

# A drone based system for surveillance applications in coastal zone

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## 1. INTRODUCTION.

Technology has been approaching and marking our lives for centuries, reaching up to a point in which we have seized it with great strength. This dependency, somewhat, does not become an issue to us, since with a proper use of technology, an improvement in the quality of life of the human being is achieved. One example of this is the appearance of UAV (Unmanned Aircraft Vehicle), commonly known as Drones, which, although they were appeared at the beginning of twentieth century, nowadays their use are being extended looking for their proper place depending on their functionalities. The drone applications are diverse, from military use to video recording for films or professional aerial cartography. Nevertheless, in vigilance and rescue where the use of drones are being forgotten and would have a place welcomed and acknowledged.

In this context aerial drones, in particular multicopters, would have their place because of their driving, maneuverability and capacity to accomplish operations which are hard or impossible to perform by other vehicles.

## 2. SYSTEM DESCRIPTION.

This kind of drones are form by 4, 6 or 8 rotors, which enables the vehicle to perform a variety of maneuvers in confined spaces, a flight control, which allow us to measure, rectify and control several magnitudes such as speed, acceleration, angular speed, direction, height , position, etc.

This is possible thanks to diverse sensors: magnetometers, accelerometers, gyroscopes, barometers, GPS...



Fig.1. Flight control's connections.

The power source of these vehicles is supplied by LiPo batteries, whose capacity vary according to the UAV's performances. Usually, the battery autonomy is about half hour; however, there are several factors which change this parameter. Regarding to the fuselage, this must be resistant enough

to hold opposed forces caused by rotors without bend, and light enough to be lifted by them. Any kind of sensors and accessories can be hitched in order to provide a practical functionality, as acoustic or infrared sensors, cameras, or even articulated arms capable of carry objects. The drone can be controlled by remote control or an emitting device, or even by a computer.

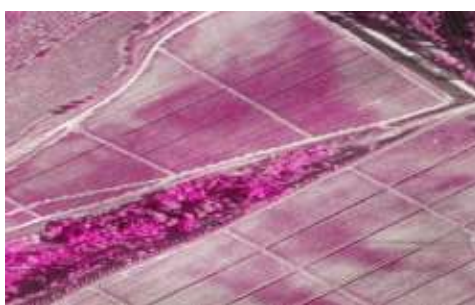


Fig. 2, 3 y 4. Drone carrying a lifesaver in a beach, Ambulance Drone carrying an automatic defibrillator, and image of an infrared electromagnetic spectrum band, respectively.

### 3. EXPERIENCE AND LEGALTY.

According to National Geography Institute, Spain has about 10660 Km of coast, of which it is known that in august of

this year, an average of two people per day have died by drowning (information gathered by Real Federación Española de Salvamento y Socorrismo). This situation makes it necessary to set up in every coastal zone of de country an assistance and prevention system which can be activated and deployed as quickly as possible, by placing UAVs ready to be used in strategical points along the shore. This would reduce the intervention time, increasing the efficacy of the operation.

Regarding to the legal framework, the article 50 of Law 18/2014 of 15<sup>th</sup> October, allows to carry out this activity without any kind of problematic. In particular, the last paragraph of the section 8, specify the corresponding and necessary in order to realize the activity we are focus in, quoting: “Authorized operators, as foreseen in this article for the exercising of aerial activities referred to section 3 and 4 in situations of high risk , catastrophe, or public calamity, as well as for protection and help of people and goods in cases in which this situations happens, when it is required by competent authorities the management of this situations”. What articles 3 and 4 gather, to put it briefly, are a collection of requirements and conditions which have to be satisfied in order to pilot a remote controlled civil aircraft.

### 4. CONCLUSION.

Vigilance and rescue in coastal zones are areas where the usage of drones must be present, due to any advance in technology which improves the quality of life as prevention, safety, and physical integrity get reinforced, is worth to be encouraged.

## 5. ACKNOWLEDGEMENTS.

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