

## TOP TEN

**Federico Rovere**  
University of Glasgow

Category: Airborne

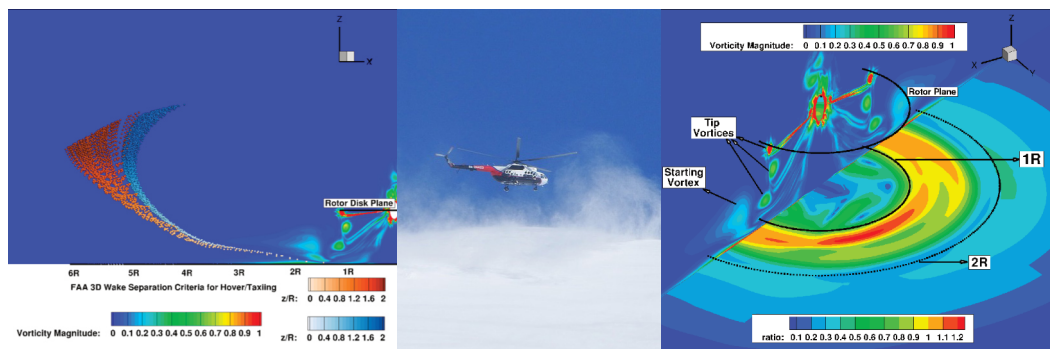
Country: United Kingdom

Research Area 10: Transport Safety and Security

Idea Number: 62

# Safe rotor wakes for better vertical lift

In recent years personal aerial vehicles are becoming an achievable dream, and it is possible that in a few years they will be in everyday city skies. Due to their efficiency, rotors will be used for personal flying machines. New startups and companies begin to offer their services in this emergent field, and focus their efforts to propose the most convenient offer to their costumers. However, the presence of rotors in populated areas, can eventually rise safety risks and problems for people and buildings that have to be resolved. Furthermore, particles on the ground can be uplifted, generating more risks for people in proximity to the vehicle. In this work, computational fluid dynamics is used to evaluate safety considerations for people operating near lifting rotors. The first step is to validate CFD using experimental results for a two-bladed small rotor In Ground Effect conditions, focusing on the evaluation and prediction of the rotor outwash. The simulated flow field is used for safety studies that include outflow forces and tracking of uplifted particles. Three aircraft weights have been studied, evaluating scaling factors to define how weight can affect outflow forces and particle paths, when rotors hover at different heights above ground. Results show how the wake generated by heavier helicopters can lead to stronger forces on ground personnel and push the particles farther away from the rotor.



## Key Characteristics

Computational fluid dynamics • Safety • Lifting rotors