# AIR AMBULANCE

### A PROJECT REPORT

#### Submitted by

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#### Inpartial fulfillment for the award of the degree of

## BACHELOR OF ENGINEERING

***In***

**ELECTRONICS AND COMMUNICATION ENGINEERING**

## M.I.E.T ENGINNERING COLLEGE, TRICHY



## ANNA UNIVERSITY::CHENNAI 600 025

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## BONAFIDE CERTIFICATE

Certified that this project report **“AIR AMBULANCE”** is the bonafide work of **“ABDUL AZIZ.M (812419106002)”,** **“AYYANAR.S (812419106010)”, “JEGAN.J (812419106021)”, “KARTHICK PANDIYAN.R (812419106023)”** who carried out the project work under my supervision.

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**ABSTRACT**

The aim of this work is to explore the use of air ambulance services as a means of providing rapid medical assistance to critically ill or injured patients in remote or inaccessible areas. An overview of the role and importance of air ambulance services in modern healthcare is examined. Here, we examine the benefits of using air ambulances, such as faster transport times, improved access to medical care, and the ability to transport patients over long distances. The findings of this study will be useful for healthcare providers, policymakers, and emergency services agencies in developing strategies for using air ambulance services effectively and efficiently to improve patient outcomes. The idea proposed in this work makes use of drones and Helium gas balloons facilitating the conveyance on land, water and air. The wheel-mounted drones levitate as they rotate, and float where needed with the help of drones and air bags filled with helium gas. The benefits of this ambulance include reduced transport times, improved patient outcomes, and increased access to healthcare in remote and underserved areas.

**Keywords**— environment friendliness, flying Ambulance Medical system, near-ground space, safety, traffic congestion, urban air mobility.

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**CHAPTER-1**

**INTRODUCTON**

This project is going to be of great help to mankind. Due to road traffic congestion and air pollution, people's lives are not saved in time and the casualties are increasing. This includes car accident victims, elderly people who are in critical condition, and those who are in a life-threatening situation if they do not go to the hospital in time. The human body is a single system, but it is made up of billions of small structures of four main types: cells, tissues, organs, and systems.

An organ is a set of different types of tissue that can work together to perform a special function. While an ambulance that transports people who may be in a critical or critical condition can take the person safely to the hospital, the ambulance takes some time to the human body while driving through a pothole on the road, which worsens the condition of the sick patient. It can even become dangerous, hence the possibility of loss of life is very high. It's going to be used a lot, so it has a high chance of survival. Thus it leads to the end of human life. It also depends on the type of device used . Coming generations In recent years humans have invented many different new life-saving devices and life-saving machines and installed them in life-saving vehicles like medical ambulances.

These devices are simple and easy to operate . As technology improves every day , providing this capability is of prime importance. The main aspect that will make this vehicle more innovative and advanced in the future is through electronics and mechanics. Helium gas and drones are acceptable for any wearable application. Wearable helium balloons and drones have mainly been invented to easily fly from one place to another, they can be used in medical and big technology .

Helium gas, Thermacol, drones can be used to propeller and fly short distances to save human lives due to their relatively medium-sized design, easy construction, significant gain and maneuverability. By using it in a variety of vehicles, it can prevent fatalities from road congestion, air pollution, vehicle collisions. The vehicle is capable of moving in the air, but is designed to move on land and water.

A common process in mechanics is that single and multiple drones are accompanied by a helium gas that helps them move in three directions on water, land, and air. This process can be better designed and implemented. In this way the engine can be improved and both electronics and mechanics can be combined to create a new vehicle that can be used to save human life.

Its goal is to make air ambulance connectivity history, a manifestation of the need for vehicles that are now ubiquitous in everyday life. So previous studies have proven that flying cars can fly for a certain amount of time and at a certain height. Under certain conditions, exposure to drones and helium gas exposure are thought to be associated with intrusions, memory and learning dysfunction, and solar plaque. One of the main problems involved is predicting wind direction. The main objective of the project is to create accurate and reliable output through IOT technology and embedded system and save lives using a mobile vehicle with all the good and auxiliary features to save lives.

* 1. **INTERNET OF THINGS(IOT)**

The IoT is the interconnection by means of the Internet of devices that we use in daily life. The devices in the IoT send and receive information. It is the organization of vehicles, wearable tech, home machines, clinical devices, and registering devices. They are inserted with sensors, actuators, hardware, and network which empowers them to send, gather, and exchange information. IoT is progressing quickly in the world of business, particularly manufacturing. The letters IoT represent the Internet of Things. We also refer to the devices in the Internet of Things as 'smart gadgets'. Smart toaster ovens, smart thermometers, smart fridges, smart vehicles, and so forth, are on the web and part of the IoT. In the world of innovation, the word 'ubiquitous' frequently refers to the Internet of Things.

* 1. **AIR AMBULANCE**

Physical Devices All electronic devices are called the Internet, cloud computing and sensors are connected. Privacy is at stake in the Internet of Things. It is very helpful for people to build smart based security. This vehicle was developed. Through this, people can overcome difficulties like security of people, construction of smart country.

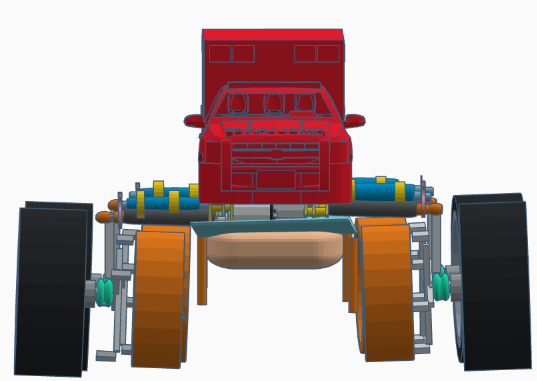


Fig.1.1 Runway Position of Air Ambulance

Sensor like Ultrasonic sensor and GSM module. The GSM module is used to get notified the Traffic Signal. Ultra Sonic sensor is used to get notified the Traffic Jam. With the aid of a drone that is integrated into the vehicle and helium gas in case of traffic congestion, this IoT- focused ambulance can travel over air and water. The Arduino and servo motor installed in this vehicle combine to change the direction of the wheel.

This application proposed gives the fastest way to reach the hospital while we stuck in the traffic jam. Also, patient should feel comfort with the rescue team.

In today’s world, accidents have become a major issue as they can’t able to save their lives at the given time due to heavy traffic. Sometimes, the road may not be clear to reach the medical team immediately. Nowadays, more persons from the child to the vintage people are like to have an eat of junk foods like pizza, burger, noodles etc,. It may cause a sudden stroke, heart attack, blood pressure and some other deadly diseases. So the people need an immediate medical treatment to coming out of the endanger.

Even in the 21st century where the technology is rapidly growing and new inventions were developed, but still so many patients are facing problems. Even today in India, because of many people working for a long hours, they are very hard to drive on the roadways. By that, many accidents are occurred on the roadways. As per the Minister of Road Transport and Highways the Indian road accident scenario, with 415 deaths and many injured everyday is more severe than Covid-19.

The annual report ‘Road Accidents in India - 2021’states that Tamil Nadu recorded the highest number of road accidents on the National Highways in 2021.

The effect of this road accidents are results for the loss of many lives in our country. These losses of lives should be reduced in future. Then only we can save the people from the death.

In modern India, accidents have occurred in many of the provinces in the country. People are not bothering about the following the traffic rules. They are travelling at high speed, sleepy at the night and so on.

Traffic jam on the roadways doesn’t led to allow the ambulances quickly to reach the infirmary. So that, Air Ambulances are play a vital role in the rescue of the patients.

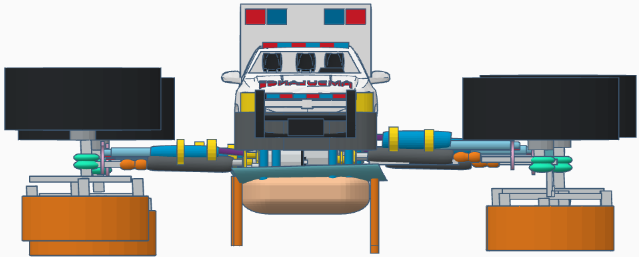


Fig.1.2 Flying Position of Air Ambulance

The Flying system of the air ambulance will be launched at the time of severe emergency. This will consumes less time to arrive the hospital or a clinic at a right time. The air ambulance will reach out the height of the 30-40 feet from the ground level. The air ambulance is travelling around the 150 km/hr in the sky.

While we cannot able to fly above the ground level due to some obstacles or any other disturbances, we are going to use the water transportation (seaways)

for driving to arrive the infirmary.

During this transportation, the structure of the ambulance is to be modified according to the buoyancy of the water. This mechanism will help the air ambulance to float on the water along the water flow. This water transportation is better than the air or road transportation due to free of traffic congestion and easy to travel to reach the destination.

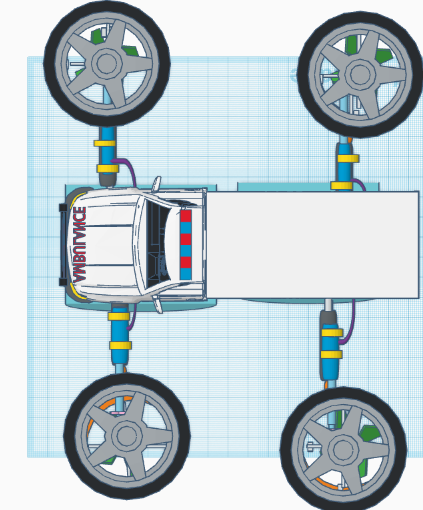


Fig.1.3 Water Floating Position of Air Ambulance

So the air transportation and water transportation of an Air Ambulance are to be very helpful in rescuing and save the patient lives. This will gives the relief to a patients and their relatives from the fear of traffic blockage.

# CHAPTER – 2

**LITERATURE SURVEY**

**2.1 PAN, G., & ALOUINI, M.-S. (2021). FLYING CAR TRANSPORTATION SYSTEM: ADVANCES, TECHNIQUES, AND CHALLENGES. IEEE ACCESS, 9, 24586– 24603[1]**

Pan, G., et all contemplated on “FLYING CAR TRANSPORTATION SYSTEM: ADVANCES, TECHNIQUES, AND CHALLENGES,” The aim of this work is to develop a flying vehicle transportation due to expanding population in the world. All of the people are using the transportation. This makes a concern of traffic congestion. To come across this problem, the main motive is to utilize the unoccupied near-grounded spaces (NGS). Flying cars are not as similar as from the road transportation. There are no more competencies during flying in the air. Usually, the lack of flying car transportation in the current period. So the aim of the study is to describe modern advances, challenges and techniques of FCTS. Flying car will improve the recent transportation. At last, this will be helpful in commercializing and helpful in rescuing of the people. We list a few of FCTS' special attributes below: 1) Flying cars fitted with power cells that potentially produce zero direct discharges and emissions are encouraged as environmentally friendly transportation; 2) Utilizing the underutilized and abundant NGS resource will enable congestion-free mobility; 3) Flying cars, unlike ground-based transportation systems, can achieve shorter journey paths since they are not constrained by physical infrastructure, making flexible and quick door-to-door transit possible; 4) Less infrastructure on the ground is needed; the majority of FCTS operate in near-ground airspace, and the vertical take-off and landing (VTOL) mode has been accepted as the primary and widely used method for flying automobiles; 5) Less traffic congestion means more room is available for people on the ground.

**2.2 Md Mohaimenuzzaman,1 S. M. Monzurur Rahman,1 Musaed Alhussein,2 Ghulam Muhammad,2 and Khondaker Abdullah Al Mamun1. (2016). ENHANCING SAFETY IN WATER TRANSPORT SYSTEM BASED ON INTERNET OF THINGS FOR DEVELOPING COUNTRIES.**

**2834616[2]**

Throughout the year, accidents on inland waterways in developing nations frequently result in fatalities, injuries, financial losses, and a sizable number of individuals going missing. As a result, many families are losing loved ones, which causes great suffering. For the emerging countries, the aforementioned backdrop necessitates an intelligent, safe, and dependable water transportation infrastructure. Although the idea of an Intelligent Transport System (ITS) may be used to create such a system, ITS has flaws, and the Internet of Things (IoT) offers a fresh approach to its creation. In this research, a methodology for converting the water transportation system into an IoT-based intelligent system is proposed. The IEEE 802.15.4 network standard, 3G cellular technology, and IPv6-based machine-to-machine (M2M) protocol all significantly contribute to this suggested Internet of Things system

**2.3 Kaushik Rajashekara, Qingchun Wang, and Kouki Matsuse(2016). FLYING CARS: CHALLENGES AND PROPULSION STRATEGIES, 2325-5987/16©2016IEEE[3]**

Throughout the history of automobiles and planes, developing and commercializing flying cars has always been a goal. This article gives an overview of the evolution of flying automobiles over the years. The difficulties with wide-scale adoption and the technological difficulties, particularly those pertaining to lift and propulsion, are discussed. There is growing interest in flying vehicles and increased electrification of these vehicles as a result of technological advancements in engines, electric motors, power converters, and communications. This article also looks at VTOL, propulsion systems for operation similar to that of a vehicle and an aeroplane, and the difficulties and needs of creating a hybrid or pure electric flying car.

**2.4 Brandon R. Sutherland(2019).FLYING CARS FOR GREEN TRANSPORTATION, Joule 3, 1180–1189, May 15, 2019 ª 2019[4]**

Brandon R. Sutherland proposed the FLYING CARS FOR GREEN TRANSPORTATION. In this paper the author done the research on flying vehicle without affecting globalization by harmful exhausting gases and noises. Nowadays, so many transportation such as fleet of trucks, planes, trains, ships are taken place by fossil fuels in our earth. This sector alone contains over 28% of all

Green house gas (GHG). Most of these vehicles are emitting the carbon-di-oxide(CO2). The main purpose of this paper is decarbonization of transportation which is accomplished by using hydrogen fuel cells, batteries and sustainable biofuels. This will saves 60% of fuel and reducing GHG emissions only by roadways conveyance by switching into an autonomous vehicle. To make a travel of aviation in every urban cities, we would require takeoff and landing aircraft (VTOLs). Every vehicle commuter's dream is to take off and soar to work in an aircraft on a direct course while oblivious to the underlying traffic jam during rush-hour gridlock.

**2.5 Mernout Burger, Bart De Schutter(2013).ENERGY-EFFICIENT TRANSPORTATION OVER FLOWING WATER, 978-1-4673-5200-0/13/$31.00 ©2013 IEEE[5]**

Water needs to be transported in order to buffer water to prevent floods downstream during rainy times, maintain river water levels to guarantee minimum depths for goods or preserve water for upcoming dry seasons. The speed of the water in rivers and canals is influenced by this manipulation of water flows, which in turn impacts the speed and energy utilisation of vessels used for transportation across water. The impact of varying water speeds (due to tide or river flows) might be considered while thinking about the challenge of scheduling micro-ferries in a harbour with the intention of providing energy-efficient schedules for passenger pickups and deliveries. This study describes how flowing water affects energy-efficient scheduling and suggests a approach using mixed-integer linear programming to address the issue.

**2.6 Bogdan Radu, Shelton, CT(2013), FLYING VEHICLE, US 8,827,200 B2[6]**

A vehicle features a flying mode that allows it to fly like a VTOL/STOL aircraft or a helicopter, and a roadable configuration that is comparable to an automobile in which several rotors are stored inside the vehicle. This invention relates broadly to a vehicle that, with minimal configuration adjustments, can travel on land, on water, and in the air. Some known aircraft, such as the V22 Osprey air craft type, have tiltable rotors that enable vertical takeoff and landing. Within specified parameters, the propellers of helicopters can be inclined, which is vitally necessary for their control. Helicopters on the ground typically have very limited mobility, if any at all, while having a total of six degrees of freedom for moving along or turning around all three axes during flight configuration.

**2.7 Adekunle Mofolasayo(2019),POTENTIAL POLICY ISSUES WITH FLYING CAR TECHNOLOGY**, **2352-1465 © 2020, 10.1016/j.trpro.2020.08.002[7]**

A desired idea for reducing traffic congestion throughout the world is the flying-car concept. While there are many benefits to flying cars, such as lower construction and maintenance costs, a decreased reliance on road infrastructures, increased dependability of travel times, and reduced congestion, there are also drawbacks that could make this technology unwelcome if proper technological implementations and planning are not made to ensure the safety of people both on the ground and in the air. This research assesses the possible benefits and drawbacks of flying-car technology and suggests solutions to these issues. This paper examined, among other things, the necessity to provide suitable tracking systems for flying vehicles, the need to ensure effective law enforcement before flying-car technology is permitted on a broad scale. The need for technological innovations to reduce the effects of any mechanical failures or accidents on both the occupants of the flying-car and people on the ground, and the requirement for mandatory collision avoidance technology systems for flying cars. enforcement systems to control misuse of the technology. It is intended that this paper would increase curiosity about possible methods for harnessing this technology for the good of humanity.

**2.8** **Harsh A. Nakum(2020), AIR CAR: A REVIEW ON THE INVENTION OF FLYING AUTOMOBILE**, **ISSN: 2278-0181 [8]**

The architecture of a flying automobile and the problem of traffic management in the modern world are the main topics of this essay. A feasible solution to this problem would be to create a flying or hovering automobile that can remove the burden off the congested roadways. Given recent innovations in the design, construction, and use of flying machines, flying automobiles are no longer only a possibility but rather a need for the near future. In terms of developing a conceptual design for a flying vehicle that can transport two people, building a model, and conducting ground and in-flight testing, the viability and feasibility of such an idea were investigated. A automobile that is considered to be a roadable aircraft that may be used for two reasons is called a "flying car."both moving through the air and on the ground. An improvement on an automobile, the flying car helps people in busy locations to get around problems. Flying cars will need to go by the same laws as modern cars do, and it is at this point that the development of virtual "highways in the sky" becomes apparent. These skyways would be a system of planned routes under the management and control of the flying vehicles' air activities. In order to maintain proper spacing between each flying car, the computer system will also maintain the flying cars' movement in terms of speed and course. The systems might consist of a configuration of computers that can control all of the region it protects from the flying automobiles.

**2.9 Nasir Saeed, Tareq Y. Al-Naffouri, and Mohamed-Slim Alouini(2021)**

**WIRELESS COMMUNICATION FOR FLYING CARS, DOI:** [**https://doi.org/10.21203/rs.3.rs-155561/v1**](https://doi.org/10.21203/rs.3.rs-155561/v1) **[9]**

There are several problems with the current ground-based transit systems, chief among them the high cost of infrastructure expansion, the scarcity of available land, and the expanding metropolitan population. In order to create flying vehicles, also known as electric vertical takeoff and landing aircrafts (eVTOLs), the automotive and aviation sectors are working together. These eVTOLs will make transit in cities and suburbs dependable and quick. Wireless communication networks must be well-developed for eVTOLs to operate safely. To deliver services to flying automobiles, existing communication technologies must be improved. We provide a number of doable possible options for communication between eVTOLs and with the ground. These options include satellites, tethered balloons, high-altitude platforms, and on-ground three-dimensional cellular networks.

**2.10 Miss Reni Varghese , Miss. Ayushi Nair , Mr. Libin George Alexander Mr. Sajilal R Nair, Mr. Mohamed Moniskhaleel (2015), COMPARISON OF FLYING CARS SINCE 2000 AND FACTORS CONSIDERED FOR ITS CONCEPTUAL DESIGN, ISSN: 2278-0181 Published by, www.ijert.org NCERAME - 2015 Conference Proceedings[10]**

A rudimentary understanding of the elements that must be taken into account for the conceptual design of flying automobiles is attempted in this essay. Additionally, the key specifications of flying cars developed since 2000 are compared, and an assessment is made of which flying vehicles most closely meet these major criteria and other requirements for successful flying cars. It is not very simple to create a successful flying automobile, as this paper has shown. In comparison to building the vehicle only as a car or an aeroplane, it must take into account a lot more other issues, such as safety and extremely short takeoff and landing distances. The three most popular flying vehicles at the moment are the PAL-V, Transition, and Aeromobile 3, They are anticipated to be commercially accessible soon as they meet practically all criteria for successful flying automobiles. The TF-X and XplorairPX200 are two examples of future flying automobiles that will be superior to those we have now.

# CHAPTER – 3

**EXISTING AND PROSED SYSTEM**

**3.1 EXISTING SYSTEM**

A medically prepared vehicle that delivers patients to treatment centres like hospitals is called an ambulance. Typically, the patient receives out-of-hospital care while being transported. Emergency medical services (EMS) use ambulances to respond to medical emergencies.

When any medical needs happened, ambulances are the first preference to treat the patients. Although this system seems to be efficient, at times there are some drawbacks because there is a lot of traffic jam occurred in the urban areas due to the increase of population. This will delay the ambulances to reach the infirmary on time. So that many people’s lives have become questionable.

Even if they carry patients, they fear that they will not go to the hospital because they will get stuck in the traffic jams. This frustration is also become a cause of death of patients. To overcome these disadvantages we propose a model,

* Firstly, this system would be more beneficial, if it was travelling with free of traffic to arrive at the hospital.
* Nowadays due to recently happened cases such as congestion in the roadways by lack of infrastructure planning for city roadways is the cause of traffic jams. Roadways are restricted by the construction of properties, workplaces flyovers, and metros; as a result, traffic gets diverted into alternative paths, resulting in chaos.
* Drone systems are currently used for aerial Photography, agriculture, search and rescue, shipping and delivery etc., and can modify some hardware components and adding some new components as we want.
* This innovation also have a water transportation mechanism, if the places are doesn’t suit for aviation.

**3.2 EXISTING BLOCK DIAGRAM**

AMBULANCE

Boat ambulance

(TEAM 3)

Basic Air Ambulance

(TEAM 1)

Road Ambulance

(TEAM 2)

Patient

Patient

Patient

Rescue

Rescue

Hospital

Rescue

Fig.3.1.Existing system

In this existing system, there are three types of rescue teams. But they are not combined and are alone. However, each of them consists of separate drawbacks like for an basic air ambulance, if there is a storm, it will be difficult to drive the ambulance on air, for road ambulance traffic congestion is the major concerns and flooding is the main worry for boat ambulance. In that crucial moment, for most of the patients, it is difficult to get into the hospital. Even if they do, it is very risky to save the patient before anything happens. It is also very unreliable.

**3.3 DISADVANTAGES**

* Delay occurs
* Even lives may not be saved
* Highly pressurized.

**3.4 PROPOSED SYSTEM**

The challenging situation facing by each patients now-a-days gave hope to bring their lives safer. The road should not be congested for an ambulance. So the proposed system is to get over the above disadvantages, we are introducing a new model of air ambulance. The working of selected design is as follows:

* When this ambulance goes on the road, it runs on the road like a normal vehicle, and when the road is jammed, the rod installed in this vehicle in all four directions will lift the vehicle.
* When it is lifted, the direction of the four wheels will change. Helium gas installed on all sides of the vehicle reduces the weight of the vehicle when reduced in such a way that the vehicle can easily fly up to a certain distance.
* When the front wheel of the vehicle rises up to 20 degrees and the rear wheel rises up to 30 degrees, it reaches the destination easily with the help of a boat mounted on the wheel of the vehicle. A magazine can easily save lives.

A

B

30º 20º

1. (b)

Fig 3.2(a) angle of front wheel rise up

3.2(b) angle of rear wheel rise up

* The places where flight is not possible, the vehicle will also go on water. A helium gas balloon attached to the bottom of the vehicle makes the vehicle buoyant when the vehicle is submerged for a certain distance.
* There are three different methods are available in ambulances. In our proposal, we all have a combined of three-in-one manner.

**3.5 PROPOSED BLOCK DIAGRAM**

**3.5.1 Proposed system of Air Ambulance**

AIR

AMBULANCE

Boat ambulance

Basic Air Ambulance

Road Ambulance

TEAM 1

Patient

Rescue

Hospital

Fig.3.3.Proposed System of Air Ambulance

**3.5.2. Block Diagram of Air Ambulance**

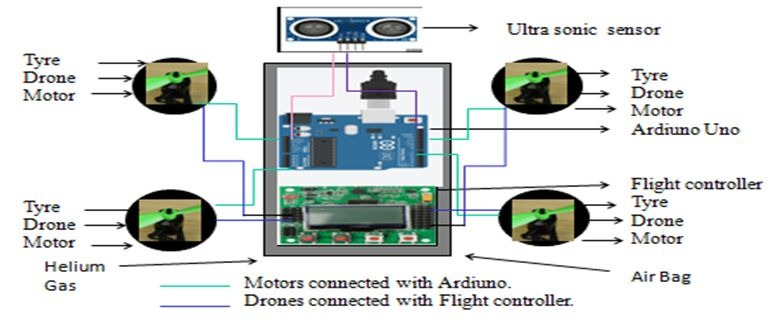


Fig.3.3.Proposed Block Diagram of Air Ambulance

**3.6 PROPOSED BLOCK DESCRIPTIONS**

**3.6.1 Motor:**

Multiple motors are used like brushless motor, servo motor and gear motor. An electric motor that runs on direct current (DC) and they are needed to move a vehicle from one place to another place. Although the upfront costs are higher, they provide clear advantages over any other motors and is ultimately more affordable.

**3.6.2 Controllers**

The controllers such as Flight Controller, Arduino UNO, Electronic speed controllers (ESCs) are tools that drone controllers can use to regulate and manage the motor speed of the aircraft. They have less complex features than other microcontrollers and they are also easily available and cheap in comparison of other microcontroller.

**3.6.3 Sensors**

An ultrasonic sensor is a device that uses ultrasonic waves to calculate a distance to an item. An ultrasonic sensor transmits and receives ultrasonic pulses using a transducer to determine the proximity of an item. No matter the shape, color, or surface roughness of the object, ultrasonic sensors can measure the distance to it. They can also gauge how close or far away an object is.

**3.7 ADVANTAGES**

* Major advantage of the proposed system is that it is adaptable.
* The proposed system consists of all the three ways to reach the hospital.
* It carries the patient safer and faster than any other ambulances**.**

# CHAPTER – 4

# SYSTEM REQUIREMENTS

# 4.1 HARDWARE REQUIREMENTS

* Brushless Motor (A2212)
* Electronic Speed Controllers (ESCs) 30A
* Flight Controller kk 2.25
* Lithium Poly Battery (2200mAh)
* Propellers (5 inch)
* Servo Motor
* Arduino UNO
* Gear Motor
* Air Bag
* Helium Gas
* Transmitter & Receiver
* Aluminium Channel
* Ultrasonic Sensor
* Arduino Shelt(Motor Controller)

**4.2 SOFTWARE REQUIREMENTS**

* **Arduino IDE**
* **Embedded C Program( inbuilt FC)**
  1. **HARDWARE SPECIFICATION**
     1. **Brushless Motor**

A motor transforms the electrical energy that is supplied into mechanical energy. Different motor types are frequently used. Among them, brushless DC motors (BLDC) are popular in many applications and have great efficiency and outstanding controllability. Compared to other motor types, the BLDC motor provides advantages for power conservation.

A brushless motor system is often built similarly to a permanent magnet synchronous motor (PMSM), although it can also be an induction (asynchronous) motor or a switching reluctance motor. The rotor and stator may be axial (flat and parallel), outrunners (the stator is encompassed by the rotor), or inrunners (the rotor is surrounded by the stator). They may also use neodymium magnets.



Fig.4.1. Brushless motor

High power-to-weight ratio, high speed, almost immediate control of speed (rpm) and torque, high efficiency, and cheap maintenance are all benefits of brushless motors over brushed motors. Brushless motors are used in a variety of devices, including hand-held power tools, model aeroplanes, automobiles, and computer peripherals (disc drives, printers).

* + 1. **Electronic Speed Controllers (ESCs)**

An electrical circuit known as an electronic speed control (ESC) controls and regulates an electric motor's speed. It consists of 30 amps and it might also offer dynamic braking and motor reversing. In radio-controlled models that are powered by electricity, tiny electronic speed controls are employed.

Brushed DC motors and brushless DC motors need various types of speed regulation. By adjusting the voltage on its armature, a brushed motor's speed can be3 managed.



Fig.4.2. Electronic speed controller

A brushless motor demands a unique operating strategy. By altering the timing of current pulses given to the motor's various windings, the speed of the motor can be changed.

* + 1. **Flight Controller**

A group of sensors are attached to the flight controller. The flight controller receives data from these sensors about the aircraft, including its height, orientation, and speed. Common sensors include a barometer for height, an inertial measurement unit (IMU) for angular speed and acceleration, and distance sensors for obstacle detection. The drone filters a lot of this information and merges some of it, much like how people perceive things. This results in information that is more accurate and efficient. Advanced flight controls are able to perceive more precisely and quickly identify differences.

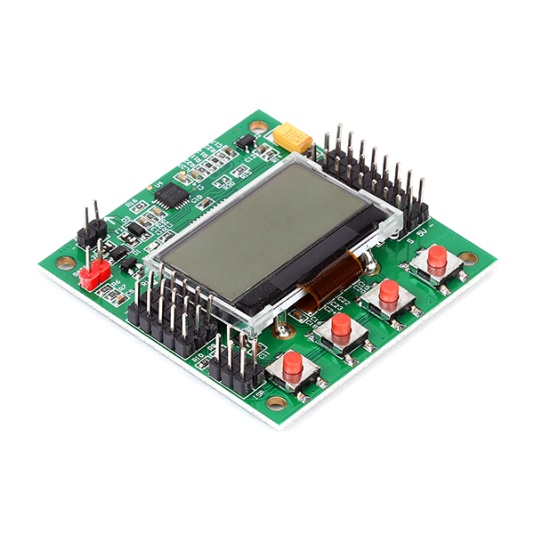
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Fig.4.3. Flight Controller

It has an inbuilt coding for flight control the FC adjusts the speed of the motors to move the drone in the desired direction.

* + 1. **Lithium Poly Battery**

A lithium polymer battery, or more accurately, a lithium-ion polymer battery, is a rechargeable battery of lithium-ion technology that uses a polymer electrolyte rather than a liquid electrolyte. This electrolyte is made up of high-conductivity semisolid (gel) polymers. These batteries are employed in applications where weight is important, such as mobile devices, radio-controlled aircraft, and some electric vehicles. They offer better specific energy than other lithium battery types.