Problem

The project aims to solve a safety problem that exists in all traditional drones today and will deal with the development of rescue means (parachute) for commercial drones.

Summary and Conclusions

* Certain situations and conditions have been defined as emergency situations that allow the deployment of a parachute.
* Successful simulations have been conducted under various conditions.
* Successful deployment of the parachute in a neutral environment was achieved.
* Real time tests couldn't be conducted due to a lack of required equipment and due to the security situation.
* Recommendations such as the addition of emergency lighting or an alert were put forward for further development.

In conclusion, after extensive research and testing, a promising, reliable and successful future can be seen in the development of a parachute as a rescue feature in the drone's market.

Defining the goals of the project

* Enhance safety for both drones and drone users.
* Design a parachute mechanism that mitigates potential damage to drones.
* Validate parachute systems reliability under diverse environmental conditions.
* Validate proper deployment under diverse environmental conditions.
* Explore and analyze the flight base code and its integrations for best implantation.

Interfaces

* QGC used as Ground Control Stations.
* Gazebo used as a simulator.

Description of system components

* Drone - DRONIX ENGINEERING, the body of the drone and four propellers.
* Battery Balance Charger - EV-PEAK C1-XR.
* Battery - Lipo Battery 4500mAh 22.2v.
* Radio Antennas – Holybro, Telemetry radio v3.
* Radio Transmitter - FrSky Electronic, Transit Radio System.
* Autopilot – CubePilot, Cube Orange+.
* GPS - Hex & ProfiCNC, here3.
* Parachute - MARS PARACHUTES, MARS MINI V2.

Solution

With the use of different components such as servos and different sensors, situations in which a drone is in danger of crashing will be identified and a parachute will open according to the constraints of these situations.

The methodology

Needs Assessment:

* Analyzed current challenges in drone operations.
* identifying scenarios for parachute system application.
* Reviewed existing features and documentation on this topic.

Integration with ArduPilot:

* Integrated the parachute system with ArduPilot, optimizing control algorithms for safe deployment.

Simulation Testing (Gazebo and QGroundControl):

* Conducted simulations in Gazebo to assess system performance, integrated with QGroundControl for real-time monitoring and user interface testing.

Field Testing:

* Validated parachute system functionality in real-world conditions, assessing performance under various scenarios.

Iterative Refinement:

* Collected feedback from tests to iteratively refine design, control algorithms, and deployment mechanisms.

Main points

Development of a parachute as a safe and reliable rescue feature for drones.

Modules:

ArduPilot

System domain:

R&D

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**Drones - Emergency Parachute Development**
Organization name: Dronix Engineering