

Simulation of Urban Air Mobility Traffic

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Abstract:

The advent of commonly available vertical-take-off-and-landing aircraft (VTOLs), capable of carrying human sized cargo, has led to the rise of Urban Air Mobility concept according to which a significant portion of services currently handled by road traffic would be moved into the air to reduce transfer times of people and goods in highly congested urban areas. As a result, the airspace above major cities would become relatively densely occupied by aircraft of various sizes and characteristics, posing new challenges with respect to air traffic management and safety as compared to current air traffic regulations.

This paper presents the Urban Air Mobility Traffic Analysis Tool (UAM TAT) which was developed to simulate urban air traffic and evaluate its metrics in order to facilitate the analysis of various aspects of the future of Urban Air Mobility associated with traffic management and its impact. The tool is capable of simulating an arbitrary number of aircraft flying along predefined routes according to their missions (personal transport, multipoint parcel delivery etc).

Within the paper several case studies will be presented, showing different air traffic management techniques that can be used to minimize the number of aircraft conflicts. The methodology for estimating the number of VTOLs in a particular urban area will be discussed.

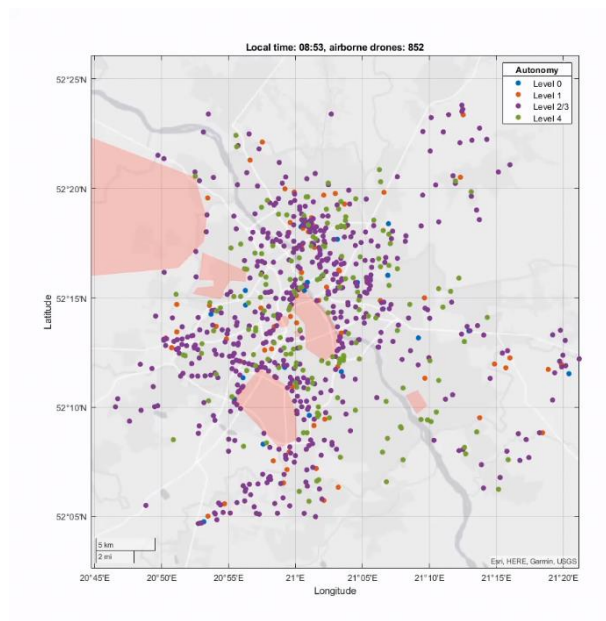


Figure 1. A snapshot from air traffic simulation over the area of Warsaw. Each point represents one aircraft. Red areas represent no-fly-zones.

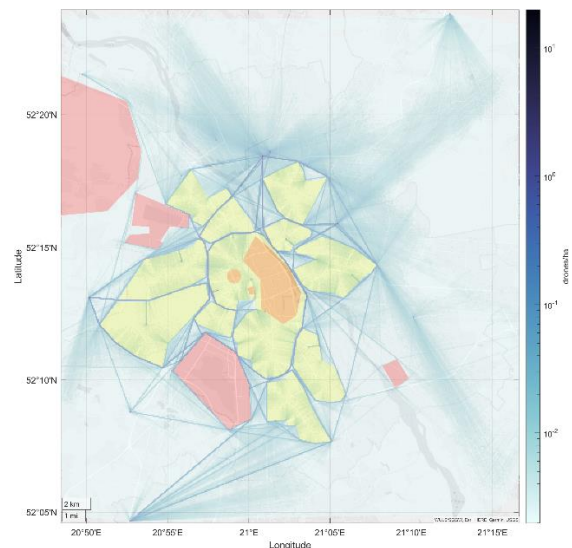


Figure 2. Air traffic density map (VTOLs per hectare). Yellow areas represent limited-fly-zones.