EXPERIENCING URBAN AIR MOBILITY: HOW PASSENGERS EVALUATE A SIMULATED FLIGHT WITH AN AIR TAXI

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Left side: View on the participant wearing the mixed-reality hardware within the air taxi cabin. The right side shows the view the participants experienced during the flight with a steward on board. Whilst the person and the display in front of the participants are real world objects, the view outside the cabin shows the virtual flight over the city of Hamburg.

Passengers want to be informed about intentions of the vehicle. The presence of a steward on board is not necessary but can increase wellbeing especially during non-nominal situations.

A Mixed Reality Air Taxi Simulator was set up. It allowed participants to experience an inner-city business shuttle flight. The study assessed the **information needs** and the **influence of another person on board** on wellbeing. In one scenario participants experienced a **re-routing of the flight** due to unavailability of landing spots at the vertidrome. During and after the flight participants answered questionnaires and extensive interviews were conducted. The study produced first empirical data on relevant factors regarding interaction, information needs and comfort within an air taxi.

- Mixed reality setups [Ernst et al. 2022, Laudien et al., 2022]
- Varjo XR-3 goggles
- Outside view modelled with Unreal Engine 4
- Flight simulation X-Plane 12

- 13 min flight time
- Ø speed 120 km/h
- Route minimized ground risk
- Realistic departure and arrival routes

- *N* = 30 Participants (14 w)
- Ø Age = 41 ys (*sd* = 18)
- Rather positive attitude towards aviation, high interest in technology

- Factor: steward on Board
- Expected impact on acceptance & wellbeing
- Consider cost vs. impact for operational concepts

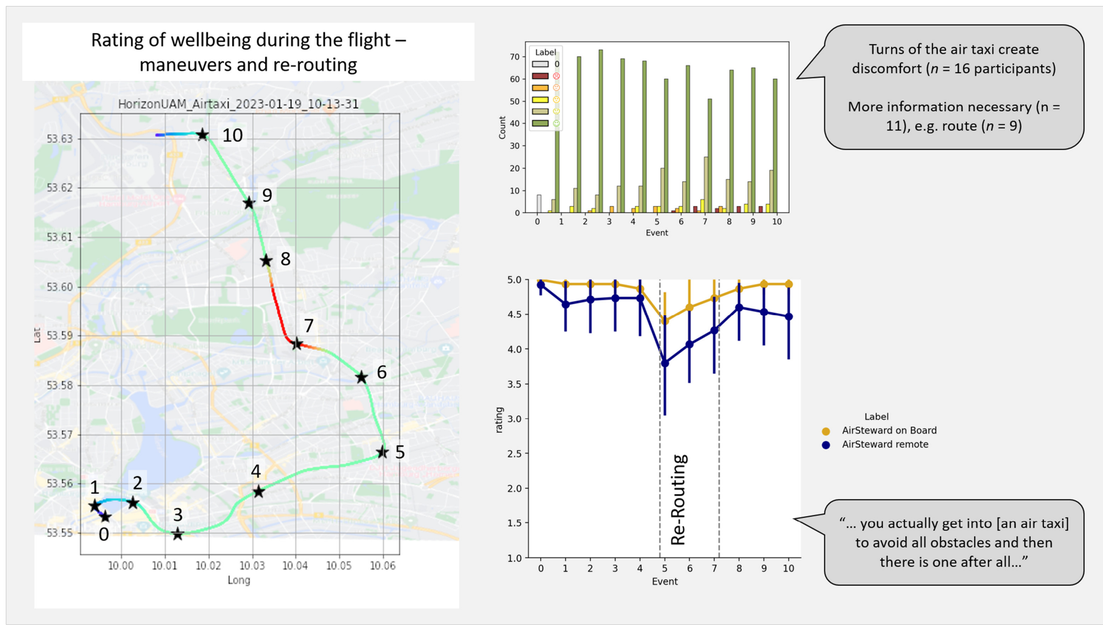
<u>The presence of an steward on board:</u> did not had an significant influence on experienced wellbeing after the flight. 16 out of 30 participants stated that an steward on board is not necessary, eight stated that a steward is needed in the introduction phase. Nine participants stated that an steward increases the perceived safety.

<u>Re-routing scenario:</u> there is a significant effect that the start of the re-routing (event 5) is rated worse than the baseline ($F_{(2.46/66.47)} = 6.97, p = .001$) and a tendency that events are rated better when the steward is on board ($F_{(1/27)} = 3.16, p = .086$), compare bottom graph of right figure.

<u>As top-5 **relevant information:**</u> were rated 1) travel time, 2) changes of the flight route because of obstacles or other traffic, 3) flight route, 4) connections and 5) safety instructions.

The first results of the study indicate that **participants want to be somewhat in the loop of the flight**. When the air taxi cannot proceed as planned, interaction with a **person on board** of the air taxi **can mitigate** some of the stress and **negative emotions** passengers experience in these situations.
The results also show that mixed-reality simulations are a **fruitful tool to investigate aspects of acceptance** to further shape interaction concepts between passengers of air taxis and highly automated transport systems.

Ratings of the participants during the flight help to identify situations that create discomfort. Here, interaction concepts are needed to mitigate these negative emotions.



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