

Societal Acceptance of Civil Drones in Europe

Insights from policy and academic literature

In May 2021, the European Union Aviation Safety Agency (EASA) published the results of a large study on societal acceptance of Urban Air Mobility (UAM) in Europe. UAM is a new air transportation system for passengers and cargo in and around urban environments, using electric aircraft taking off and landing vertically, with or without a pilot on board. It is estimated that the first operations may be a reality in three to five years from now. What are the EU citizens' main expectations and concerns about it? This policy brief analyses the findings of the EASA report in light of the academic literature on societal acceptance of civilian drones.

Brief Points

- Safety and noise pollution top the list of EU citizens' concerns in the EASA study, followed by cybersecurity risks and the potential impact on wildlife.
- The economic potential of commercial drones is generally recognized by the population, but several studies have shown that safety, security and privacy concerns remain.
- EU citizens have expressed generally positive attitudes to new forms of air mobility, though further studies have revealed that, typically, at least in the case of drones, people know less about the technology than they think they do.
- Given the significant impact that new forms of air mobility will have on society, it is fundamental that the whole of civil society, and not only end-users, participate in the regulatory process.

Introduction

Traffic jams and pollution are already a reality in many European cities. With the population of cities in the European Union (EU) set to grow to more than 340 million citizens by 2030, there is a risk of increased pollution and congestion. In this context, according to different EU agencies, local authorities are looking at “smarter, greener, more integrated and sustainable mobility solutions” (EASA 2021). A key determinant for the development and implementation of such solutions is that the public generally agrees with them. Furthermore, this acceptability is key for establishing an adequate regulatory environment, including a clear framework for the industry.

In May 2021, the European Union Aviation Safety Agency (EASA) published the results of a study on societal acceptance of so-called Urban Air Mobility (UAM) in Europe. EASA is the European agency responsible for setting the rules, guidelines and standards for all safety and environmental aspects of civil aviation. It was created in 2002 and includes all 27 EU member states plus Norway, Switzerland, Lichtenstein and Iceland. UAM is a new air transportation system for passengers and cargo in and around urban environments, using electric aircraft taking off and landing vertically, with or without a pilot on board. It is estimated that the first operations will be a reality in three to five years from now. The study in question was externally commissioned by EASA and does not necessarily reflect the views of the agency. Nevertheless, the study was published by the agency itself, which gives it increased weight and visibility. This is likely the first study of this scale where public opinion is systematically taken into account to indicate how UAM would be received by the general public. In the following sections, the main findings of this report are described and some particular issues are reflected upon.

The EASA Study: Methodology and Results

In order to explore the issue of public acceptability, several research methods were employed. Based on a literature review, local market analysis, surveys and interviews, the study examined the attitudes, expectations and concerns of EU citizens with respect to UAM. The main part of the study, a web-based quantitative survey

with 3,690 citizens across six European cities, contained three parts: First, a market analysis was conducted to identify European cities offering the conditions for the deployment of UAM in the next ten years. Six of them were selected from this list to conduct the survey (Hamburg; Paris; Barcelona; Milano; Budapest; and the Öresund region on the Danish-Swedish border, a metropolitan region that comprises the greater Copenhagen area and Skåne in southern Sweden). Second, a qualitative survey was carried out, consisting of one-hour interviews with more than 40 stakeholders at local, national and European levels. Third, a dedicated noise perception survey with 20 participants was conducted.

The report draws together insights from the data gathered via the above-mentioned methods. Combined, and according to EASA, the results are both interesting and to some extent unexpected. In a summary, EASA clusters the survey results, which are described as very homogeneous across the EU, into ten key take-aways:

1. “EU citizens initially and spontaneously expressed a positive attitude towards and interest in UAM, seeing it as a new and attractive means of mobility, and a majority state that they are ready to try it out;
2. The notion of general/public interest is a determining factor for acceptance: use cases for the benefit of the community, such as medical or emergency transport or connecting remote areas, are seen as the most promising use of UAM;
3. The main benefits expected from UAM are faster, cleaner and extended connectivity;
4. However, when encouraged to reflect upon the concrete consequences of potential UAM operations in their city, EU citizens indicated that they want to limit their own exposure to specifically four impacts relating to safety, noise, security and environmental issues:
5. Safety concerns come first, but the study also showed that citizens trust the current aviation safety levels and would be reassured if these levels were applied to UAM;
6. Noise was the second main concern expressed; the study indicated that the level of annoyance versus acceptance would vary

with the familiarity of the sound, the distance, duration and repetition of the sound;

7. UAM was seen as a good option to improve the local environmental footprint, through reduced urban traffic congestion and better local air quality, provided that it does not impact wildlife;
8. The results also demonstrated limited trust in the security and cybersecurity of UAM, which will require threat prevention measures;
9. It is important that the integration of UAM into the existing air and ground infrastructure must respect residents’ quality of life and the cultural heritage of old European cities;
10. Finally, local residents and authorities felt directly affected by the deployment of UAM and want to engage and play an active role in its implementation.” (EASA 2021: 3).

Analysis

The fact that these ten points are highlighted by EASA surely tells us something about what should be considered priority areas for UAM implementation, but the presentation of them also warrants some closer scrutiny. Regarding the first point on the list, EASA describes the result as unexpected. This would suggest that the agency was not expecting the general attitude towards the use of UAMs to be positive. The fact that the replies are unexpectedly homogeneous across all groups of respondents indicates a level playing field for UAM throughout Europe, at least for the cities included in the study. Furthermore, the results interestingly show that there is no major deviation between the respondents of the six cities, and neither is there significant differentiation according to age, household composition or how fond the respondents are of new technologies.

Regarding the second point on public interest and perceived usefulness of potential operations in the respondents’ cities, the use cases relating to emergency and/or medical transport were reported as most useful. These make up the top four use cases (the fifth being long-distance forwarding of heavy cargo). More specifically, although the report highlights in the list of top ten findings that public interest is a determining

factor for societal acceptance, and, for example, time saved for city-to-airport transport is underlined as a UAM high-level societal benefit, the picture looks a bit different when examining the numbers more closely. For example, the perceived usefulness of drone airport shuttle transportation according to Figure 35 is only 10%. Similarly, the perceived usefulness of using an air taxi for sightseeing is only at 5%. The link between perceived usefulness and societal acceptance thus becomes blurry, as these numbers indicate that the respondents are struggling to see how useful it actually is to be able to hop on a drone to get to the airport. In addition, noise is reported as a particularly great concern for air taxis at 38% (Figure 37). This is interesting especially since airport shuttle and air taxis are often portrayed as the most likely use cases to be deployed in the EU first (full report page 43).

In any case, the ten key take-aways listed above must be taken into account, and the registered concerns must be mitigated by taking preventive actions. EASA state that they will use the results summarized above to prepare an impact assessment and regulatory proposal for UAM in Europe in 2022. In a preliminary conclusion, the agency describes how public acceptance should be secured by different levers, for example by ensuring that UAM is affordable to all and used in the public interest, that it is well integrated into the local mobility system, that it is supported by timely, sufficient and transparent information to citizens and local stakeholder groups, and finally that it is tested through the execution of pilot projects demonstrating that UAM is functioning and safe.

Insights from the Academic Literature

Drones, air mobility and new mobility solutions are discussed both in and outside of academia, and in a plethora of outlets. However, the issue of societal or public acceptability is somewhat of a particular field, although one that is receiving increasing attention.

In a recent article, Burchan Aydin (2019) confirms that short-term and long-term forecasts show extensive utilization of drones in various sectors, but that it is still uncertain whether the general public accepts potential high drone congestion. Similar to EASA, Aydin carried out a quantitative survey study (153 fully completed surveys, combined with a qualitative risk analysis), but Aydin explored public acceptance of

drones by using the Knowledge, Attitude and Practice (KAP) model and by using statistical analysis in an attempt to decrease the aforementioned uncertainty. His results show that drones are not well accepted at present, except for in public safety and scientific research applications. Commercial and hobby uses are not supported, according to Aydin, and he describes how the public sees drones as a risky and privacy-unfriendly technology. His study therefore recommends that public and private institutions collaborate in the development of risk mitigation and response strategies to minimize the risks.

From his study, it is also clear that the public's actual knowledge about this technology is significantly lower than their perceived knowledge. Aydin recommends a boost of information to the public, which might help to improve the reputation of drones "from killer machines or privacy interrupters" towards a technology that can actually be beneficial to society.

Finally, Aydin found that the highest risk factors as seen by the public are "drones misused by criminals or terrorists, and drones misused with respect to privacy." There are some deviations between Aydin's findings here and those of the EASA report. According to EASA (Figure 37), "incident due to deliberate harmful action, e.g. by criminal organization or terrorists" is ranked as a top-three concern by 39% of the respondents when it comes to delivery drones (safety is ranked higher), and 29% for air taxis (safety, noise and environmental concerns are ranked higher).

In another article, Philip Boucher (2016) takes a similar starting point to Aydin, stating that strategies to "manage public acceptance" have so far relied upon several untested assumptions. As a response, Boucher conducted public engagement activities to explore citizens' visions of civil drones, and he concludes that several insights contradicted the prevailing assumptions. Specifically, he rejects the notion that the public either bluntly rejects or willingly accepts civil drones; rather, he found that citizens make nuanced and deliberate decisions depending upon the purpose of the flight and the actors involved (Boucher 2016: 1). Two particularly relevant issues can be mentioned from the concluding remarks of the article. First, the boundary between acceptable and unacceptable civil drone development is defined by how serious the benefits are, and who the user is. Specifically, the

uses (what EASA refers to in their report as "use cases") that had benefits in terms of safety or security for others were considered acceptable, while those uses with benefits to the drone operator (such as recreational or hobby use) were not acceptable. Second, the participants of the study by Boucher were, in his own words, "generally resigned to the emergence and rapid development of civil drone technology and did not feel that they had any role in shaping development."

In Boucher's article, a clear plea is made for making a shift from the current focus on public acceptance of civil drone development to the development of civil drones that are acceptable to society. To some extent, the report by EASA responds to this concern by focusing on acceptability in the early stages of UAM development and implementation. However, in order to meaningfully take part in shaping this development, the EASA study necessarily needs significant follow-up assessments, perhaps with a stronger focus also on other qualitative research methodologies.

In an article by Scott Thompson and Ciara Bracken-Roche (2015), the focus is on Canadian public opinion regarding the use of Unmanned Aerial Vehicles (UAVs). First, Thompson & Bracken-Roche explore and assess the knowledge level of the Canadian public, before they test the hypothesis that public opinion regarding the use of UAVs for data collection in Canada varies by application, by institution, by collection method, and by respondent demographics. Similar to both Aydin (2019) and Boucher (2016), the study found that a majority of the respondents supported the use of UAVs for safety or emergency-response purposes (i.e. not recreational or commercial use). However, according to Thompson & Bracken-Roche, this support falls away in cases where UAVs are used to perform routinized acts of surveillance or identification. By focusing on one geographical location (albeit Canada is obviously a vast country), Thompson & Bracken-Roche are able to go more into detail on societal and national variables that might influence public opinion and acceptability when it comes to drones. While the EASA study is valuable in its generality on the European level, it seems highly relevant to carry out further national or local investigations on the topic as it would allow for a more fine-grained analysis of e.g. the sociocultural and historical factors that are at stake for the public. In line with Boucher (2016), a detailed societal impact assessment, focusing not only on finding ways to

have the public accept such technology, but also on how the societal, historical and cultural conditions in which the public exist should actually steer the technology's development, seems like a timely effort.

As mentioned above, the perception of a general public interest is a determining factor for acceptance: use cases where a benefit for the community can be perceived, such as the delivery of medical supplies, emergency transport or contact with remote areas, are seen as the most promising use of UAM. During the COVID-19 pandemic, the promise of drones to fulfill a number of pandemic-related tasks (disinfection, delivery of cargo and surveillance – including through thermal surveillance) has led to a vast use by public authorities worldwide, as documented by Martins, Lavallée and Silkoset (2021). Yet this usage was enabled, at least partially, by an alleviation of regulatory restrictions on drone flights. As mentioned in that article, authorities in different countries either sped up pre-existing regulatory processes or opened up exceptions to allow new uses of drones in urban settings. Since then, some of these decisions have received push-back from data protection authorities and other governmental bodies. These dynamics have the potential to affect the public acceptance of drones, even when their potential for public interest is there.

Further Elements for Discussion

Although the EASA report is fairly comprehensive, there are a few issues that are worth reflecting upon for the impending future development of UAM.

Scenario assumptions

Follow-up surveys should be conducted also for the remaining phases of UAM development and implementation. As promoted in particular

on the press briefing slides that come with the report, estimations that a UAM city-to-airport transfer in Paris by air taxi could be two to four times faster compared to a car journey on a Thursday evening during rush hour would look different if this was the chosen transfer by, let's say, 50% of all travelers. In another example, when emergency response time and reduction of traffic jams are seen as the two most welcomed benefits of UAM, this is based on a scenario where UAM users are a minority and operate in parallel to conventional traffic. As UAM implementation evolves, the conditions are likely to change. Thus, follow-up studies should be conducted to take this into account.

Noise study

Noise is a key worry of the respondents for the quantitative survey (and especially for air taxis, which is one of the very most likely mobility solutions to be implemented first in the EU), but only 20 individuals are included in the report's in-depth study on this. This seems like a very low number for the most important acceptability factor. As part of the key insights found in the literature review, the report confirms that noise is the main "societal acceptance barrier" (although the societal acceptance factors are comparable to those of other smart technologies). Future studies should go more into depth on this issue, including wider and targeted surveys and interviews with a larger set of respondents.

Knowledge paradox

Although it is highlighted in the report that 64% of the respondents would be interested in using drone delivery and 49% would be interested in using an air taxi, the survey also reveals that most stakeholders generally lack information on the topic of UAM. Put bluntly: they want it, but they are not sure what it is. This is somewhat of a paradox, and an indication that

there should be follow-up studies once the general level of knowledge is raised and people have been exposed to UAVs in some form. Further studies of a more informed public will likely be important not only for the future development and implementation of UAM, but also for managing the potential that increased knowledge may also lead to increased skepticism. ■

Further Reading

- Aydin, B. (2019) Public acceptance of drones: Knowledge, attitudes, and practice. *Technology in Society* 59 (101180). DOI: [10.1016/j.techsoc.2019.101180](https://doi.org/10.1016/j.techsoc.2019.101180).
- Boucher, P. (2016) 'You Wouldn't have Your Granny Using Them': Drawing Boundaries Between Acceptable and Unacceptable Applications of Civil Drones. *Science & Engineering Ethics* 22:1391–1418. DOI: [10.1007/s11948-015-9720-7](https://doi.org/10.1007/s11948-015-9720-7).
- European Union Aviation Safety Agency (2021) *Study on the societal acceptance of Urban Air Mobility in Europe*. 19 May. Available at: www.easa.europa.eu/sites/default/files/dfu/uam-full-report.pdf.
- Martins, B. O.; C. Lavallée & A. Silkoset (2021) Drone Use for COVID-19 Related Problems: Techno-solutionism and its Societal Implications. *Global Policy*, early view. DOI: [10.1111/1758-5899.13007](https://doi.org/10.1111/1758-5899.13007).
- Thomson, S. & C. Bracken-Roche (2015) Understanding public opinion of UAVs in Canada: A 2014 analysis of survey data and its policy implications. *Journal of Unmanned Vehicle Systems* 3(4): 156–175. DOI: cdnsiencepub.com/doi/abs/10.1139/juvs-2015-0025.

THE AUTHOR

Stine Bergersen is a Doctoral Researcher at PRIO where she works on risk- and threat communication and societal impacts of emerging technologies. She led PRIO's work on societal impact assessments of crisis management innovation in the DRIVER+ project.

THE PROJECT

The RegulAIR project addresses the integration of civilian drones in the Norwegian and European airspaces. The project explores how to conceive of security in the three-dimensional airspace, and how to reconceptualize and re-regulate the new security problem-set emanating from emerging technologies.

PRIO

The Peace Research Institute Oslo (PRIO) is a non-profit peace research institute (established in 1959) whose overarching purpose is to conduct research on the conditions for peaceful relations between states, groups and people. The institute is independent, international and interdisciplinary, and explores issues related to all facets of peace and conflict.