AUTOMATED R.C.PLANE

TEAM NAME: ***VORTEX***

TEAM MEMBERS:

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TOPIC: ***MAKING A ATTITUDE HOLDING RC PLANE***

AUTOMATED R.C.PLANE

BASIC IDEA:

We aim to build a r.c. plane which autonomously holds its attitude during its steady flight . We will be using a r.c. plane which was already made by us and electronic sensors(like accelerometers and gyros) and micro-controller to control it. we plan to make the plane stable in air in terms of its attitude(pitch, yaw and roll stability) and holding its altitude.

Generally it happens(specially for beginner pilots) that their manual inputs provided to a r.c.plane by a radio controller are imprecise and plane gets disoriented and eventualy crashes . It takes a lot of practice to get a good flying skill and even after that we are not able to fly the plane properly.So, our project can help the beginner rc plane flyers to learn flying in an efficient way without facing crashes.

MAIN AIM : Our focus is mainly on the attitude holding part**(note: ATTITUDE means ALTITUDE +DIRECTION+STABILITY)**. we want to make the ***plane which fly at a reference height***(controlled by us***) and maintains its direction of flight*** .

BRIEF DESCRIPTION:

FLIGHT MODES:

Our plane will fly in two modes, wich is described as follows:

- **MANUAL MODE:**

  We will first fly the plane manually using a standard 9 channel rf controller to a particular height and then turn on the automated mode so that it can fly autonomously holding its attitude.

  Also we will be using manual mode during **emergency situation** when automated mode system fails or to avoid crashes.

- **AUTOMATED MODE:**

  This mode will will enable the plane to autonomously maneuver in air so that plane flies stably keeping its attitude(which include altitude and direction)steady.

CHALLENGES TO BE FACED:

- **CONTROL IN 3 AXES FOR STABLE FLIGHT**:

  The biggest challenge here is to control the plane autonomously in the three axes(pitch ,yaw and roll), so that it keep its steady flight.

PITCH CONTROL:

We are planning to use a **radar altimeter** to sense the altitude of plane and

fix a reference height for the flight. So whenever plane deviates from this reference height due to wind disturbances , the plane pitches up or down to restore this height.

ROLL CONTROL:

To control the roll, we will use **accelerometers** at the tip of wings and find the difference in acceleration between two. We will have to make this difference zero to achieve roll stability.

YAW CONTROL:

We will be using **magnetic or gyrocompass** to make it follow a reference direction(controlled by us).

- ## DESIGNING THE ATTITUTE CONTROL SYSTEM FOR PLANE:

  We will be designing a **control system** that will keep the plane in steady flight. we will use sensors (like accelerometers and gyroscope), and microcontroller(like arduino or raspberry) to read sensor values and actuate the servos of elevators ,rudders and ailerons, so that plane flies holding its attitude.

- ## CALIBRATING THE SENSOR VALUES FOR STEADY FLIGHT:

  One of the most tough challenge is to calibrate the sensor values so as to optimize the smoothness of flight. It takes a lot of experimentation to come upto a calibration which make the plane fly.

  Here we have to calibrate values of **gyroscope** and **accelerometers** so that it leads to steady flight even in uneven conditions.

HARDWARE TO BE REQUIRED: **accelerometer, magnetic or gyro-compass, radar altimeter**, micro-controller like-**arduino , raspberry pi** or **atmega**, **servo motors**

ESTIMATED COST OF PROJECT: RS 10,000/-(approx)

REFERENCES:

1. www.google.com
2. www.wikipedia.com
3. www.ieee.org