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Arduino Microcontroller Based Airphibian Robot for Surveillance

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Abstract : *This Paper Is A Arrangement Of The Outline Procedure And Comprehension Of The Airphibian Surveillance Robot. A Prototype Of Flying Machine Based On Four Rotors Design. The Airphibian Robot Can Be Controlled By The Transmitter And Receiver Also Operated By An Arduino Microcontroller. We Want To Achieve Implementation Of An Arduino Microcontroller As The Airphibian Surveillance Robot's Flying Machine Controller.*

Keywords – *Radio Transmitter And Reciever , Arduino IDE , BLLDC Motor*

I. INTRODUCTION

Surveillance Is The Process Of Monitoring A Situation, An Area Or A Person. This Generally Occurs In A Military Scenario Where Surveillance Of Borderlines And Enemy Territory Is Essential To A Country's Safety. Human Surveillance Is Accomplished By Placing Human Resources Near Delicate Areas In Order To Regular Detection For Changes. But Humans Do Have Their Restrictions, And Distribution In Unreachable Places Is Not Always Attainable. There Are Also Connected Prospect Of Losing Human Resources In The Event Of Getting Seize By The Rivals. [1]

The Progress In Technology Over The Past Years, However, It Is Achievable To Distantly Remote Areas Of Significance By Using Robots In Site Of Humans. Independently From The Clear Benefit Of Not Having To Possibility Of Harm In Any Human Resources, Earthly And Flying Robots Can Also Collect Details That Are Not Obvious To Humans. By Collecting Them With High Resolution Cameras And Various Sensors, It Is Possible To Collect Details About The Certain Remote Area. Thus, In Recent Times, Surveillance Robotics Has Become An Area Of Great Research Interest. However, Producing A Small Robot For Testing And Research Purposes Proves To Be Highly Expensive. Particularly Because A Security Robot Would Require Certain Components Such As A GPS Module, High Resolution Cameras, Radios For Satellite Connectivity[2].

II. DETERMINING AIRPHIBIANS ORIENTATION:

Airphibian Is A World's First Flying Car, Less A Flying Car Than Driving Airplane, The "Airphibian" Was A Plane/Auto Hybrid Crafted And Developed By Robert Fulton. In 1950, It Became The First "Road Albe Aircraft' To Be Certified By The FAA. Robert Fulton's First Flying Car, Which He Named The "Airphibian", It Is Used The Same Controls For Flying And Driving.

In Sequence To Maintain Stability Of The Airphibian It Is First Critical To Regulate The Aircraft Orientation (Known As Attitude) Relative To Fixed Inertial Frame Of The Earth. These Inertial Frame Is Shown In Figure 1. And Made Up Of Orthogonal Axes (East, North And Down) And The Rotation About These Axes (Roll, Pitch And Yaw). In Order To Gain Stable Flight We Need To Control The Stability Of The Roll And Pitch Axes. If These Axes Are Appropriately Controlled, The Airphibian Will Instantly Tip Over And Not Able To Fly. The Pitch And Roll Atittude's Of Aircraft Are Determined Using The Attitude Sensor. In The Instance Of Our Project These Was Done Using The Gyroscope And Accelerometer In Combination. The Yaw Axes Must Also Be Relatively Stable For The Airphibian To Be Controlled, But It Is Less Crucial. Tiny Accumulation In The Yaw Axes Is Easily Counter-Work Using The Radio Control, And Usually Will Not Conclude In A Loss Of Stability. Using Only An Accelerometer And Gyroscope, The Absolute Yaw Orientation Is In Fact Not Measurable. The Change In Yaw Orientation Is Measurable By Using The Gyroscope, But These Proved To Be Adequate To Enable Of The Airphibian .

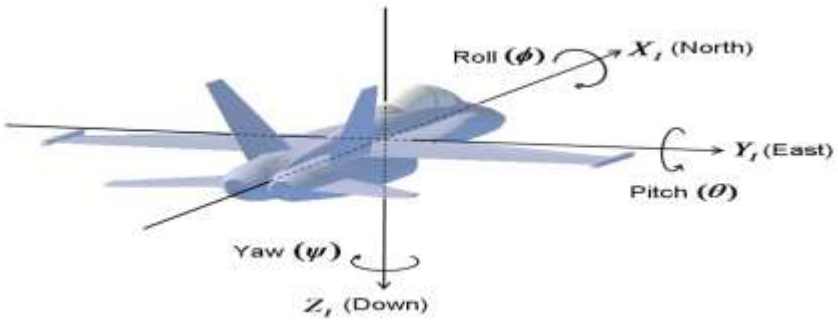

Figure 1. Inertial Frame Of A Free Body

III. AIRPIBIAN SURVEILLANCE ROBOT ESSENTIALS

Every Radio Controlled (RC) Flying Machine Requires, At Minimum , The Following Components: Motor Speed Controllers, A Frame, Motors With Propellers, A Radio Receiver, A Flight Controller, A Battery, And An Attitude Sensor. Let's Study The Function Of Each Component, And Why It Is Necessary And What Characteristics To Make When Choosing That Component.

- Speed Controllers
- Airphibians Frame
- Motors And Propellers
- Radio Receiver
- Flight Controller
- Attitude Sensor

IV. Block Diaram

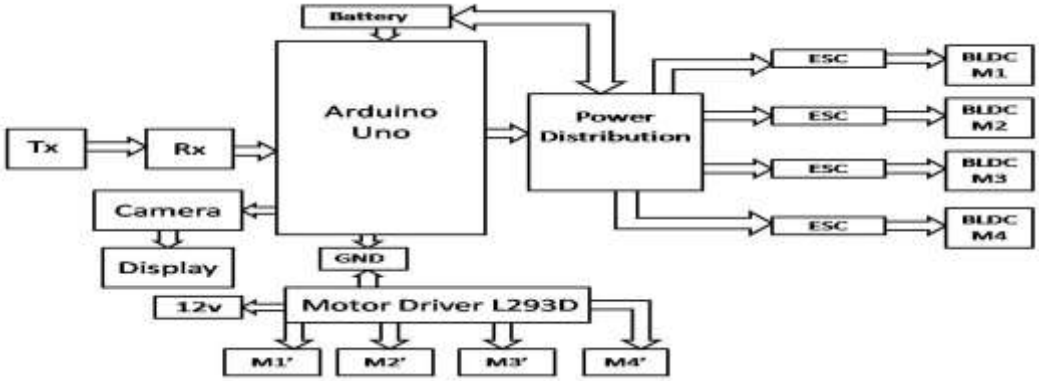

Figure 2. Block Diagram Of Surveillance Robot

V. WORKING PRINCIPLE

The Purpose Of This Project Is In Two Modes Rc Modes And Quad Copter Mode , Quad Copter Mode Uses Bldc Motor. Quad Copter Is Based On Newton's Third Law And Bernoulli's Law. According To Newton's Third Law The Mass Of Air Is Pushed Down Which Lift By Using Rotor's. Whereas Bernoulli's State That Pressure Difference Between The Air At The And At Bottom Due To Condo Effect Generate A Lift Towards The Lower Pressure At The Top.

The Rotation Speed Must Be Same And Sufficient Enough For The Quad Copter To Generate A Lift To Move Quad Copter In Left Side. The Thrust Force Acting On Left Side Should Be Minimize So That Drag Will Increase And Move Towards Left. Similarly To Move Quad Copter In Right Side The Thrust Force Acting On Right Side Should Be Minimize So That Drag Will Increase And Move Towards Right. Also To Move Quad Copter In Forward And Backward Direction Thrust Force Of Forward And Backward Rotor Should Decrease.

VI. Applications

- Commercial And Industrial Application.
- Traffic Monitoring And Management.
- Search And Rescue Operation.
- Temperature And Altitude Estimation.

- Crowd Management.
- Locating Forest Fire Or Frost Conditions In Farmlands.
- Weather Forecasting.
- Post Natural Disaster.
- Object Identification

VII. ADVANTAGES:

- The Main Benefit Of The Proposed System Is To Capture Live Video Streaming And Capture Perfect Image.
- The Proposed System Is Easy To Carry From One Place To Another Place Due To Its Light Weight.
- It Is Efficient, Reliable And Compact.

VIII. FUTURE SCOPE:

The Proposed System Can Be Used By A Ordinary Person For The Security Purpose In Domestic Areas. Also With More Advanced Technology It Can Be Used For Personal Transport. Nowadays A World Full Of New Technology These Aircraft Can Be Used For Entertainment Purpose. These Aircraft Product Can Be Use In Fire Extinguisher Without Harming Living Things Nearby.

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IX. CONCLUSION

Quad Copter Will Soon Take Over An Crucial Extant In The Nearing Future. They Will Take Huge Part For A Jobs As Well As Business. In Future They Can Become A Important Part Of Our Lives, From Varying The Way Farmers Take Care Of Their Crops , Delivering Groceries , Advance Security. Nowadays Quad Copters Are Recording HD Video, Shooting Films, Arranging Disaster Consolation. They Are Classified According To Their Compatible Uses. Quad Copters Offer To Be A Great Balance Between Cost, Capability, And Performance. The Only Problem Is When Funds Are Coupled With Highly Ambitious Projects. In This Paper We Have Provided The Information Of Airphibian Surveillance Robot. This Paper Contains Necessary Components For Airphibian Surveillance Robot. From This Paper We Conclude That The Airphibian Surveillance Robot Can Prove Out To Be Helpful In Many Application Areas. Also This Product Gives Real Time Video Streaming Of The Required Places. The Proposed System Is Efficient And Reliable, Which Eliminates The Role Of Manpower.

REFERENCES

Journal Papers:

[1] Md R Maque , M Muhammad , D Swarnaker , Quadcopter As Low Weight And Lost Cost Autonomous Flight, Electrical Engineering And Information And Technology , (An ISO 3297:2007 Cetrified Organisation) Vol. 2 , Special Issue 10 April,2014.

[2] James Dryden , Ryan Barbaccia , Quadcopter Design Project , ME 445 Final Report ,Vol. 6 , Special Issue 19 December , 2014

These:

[3] Budd Davisson "The PD-1 Roadable Glastar". Sport Aviation. (October 2010).

[4] Blain, Loz. "The Flying Motorcycle - Road-Registered And Available Now"Gizmag, 17 April 2007. Retrieved 4 April 2012.

[5] Dawson, Virginia; Mark D. Bowles Realizing The Dream Of Flight: Biographical Essays In Honor Of The Centennial Of Flight, 1903–2003. National Aeronautics And Space Administration, NASA History Division, Office Of External Relations. P. 70. ASIN B002Y26TM0.