





User safety attitudes towards Urban Air Mobility

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Aim

- To investigate individuals' concerns behavior, perceptions and attitudes towards the safety implications that arise from the implementation of air taxis
- To capture the individuals' **mode choice** in the presence of **Urban Air Mobility**









...because it will revolutionize the future of short-distance air transport!









Urban Air Mobility: a form of automation in mobility, materialized by the electric vertical landing and take-off technology (eVToLs), facilitating short-haul passenger trips and commutes in both urban and inter-urban environments.

Urban Air Mobility → human-related errors which are responsible for the 68% of air accidents *Cokorilo, O.* (2020)

Obligations on the safety standards to certify eVToLs' production and operation are imposed to reassure fatal accident probability at less than 10⁻⁹ and safe land in case of various system failures *EASA*, (2021)

Current studies on <u>autonomous mobility</u> → Concerns about the safety aspects of Urban Air Mobility, and individuals' safety perceptions towards autonomy impact social acceptance *Vance S. & Malik A.* (2015), *Eker U. et al.* (2019;2020), *Moody J.* (2020), *Nair, G. & Bhat C.* (2021), *Ward K.* (2021)



The market of Greece



Geography

Complexes of islands \rightarrow Cyclades, Dodecanese, Ionian islands

Geographical distances between the islands are lower than 60 nautical miles (around 100km)

Lack of adequate **connectivity** and **accessibility**

Due to **geomorphological surface**: no airport infrastructure in some islands

Athens Airport 🛪 **Port of Piraeus** र्रोट









Tistributed to individuals located in Greece

Collect data on:

- Socio-demographic characteristics
- Psychometric questions to capture individuals' perception and attitudes regarding perceived safety towards Urban Air Mobility *(Likert Scale Questions)*
- Use Case Scenario: Individuals' choices regarding Urban Air Mobility *(Stated Preference Experiment)*



Socio-demographic characteristics



965 respondents located in Greece

Variable	Category	%
Age	Mean age	~37 years old
Gender	Female	63.80%
	Male	34.40%
	Other	0.40%
	I prefer not to answer	1.30%
Educational level	Less than high school	0.50%
	High school graduate	20.40%
	Vocational	8.60%
	BSc degree	37.70%
	MSc or Doctorate	32.80%
Employment Status	Full-time employed	57.20%
	Part-time employed	6.50%
	Student	17.50%
	On furlough	2.60%
	Retired	3.90%
	Unemployed	8.00%
	Other	4.20%
Annual income before tax €	Less than 9,100	36.30%
	9,100 to 16,800	29.20%
	16,801 to 25,200	19.00%
	25,201 to 33,600	7.10%
	33.601 and more	8.40%







Island hopping on accessible islands

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- The long-term period since has implemented
- Inter-island 100-150 km / 60-95 miles trip in the Greek islands
- Good weather conditions
- Departure and arrival station: island vertiports
- 2 tasks: Leisure or business purpose of travel

Please read through the different options, which propose a different combination of travel characteristics, and choose the one that you would prefer. (1 of 2)

Transport Mode	Airplane	Air taxi	Ship
Travel time on board (min)	20	45	80
Total boarding nd disembarking time (min)	120	10	60
Total travel cost (one-way in C)	50	360	44
Frequency of service	3 itineraries per day	On-demand	1 itinerary per day
Level of automation	Fully automated	Remotely piloted	Remotely piloted
Environmental footprint	-	- 🕈 🕈 -	-
	Select	Select	Select



Methodological Approach



Likert Scale Questions and socio-demographic characteristics

Psychometric questions to capture individuals' opinions regarding perceived safety towards Urban Air Mobility and socio-demographic characteristics

🛛 Analysis in 💷 😂 SPSS

Used as observable variables in the following developed model

Stated Preference Experiment

Use Case Scenario: Individuals' choices regarding Urban Air Mobility

Discrete Choice Analysis with Biogeme Models in ANACOND











Automation Level: Fully automated air taxi (0.462; t = 1.96)
Environmental Footprint: Eco-friendly air taxi operation (0.508; t = 2.65)





- Error Component capturing unobservable attributes that **air modes** share (1.720; t = 9.97)
- Error Component capturing unobservable attributes that **traditional modes** share (-1.670; t = -8.28)
 - Error Component capturing correlation from **repeated observations** (3.370; t = 6.05)







Individuals are affected by travel cost and time in choosing transport mode

Automation and low environmental footprint positively affect people's choices for Urban Air Mobility

Potential technological failures of air taxis, fear of flying and flying with air taxi during night are key elements negatively affecting air taxis.

Future Research

Enhance the current discrete choice model by developing a Latent Variable model and incorporating the safety-related opinions as latent variables in the utility function.

Extend the current sample to include international respondents and identify differences based on the place of residence







Thank you for your attention!

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