

Planning and Control Strategies for Collaborative Aerial Autonomous Vehicles: summary

Spanò Cuomo Luca

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Drones or UAVs have long entered everyday language. They were born to achieve particular tasks whose requirements were difficult to obtain from crewed aircraft (e.g., very long flight time, overflight of areas dangerous to health, low cost). They are today increasingly widespread also in the civil sector. A rapid spread and the introduction of low-performance models marked the drone introduction to the civil environment, leading to some accidents. These incidents prompted the need for appropriate legislation, which often resulted in a practically absolute ban on the use of drones, even outside the urban environment. This work analyzes the technical and legislative challenges that need to be overcome for drones to be fully exploited, even in the urban environment, offering a valid and realistic solution. The present work, therefore, has a dual purpose. On the one hand, to overcome the legislative problem by introducing an original drone risk assessment, on the other, to propose an architecture that uses the novelty introduced, allowing drones to carry out their task independently of the human.

The original risk assessment formula proposed in this work would enable expanding the use of drones considerably, allowing a much more profitable way than today. The original risk assessment represents the main part of the thesis. It introduces novelty about the casualty area (that that author tailors for drones) and the sheltering factor (that the author evaluates via artificial intelligence). A path planner can exploit the value of the risk to return the safest path. The new introductions fulfill all the rules of the airspace authorities, and the author provides straightforward tools to evaluate them.