NASA – SPACEAPPSCHALLENGE ROSARIO

#Aeronautics #DroneHome

DON'T CRASH MY DRONE

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“DON’T CRASH MY DRONE”

DESCRIPTION

Create an app that will enable small drone operators to know more about specific weather parameters, local terrain and no fly zones within a five-mile radius of their GPS location.

BACKGROUND

Thousands of small drone owners crash their vehicles due to wind, water, ice, or objects in the air. Often the vehicles are damaged beyond repair. At times, drones have accidentally flown into No-Fly Zones or restricted airspace. Currently small UAS owners can consult their local weather sources and they can visually inspect airspace for objects and air traffic; however, their line of sight may not extend far enough to avoid crashes. Unless they know the FAA rules about restricted airspace, they would not know about restricted areas that may be nearby.

CONSIDERATIONS

The new application should be developed in an easy to understand format, and could potentially be integrated into the controller systems of a variety of aircraft so the operator will receive warnings before and during flight should the flight parameters of their vehicle be exceeded.

The app should represent current conditions within a five-mile radius of the operator location:

- Weather parameters of wind speed and direction, gust speed potential, dew point, temperature and visibility.
- Zoom-capable Imagery of vegetation, buildings, poles and wires, communication towers; bodies of water
- Known No-Fly Zones or Restricted airspace within a five-mile radius.

THE TEAM

We are a group of friends who are studing information systems engineering and electronic engineering, we liked the idea of meeting a challenge together.
We learned of the challenge in a speech delivered at the university and we began to organize to provide a solution to some of the problems.
After many twists and turns we ended up opting for the challenge "Don’t Crash My Drone" and here we present the solution…

OUR SOLUTION

We design a web aplication (with a future implementation in Andorid and iOS) which provied information to the drones drivers about bad wheather, no fly zones, possible objects that can collide, and real time geolocalitation

An arduino device with GPS and proximity sensors send data to a Server connected in real time which porcces these and give back information about the zone with pre-set up parameters, this web have a simple and nicely design .

RESOURCES:

- PHP
- Java-Android
- JS (JavaScript)
- HTML - CSS
- Google Maps API
- WebSocket
- Azure
- https://www.aviationweather.gov/
- Material Design
- Arduino
- MySQL

WHAT WE WANT TO IMPLEMENT

The next step in our project will consist in replacing the mobile phone for a device with GPS and a way to send data directly, in order to minimize the weight over the drone, increase the speed of the connection. Besides, we are looking for a way to improve the altitude that we get with GPS.

In the future, it will be posible to add an automatization that prevent collisions and stop the drone when it's about to crash.

Furthermore, we want to integrate more API's with information of restricted airspace reloading in real time.

ADVANTAGES:

- The application is easily adaptable to every platform because its coded as Open Source.
- It has a friendly and easy-to-use interface that can be used by everybody without tecnical knowledge.
- Low cost and easy to be implemented, just using a smartphone you are able to use the service.
- Meteorological information and restricted fly areas can be obtained in the hole word.
- Most important cities have tridimensional maps. This fact allow us to calculate better information for the user.

DISADVANTAGES:

- We depend on Wi-Fi or GPRS signal, and it's impossible to implement our system in places with no signal.
- GPS system that we apply has an error of +/- 10 metres in the Z axis (altitude), and that could cause mistaken interpretations.
- The weather information is taken from external pages. If their service fall down, our app fall down.
- Nowadays, in our country, there is no much legislation about the restricted zones, so it's difficult to get that data.

OUR FUTURE:

Talking with a airplane pilot, an idea came to us: integrating the information with other actual systems of air traffic control, which will help also to control the traffic of other drones flying in the same zone.

Nowadays, the APM system (Auto Pilot Arduino) integrates a similar techonology, with the possibility to control the drone. This application working with our solution will allow to alert the proximity of other drones' users registered in our system, no matter with its brand or model.

EXTERNAL REFERENCES:

- https://developers.google.com/maps/documentation/javascript/?hl=es
- https://espanol.wunderground.com/weather/api/
- http://www.websocket.org/
- https://www.aviationweather.gov/
- https://design.google.com/