

Patent number

PCT/IB2014/06427

PI2013A000081



UNIVERSITÀ
DEGLI STUDI
FIRENZE

CSAVRI
CENTRO SERVIZI DI ATENEO
PER LA VALORIZZAZIONE DELLA
RICERCA E GESTIONE DE
L'INCUBATORE UNIVERSITARIO

An improved drone structure



Patent Status

- Operating prototype
- Italian patent application submitted, ongoing evaluation of Italian Patent Office.
- International patent application submitted, ongoing evaluation of European Patent Office.

Intellectual Property owner: University of Florence

Ufficio Brevettazione e Proprietà Intellettuale

Piazza San Marco, 4 – 50121 Firenze

+39 055 275 7686 / 7687 | e-mail: brevetti@csavri.unifi.it, posta certificata: csavri@pec.unifi.it

P.IVA | Cod. Fis. 01279680480

Abstract

Supporting Frame Innovation of Multicopter Drones. A drone is a robotic vehicle with limited decision making abilities and remote control possibilities. Most recently it is synonymous with the term UAV (Unmanned Aerial Vehicle), an aircraft controlled by its own artificial intelligence onboard and with the possibility of remote control from a ground station. Among existing drones, multicopters are the most diffused and growing sector for remote sensing. This patent is regarding the chassis and frame improvement aimed at significantly improving flight performance and safety introducing a new generation of multicopters.

Figure 2 – The Drone prototype in high altitude flight.



The Technology and its advantage

This patent introduces a perimetrical chassis that provides a rigid connection among the motors and improves flight dynamics without the classic radial spoke. This chassis is lighter than classic models in a high number motor configuration allowing for a heavier payload or an improved flight time. Along with these improvements, the new design supports multiple motor configuration in a single chassis: a quadcopter, hexacopter, octocopter, or more depending on the flight needs. The rigid connection among the motors, fundamental for the best flight dynamics, is independent from the frame that supports the flight sensor and payload instruments allowing for notable improvements to lower the transmission of vibrations. The patent also introduces a continuous variable motor configuration even during flight. This

technology allows for a stable flight attitude in the event of an engine failure by reconfiguring the geometrical thrust and allowing for safe emergency landing without damaging or destroying the payload or causing danger to people and property. The variable motor configuration has a notable advantage in flight performance (better manoeuvrability and flight stability) but also in safety.

Market opportunity

This patent involves the flight chassis which influences flight dynamics and therefore can be considered a technology which interests the multicopter drone market at all levels. Consequently, the market opportunities are numerous, from advanced drone factory production to companies that offer exclusive and advantageous drone services. The production of drones with a high level of safety and manoeuvrability is of increasing interest in the consumer market (for sport or hobby) but especially in the professional market. Sophisticated, heavy and costly instruments can be safely transported with low risk of damage, and therefore lower insurance costs, thanks to the patented technology. The regulations of professional drone use will eventually require flight certification which will favour drones equipped with advanced safety systems like this in flight variable motor configuration patent. The services which could be offered with a drone with a perimetrical chassis and a continuous in flight variable motor configuration would increase the use of this type of aircraft in sectors such as: environmental risk and hazard management, public and private security, preservation of architectural and archaeological heritage, agricultural analysis and delivery services.

Figure 3 – The Drone prototype during a dusk recognition mission.





Inventors

Guglielmo Rossi, Sandro Moretti, Nicola Casagli

Contacts

Ufficio brevetti proprietà intellettuale Unifi
brevetti@csavri.unifi.it
Tel. 055 2757686; 055 2757687
Piazza S. Marco, 4 - 50121 Firenze