International Journal of Scientific Research in Computer Science, Engineering and Information Technology
© 2017 IJSRCSEIT | Volume 2 | Issue 6 | ISSN : 2456-3307

Modeling and Designing of Drone

Vikas[1], Tushar Sharma[2], Himanshu Kaushal[3], Abhishek Rana[4] , Harpreet Kaur Channi[5]
Student of Electrical Engineering Department ([1,2,3,4])
Assistant Professor Department Of Electrical Engineering([5])
University Institute Of Engineering, Chandigarh University, Gharuan, Mohali, Punjab, India

ABSTRACT

Drone technology has skyrocketed over the past decade driving costs down and the number of potential applications upon being agricultural crop monitoring. Normalized Difference Vegetation Index (NDVI) is an imaging technique used to visualize near infrared light, which happens to be a very good indicator of plant health and productivity. This project aims to explore the potential of Unmanned Aerial Vehicles (UAV's) using NDVI imaging for crop monitoring and assess the feasibility of the process by developing a UAV with a NDVI camera to create NDVI maps from the aerial crop images. These maps will be cross referenced with soil samples to check for proof of concept and accuracy. The project will be presented at the 2015 American Society of Agricultural and Biological Engineering conference in New Orleans, Louisiana in the student poster and paper competition and at the Cal Poly BRAE senior project presentation banquet. The final product will illustrate the feasibility, efficiency, and economic benefits of UAV NDVI crop imaging and offer a solution to the dated and tedious process of crop monitoring that is currently physically walking the field.

Keywords : Quad copter, UAV , Propeller, LI-PO Battery, Transmitter , Receiver

I. INTRODUCTION

The term drones covers a very broad category of unmanned aerial vehicles (UAVS) that can be used for anything from military or commercial purposes, to personal entertainment. In popular culture, when people talk about drones they are frequently referring to any of a range of drones that have become trendy over the last two years[1].Unlike regular helicopters, quad copters have two sets of propellers, making them easier to maneuver both indoors and outdoors. Further aiding ease of use, modern quad copters have begun incorporating a range of new technology, including electronic sensors that stabilize them, with some models even controllable via a Smartphone app instead of bulky controllers. Some models can even be programmed to fly set paths or patterns [2].These advancements have not only seen drones becoming popular amongst even the most casual of hobbyists, but also in commercial endeavors. Large companies such as Face book, Google and Amazon have already invested heavily in research related to drones, and even smaller companies such as florists, pizza restaurants (and even real-estate agencies) have started to investigate how drones can be used in their industry [3]. More recently news agencies have begun to look at using drones when covering certain news stories, and Hollywood has already started using drones during the production of movies and TV shows[4]. The use of Unmanned Aerial Vehicles (UAVs) to support humanitarian actions has grown since 2001, after the terrorist attack of 9/11. UAVs are valuable tools due to their flexibility, safety, ease of operation, and relatively low-cost for the owner and the operation, which facilitates the using in disaster situations. This paper provides a systematic literature review on the applications of UAVs in humanitarian relief which aims to analyze the main characteristics of publications on the subject and discuss trends for future research directions. The main applications are intended to map affected areas after a disaster, analyze the images collected, coordinate UAV's networks, detect disasters through chemical sensors, and integrate UAVs with other vehicles to improve the speed and quality of information's transmission. The paper also contributes with a discussion on the opportunities that are opened up and the challenges that need to be addressed. Palavras-chave: UAV, drone, humanitarian relief,

disaster. An unmanned aerial vehicle (UAV), commonly known as a drone, as an unmanned aircraft system (UAS), and also referred by several other names, is an aircraft without a human pilot aboard. The flight of UAVs may be controlled with various kinds of autonomy: either by a given degree of remote control from an operator, located on the ground or in another vehicle, or fully autonomously, by onboard computers UAVs are often preferred for missions that are too dangerous for manned aircraft. They have been and are mostly found in military and special operation applications, though UAVs are increasingly finding uses in civil and recreational applications, such as policing and surveillance, aerial filming, and drone racing. Conventional helicopters endure of many disadvantages such as intensified weight and cost, restriction of aero dynamic structure, and displacement of centre of gravity. A co-axial helicopter overcomes most of the disadvantages of a single rotor helicopter with.

II. LITERATURE REVIEW

R. Swaminathan [5] explained that India currently operates close to 50 drones in various military, reconnaissance and intelligence gathering configurations, a number more than that of France, Germany and Italy combined. 1 Internationally certified figures show that India has the second largest number of acknowledged drones in the world after the United States of America. Yet the Directorate General of Civil Aviation (DGCA) does not yet have an official policy towards the civilian application or uses of drones. Nor does India have any enabling administrative and institutional framework for the different kinds of drones that have started appearing in the skies. Drones pose unique policy challenges that transcend conventional domains of national security, safety, consumer technology, aviation, privacy and business practices. Drones also fundamentally question our long-held notions of nationhood, sovereignty and geographical boundaries, as well as our frameworks of geopolitics and statecraft. This paper will first explore the rapidly emerging global landscape of drones to understand and analyse the various ways in which these autonomously and remotely piloted aerial vehicles are integrating themselves with various aspects of military and civilian domains. Second, the paper will outline the global policy implications of such a rapid proliferation.

Ananth Padmanabhan [6]described that Unmanned aerial vehicles, also known as UAVs or drones, have decentralized airspace access, allowing agriculturists, construction workers, and other civilian users to integrate aerial monitoring into their daily work. Tis technological revolution comes with a set of concerns, impinging as it does upon the proprietary, reputational, and security interests of individuals. An appropriate regulatory response and new policy recommendations must go beyond the current regulatory intervention in India.

Anuj Tiwari , Abhilasha Dixit[7] explained that Often referred to as unmanned aerial vehicles, or UAVs, drones were most commonly associated with military or police operations but with advancement in information technology in last two decades, cheaper and smaller sensors, better integration and ease-of-use options this tool is start revolutionizing the way geospatial data is collected in many countries, monitoring large, rugged areas, tracking down criminals, observing forest fires and disaster areas. Beyond just viewing the result, with the use of photogrammetry, image processing and ground control points, the captured imagery could provide a base for collecting all the 2D and 3D features that are the last-mile problem in modeling and visualizing the whole world. The research aims to understand various characteristics of this emerging technology that makes it the most promising geospatial and attribute data collection tool in GIS community. Second aim of this paper is to explore the possible applications of UAV in the developing country like India.

Swetha S , Alvina A Nirmalraj ,Girish R Shanbough,[8] explained that Agricul ture is considered as a back bone of Indian economy with over 60% of the population engaged in agricul tural activities in some form or the other. However due to primitive agricul tural practices, lack of labor and urbanization the agricultural output is below par when compared to those countries whose main occupation is not agriculture. And in today's scenario the main problem India is facing is shortage of agricultural labor. So this situation calls for incorporation of automation in agriculture and one such effort has been undertaken in this project to pool in agriculture with aeronautics using AUTONOMOUS VTOL AGRO-DRONE. Due to agricultural pesticides exposure around 2.2million peopl e located in developing nations are at a risk. Pesticides may enter the human body easily through inhal ation, ingestion, or by dermal penetration through the skin. Now a day

the people who work with agricultural pesticides are the most at risk if they are not properly dressed or if there are broken and leaking equipment. Hence the approach of this project is to develop a prototype model of Autonomous AGRO-DRONE to facilitate the farmers wherein a click of a button would spray the pesticides. The farmer need not dirty his hands to spray pesticides but instead can sit comfortably in his farm and monitor the entire process with the help of the surveillance system installed in the model

III. FORMULATION PROBLEM

A drone by any other name would smell as sweet. Unmanned Aerial Vehicle (UAV), Unmanned Aerial System (UAS), Remote Controlled Aircraft, Unmanned Combat Air Vehicle (UCAV), Remotely Piloted Aircraft (RPA); what were once technical distinctions have become euphemisms. The military's resistance to the popular and widely used term, drone, widens the gap between them and the public. At best, it demonstrates an indifference to the perception or concerns of the public. At worst, it represents an outdated view of the technology and its application… imagine if the Army insisted on the term, Tactical Horseless Carriage. But fortunately for the English language, the military does not control the dictionary. Data collected is not data understood. Despite popular belief, the military does not have automated recognition or computer vision algorithms sufficient to infer what is happening in a given image or feed. Even if there were a perfect target recognition algorithm, tracker, or identifier, there is always the matter of context. Context tells you why the man is digging on the side of the road. Is it a bomb or just a new drainage ditch? Understanding context is a very human-intensive process.

A. MOTIVATION

There are several good reasons for developing a drone but for us our motivation was to make drone as per defence perspective. As we have seen in past , because of lack of technology Indian army was at back foot in 1999 Kargil war . As enemy was sitting at high altitude in that war ,so our soldiers didn't had any exact location which caused many casulities from our side. Thanks to Israel which helped us with their GPS technology and we became victorious. So, taking present and future conditions in consideration , drones would be benificial for locating enemies at borders, high altitude battlefields etc.

B. OBJECTIVES

The main objective of the project are :-

- For defence purposes.
- For surveillance.
- For delivering something.
- To explore the landmarks where explorers fear to go.
- For making videos,clicking photos from unbelievable angles.

IV. METHODOLOGY

Unmanned Aerial Vehicle (UAV) systems, despite having no onboard human pilots, currently require extensive human involvement to accomplish successful mission operations. Further, successful operations also require extensive collaboration between mission stakeholders, including operators, mission commanders, and information consumers (e.g. ground troops relying on intelligence reports in their area). Existing UAV system interfaces provide little to no support for collaboration between remote operators or for operators to collaborate with information consumers. As reliance on UAVs continues to increase in military and civilian operations, this lack of support for collaboration will likely become a substantial limitation of existing UAV systems. In order to introduce effective collaboration support to UAV system interfaces, it is essential to understand, and be able to derive system design requirements that address, the necessary group interactions that occur in UAV task environment. However, few collaborative requirements analysis methods exist, and to our knowledge, no method exists that captures design requirements for collaborative decision making in complex, time-critical environments.This report describes the development of a new design requirements analysis method for deriving information and functional requirements that address the collaboration needs of UAV (and other complex task) operators, and the needs of stakeholders interacting with these operators. More specifically, theis method extends a recently developed requirements analysis method, called the Hybrid Cognitive Task Analysis (CTA) method, which enables the generation of information and functional

requirements for futuristic UAV system interfaces. The original Hybrid CTA method focused on deriving single user system interface requirements. This work extends this method by introducing analytic steps to identify task and decision-making dependencies between different UAV operations collaborators. Figure 1 shows the block diagram of drone. Figure 2 shows the actual view project.

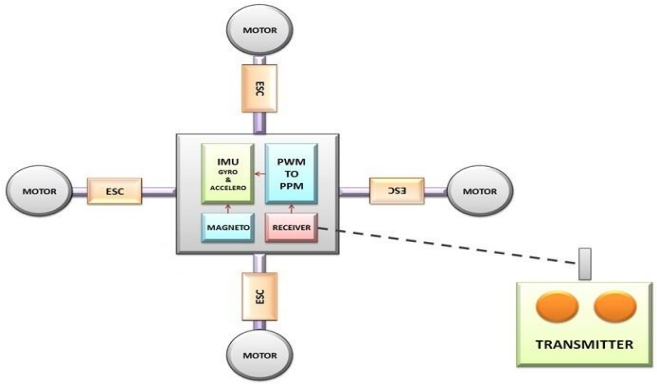

Figure 1. Block diagram of drone

Figure 2. Actual View of Project

V. RESULT

Unmanned aerial vehicles (UAV), colloquially known as drones, are reinventing old businesses and even creating brand new opportunities. Whether it's innovation in media coverage and filmmaking or new capabilities for emergency responders, drones are capable of some pretty incredible things.

VI. CONCLUSION

It is obvious that drone technology is an important part of the future of warfare and is set to become a big commercial industry. The fact that drones capabilities pose a threat to the liberties of people around the globe is also apparent. Legislating on drones now is of paramount importance because it sets the necessary limitations to protect rights as drones are used in the future.

Limitations must be put in place as to where the line between effective drone use and excessive drone use is. Drones have the potential to become a vital part of society, but they also come with a lot of disadvantages. For every successful drone strike on foreign soil, many more innocents are killed. For every person who seeks to help the United States with drones, there is a person who seeks to hurt it. Acknowledging that drone technology is not flawless is the integral idea, and as such Americans must demand constraints under which drones are used.

VII. ACKNOWLEDGEMENT

A person with only theoretical knowledge is not a complete engineer. Practical knowledge is very important to develop and apply engineering skills. It gives us a great pleasure to have an opportunity to acknowledge and to express gratitude in our drone project. Special thanks to Harpreet Kaur Chani for providing us an opportunity to undergo training under her able guidance and offering us a very deep knowledge of practical aspects. We would also like to thank CHANDIGARH UNIVERSITY (Pb) for able knowledge and experience of working in industry .

VIII. REFERENCES

[1]. "The Aerial Torpedo / Early US Target Drones." [1.0] The Aerial Torpedo. N.p., 01 Feb. 2012. Web. 17 Nov. 2012.<http://www.vectorsite.net/twcruz_1.html>. (Main topics: WWI and WWII drones, and 1950-60s drones

[2]. LeeSmithsonian,T. -W. Military Technologies of the World. Vol. 1 & 2. Westport, CT: Praeger Security International 2009. 161-165, & Other. Accessed via Google Books.

[3]. "Military Unmanned Aerial Vehicles (UAV)." Smithsonian National Air & Space Museum Smithsonian, n.d. Web. 17 Nov. 2012.<http://airandspace.si.edu/exhibitions/gal104/uav.cfm>

[4]. "NEUROn Milestones:" Dassault Aviation. Dassault, 2011. Web. 17 Nov. 2012.

<http://www.dassault-aviation.com/en/defense/neuron/programme-milestones.html?L=1>(nEUROn)

[5]. Parsch Andreas: "Various Articles." Designation-Systems.Net. N.p., 30 Mar. 2003. Web.17 Nov. 2012. <http://www.designation-systems.net/>.

[6]. R. Swaminathan Drones & India, Exploring Policy and Regulatory Challenges Posed by Civilian Unmanned Aerial Vehicles ORF OCCASIONAL PAPER #58, FEBRUARY 2015, OBSERVER RESEARCH FOUNDATION

[7]. Ananth Padmanabhan CIVILIAN DRONES AND INDIA'S REGULATORY RESPONSE Carnegie Endowment for International Peace Publications Department ,March 2017.

[8]. Anuj Tiwari , Abhilasha Dixit, Unmanned Aerial Vehicle and Geospatial Technology Pushing the Limits of Development American Journal of Engineering Research (AJER) e-ISSN : 2320-0847 p-ISSN : 2320-0936 Volume-04, Issue-01, pp-16-21 www.ajer.org.

[9]. Swetha S , Alvina A Nirmalraj ,Girish R Shanbough, "AUTONOMOUS VTOL AGRO-DRONE "International Journal of Research in Engineering and Applied Sciences(IJREAS) Available online at http://euroasiapub.org/journals.php Vol. x Issue x, August 2016, pp. 26~34 ISSN(O): 2249-3905, ISSN(P) : 2349-6525 | Impact Factor: 6.573 | Thomson Reuters ID: L-5236-2015