

TEAM DHAKSHA IN INTERNATIONAL UAV MEDICAL EXPRESS CHALLENGE 2018 AND FUTURISTIC UAV BASED MEDICAL APPLICATIONS

K. Senthil Kumar
Professor

Department of Aerospace Engineering
Anna University, MIT Campus
Chennai-600 044, Tamil Nadu, India
Email : ksk.mit@gmail.com

S. Thamarai Selvi
Professor

Department of Computer Technology
Anna University, MIT Campus
Chennai-600 044, Tamil Nadu, India
Email : thamaraiselvis@gmail.com

Abstract

The unmanned aerial systems present endless opportunity for both military and civilian applications. This paper discusses about one such solution in the civilian space, which was practically developed and demonstrated by Team Dhaksha India during UAV Challenge Medical Express 2018, Queensland, Australia. The mission of the UAV Challenge is to demonstrate the utility of Unmanned Aerial Vehicles (UAVs) for medical applications, thereby saving the lives of people. The developed system architecture consists of many subsystems that work in coordination to ensure safe flight to provide medical aid. The challenge was to get the blood sample to the desired location. Teams must deploy unmanned aircraft to outback Joe's location, and then return his blood sample utilizing remote landing and take-off site close to Joe. The systems deployed must be capable of precisely finding a target marker placed at the Remote Landing Site. A roundtrip distance of approximately 50 kilometers from the take-off location known as the Base was covered in this mission. UAV flew to and from Remote Landing Location via a number of transit waypoints. Major challenges were to complete the mission within 60 minutes, relay communication during all phases of mission, fly without crossing the Geo fence boundary, fly with full autonomy in terms of take-off, marker identification, precise remote landing, disarming at remote landing site, arming once the blood sample is placed, autonomous remote takeoff and return to base with blood sample intact without breaching Static No Fly Zone. Team Dhaksha achieved the challenge, by deploying two hybrid UAVs, one as retrieval and another as supporting UAV. Supporting UAV was used as a communication relay to enhance the range up to 25 kms. The onboard companion computer collects data from various sub-systems and served as an intelligent guidance system. This developed UAV technology will be helpful towards transport of medical supplies such as First aid kits, Automatic external Defibrillators (AED), vaccines, blood samples, plasma packets etc, to the desired destination. Further research efforts are ongoing, to upgrade the technology to develop and fly drone ambulances in the near future.

Keywords: Unmanned Aerial Vehicle, UAV Challenge, Drone Delivery, Air Ambulance