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Urban Air Mobility: What business model(s)?

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The business case of Urban Air Mobility

This document summarizes the Airneth seminar entitled “The business case of Urban Air Mobility” held on February 2ndth 2023 in The Hague. The seminar audience was welcomed by Goriska van Cooten (Ministry of Infrastructure and Water Management) and the proceedings were chaired by dr. Christiaan Behrens (Airneth). The seminar included presentations by: dr. Anna Straubinger (ZEW-Leibniz Centre of European Economic Research), dr. Vassilis Agouridas (Urban Air Mobility Initiative Cities Community), Joshua Serrão (Municipality of Amsterdam) and followed by a general discussion.

1. Introduction

Technological developments in unmanned aviation are moving fast. At the moment, more than 200 companies worldwide are developing drones and eVTOLs for all kinds of different applications in passenger and freight transport (Straubinger et al., 2021). These technological developments can result in a mobility revolution in which air transport - even over relatively shorter distances - can become a fully-fledged alternative to land transport. However, much is still unclear about how passenger and cargo transport by air via drones, or eVTOLs, can be offered in an economically viable (and sustainable) way. In other words, the technological developments are ahead of the economic developments of the applications. It is not yet clear to what extent these technological developments will be accepted and adopted by both consumers and policymakers (Fu et al., 2019), how this new form of mobility fits into the current mobility offer in both densely and sparsely populated areas and the effect of various external or negative effects such as visual nuisance and safety risks (Straubinger et al. 2020).

Industry expectations are high. According to KPMG, the Netherlands are on the third place in air taxi readiness in a ranking that considers societal acceptance, infrastructure, law and regulation as well as technological readiness. Roland Berger has high expectations for the increase in demand and traveled kilometers with UAM Passenger drones until 2050. Their expectation is 18.880 million annual km travelled by 2050, split into 36% city taxis (15-50km), 35% airport shuttles (15-50km) and 29% intercity flights (50-250km). These forecasts are challenged in academic studies. The necessary scale to arrive at even 1% of modal share of trips of a big city in UAM would result in tens of thousands of UAM trips in the sky per day and necessitate more than a thousand drones.

There are still few scientific studies that provide detailed insight into the viability of possible business cases, especially when it comes to passenger transport and unmanned aviation. Two studies are a hierarchical exception: Lewis et al. (2021) and Straubinger et al. (2021). In this latest study, three different types of business cases are considered most plausible: 1) drones as a supply route for airports (airport shuttles), 2) drones for regional mobility (lower population density), 3) drones that meet the passenger transport needs of companies (e.g. between offices). In addition, the research identifies two other business cases: tourism (to replace helicopter flights) and drones for commuting in (dense) urban areas.

The Action Plan Unmanned Aviation 2021-2023 from the National Government also recognizes this tension between technological developments and insight into possible applications. In order to allow policy development to grow at an early stage and consistently with the technological and economic development of unmanned aviation a deeper understanding of the most plausible future business cases in the Dutch mobility context is required.

The seminar addressed the following subjects:

- ❖ Urban Air Mobility in the wider context of unmanned aerial vehicles
- ❖ Business models of Urban Air Mobility in the wider context of Drone use cases
- ❖ Challenges and societal benefits of UAM
- ❖ Acceptance of Urban Air Mobility: What are factors determining public acceptance



2. Key takeaways

Presentations

- ❖ The passenger transportation part of Urban Air Mobility (UAM) should be distinguished from other drone use.
- ❖ Drone use that is not UAM (for example, aerial surveillance and monitoring applications that fall under EASA's recent category of aerial services) has substantially increased over the last years. Registered pilots increase from 2017: 755, 2019: 2.109, up to 2021: >3.000. Similarly on the rise are detections of illegal drone flights per month (more than 3000 in Amsterdam).
- ❖ Theoretically, UAM vehicles in the form of air-taxies could be 'ready' by 2030. But the question is if people are ready for that. UAM for passengers transportation is currently in the peak of inflated expectations according to the Gartner (2022) hype cycle.
- ❖ Acceptance of UAM strongly hinges on its societal function and social cost. Adoption and acceptance are closely related.
- ❖ Business cases for UAM (for passengers) suffer from high cost, low passenger capacity, and the unbalanced ratio between private benefits vs societal cost. UAM lacks a clear business case beyond private niche transport for people with high willingness to pay
- ❖ Demand for a service is a necessary but not sufficient criteria to allow an innovation in the public sphere such as UAM
- ❖ There is no guaranteed match between UAM characteristics and requirements of municipal mobility goals, such as: shared, sustainable, safe, affordable.
- ❖ For UAM environmentally, socially and economically sustainable application cases need to be found. It is therefore important to establish an assessment framework to determine the proportionality of UAM
- ❖ There are no 'rules' yet, in terms of what is acceptable for frequencies, noise etc.
- ❖ Experimentation in the real world and co-creation in the development of drones (inc. UAM) is the only pathway to potentially find products and regulation with a positive net-outcome for society. Living labs are suitable for experimentation.

Discussion

- ❖ Acceptance and Adoption of UAM depends on the balance between societal gains and costs.
- ❖ Business case for UAM (passengers?) may easily conflict with societal goals of sustainability and fairness.
- ❖ UAM (for passengers) appears not to fit into municipal mobility strategies since these do not offer solutions to urban problems that couldn't be achieved better otherwise.
- ❖ Governments are necessary to provide the framework, regulation and discussion on new technologies such UAM.



Literature and further reading

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