Deliverable 2.3

Guidance on socially acceptable AI

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Abstract:

This document presents the results of the activities conducted under HAIKU Tasks 2.3, "*Analysis of Societal Impact*" (Section 1), and 2.4, "*Engagement with End-Users and Stakeholders*" (Section 2). It presents the findings of the societal acceptance assessment of AI conducted throughout the project's three-year duration and details the stakeholder engagement activities carried out during this period.

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Executive summary

This document presents the findings from the societal acceptance assessment of AI and stakeholder engagement activities carried out over the project's three-year duration. It offers a comprehensive view of how AI is perceived in aviation and by the general public.

The **assessment of the six project-developed Intelligent Assistants (IAs)** revealed a generally favorable disposition toward AI integration in aviation, with moderate to high levels of acceptance. HAIKU Use Case Leaders consistently rated the assistants more positively than end-users, underscoring a divergence between "strategic optimism" and "operational realism". End-users, such as pilots and ATCOs, expressed concerns about overreliance, skill degradation, and data privacy, emphasizing that trust in AI systems must be earned over time through demonstrated reliability and transparency.

A wider **survey targeting the general public** found a mix of emotions toward AI, with positive feelings like curiosity, excitement, and optimism prevailing, especially among those with higher AI knowledge. The public primarily desires AI to be a support tool for data and information management but widely rejects its role as an autonomous decision-maker or manager. Furthermore, it is clearly noted that the concept of AI as a "teammate" is not yet widely accepted or understood.
Concerning future aviation scenarios, highly automated airports and AI-driven ATM received more public approval than pilotless flights, which are still largely rejected. Acceptance for drone delivery services is also favorable, but often limited to urgent situations like medicine delivery.

Based on these findings, the document provides **four key recommendations** to ensure successful AI adoption:

- **Promote AI literacy**: Offering accessible education about AI is crucial to moving people beyond misconceptions and fostering a more optimistic perspective.
- **Involve end-users throughout the design process**: Continuous engagement with end-users, especially in safety-critical domains like aviation, ensures that AI systems are developed to meet real-world needs and build essential trust.
- **Design AI to assist with difficult or tedious tasks:** Developers should start by creating AI systems that assist with tasks people find challenging or tedious, such as data processing, to help users gain confidence before tackling more critical applications.

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- **Avoid assigning AI a critical role in operations**: AI should be designed to support human actions without introducing additional critical elements, ensuring that humans remain the most vital and adaptable safety layer.

The report also details the methodology and results of the **project's stakeholder engagement activities**, noting that approximately 739 people from over 50 organizations and different aviation segments were involved over the project's duration.

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List of Acronyms

Acronym	Definition
AAM	Advanced Air Mobility
AI	Artificial Intelligence
AIDUA	AI Device Use Acceptance model
ANACNA	Associazione Nazionale degli Assistenti e Controllori della Navigazione Aerea
ASW	Airport Safety Watch *(UC5 Intelligent Assistant)*
ATCO	Air Traffic Controller
ATM	Air Traffic Management
AVs	Autonomous Vehicles
CERTH	Centre for Research and Technology Hellas
COVAID	Covid Aid *(UC6 Intelligent Assistant)*
DUC	Digital assistant for UAM Coordinator *(UC3 Intelligent Assistant)*
EASA	European Union Aviation Safety Agency
ECA	European Cockpit Association
ENAC	Ecole Nationale de l'Aviation Civile
ENAV	Ente Nazionale Assistenza al Volo
FOCUS	Flight Operational Companion for Unexpected Situations *(UC1 Intelligent Assistant)*

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HAT	Human-AI Teaming
HAZOP	HAZard and OPerability analysis
H&S	Health & Safety
IA	Intelligent Assistant
ISA	Intelligent Sequence Assistant *(UC4 Intelligent Assistant)*
IU	Intention to Use
LLA	London Luton Airport
ML	Machine Learning
NATS	National Air Traffic Services
OLVIA	OperationaL Intentions adVIser for Aviation *(UC2 Intelligent Assistant)*
PEOU	Perceived Ease of Use
PU	Perceived Usefulness
TAM	Technology Acceptance Model
SDSP	Supplemental Data Service Provider
TAP	Transportes Aéreos Portugueses
UAM	Urban Air Mobility
UAS	Unmanned Aerial Systems
UC	Use Case
UCL	Use Case Leader
UTAUT	Unified Theory of Acceptance and Use of Technology

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VMUTES	Virtual Mobile Unmanned Aerial System Technology Acceptance and Use
WP	Work Package

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Introduction

The document presents the outcomes of the activities carried out within HAIKU Tasks 2.3 "*Analysis of Societal Impact*" (Section 1) and 2.4 "*Engagement with end-users and stakeholders*" (Section 2).

Section 1 presents the results of the societal acceptance assessment of AI conducted over the three years of the project. It is structured into 3 chapters:

- Chapter 1 provides an overview of the societal acceptance assessment of the six HAIKU Intelligent Assistants (IAs).
- Chapter 2 presents the exploratory work on public attitudes toward AI and its potential role in shaping future mobility and public services.
- Chapter 3 offers the conclusions, including a set of key insights and actionable recommendations derived from the assessment results.

Section 2 presents the stakeholder engagement activities carried out during the project. It is structured in two chapters:

- Chapter 1 provides a mapping of the relevant stakeholders for each use case and describes the strategy used to identify the most important stakeholders to involve in the prototypes design process.
- Chapter 2 offers a quantitative overview of the stakeholder engagement efforts, with a detailed breakdown by aviation segments.

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SECTION 1: Analysis of Societal Acceptance

In recent years, the rapid advancement of Machine Learning (ML) and Artificial Intelligence (AI) technologies has brought about a transformative era in which AI is increasingly integrated into expert decision-making processes. These developments have opened up new frontiers in fields such as automotive, manufacturing, healthcare, and aviation, potentially revolutionising the way these domains operate. However, the mere delivery of accurate algorithmic predictions, though crucial, has proven insufficient for effective human-AI collaboration (Cai et al., 2019). As AI technologies continue to proliferate across various sectors, the need to understand and enhance human-AI interaction has gained prominence in the realm of technological innovation.

A critical point of discussion is that the adoption of AI is not solely contingent upon the technology's functionality and reliability. While developers have been primarily focused on demonstrating the efficacy of AI, the intricate interplay of various factors that influence technology acceptance has often been overlooked (Sujan et al., 2020). Several studies have delved into psychological factors, drawing from established behavioural theories, to elucidate the dynamics of technology acceptance. The existing body of research suggests that the exploration of Human Factors (HF) tied to user demographics and cognitive aspects should be an integral part of the AI development process (Sujan et al., 2020). Furthermore, researchers emphasise the importance of considering human values when establishing successful interactions with AI systems, as the insufficient trust in AI systems remains a significant barrier to technology adoption (de Visser et al., 2020).

To address this important area, HAIKU has established a dedicated stream focused on assessing societal acceptance and perception of AI. Two complementary lines of work have been carried out:

- A sector- and application-specific assessment that explores societal acceptance of the six HAIKU Intelligent Assistants (IA) by involving both use case leaders and end-users engaged in their design and validation, detailed in Chapter 1.1.
- A wider exploration of general public attitudes toward AI and its potential role in future mobility and public services, conducted via a survey targeting the general public, presented in Chapter 1.2.

The two lines of work are complementary and converge into a set of key insights and actionable recommendations, which are presented in the concluding Chapter 1.3.

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1.1. Assessing Societal Acceptance of HAIKU's IAs

1.1.1. Model and Framework

The societal uptake of Artificial Intelligence (AI) technologies in aviation is not determined solely by their operational performance or technical robustness. Instead, it hinges upon a more intricate interplay of cognitive, behavioural, and contextual factors that shape users' trust, willingness, and ability to integrate intelligent systems into their daily operations.

In HAIKU D2.2 (2024) an extensive overview was conducted to map these dimensions. This effort laid the foundation for understanding how human values, perceived risk, ease of use, and trust act as mediating variables in the adoption of AI-enabled Intelligent Assistants (IAs). That deliverable also proposed a structured methodological framework to gauge users' attitudes, using an 8-dimension model supported by quantitative survey instruments.

In continuity with that effort, this document reaffirms the adoption of the Virtual Mobile Unmanned Aerial System Technology Acceptance and Use model (VMUTES) as the reference framework to assess societal acceptance across the HAIKU use cases. VMUTES was selected for its domain-specific relevance to aviation, its integration of behavioural and contextual constructs (e.g. subjective norms, perceived risk, knowledge of regulations), and its multi-stage appraisal structure, which enables a more granular understanding of users' evaluative processes compared to traditional binary acceptance models.
In addition, trust is reaffirmed as a transversal enabler of technology acceptance, shaping not only intention and use, but also moderating the relationship between perceived usefulness and adoption, especially in contexts where system transparency and explainability remain a challenge.

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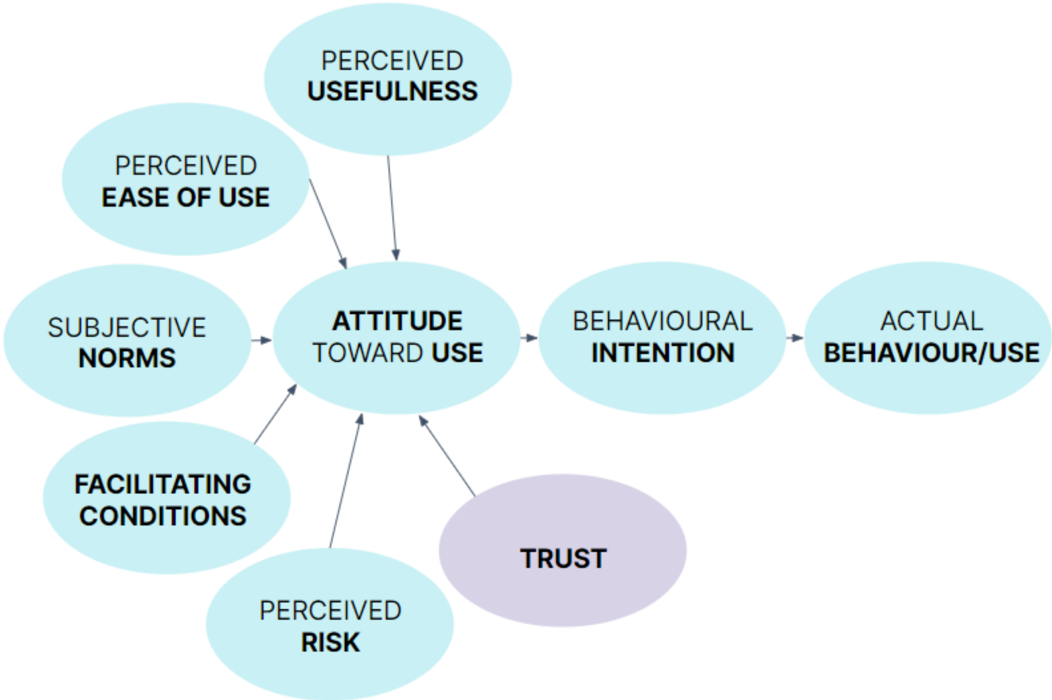

Figure 1: Societal Acceptance Model

Regarding the methodology, to gauge participants' perceptions and attitudes, we utilised a structured questionnaire comprising 23 questions. Each question was evaluated on a 5-point Likert scale, spanning from 1 (Strongly Disagree) to 5 (Strongly Agree). Upon completing the questionnaire, the responses to individual questions were averaged to derive the final average for each respective dimension. Additionally, participants had the option to respond with a 0 in instances where a specific item was deemed irrelevant to their Use Case (UC). Notably, any response marked as 0 was excluded from the computation of dimension averages.

The questionnaire was crafted to address 8 dimensions concerning the utilisation of IAs. These dimensions are summarised and defined in Annex A.

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1.1.2 Results

1.1.2.1. Synthesis

The societal acceptance of the six Intelligent Assistants (IAs) assessed within the HAIKU project was systematically evaluated across a common set of dimensions derived from the VMUTES model. These dimensions - Perceived Usefulness, Perceived Ease of Use, Subjective Norms, Attitude Toward Use, Facilitating Conditions, Perceived Risk, Behavioural Intention, and Trust - provided a structured lens through which the perceptions of both Use Case Leaders (UCLs) and operational end-users involved in Validation 2 could be examined and compared. The analysis reveals a generally **favourable disposition towards AI integration across diverse aviation contexts**, yet it also exposes meaningful variations that are critical for informing future development, integration, and adoption strategies.

Overall, the six Use Cases demonstrated **moderate to high levels of societal acceptance**, with particularly strong scores in the dimensions of Perceived Usefulness, Ease of Use, and Trust. These dimensions consistently received the most positive evaluations from Use Case Leaders, who underscored the assistants' potential to enhance operational productivity, reduce cognitive workload, and support decision-making processes. The uniformly high expectations expressed by UCLs suggest that, from a conceptual and design-oriented standpoint, the IAs are perceived as valid solutions to real operational challenges.

However, this optimistic outlook was often moderated by the more pragmatic and experience-based feedback provided by the Validation 2 participants, who engaged directly with the assistants in simulation or trial environments. Each IA's evaluation was influenced not only by its technical maturity but also by its specific domain of application and the nature of human-system interaction it introduced.

For example, the assistants developed under *Use Case 1 (FOCUS)* and *Use Case 2 (OLIVIA)* - both oriented towards cockpit operations - elicited concerns regarding overreliance, the clarity of the assistant's intentions, and the psychological implications of constant monitoring. Pilots expressed a willingness to engage with these systems, particularly under high workload or time pressure, yet emphasised the necessity for explainability and reassurance that the assistant's role would remain advisory rather than prescriptive.

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In *Use Case 3 (DUC)*, designed to assist the future role of Urban Air Mobility (UAM) coordinator, participants acknowledged the strategic relevance of such a tool in a future high-density airspace scenario. Nonetheless, both the UCL and the users highlighted uncertainties about the current maturity of the system and the operational concept in which it is embedded. The assistant's perceived utility was consistently framed as conditional, heavily dependent on further development, clearer role definition, and demonstrated reliability.

Use Case 4 (ISA) and *Use Case 5 (ASW)* displayed comparatively high levels of alignment between leadership and user perceptions. Air Traffic Controllers involved in UC4 Validation 2 provided strong endorsement of the assistant's potential to improve sequencing operations, especially under high traffic conditions, and recognised its value as a training support tool. In UC5, safety personnel saw ASW as a promising aid to identifying complex safety trends, though they noted that the tool's capacity to provide actionable insights had not yet reached its full potential. In both cases, trust in the broader institutional safety net appeared to bolster acceptance.

By contrast, *Use Case 6 (COVAID)*, addressing the monitoring of risk factors related to disease spread in airports, stood out as a public health-oriented application. The tool was generally well received by both the UCL and users, with strong ratings in ease of use and subjective norms. Nevertheless, concerns were raised regarding data privacy, potential passenger stress, and the implications of integrating health surveillance into the travel experience-issues which, while not unique to this use case, were more acutely felt due to the nature of the application.

A common pattern emerged across *all six Use Cases*: Use Case Leaders consistently rated the assistants more favourably than end-users involved in Validation 2 (see Fig.2). While UCLs tended to report high confidence in the assistants' utility, intuitiveness, and societal relevance, end-users adopted a more nuanced and operationally grounded stance, frequently identifying gaps between design expectations and real-world applicability. This divergence underscores the value of involving representative user groups in validation exercises, particularly when designing systems for safety-critical domains.

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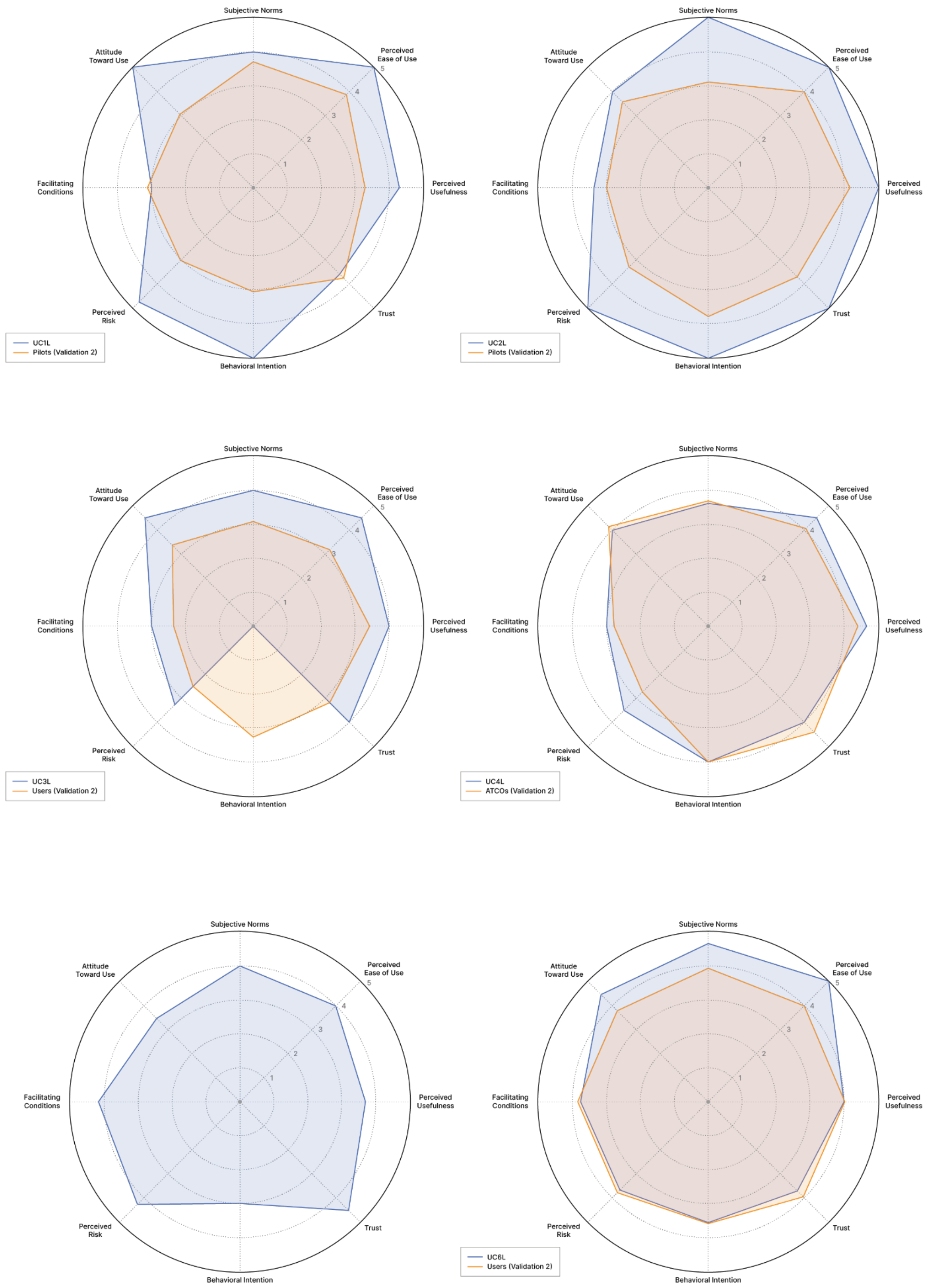

Figure 2: Societal Acceptance results - All use cases

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The analysis of discrepancies between UCLs and users revealed several recurrent themes across the VMUTES dimensions. A salient distinction was observed between strategic optimism and operational realism. UCLs generally perceived the assistants as mission-enabling systems, particularly in the dimensions of Perceived Usefulness and Behavioural Intention. They emphasised the assistants' value in enhancing productivity, supporting situational awareness, and improving coordination. In contrast, end-users often evaluated these same assistants as contextually helpful but not yet indispensable, frequently qualifying their responses with conditions related to maturity, trust, and perceived autonomy.

This divergence was especially pronounced in the domain of Trust. While UCLs tended to regard trust as a matter of system reliability and correct functioning - often supported by existing institutional and regulatory safeguards - users highlighted the importance of explainability, accountability, and data transparency. Particularly in UC1, UC2, and UC3, user trust was not granted by default but seen as something that must be earned over time through demonstrated behaviour, consistent performance, and open communication about data use and system boundaries (see Fig.2). The same was true for the dimension of Perceived Risk. Whereas UCLs largely downplayed the emergence of new risks, users articulated concerns about system malfunctions, the risk of cognitive overload in case of erroneous cues, and the implications of skill degradation due to automation. These concerns were most acute in cockpit and control tower environments, where the consequences of system error are most severe.

Another consistent discrepancy emerged in the dimension of Facilitating Conditions. Users across several use cases indicated that successful integration of the assistants would require dedicated training, clear procedural documentation, and robust fallback protocols. While UCLs often assumed that these prerequisites were already satisfied or readily achievable, users emphasised the complexity of onboarding new tools into established workflows. The need for targeted educational interventions, especially in UC3 and UC5, was viewed not only as a technical requirement but also as a prerequisite for building confidence and autonomy in system usage.

In the dimension of Subjective Norms, the gap between UCLs and users was more variable. Leadership responses tended to reflect confidence in the societal and institutional alignment behind AI integration, often interpreting societal norms as supportive of innovation and digitalisation. Users, however, offered more diverse perspectives. In some cases, such as UC2 and UC3, respondents indicated that societal acceptance was contingent upon broader cultural and ethical attitudes toward AI - particularly when automation intersects with job roles, data privacy, or public health. This variability suggests that perceptions of alignment with societal values are not

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monolithic and must be continuously re-assessed as AI technologies evolve and their implications become more visible.

Finally, the dimensions of Attitude Toward Use and Behavioural Intention offered insight into users' willingness to adopt the assistants in practice. While no use case revealed outright rejection, it became evident that adoption was often perceived as conditional. Users expressed openness to working with the assistants - particularly in high-complexity or high-stress scenarios - yet emphasised that long-term usage would depend on the system's transparency, seamless integration, and the perceived added value in daily operations. This conditionality was not a sign of resistance, but rather a reflection of professional caution and the high standards required for tools that operate in safety-critical environments.

In conclusion, the comparative assessment across the six Use Cases reveals a strong potential for the societal acceptance of AI-based assistants in aviation and airport operations. However, it also underscores the critical importance of engaging with users not only during validation phases but throughout the entire design and implementation lifecycle. Acceptance, as these results show, is not a static endpoint but a dynamic process shaped by experience, trust, institutional readiness, and cultural values. To ensure lasting integration and sustained acceptance, future developments must continue to prioritise user-centred design, transparency, and active dialogue between developers, stakeholders, and end users.

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1.1.2.2. Use Case 1: Intelligent Assistant in the cockpit to assist in 'startle response' adverse events

The results of the study on the societal acceptance of FOCUS (Flight Operational Companion for Unexpected Situations) was analysed comparing the Leadership team and 12 of the pilots involved in Validation 2. The results are summarised in Figure 3 below.

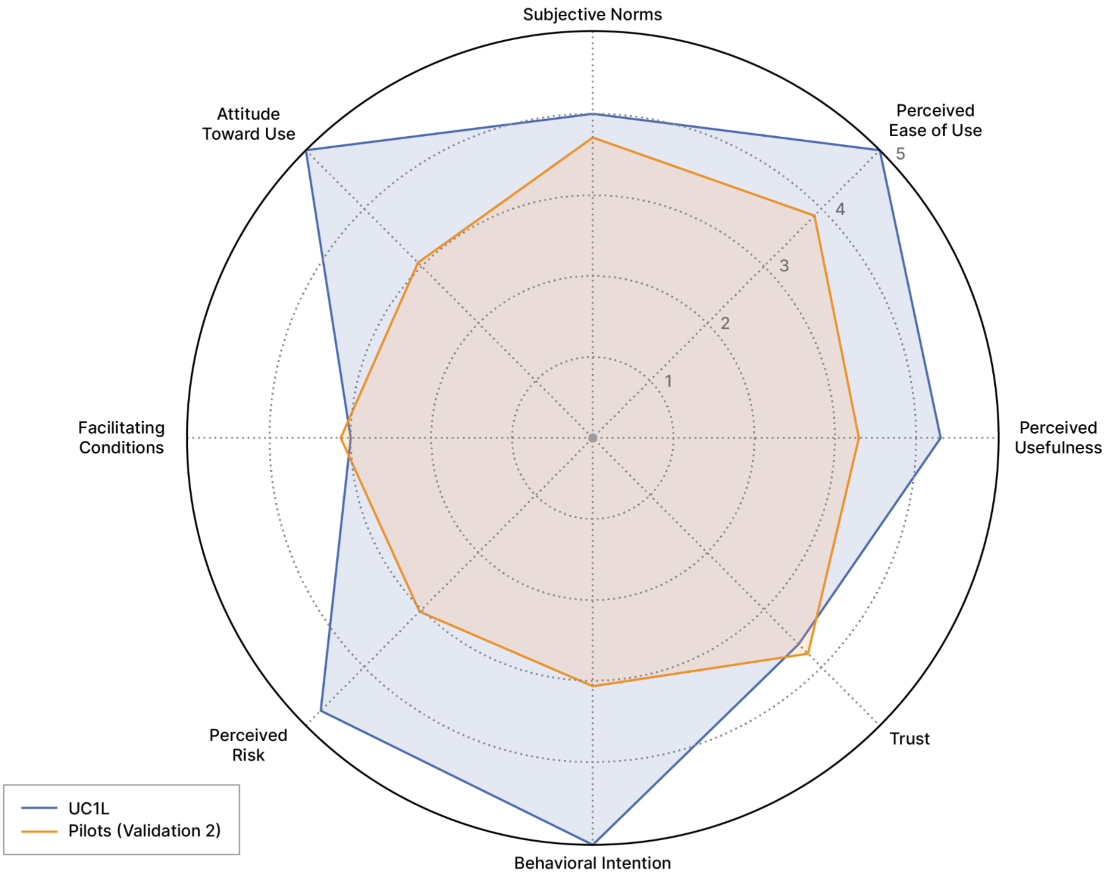

Figure 3. Societal Acceptance UC1 Results
(spider-chart comparing the responses of the use case leadership team - blue - and pilots - orange)

The societal acceptance of the FOCUS assistant was assessed along eight key dimensions derived from the VMUTES model. Feedback was collected both from UC1 leaders (UC1L) and pilots during Validation 2. While the UC1L perspective remains consistently optimistic across all dimensions, the aggregated pilot responses offer a more nuanced and, at times, critical view, underscoring the importance of capturing operational perspectives in realistic settings.

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Perceived Usefulness

FOCUS was positively evaluated in terms of perceived usefulness by the UC1L (score: 4.3), who acknowledged its potential to support startle recognition and contribute to workload optimisation by helping the pilot focus on relevant information. However, pilots provided a significantly lower average score (3.29), reflecting a more restrained endorsement. While its ability to raise awareness during startle was acknowledged, concerns were expressed regarding its effectiveness in accelerating recovery and supporting the re-establishment of situational awareness. This highlights a discrepancy between conceptual expectations and practical relevance in operational contexts which deserves close attention to ensure effectiveness. However, it has to be noted that data shows that pilots who reported not noticing or following the breathing guidance were, in fact, unconsciously synchronizing their breathing with it - suggesting a potential subconscious effectiveness of the stress regulation function.

Perceived Ease of Use

Ease of use emerged as one of the more aligned dimensions, with the UC1L assigning the maximum score (5) and pilots reporting a reasonably high average (3.88). FOCUS was described as intuitive and user-friendly, but pilots warned of potential disruptions to cognitive flow, particularly in high-stress or time-sensitive situations. Some highlighted the risk of confusion if the assistant draws attention to already-known elements or provides insufficient justification for its cues. This suggests that usability should be reinforced not only through interface simplicity, but also through explainability mechanisms tailored to dynamic cockpit environments. Furthermore, it reveals that different interaction modalities should be explored, e.g. voice-based interactions could help an effective solution to reduce cognitive workload.

Subjective Norms

Both UC1L and pilots perceived that FOCUS aligns with broader societal expectations around improving safety (UC1L score: 4; Pilot average: 3.69). Nonetheless, while institutional acceptance may be high, individual-level acceptance may be moderated by personal beliefs and operational culture. Pilots especially recognised the potential of FOCUS in training environments, where it could aid in learning how to distinguish between startle and surprise reactions, but remained more cautious about its role in live operations.

Attitude Toward Use

This dimension presented one of the most pronounced discrepancies (UC1L score: 5; Pilot average: 3.05). While the conceptual view sees FOCUS as a valuable teammate - particularly in both dual- and single-pilot configurations - the pilots raised concerns

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about the psychological implications of continuous monitoring. The notion of "being watched" was mentioned as potentially intrusive, especially if not accompanied by clear data governance and usage transparency. These concerns underline the need to incorporate privacy-by-design principles into FOCUS's architecture.

Facilitating Conditions

Both groups agreed that successful integration of FOCUS would require targeted interventions (UC1L score: 3; Pilot average: 3.10). The pilots stressed that, while intuitive, the assistant demands dedicated training to become a true partner in operations. Specifically, pilots emphasised the need for hands-on practice in simulated environments and for documentation that clearly outlines the assistant's functionality, limitations, and failure modes. The importance of learning when and how FOCUS behaves correctly - and when it does not - was reiterated as essential for trust calibration.

Perceived Risk

A marked divergence emerged in the perception of risk (UC1L score: 4.75; Pilot average: 3.02). While the UC1L perspective downplays the introduction of new risks, pilots voiced significant concerns about possible misdirection or irrelevant cues from the assistant, particularly in safety-critical phases. One recurring theme was the potential over-reliance on a system that might not be available during all flights. In this respect, pilots recommended that FOCUS be included in the aircraft's Minimum Equipment List (MEL), to avoid operational inconsistencies when it is unavailable.

Behavioural Intention

The intention to use FOCUS remains generally positive (UC1L score: 5; Pilot average: 3.05). Pilots expressed openness to using the assistant in complex or high-stress scenarios, particularly where it could provide a structured response strategy. However, their willingness to adopt it across a wider range of situations appears conditional upon improvements in explainability, transparency, and training.

Trust

Trust emerged as the most sensitive and polarised dimension. While the UC1L provided a moderate score (3.6), the pilot average (1.6 in the initial version, now revised upward to 3.75 in Validation 2) indicates a considerable shift. The updated pilot feedback suggests growing confidence, likely reflecting improved exposure and understanding of the system through iterative validation. Still, concerns persist about data privacy - especially with regard to physiological measures - and system robustness. Trust in FOCUS appears to be highly contingent upon transparency, reliability, and the

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availability of clear communication about how decisions are made and data are handled.

The comparison between UC1L expectations and pilot feedback from Validation 2 reveals a clear divergence in the perceived maturity and operational readiness of the FOCUS assistant. While UC1L scores reflect a strong belief in the assistant’s potential - particularly in terms of usefulness, attitude toward use, and behavioural intention - pilot assessments were consistently more moderate and, in some cases, notably critical. Importantly, the relatively lower pilot ratings in dimensions such as trust, perceived risk, and facilitating conditions highlight a need for further development of transparency, robustness, and tailored training strategies.

1.1.2.3. Use Case 2: Intelligent Assistant in the cockpit to assist in route planning/replanning

The results of the study on the societal acceptance of OLIVIA (OperationaL Intentions adVIser for Aviation) was analysed together with the Use Case 2 Leader (UC2L) and 10 Pilots from Validation 2. The results are summarised in Figure 4 and further detailed below.

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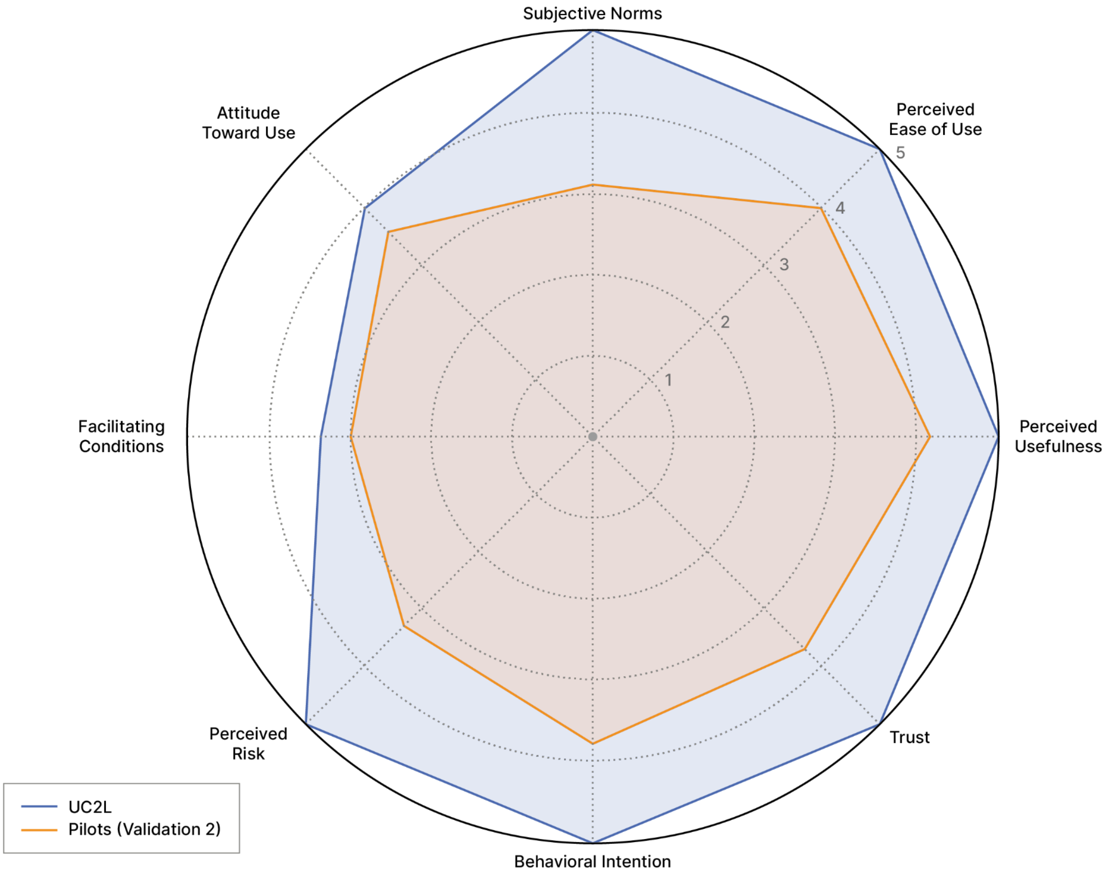

Figure 4. Societal Acceptance UC2 Results
(spider-chart comparing the responses of the use case leadership team - blue - and pilots - orange)

Perceived Usefulness
The UC2L assigned the highest possible score (5) to perceived usefulness, citing the assistant's ability to support route planning and re-planning, optimise workload, and improve productivity. Pilot responses also reflected a strong appreciation, with an average score of 4.13. This close alignment confirms a shared recognition of the IA's functional value, particularly in aiding strategic decisions and maintaining operational flow. Nevertheless, the slight gap suggests that while pilots acknowledge the IA's support role, they may see it as one of several tools, rather than a transformative enabler.

Perceived Ease of Use
Perceived ease of use received full marks from the UC2L (5), describing the system as intuitive and cognitively unobtrusive. Pilots rated this dimension at 4.00 - still clearly positive, yet indicating some operational friction or unmet expectations in interface design or response fluidity. This delta, although not large, signals the importance of

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further usability refinement, particularly in time-pressured cockpit environments where intuitiveness must translate into immediate operability.

Subjective Norms

A significant gap was observed in the dimension of subjective norms (UC2L: 5; Pilots: 3.10). The UC2L anticipates strong societal and professional endorsement of the IA, reflecting confidence in its alignment with broader expectations of innovation, safety, and efficiency. Conversely, pilots demonstrated a more reserved stance, possibly reflecting uncertainty about peer acceptance, lack of institutional clarity, or concerns about cultural readiness for such integration. This indicates that while top-down confidence exists, bottom-up legitimacy may still need to be fostered through engagement and demonstration.

Attitude Toward Use

Attitude toward use was rated positively by both groups, though to different extents (UC2L: 4; Pilots: 3.55). While the UC2L sees the assistant as a valuable asset for improving routing/re-routing based on operational intentions, pilots appear cautiously optimistic. The lower score suggests that, although there is no strong resistance to adoption, the assistant still needs to demonstrate and refine its practical value. Further exploration is needed into how (and if) intention priorities could be partially or fully predefined before flight, an aspect that is likely to vary between airline companies.

Facilitating Conditions

Facilitating conditions represent another dimension where a slight yet notable gap is observed (UC2L: 3.4; Pilots: 3.00). The UC2L expresses confidence that basic training would be sufficient due to the IA's user-friendly nature. Pilot scores, while not negative, reflect a more conservative view of readiness. This suggests a need for structured training pathways, better familiarisation efforts, and perhaps stronger integration with existing systems and routines to fully support confident and autonomous use.

Perceived Risk

The UC2L perceives the assistant as non-threatening (score: 5), with malfunctions expected to affect secondary performance indicators (e.g., passenger comfort, efficiency) rather than flight safety. Pilots, however, rated perceived risk at 3.36, indicating a more critical stance. While not viewing the system as inherently unsafe, pilots may worry about potential distractions, misunderstandings, or over-reliance. Furthermore, concerns were raised about the potential broader impact on traffic control, highlighting the need for careful consideration and early involvement of ATM stakeholders in the next stages of the design process to safely support system maturity and growth.

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Behavioural Intention
Behavioural intention to use the IA was unanimously high from the UC2L (score: 5), premised on its ability to support decision-making in complex scenarios and its ease of recommendation. Pilots, while generally supportive, reported a lower score (3.80), implying that intent to adopt is conditional. Willingness exists, but depends on system performance, integration, and clarity of added value.

Trust
Trust was rated at the maximum value by the UC2L (score: 5), supported by the system's explainability and the preservation of pilot decision authority. Pilot responses, averaging 3.67, reflect a healthy but developing trust. While generally positive, this score suggests that confidence in system reliability and data privacy is not yet fully consolidated. Continued exposure, transparency, and communication about the assistant's capabilities and boundaries will be crucial to deepening trust.

The comparative assessment of OLIVIA reveals an encouraging yet cautiously differentiated picture of societal acceptance. From a strategic perspective, the UC2L expresses strong endorsement across all key dimensions, viewing the IA as a valuable, safe, and trustworthy support system. Pilots, while not rejecting these views, provide a more measured and operationally grounded perspective. Overall, the pilots' feedback points to a system with high potential, yet still in need of targeted refinements in usability, trust-building mechanisms, and organisational embedding. Notably, dimensions such as perceived usefulness and ease of use show strong alignment, signalling a solid functional foundation. However, divergences in subjective norms, perceived risk, and behavioural intention underline the importance of supporting adoption through training, transparency, and peer validation.
Importantly, trust, as a linchpin of acceptance, is still maturing. While explainability and control structures are appreciated, confidence in the system's robustness and institutional safeguards remains in formation.

1.1.2.4.Use Case 3: Digital Intelligent Assistant for Urban Air Mobility coordinator to assist in traffic management

The results of the study on the societal acceptance of DUC (Digital intelligent assistant for UAM Coordinator) was analysed together with the Use Case 3 Leadership Team and 9 users in Validation 2. It is important to note that, since UAM is still an evolving concept and the UAM Coordinator role does not yet exist, the participants involved were ATCOs,

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professionals whose role share some similarities but also significant differences. As such, while their input is valuable, their feedback cannot be considered fully equivalent to that of actual end-users, as in the other use cases. The results are summarised in Figure 5 and further detailed below.

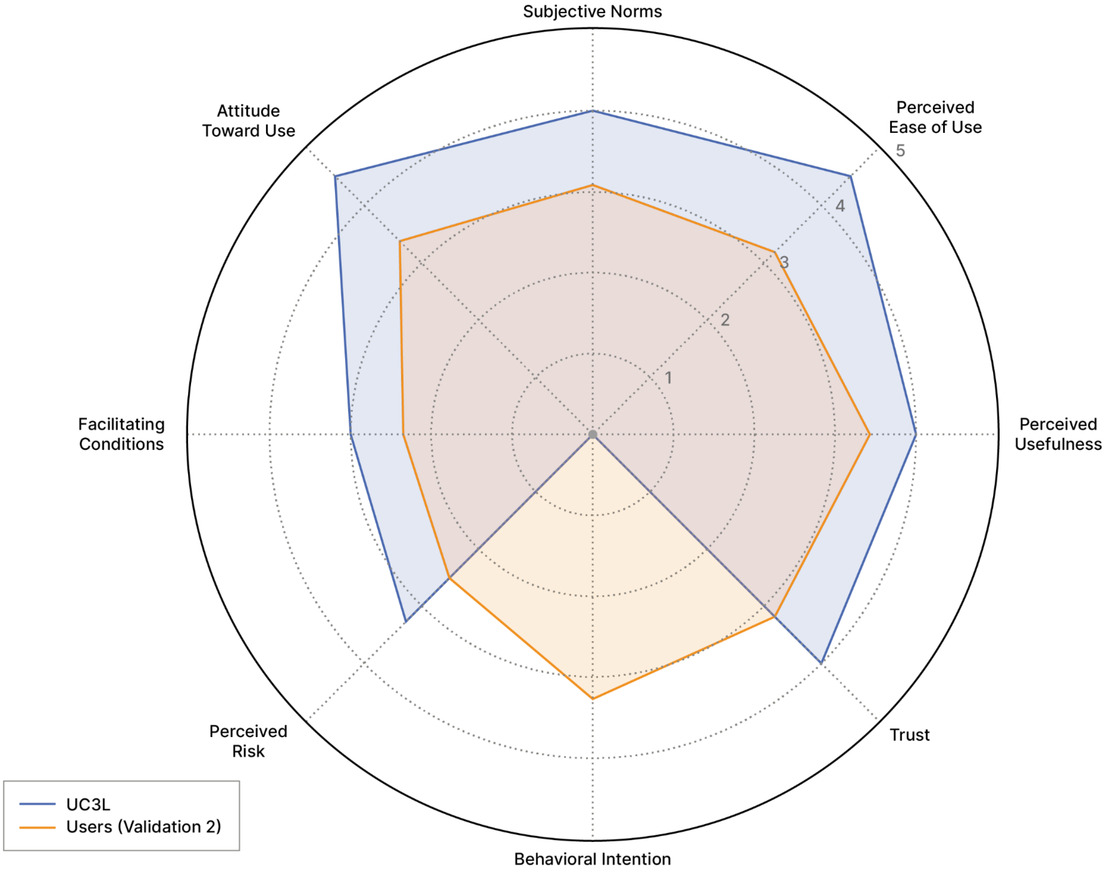

Figure 5. Societal Acceptance UC3 Results
(spider-chart comparing the responses of the use case leadership team - blue - and ATCOs - orange)

Perceived Usefulness
The UC3L rated the usefulness of DUC at 4, citing its relevance in enabling coordination under high traffic loads and its potential to execute complex tasks beyond human capacity. However, they noted that its utility would depend on levels of trust. Users provided a slightly lower score (3.41), recognising that "if I can rely on the DUC, it has the potential to improve operations". Others expressed a more cautious stance, suggesting that "maybe the quality, not quantity" of coordination would benefit, or noting that the DUC is "correct, some good things there..." but not yet transformative.

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These perspectives underline the assistant's promise while reinforcing the importance of real-world validation.

Perceived Ease of Use

The UC3L described the system as intuitive and mentally supportive (score: 4.5), but deferred full judgment pending further validation. In contrast, users assigned a more restrained average score (3.17). While some agreed that the assistant "won't require looking up things as much," others indicated reservations, stating "it takes away my role completely" or highlighting concerns about responsibility: "It all depends on the responsibility between human and system." These remarks reflect the need for clearly defined interaction boundaries and better support for collaborative teaming.

Subjective Norms

UC3L acknowledged a neutral outlook regarding societal acceptance, noting that public and institutional support would hinge on broader acceptance of UAM and AI integration. The users' score (3.07) aligns with this ambivalence. One respondent remarked that "depends on how advanced DUC is," while another noted that "some will recommend it, some won't," signalling a lack of unified perception among peers. This suggests that societal acceptance of DUC will require simultaneous efforts to strengthen both the UAM concept and trust in AI coordination tools.

Attitude Toward Use

A positive attitude was expressed by UC3L (4.5), seeing DUC as a critical enabler of future operations, albeit with emerging safety concerns. Users, however, provided a more measured score (3.39). One participant commented that the DUC may be useful "in some cases, but not in every situation," while others questioned its impact on human roles: "It makes the decisions so my role is hard to see." These comments underscore the importance of maintaining clarity of human responsibility and preserving the UAM Coordinator's agency within the system.

Facilitating Conditions

This dimension showed a marked gap (UC3L: 3; Users: 2.31). The UC3L recognised the need for dedicated training, procedural support, and fallback mechanisms. User comments reinforce this need, suggesting that "it hasn't really been tested - what if a lot of stuff goes wrong?" or that "guidance and checklists are essential." These statements highlight the perceived fragility of current preparedness - which is aligned with the TRL maturity level achieved, reinforcing the need for comprehensive training frameworks and robust resilience planning.

Perceived Risk

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While the UC3L acknowledged moderate risks (score: 3.3) and stressed the importance of backups, users provided a lower score (2.53), with several expressing uncertainty about system reliability and skill degradation. One user remarked, “hard to say, don’t know how it works,” while another pointed to the need for oversight: “This is a must, but also the hard part if you ask me.” These insights underline the importance of transparency, monitoring, and fail-safe design in mitigating risk perception.

Behavioural Intention

Although behavioural intention was officially considered not applicable by UC3L, user input (score: 3.24) nonetheless suggests tentative engagement. While some respondents expressed openness - “depends on how advanced DUC is” - others questioned whether DUC would be the preferred choice, stating, “Maybe in some cases, but not always.” These conditional attitudes imply that behavioural intention will strengthen only as confidence in system performance grows.

Trust

Trust received a score of 4 from the UC3L, supported by perceived system reliability and accuracy. Users reported a somewhat lower level of trust (3.19), reflecting a cautious optimism. One user noted, “I should trust, but do I?” while another said, “depends on personal experience.” These responses signal that trust is still forming and remains highly context-dependent. Notably, trust in privacy and security mechanisms was particularly tentative, with remarks such as “Computers - can it be trusted?” and “maybe in time... ,” reinforcing the importance of institutional oversight and continuous evaluation.

The analysis of the Digital Assistant for UAM Coordination reveals a dynamic and evolving perception landscape. While the UC3 leadership views the DUC as an essential element in enabling future UAM scalability and safety, user feedback illustrates a tempered and experience-driven approach, characterised by cautious optimism and a clear call for greater transparency, procedural support, and operational validation. The most significant discrepancies between UC leaders and users lie in facilitating conditions and perceived risk. Users highlight a readiness gap, citing the need for robust training, fallback procedures, and role-specific guidance. These requirements are not merely technical; they are preconditions for trust, acceptance, and safe deployment. Trust, as consistently observed across use cases, remains a formative construct.

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1.1.2.5. Use Case 4: Intelligent Assistant for tower (and remote tower) controllers to assist in routine and repetitive tasks for aircraft on approach

The societal acceptance of the Intelligent Sequence Assistant (ISA) was analysed in detail by involving both the Use Case 4 Leader (UC4L) and the 8 Tower Controllers involved in Validation 1. A comparative analysis between the responses of UC4 leaders and the controllers involved in the experiment was carried out resulting in general acknowledgement of the potential benefits of integrating ISA into tower control operations, with slight discrepancies between the perceptions of UC4 leaders and those of the end users. The results are summarised in Figure 6 and further detailed below.

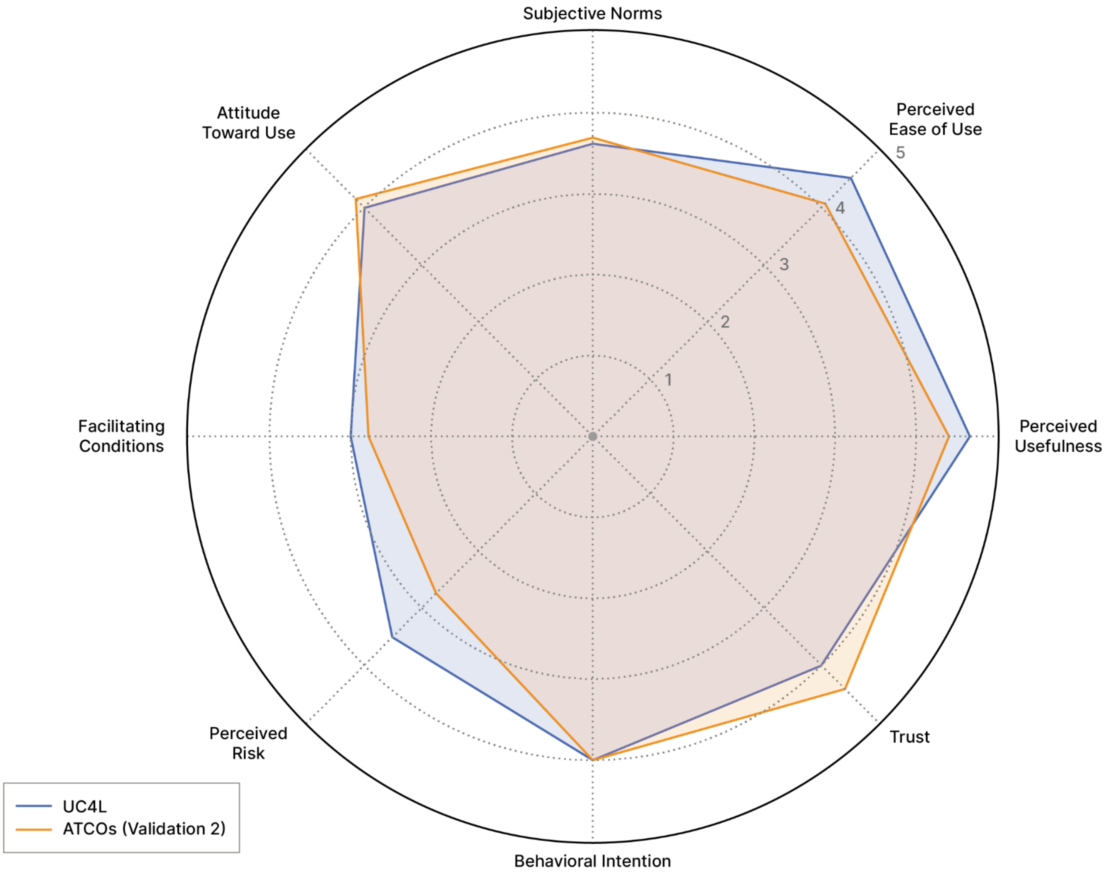

Figure 6. Societal Acceptance UC4 Results
(spider-chart comparing the responses of the use case leadership team - blue - and ATCOs - orange)

Perceived Usefulness
The UC4L rated the perceived usefulness of ISA at 4.7, emphasising its capacity to expedite sequencing tasks and improve operational productivity, particularly under high

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workload conditions. ATCOs echoed this positive view with a high average score of 4.42. While the overall judgement confirms the assistant's relevance, some ATCOs noted that its benefits are more evident during peak traffic, while in low traffic situations, ISA support may be perceived as redundant. Importantly, a few participants expressed doubts about the benefits the system can offer in less standardised contexts (e.g., small airports with VFR operations and flight school traffic), highlighting that its perceived usefulness is closely linked to the types of airport.

Perceived Ease of Use

Perceived ease of use received strong ratings from both the UC4L (4.5) and ATCOs (4.07). Participants agreed that ISA has the potential to reduce mental workload, particularly in time-sensitive contexts. The Human-Machine Interface (HMI) prototype was positively received, described as intuitive and easy to navigate. However, opportunities for further improvement emerged, particularly in making the AI more adaptable to individual working styles. To maximise the effectiveness of AI solutions, optimise Human–AI Teaming, and enhance operational efficiency, systems should be capable of adapting to - and learning from - each operator's unique way of working.

Subjective Norms

Both UC4L and ATCOs acknowledged a favourable perception of subjective norms, with scores of 3.6 and 3.68 respectively. However, the UC4L raised concerns about individual acceptance, particularly in relation to potential workforce reduction, while ATCOs exhibited a broader range of views. Some expressed apprehension about job security and societal perception, while others conveyed optimism, stating that the integration of ISA aligns with wider AI acceptance trends. The perception that ISA contributes to safety and efficiency appears to be a consistent factor promoting acceptance across both institutional and societal levels.

Attitude Toward Use

Attitudes toward ISA were highly positive (UC4L score: 4; ATCOs average: 4.14), indicating a strong openness to integrating the system into daily operations. This suggests that ISA is viewed not merely as a support tool but as a valuable asset in traffic management. While earlier analyses indicated some resistance among older ATCOs, the current average suggests an overall shift toward endorsement, with remaining hesitations appearing to be context-dependent rather than generationally driven.

Facilitating Conditions

Facilitating conditions remained one of the lower-scoring dimensions (UC4L: 3; ATCOs: 2.8). Both parties agreed that successful adoption of ISA would require targeted

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interventions. While ATCOs generally felt capable of using ISA, they emphasised the need for structured training, clear system documentation, and predefined contingency procedures. These enabling factors are considered vital not only for operational safety but also for fostering operator confidence and autonomy when interacting with ISA.

Perceived Risk

The perceived risk dimension revealed a divergence in perceived severity (UC4L: 3.5; ATCOs: 2.71). ATCOs expressed moderate concern regarding system malfunctions, overreliance, cyber vulnerabilities, and particularly the potential degradation of controller skills. These risks are not considered prohibitive, but they underscore the necessity of integrating ISA with human-centred safeguards. For instance, reflections were made on how to introduce ISA to novice controllers. It was suggested that ISA should not be made available to novices initially, as they first need to develop the skills required to manage complexity. Instead, its introduction would be more appropriate at a later stage in their training.

Behavioural Intention

Both UC4L and ATCOs assigned ISA a behavioural intention score of 4, suggesting that the assistant is broadly welcomed and that users are willing to adopt and recommend it. Notably, ATCOs emphasised ISA's value in complex or high-traffic scenarios, as well as its potential to support the learning process of less experienced controllers when used as a quantitative parameter to evaluate and debrief ATCO performance in simulation environments. This suggests that the system is not only seen as a real-time aid but also as an enabler for training and performance development.

Trust

Trust received particularly strong ratings (UC4L: 4; ATCOs: 4.42), making it one of the highest-scoring dimensions overall. ATCOs conveyed confidence in the robustness of the aviation system and its regulatory frameworks, which are seen as guarantees of the assistant's safety and performance. This level of trust is rooted not only in the perceived reliability of the ISA itself but in the broader institutional processes that govern its deployment, evaluation, and continuous improvement.

The evaluation of the Intelligent Sequencing Assistant (ISA) reveals an encouraging consensus between the UC4 leadership and operational stakeholders regarding the assistant's value in supporting sequencing, productivity, and controller workload. While the UC4L provides a strategic endorsement, ATCOs validate its practical relevance - particularly under high-stress conditions - demonstrating that ISA is viewed as a credible and welcome tool within the air traffic management ecosystem. The few areas of divergence - specifically regarding perceived risk and facilitating conditions - highlight the importance of continued operational validation, tailored training, and

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contingency planning. Importantly, ATCOs' concern about overreliance and skill degradation underscores the need for human-in-the-loop strategies and procedural resilience, particularly in non-nominal situations. Trust, ease of use, and behavioural intention all scored highly, indicating that the foundations for societal acceptance are well established.

1.1.2.6. Use Case 5: Intelligent Assistant in the airport to assist safety in data analysis

The results of the study on the societal acceptance of the Airport Safety Watch (ASW) was analysed together with the London Luton Airport Stack interviewees (LLA). The results are summarised in Figure 7 and further detailed below.

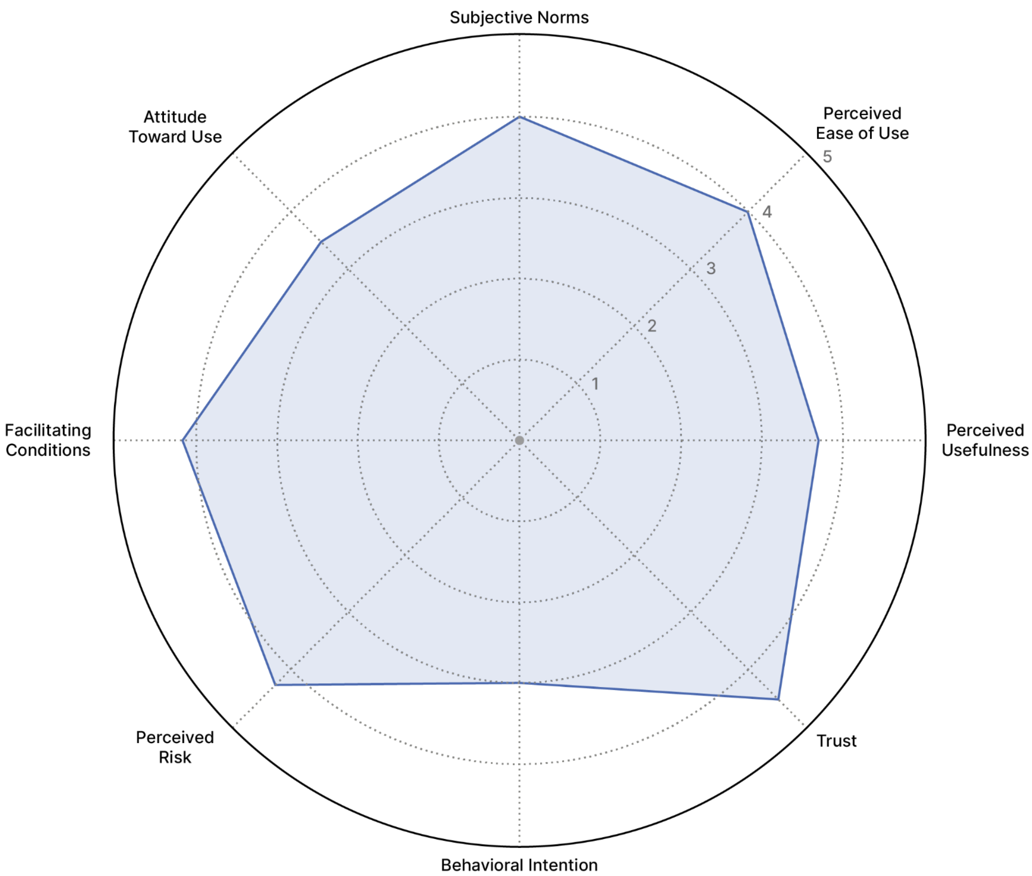

Figure 7. Societal Acceptance UC5 Results

The **perceived usefulness** of ASW received good ratings (score: 3.6), acknowledging that its main goal is to enable airport safety personnel to identify and better understand

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safety risks and hazards, providing new possible solutions to tackle both existing and evolving problems.
Concerning **perceived ease of use**, the participants expressed positive sentiments about ASW reducing mental effort in understanding safety risks and hazards (score: 4) as it helps the LLA Stack partners to explore the data in new ways.

Subjective norms received a positive rating (score: 4.3), denoting a strong support and alignment of individual values with the introduction and use of ASW. However, the study highlighted a dependence on the societal mindset toward AI at the time of implementation, suggesting the need for targeted awareness strategies to address potential organisational hesitations. The scores for societal favour and perception of ASW as a safety and efficiency improvement were 4, indicating conditional support based on societal acceptance.

Overall positive **attitudes toward ASW usage** were observed (score: 4). However, these positive attitudes were contingent on the evolution of ASW over time, emphasising the necessity for continuous improvements and updates to maintain positive perceptions.

Facilitating conditions are acknowledged to be the dimension where a set of targeted interventions may be required (score: 2.6). Concerns were raised about the knowledge and experience required for effective ASW utilisation, particularly in the domain of data science. Participants held diverse opinions on the need for specific training, and some underscored the necessity of guidance to understand ASW behaviours, indicating a need for tailored educational initiatives. High confidence in maintaining safety even in case of ASW failures was acknowledged.

Perceived risks were considered moderate (score: 3.3), prompting participants to advocate for a HAZOP study to address potential threats and risks associated with ASW. Notably, there was an acknowledgment that ASW malfunctions may not necessarily undermine airport safety, and extensive usage should not lead to skills degradation. The perceived costs associated with ASW, not from a financial perspective but from data sharing concerns, scored a 3, particularly relevant in VAL2.

Behavioural intention (score: 3.8) showed a preference for opting for ASW in complex scenarios, especially when traditional techniques proved ineffective in addressing stubborn incident patterns.

Trust in ASW was moderate (score: 3.7), with participants adopting a wait-and-see approach, contingent on future performance and results. While trust in the accuracy and reliability of ASW suggestions scored relatively high with a score of 4, confidence

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in the security and privacy measures was tied to ASW being considered an add-on to existing systems. The integrated comments underscored the importance of a holistic reassessment in VAL2, particularly in terms of security and privacy measures.

In conclusion, the study suggests an overall positive initial reception of ASW among airport safety personnel, with promising feedback on perceived usefulness and positive attitudes. The integrated comments provide valuable insights into specific areas requiring attention, such as interface intuitiveness, societal mindset considerations, and comprehensive assessments in subsequent phases.

1.1.2.7. Use Case 6: Intelligent Assistant in the airport to monitor risk factor conditions associated with indoor spread of infectious diseases

The results of the study on the societal acceptance of COVAID (Covid Aid Intelligent Assistant) was analysed together with the Use Case 6 Leader Team and the 20 Users involved in Validation 2. The results are summarised in Figure 8 and further detailed below.

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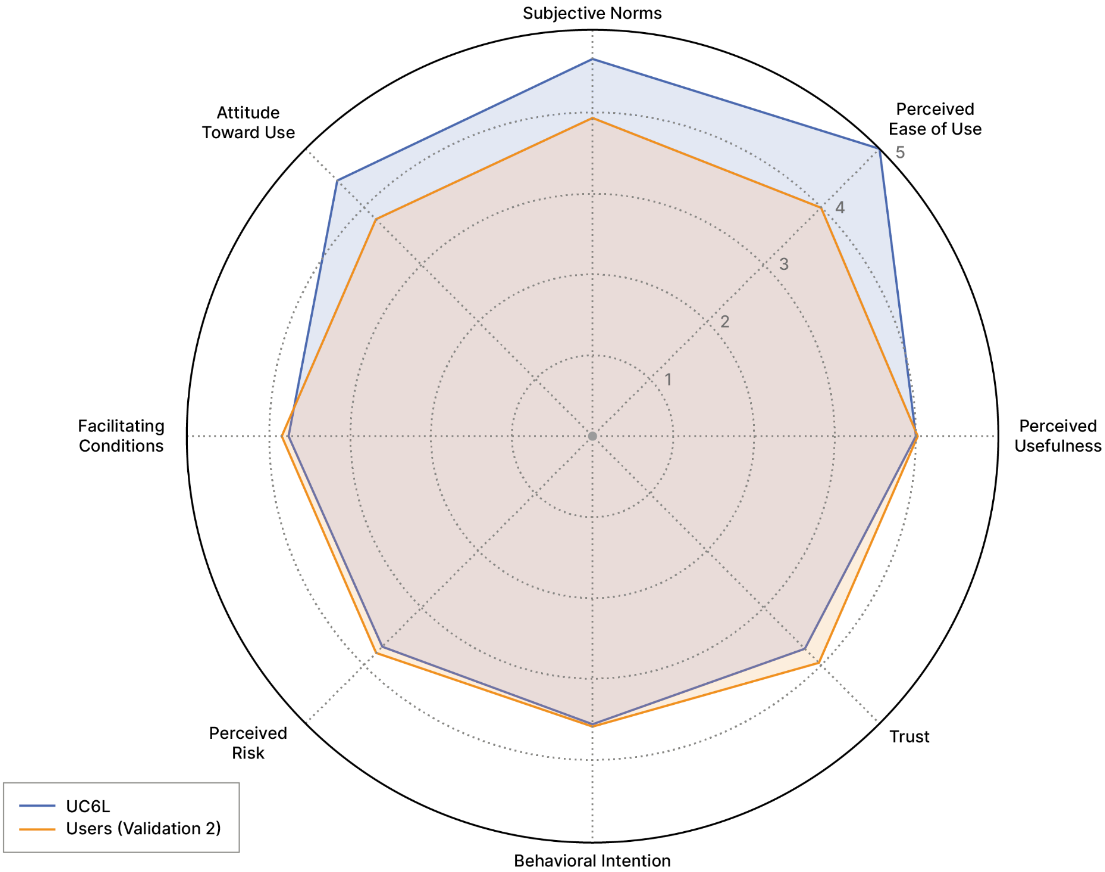

Figure 8. Societal Acceptance UC6 Results
(spider-chart comparing the responses of the use case leadership team - blue - and passengers - orange)

Perceived Usefulness

Perceived usefulness was positively rated by both UC6L (score: 4) and Validation 2 users (average: 4.02). The UC6L highlighted COVAID's potential contribution to public health by supporting disease prevention efforts within the airport environment. Users corroborated this view, perceiving COVAID as a helpful tool, particularly in high-density areas. However, the UC6L noted reservations regarding its impact on airport productivity (score: 3), which were not strongly reflected in user feedback - suggesting that operational concerns are more prominent from a leadership than from a passenger standpoint.

Perceived Ease of Use

Ease of use was one of the most positively evaluated dimensions, with UC6L assigning a maximum score (5) and users closely aligning (average: 4.00). COVAID was perceived as intuitive and easily navigable by the general public. The UC6L expressed high confidence in passengers' ability to engage with the application autonomously, though

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a cautionary note was introduced regarding potential mental stress caused by health-related digital procedures. This aligns with the user perspective, which affirms usability but implicitly assumes that supportive onboarding and clear instructions will be critical for adoption.

Subjective Norms

The UC6L rated subjective norms highly (average: 4.67), indicating a strong alignment between individual beliefs, social expectations, and support for disease prevention technologies. This includes anticipated societal approval, especially in the post-quarantine context. User scores (average: 3.95) reflect a similar outlook, suggesting that societal endorsement is broadly assumed, although slightly more tentative at the personal level. This subtle gap may reflect differing degrees of exposure to health technologies or variation in privacy attitudes.

Attitude Toward Use

The UC6L expressed a favourable attitude toward COVAID (score: 4.5), emphasising its perceived role in enhancing airport safety. Validation 2 users also reported a strong average score (3.81), indicating willingness to use the application under appropriate conditions. The slightly lower score from users may reflect a level of caution stemming from uncertainties about performance or the implications of AI involvement in health screening tasks.

Facilitating Conditions

Facilitating conditions were evaluated positively by both the UC6L (3.8) and users (3.9), with minor variance. The UC6L underscored the importance of ensuring passengers are equipped with clear guidance and an optimised user interface to avoid unnecessary stress. Users appeared confident in their ability to interact with COVAID, though their score suggests that the practical availability of support tools (e.g. onboarding, multilingual interfaces) will be essential for seamless use in real-world settings.

Perceived Risk

Perceived risk was one of the more cautiously rated dimensions. The UC6L reported concerns about system malfunctions and their consequences, such as crowding or incorrect alerts (average score: 3.67). Validation 2 users expressed similar reservations (average: 3.78), pointing to potential unintended effects and signalling a demand for transparency in system behaviour. The scores reflect a healthy vigilance without significant alarm, suggesting that risk perceptions are manageable if accompanied by clear accountability structures and fallback procedures.

Behavioural Intention

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Behavioural intention to use COVAID received a moderate score from both the UC6L (3.5) and users (3.53), confirming a conditional openness. The UC6L noted that passengers' likelihood to adopt and recommend COVAID would depend on their experience with its reliability and visibility within the broader travel ecosystem. This was echoed by users, suggesting that awareness campaigns, demonstrations of efficacy, and trust-building mechanisms will be pivotal in shifting intention into action.

Trust

Trust received a strong rating from the UC6L (average: 3.67), based on the assumption that confidence in COVAID will evolve with consistent usage and transparent system performance. The UC6L also flagged concerns about the extent of personal data collection, which may affect user acceptance, especially if the system becomes more deeply integrated across multiple travel checkpoints. Users reported a slightly higher average score (3.95), indicating a favourable but conditional trust—likely dependent on institutional assurances about privacy, data security, and transparency in how decisions are made.

The comparative assessment of COVAID reveals a generally positive and aligned outlook on its societal acceptance, particularly in light of recent public health crises and increasing digitalisation of passenger services. Both the UC6L and users recognise its value in mitigating health risks and acknowledge its potential to be seamlessly integrated into the airport experience. Notably, dimensions such as ease of use, subjective norms, and trust show strong and convergent scores, suggesting a readiness to engage with the system, provided that deployment is paired with transparency and thoughtful design. Minor gaps appear in attitude toward use and behavioural intention, where user endorsement is clearly present but still subject to confirmation through direct experience and perceived reliability. The perceived risk dimension emerges as a strategic area of focus. Although users and leadership did not express acute concerns, there is a shared recognition that operational and data-related risks must be explicitly addressed.

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1.2. Assessing General Public attitudes toward AI and the Future of Aviation

The transformative potential of AI is becoming increasingly evident across various domains of contemporary life - from personal digital assistants to autonomous vehicles. Alongside the sector- and application-specific investigations conducted within the HAIKU project and detailed in Chapter 1 of this Section, a comprehensive analysis also requires an in-depth exploration of the general public's perception and willingness to access both this relatively new technology and the potential future of aviation.

To this end, a survey targeting the general public was designed to explore societal attitudes toward AI and its envisioned role in shaping future mobility and public services. The questionnaire aimed to gauge levels of knowledge, emotional responses, perceived benefits and risks, and expectations regarding AI applications, with particular attention to its role in transforming air transport systems. Ultimately, the goal is to capture nuanced insights into how the public anticipates, supports, or resists the future developments of AI, thus complementing the use case-specific considerations reported in the earlier part of this deliverable.

1.2.1. Survey

The survey consists of 17 questions and was made available in all the national languages of the consortium partners (Greek, Italian, English, Spanish, Swedish, French, German, and Portuguese) to ensure broad accessibility and cultural relevance across HAIKU's diverse stakeholder landscape.

Its questions and answer options were carefully crafted to use language accessible to non-experts, facilitating clear and straightforward responses. However, underlying the survey are more complex models, essential for meaningful analysis and interpretation of the results.

The questionnaire was self-administered and distributed in digital format across all participating countries between January and April 2025. The estimated completion time was approximately 10 minutes, a deliberate prerequisite aimed at ensuring accessibility and increasing the likelihood of voluntary participation.
The questionnaire is structured in 5 sections:

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- Section 1 – Preliminary Information (Q1–Q2): This section served to assess the respondents' baseline knowledge regarding AI and the aviation sector. Understanding the self-reported familiarity with these domains was necessary to contextualise subsequent answers and identify possible correlations between expertise and attitude.
- Section 2 – Demographics (Q3–Q7): Key demographic data were collected to support intersectional analysis across variables such as age group, education level, professional status, and country of residence. These variables allow for a culturally and generationally informed interpretation of AI perceptions.
- Section 3 – AI Perception (Q8–Q9): This section aimed to investigate the public's evaluation of recent technological innovations and the personal benefits experienced. It served as a baseline for understanding what kinds of innovations are perceived as valuable and to what extent these experiences influence openness to future technologies.
- Section 4 – AI Attitudes and Expectations (Q10–Q13): This was the core of the AI-related section, focused on emotions, expectations, and concerns related to AI. Questions were inspired by the typologies and digital assistant categories developed in HAIKU (D3.2, 2023). Respondents were asked to express their emotional responses, imagine future AI roles in their lives, and reflect on anticipated advantages and perceived threats, including ethical, security, and social implications.
- Section 5 – Acceptance of Future Aviation (Q14–Q17): The final section presented speculative but realistic scenarios depicting AI applications in future aviation systems - such as pilot-less aircraft, biometric security, autonomous traffic management, and drone-based deliveries. These questions were intended to measure the public's willingness to accept or reject such developments and to capture their motivations.

The full questionnaire can be found in Annex B.

The multi-lingual deployment of the survey ensured inclusivity and interpretive consistency across partner countries. Data collection was anonymised and voluntary, in full respect of ethical guidelines for public research participation.

1.2.2. Respondents overview

The questionnaire achieved a strong response rate, with a total of 614 completed surveys from 17 different European countries (Table 1).

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Table 1: Distribution of survey respondents by nationality

COUNTRY	N. OF RESPONDENTS
Italy	211
France	161
Germany	68
Greece	46
Spain	39
Sweden	36
Portugal	21
Slovenia	6
Netherlands	5
UK	5
Lituania	4
Rumenia	4
Hungary	3
Belgium	2
Latvia	1
Norway	1
Poland	1
Total	614

The results reflect a diverse range of perspectives, not only across countries of origin but also with a balanced representation of gender, age groups, education levels, and occupational backgrounds (Figure 9).

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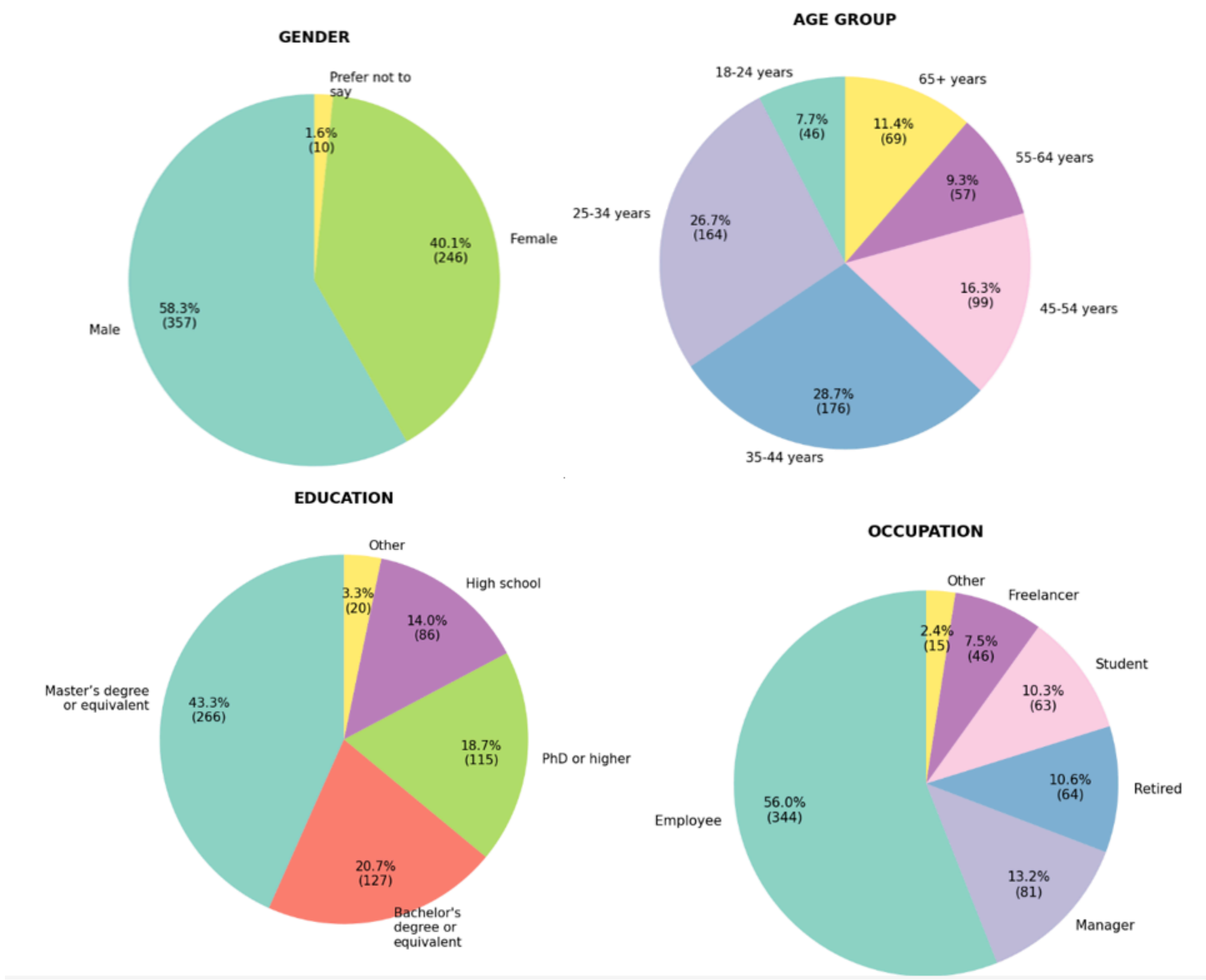

Figure 9: Distribution of survey respondents by gender (Q4), age (Q3), level of education (Q5), and occupation (Q6)

They also encompass viewpoints from individuals with varying levels of knowledge about AI and aviation, ranging from complete novices to experts (Figure 10).

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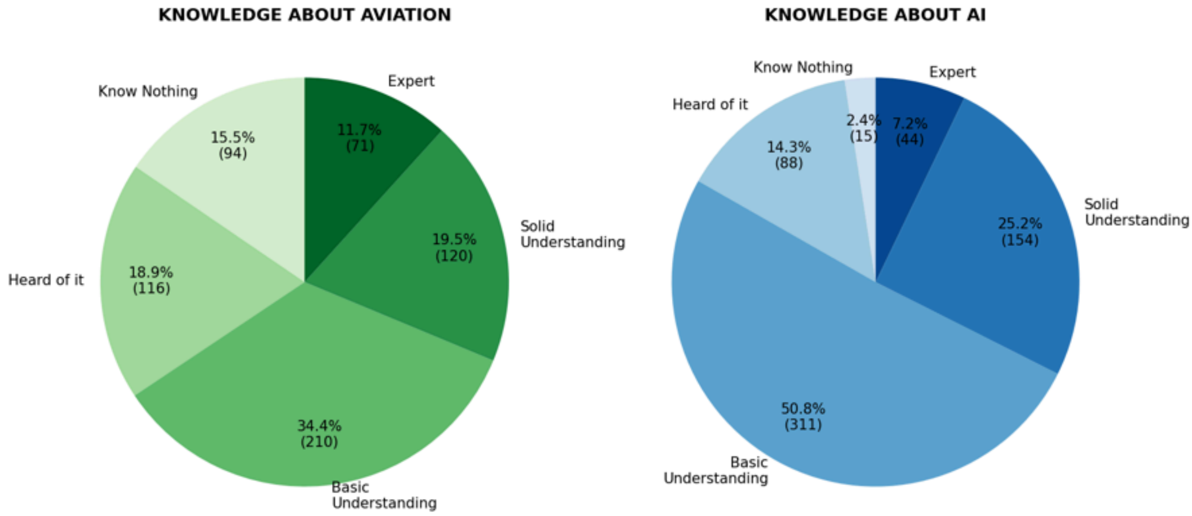

Figure 10: Respondents' distribution by AI (Q1) and aviation knowledge (Q2)

1.2.3. Results

1.2.3.1. Synthesis

The assessment of societal perception and acceptance of AI and the potential future of aviation represents a key outcome that complements the more application-specific investigations carried out within the HAIKU project and described in Chapter 1 of this Section.

This analysis highlights a **general sense of curiosity and openness toward AI**, with the **level of AI knowledge** playing a significant role in shaping both its current use and the perceived benefits. Indeed, individuals with limited or no AI knowledge tend to use it mainly in everyday contexts, while those with higher expertise integrate it more into professional settings. Likewise, emotional responses vary significantly: people unfamiliar with AI often express worry and anxiety, whereas more knowledgeable participants report mostly positive feelings such as excitement, optimism, and inspiration.

In terms of desired applications and roles over the medium term (5 years), AI is predominantly seen as a **potential support tool for data and information management**. Interest in its role in task execution increases with AI familiarity. However, there is a **clear rejection of the idea of AI acting as an autonomous decision-maker or full manager**, even though its value in supporting problem-solving and improving decision-making accuracy is acknowledged.

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Furthermore, one aspect that deserves particular attention is the **limited recognition of AI as a teammate**. This indicates that AI is still predominantly perceived as a tool rather than a collaborative partner, and that the concept of Human-AI Teaming (HAT) remains far from being widely accepted or understood. This highlights the need for significant societal preparation before such a paradigm shift can be realistically implemented in real-world operations.

It is important to highlight that **safety and security are not widely perceived as areas where AI can deliver clear benefits**. This perception is particularly evident among AI experts, who not only question the added value of AI in these areas but also raise specific concerns and anticipate potential risks. This insight represents a crucial point of reflection - both for the HAIKU project and for the aviation community at large - when considering where to integrate AI into safety-critical domains such as aviation.

Focusing on aviation, futuristic scenarios such as *pilotless flight* are still **far from public acceptance**, whereas concepts like *highly automated airports* are met with **more positive approval**.
AI-driven air traffic management systems appear to be **generally accepted**, despite their safety-critical nature - possibly because their role is largely "invisible" from the passenger's perspective, making them less tangible and, consequently, less perceived as a threat by the general public.
Lastly, public acceptance of *drones delivery services* appears **favorable**, though mostly restricted to urgent cases (e.g. medicine delivery).

The detailed analysis is available in the following Chapters 1.2.3.2 and 1.2.3.3.

1.2.3.2. AI Perception and Acceptance

To investigate the general public's perception and willingness to accept AI, a preliminary analysis was conducted focusing on *past experiences with technological innovation*. Participants were asked to identify the technological innovations that had the most significant impact on their lives over the past ten years. As illustrated in Figure 11:

- **Social media platforms** and **on-demand streaming services** were most commonly cited as the key game changers of recent years.
- Respondents *with little or no AI background* tended to value **innovations that directly affect everyday life**, such as assisted driving systems, personalized e-commerce experiences, and wearable devices for fitness and health tracking.
- In contrast, individuals *with a strong AI-related background* were more likely to highlight **advanced tools often used in professional contexts**, such as ChatGPT,

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sophisticated chatbots, voice recognition systems, and transaction automation software.

Consistently, the *perceived benefits* of AI appear to shift depending on the respondent's level of expertise (Figure 12). Individuals with little or no background in AI tend to emphasize life-related advantages, such as improved convenience and enhanced social connectivity. In contrast, those with solid AI expertise are more likely to highlight work- and education-related benefits, including increased efficiency, productivity, and enhanced learning and skill development. Furthermore, the data suggests an **inverse relationship between AI knowledge and perceived benefits in terms of safety and security**: the more familiar respondents are with AI and technology, the less they tend to expect gains in these areas.

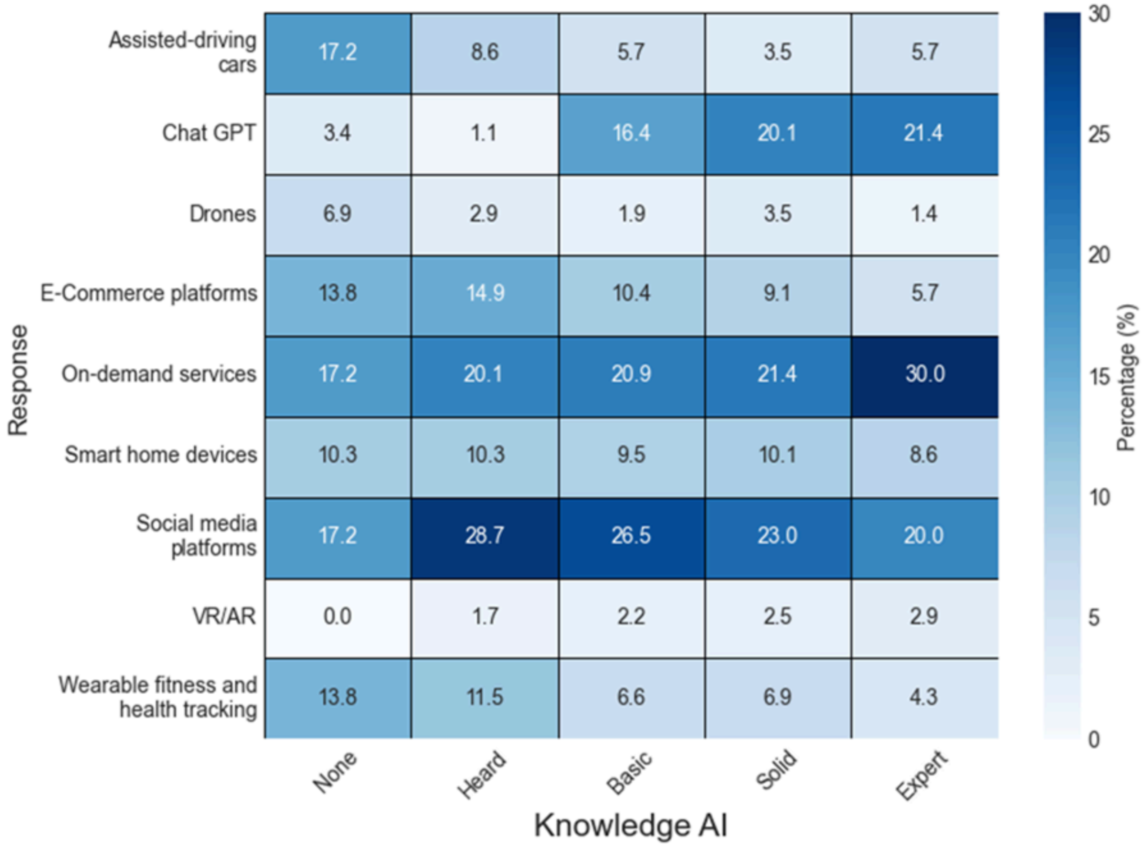

Figure 11: Technological innovations that had the greatest impact on participants' lives over the past ten years (Q8), correlated with their level of AI knowledge (Q1)

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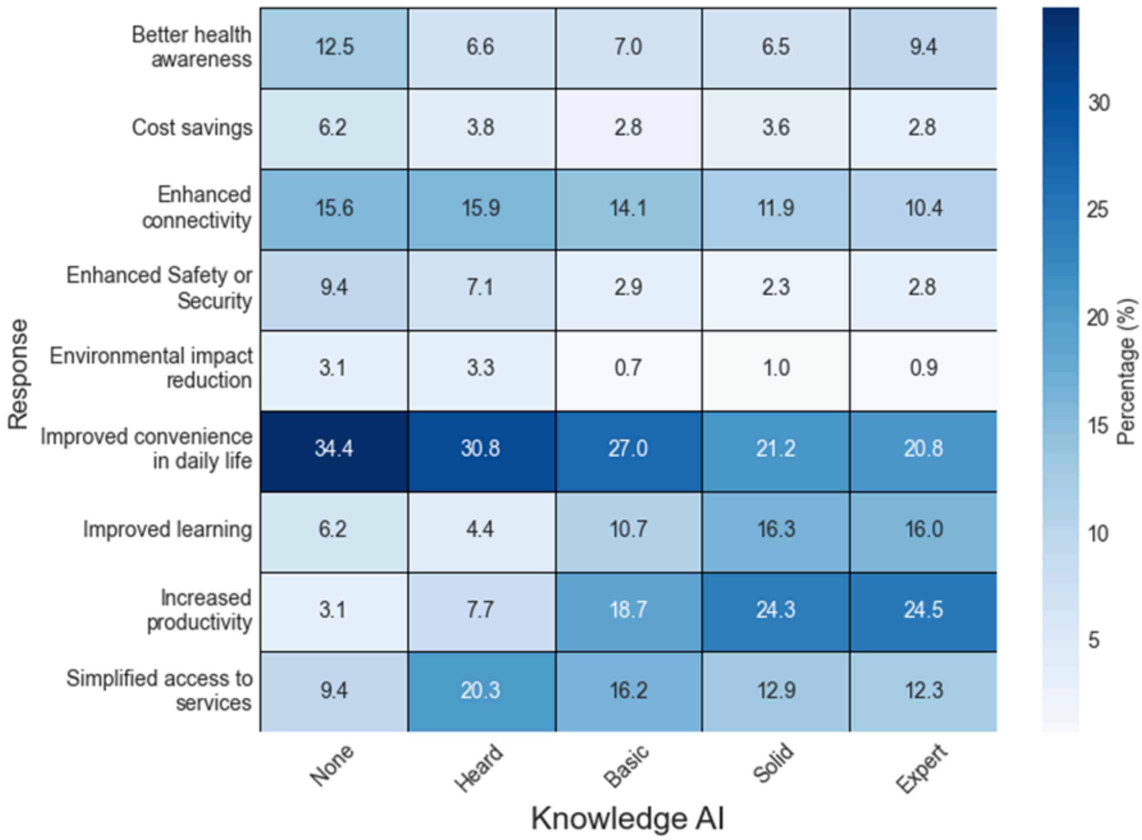

Figure 12: Main benefits associated with past technological innovations (Q9), shown in relation to respondents' level of AI knowledge (Q1)

When examining *feelings and emotions* specifically related to AI technology, respondents expressed a mix of reactions, with **positive emotions clearly prevailing** (Figure 13). Furthermore, as shown in Figure 14, **negative emotions tend to decrease as AI expertise increases**, highlighting how attitudes toward AI are closely linked to one's level of knowledge. Negative feelings are also more common among respondents aged 65 and older.

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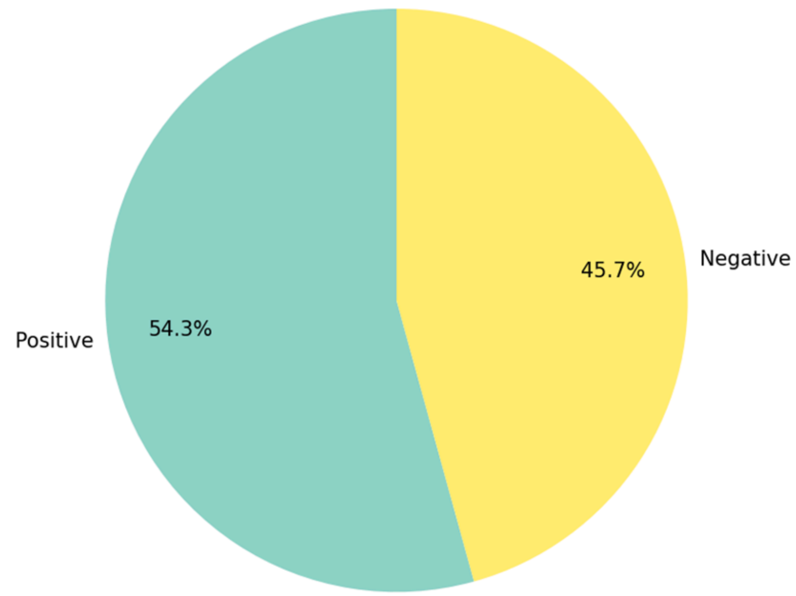

Figure 13: Emotional reactions to AI (Q10)

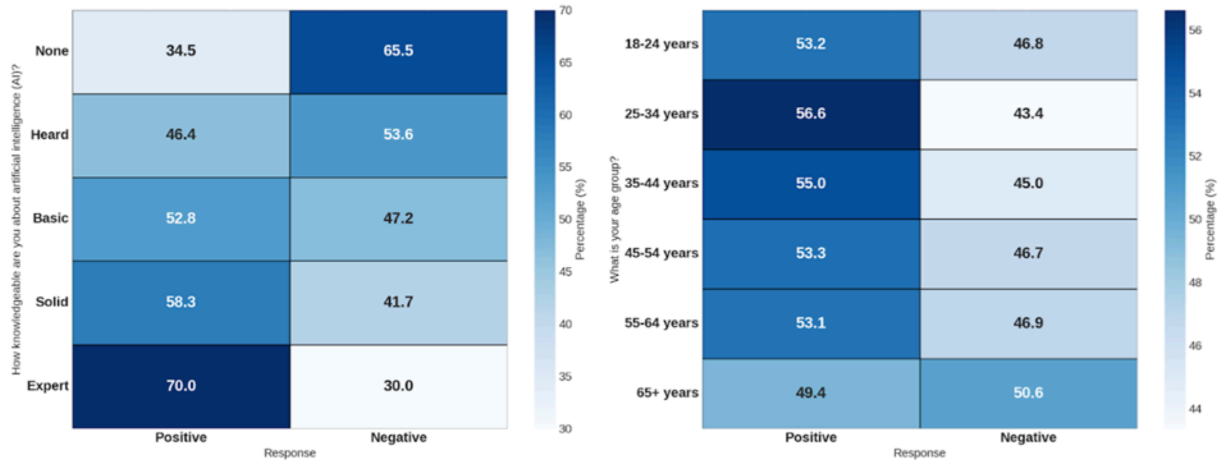

Figure 14: Emotional reactions to AI (Q10), in relation to AI knowledge (left) and age group (right)

Delving deeper into these emotions, Figure 15 reveals **a general curiosity about AI** across all knowledge levels. Those with lower AI knowledge tend to experience more caution, worry, and anxiety, while positive emotions such as excitement, optimism, and inspiration steadily increase with greater expertise. Despite this, **skepticism remains a frequent and common sentiment**, likely reflecting the fast-evolving nature of AI and its uncertain future, such reserved perspectives understandable.

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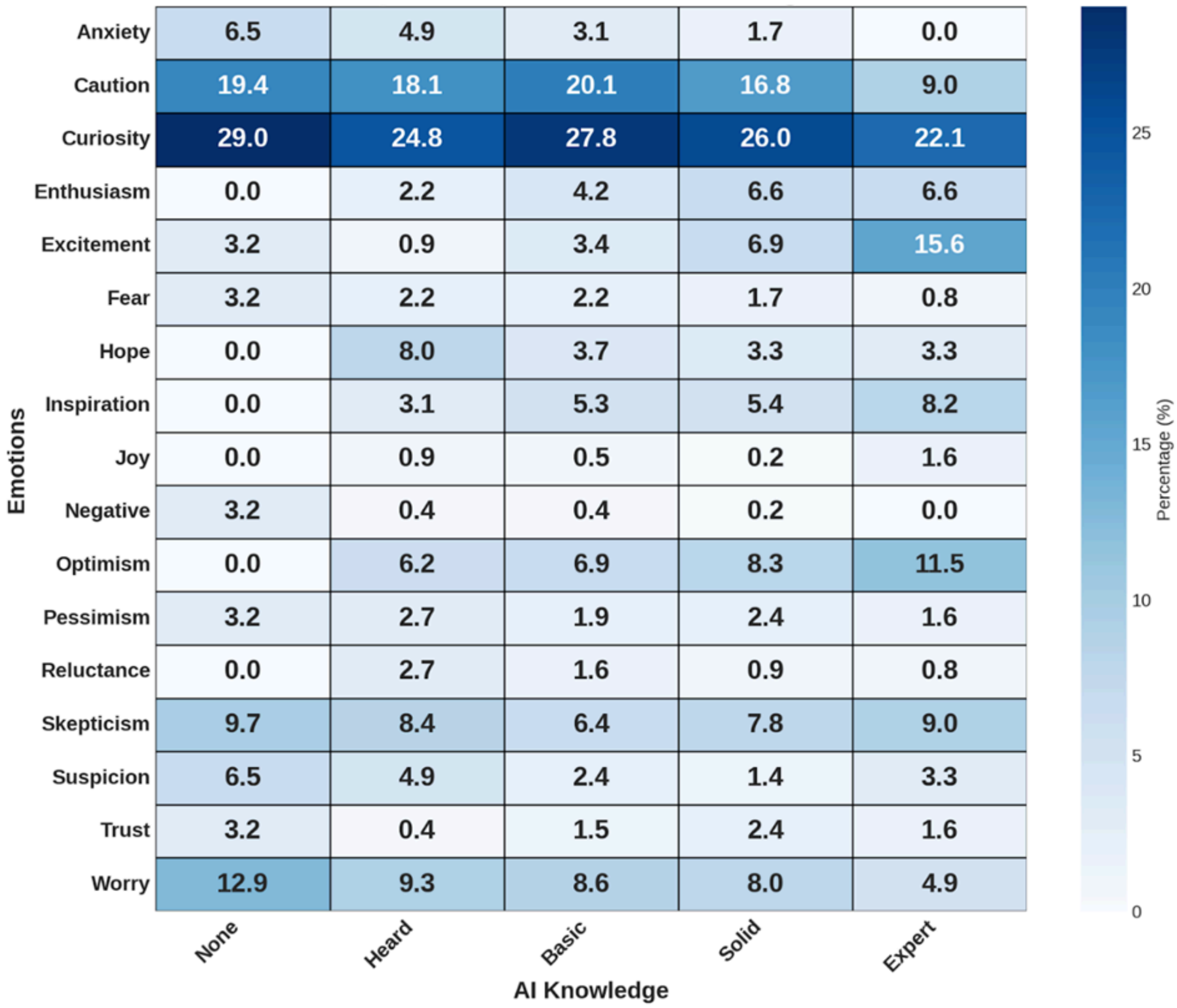

Figure 15: Breakdown of emotional reactions to AI (Q10) by respondents' level of AI knowledge

Exploring the *roles and types of support* that people mostly desire from AI over the medium term (5 years), along with the *perceived benefits*, Figure 16 clearly shows that the **perception of AI providing no support is very limited** and mostly reported by individuals with little or no AI knowledge. Considering three high-level types of AI support - ranging from information management, to assistance in task execution and coordination, to autonomous AI actions - Figures 16 and 17 highlight the following insights:

- People **primarily desire AI to support data and information analysis**, aiming for enhanced insights and help navigating cases of information overload (i.e., understanding complex situations involving multiple information sources), with AI acting as a digital analyst and informer.

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- The **desire for AI support in task execution** appears to **increase with higher levels of AI knowledge**, reflecting a preference for AI assistance in performing tasks and boosting productivity, where AI functions as a Digital Secretary. However, AI's role in organizational and coordination support is less valued.
- **Support for problem-solving is moderately appreciated** across all levels of AI knowledge. Nonetheless, there is **a clear rejection of AI acting as a decision-maker or full manager**, even though it is acknowledged that AI can help improve decision-making accuracy.

Focusing on transversal items - aimed at capturing further feelings associated with AI's potential roles - a few points deserve attention:

- Fear of AI as a digital deceiver or spy is observed, although this concern decreases as AI knowledge increases.
- AI is generally not perceived as a tool that can enhance safety and security.
- There is **very little recognition of AI as a true teammate** - whether as a digital colleague, friend, or even enemy - indicating that AI is primarily viewed as a tool and that the concept of Human-AI Teaming (HAT) is still far from being widely accepted or understood.

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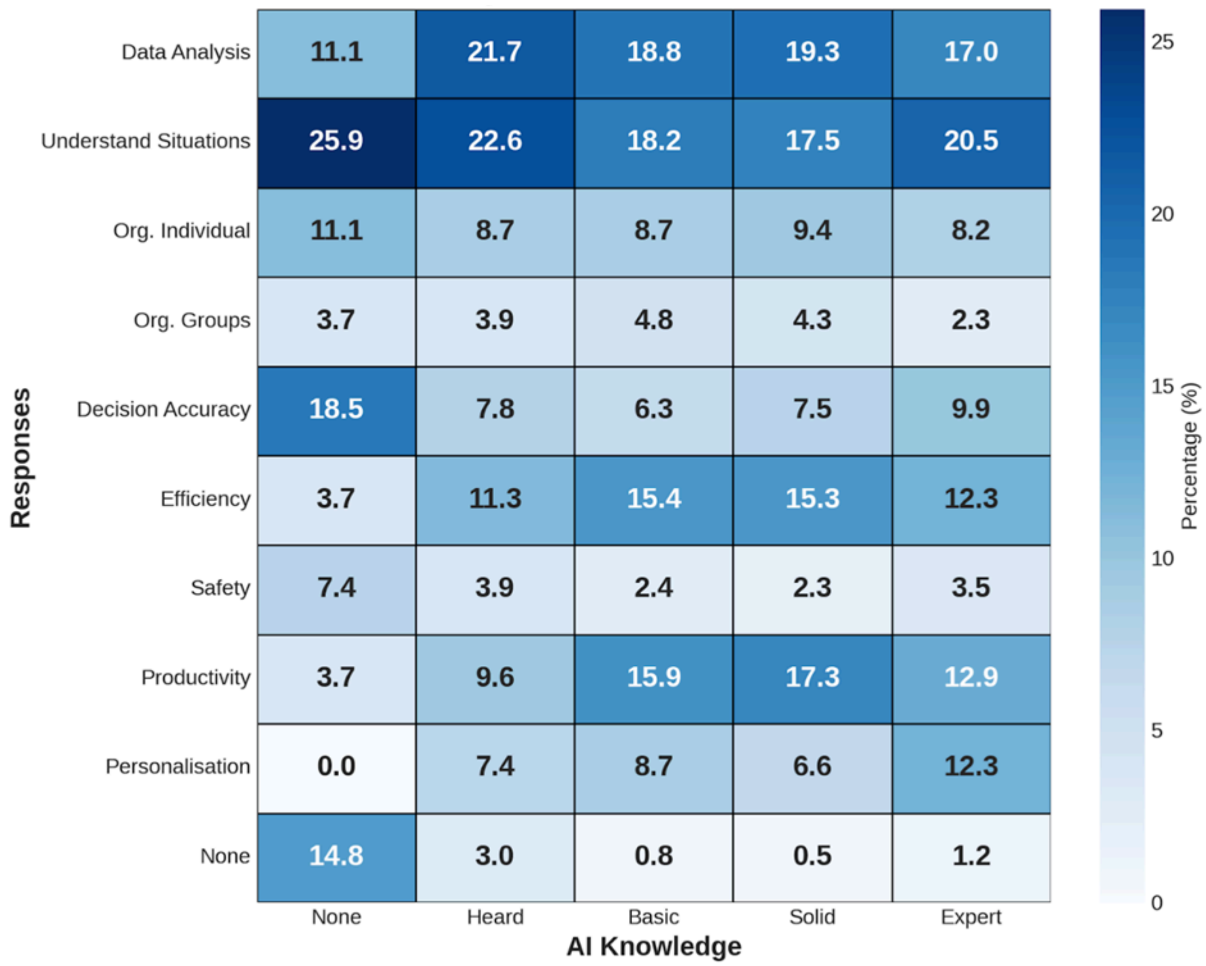

Figure 16: Perceived benefits of AI (Q12) by respondents' level of AI knowledge

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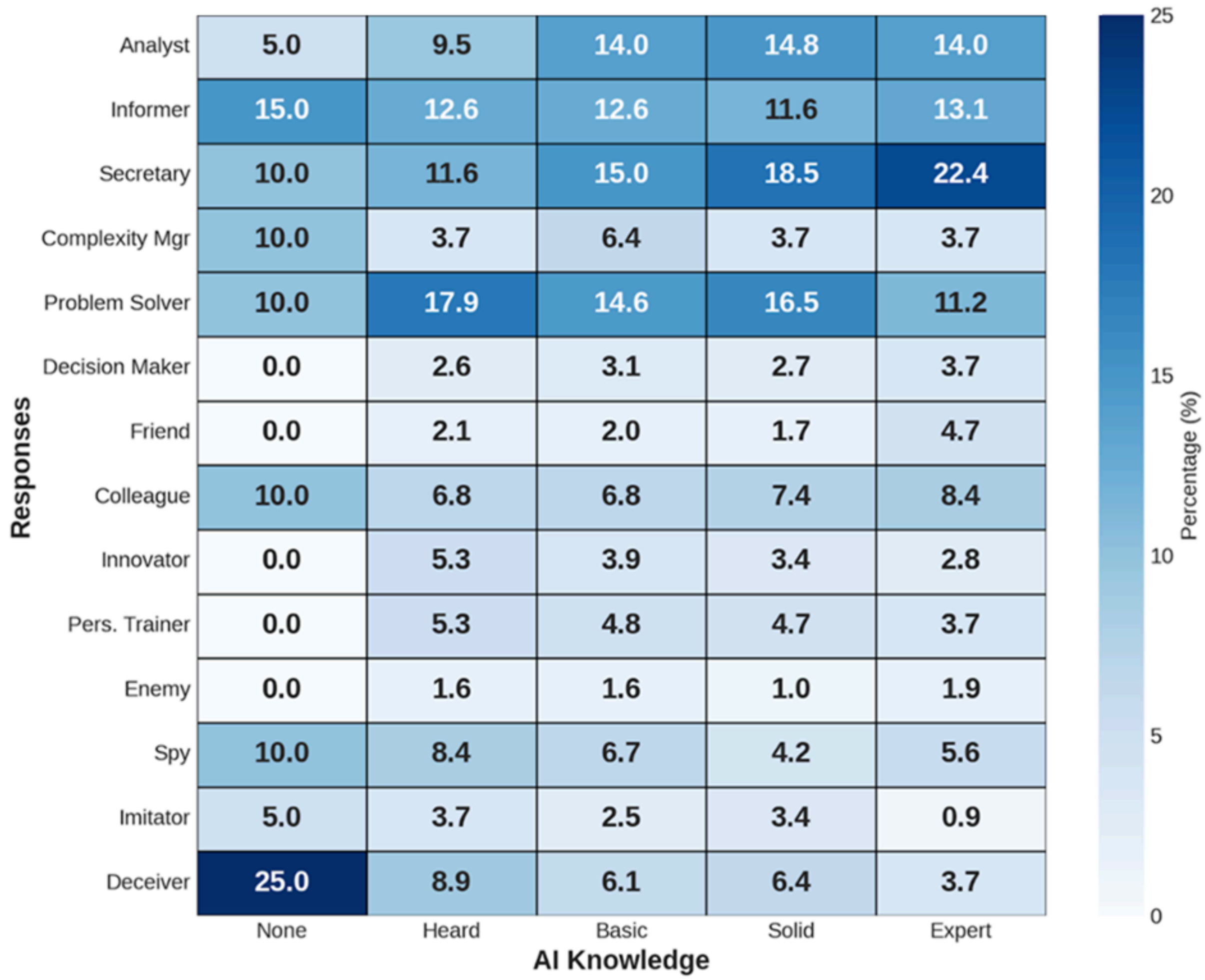

Figure 17: Desired roles of AI in the next five years (Q11), by respondents' level of AI knowledge

Lastly, examining the *perceived risks* (Figure 18), while no single risk dominates universally, some key patterns emerge:

- The perceived risks of increased **dependency** on technology and **job displacement** tend to **decrease** as AI knowledge increases.
- Concerns about **lack of transparency in AI decision-making** and potential **biases in AI algorithms grow** with higher levels of AI expertise.
- Worries about **skill degradation** and **unethical use of AI** are widespread across all levels of knowledge.

Furthermore, a few additional and final considerations on the results of Figure 18 and some previous observations are warranted:

- While AI is widely recognized for its value in information and data management, significant risks are associated with its use in this area. Experts tend to express

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concerns about AI-driven aggressive marketing practices that may distort public opinion and influence decisions, whereas those with less expertise are more focused on the **risk of AI spreading misinformation and fake news**.

- In addition to the earlier observation that AI is generally not perceived as a tool that enhances safety and security, this concern is further reinforced by the widespread expression of perceived risks related to these areas. Overall, the main concerns are predominantly associated with **security issues**, while **safety-related concerns are less frequently reported** and mainly recognized by individuals with higher levels of AI knowledge.

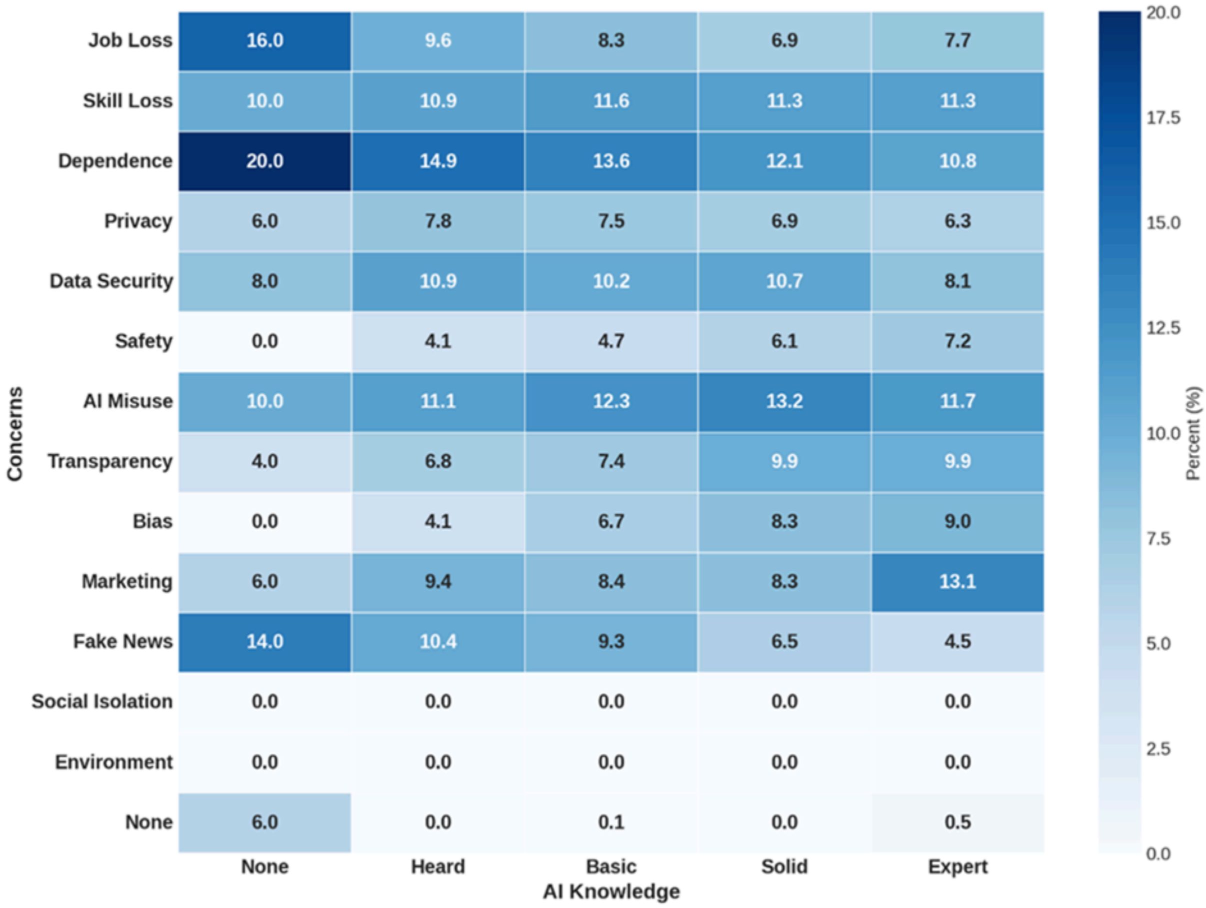

Figure 18: Key concerns about AI (Q13), by level of AI knowledge

1.2.3.3. Future of Aviation Perception and Acceptance

The general public's perception and willingness to accept potential future developments in the aviation industry (2050) - where AI is expected to play a key role - were explored

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through four scenarios: pilotless flights, biometric security at airports, autonomous air traffic management, and drone-based delivery of goods and services.

The idea of *flying on a pilotless aircraft* still appears **far from being accepted**, with rejection actually increasing among those with higher expertise in the aviation sector (Figure 19). Younger participants tend to be more open to the possibility of flying without a human pilot, but generally only under the condition of receiving positive feedback about the airline (Figure 20). In addition, the level of AI knowledge also seems to influence acceptance (Figure 21). Individuals with greater expertise in AI show a higher willingness to consider pilotless flights - once again highlighting how AI literacy plays a key role in shaping acceptance, even in highly safety-critical sectors such as aviation.

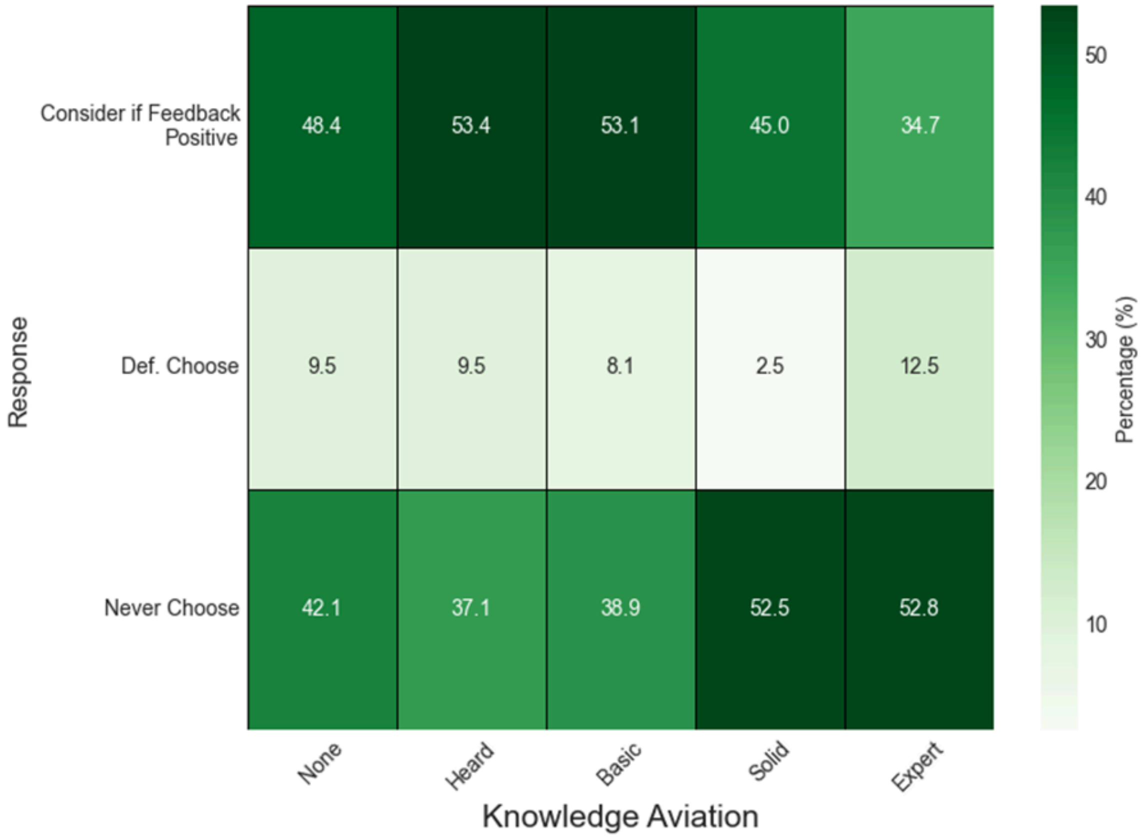

Figure 19: Openness to flying on a pilotless aircraft (Q14), segmented by aviation expertise level

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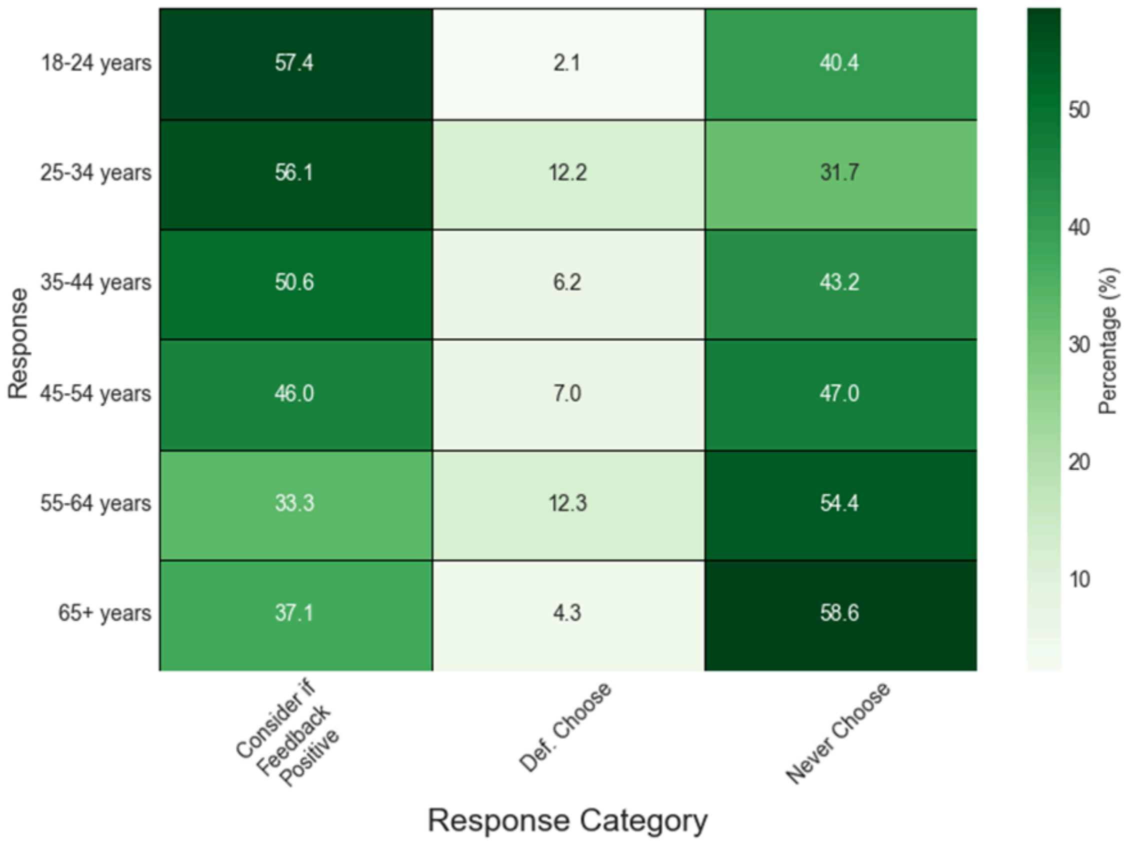

Figure 20: Openness to flying on a pilotless aircraft (Q14), segmented by age group

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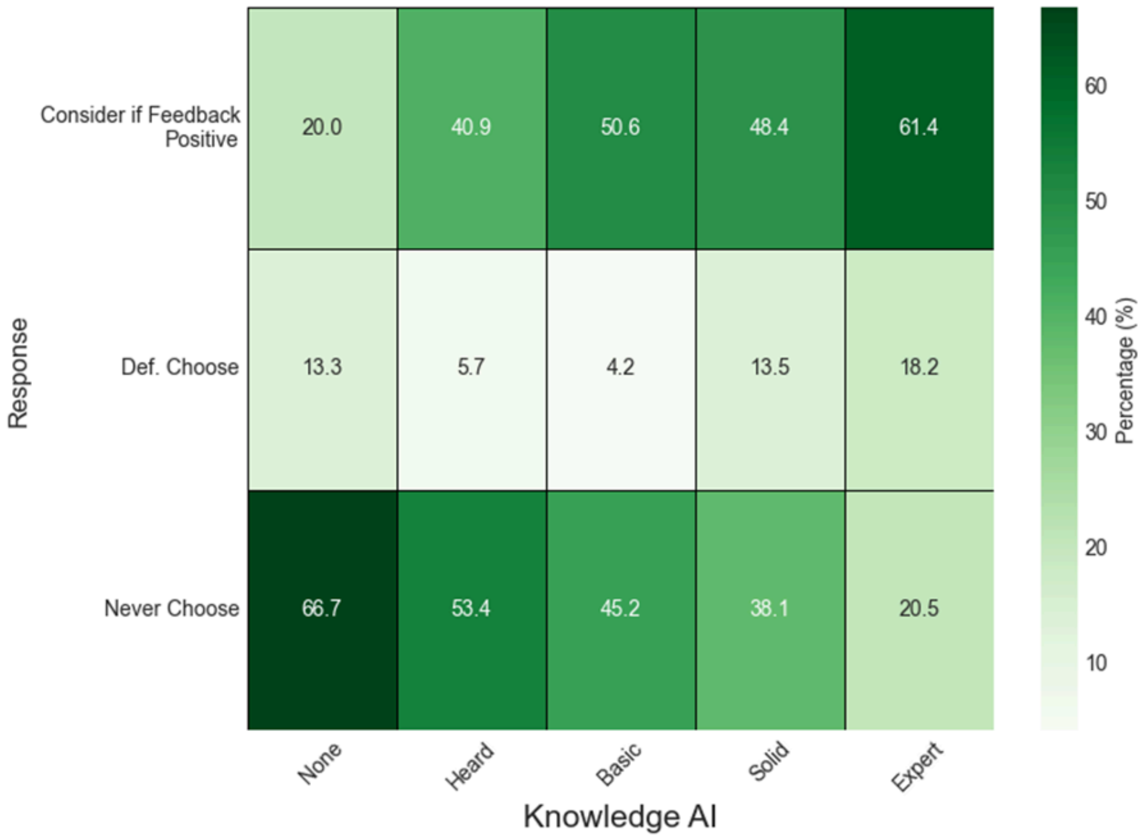

Figure 21: Openness to flying on a pilotless aircraft (Q14), by level of AI knowledge

Envisioning *future airports* with fast, autonomous check-in processes and seamless security checks powered by biometric recognition systems reveals a **generally positive response** (Figure 22). Acceptance appears consistent across all demographic groups, regardless of aviation expertise, age, AI knowledge, education, or occupation. While the level of enthusiasm remains moderate, no notable resistance to the concept has been observed.

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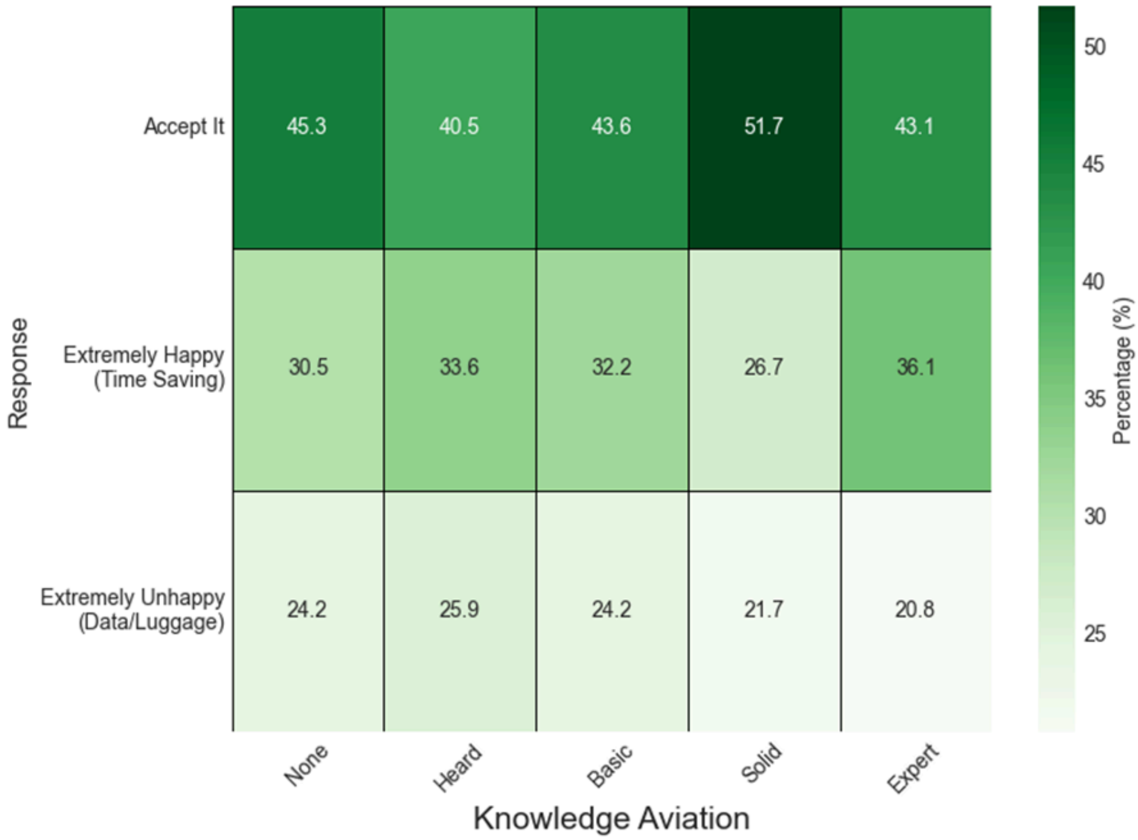

Figure 22: Acceptance of highly automated future airports (Q15), segmented by level of aviation expertise

When considering *future air traffic management systems* - where traffic is autonomously managed by AI-based technologies and human operators are trained to intervene only in case of anomalies or emergencies - the concept appears to be **generally accepted** (Figure 23). While some individuals report **feeling slightly less safe** compared to current systems, this does not represent significant resistance from the public and is unlikely to pose a major barrier for the aviation industry. This may be due to the fact that such systems operate behind the scenes, largely out of public view. Indeed, the perception of reduced safety tends to increase with higher levels of aviation knowledge.

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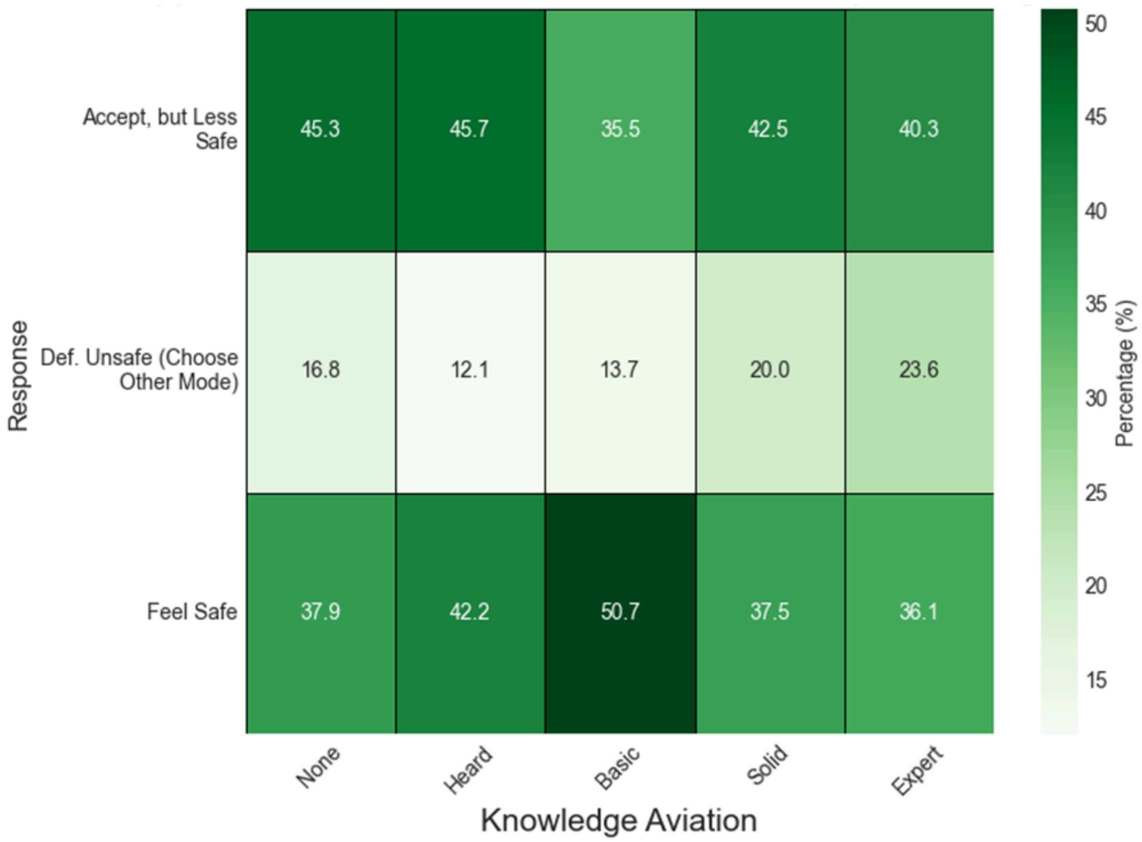

Figure 23: Acceptance of future air traffic management (Q16), by aviation expertise.

Lastly, when it comes to the world of *drones*, envisioning a scenario where fleets of pilotless drones deliver a wide range of goods to people's homes within a few hours, respondents generally **show support**, particularly **for urgent purchases** (e.g. medicines) (Figures 24, 25, 26).

A cross-analysis of responses by age, aviation expertise, and AI knowledge reveals some key patterns:

- Views among respondents with aviation expertise are more polarized, with some strongly supporting the idea and others clearly opposing it, an aspect that may warrant further investigation (Figure 24).
- Interestingly, the strongest preference for limiting drone delivery to urgent needs comes from the youngest (18–24) and oldest (55+) age groups, while respondents in the middle age ranges are generally more open to a broader use of the service beyond emergencies (Figure 25).
- AI knowledge also plays a significant role: participants with little or no AI background tend to favor drone delivery mainly for urgent needs, whereas those with stronger AI expertise are more inclined to support its use for everyday purchases (Figure 26).

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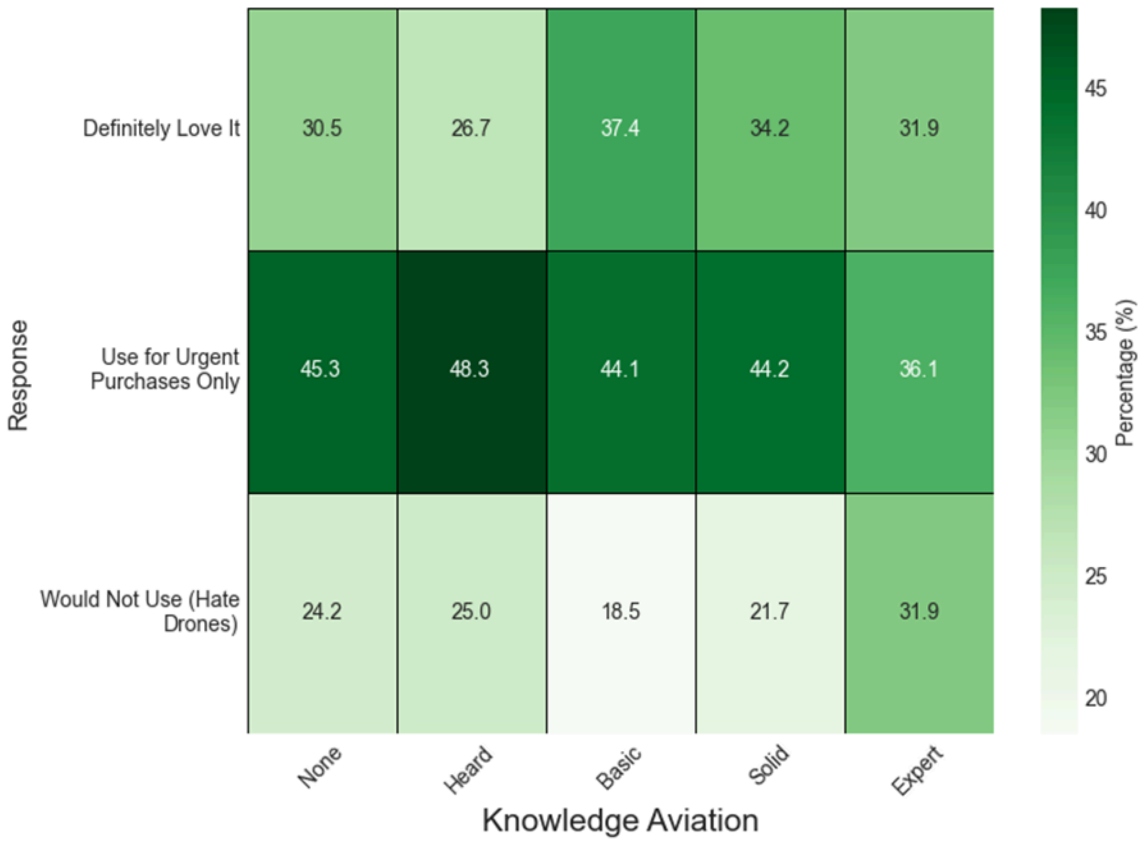

Figure 24: Acceptance of drones services (Q17), by aviation expertise

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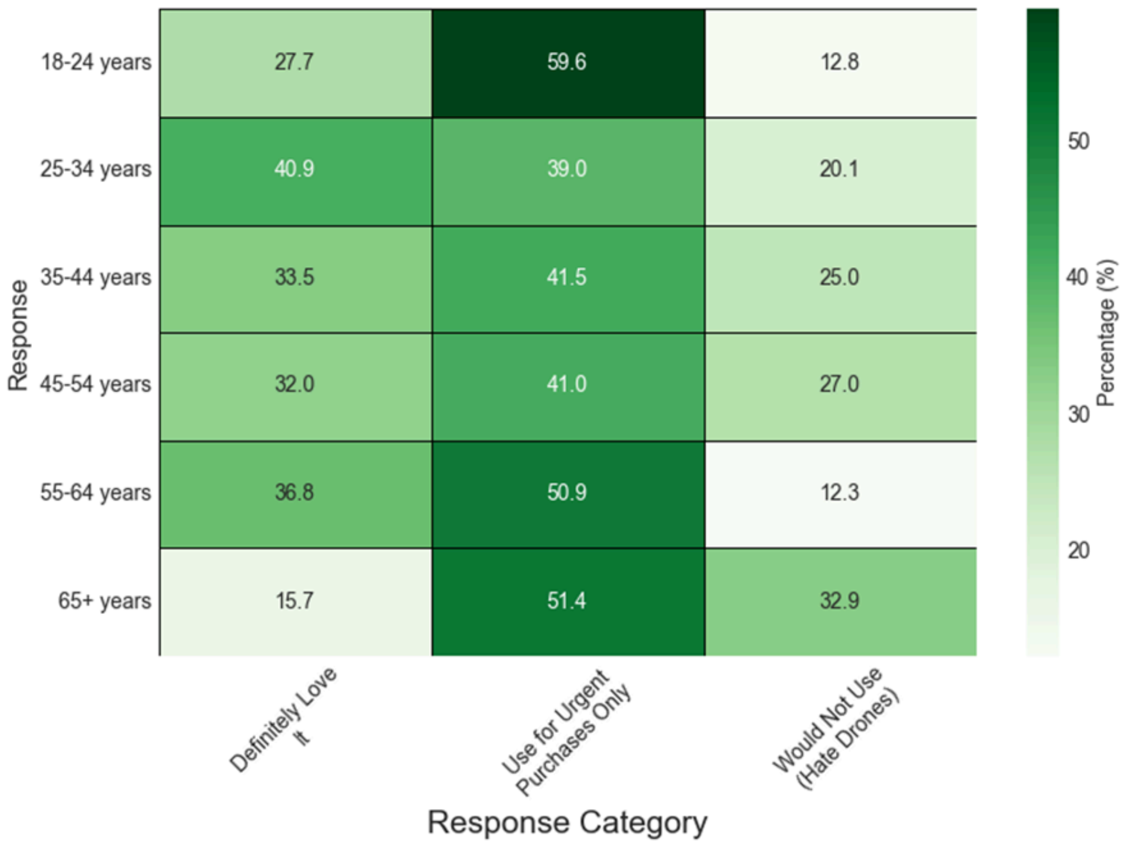

Figure 25: Acceptance of drones services (Q17), by age group

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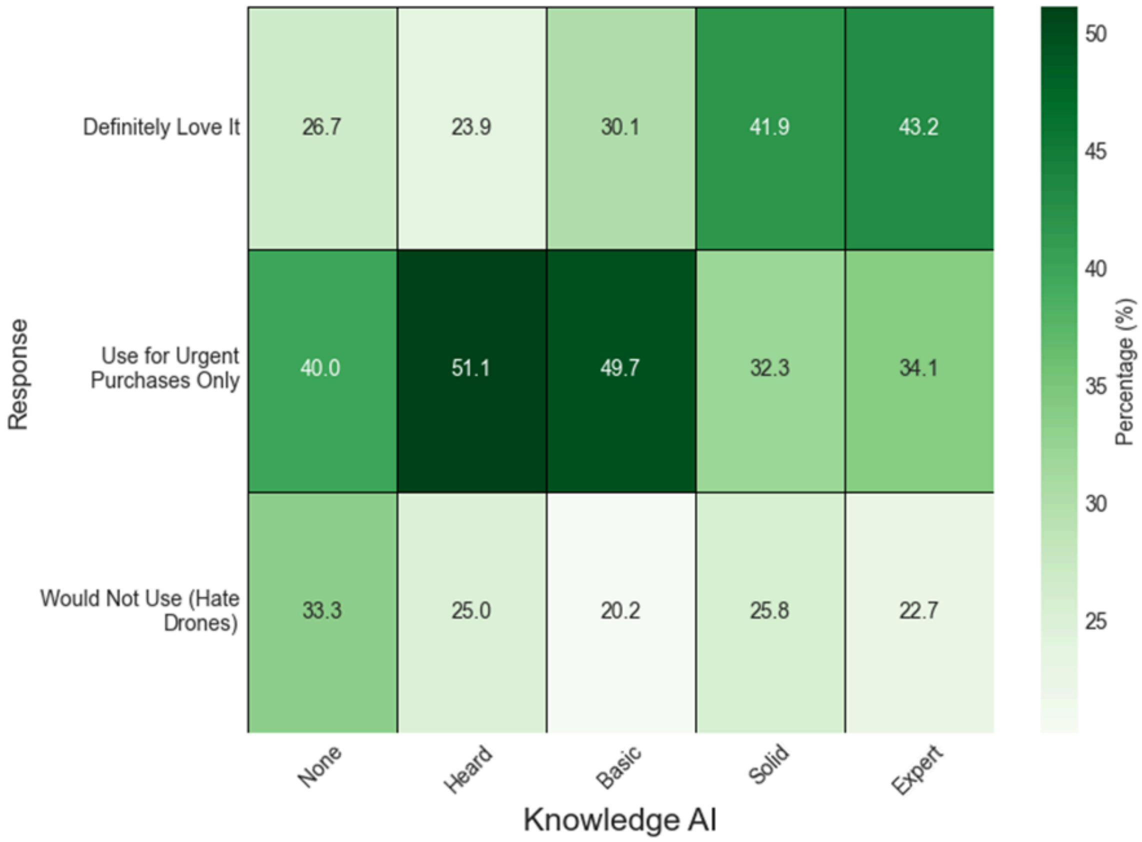

Figure 26: Acceptance of drones services (Q17), by AI knowledge level

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1.3. Conclusions

The assessment of societal perception and acceptance of AI presented above has uncovered clear insights that provide a solid foundation for developing practical recommendations aimed at facilitating the successful integration of this emerging technology, particularly in safety-critical sectors like aviation.

1. ***"People fear what they don't know"***: AI literacy and system-specific training emerged as the most powerful enablers of societal acceptance, and, consequently, of successful AI adoption. This leads to the first two key recommendations:
    - Recommendation #1 – **Promote AI literacy starting now.**
    Offering clear, accessible education about AI - its capabilities, limitations, and implications - helps people move beyond scary misconceptions toward a more optimistic and hopeful perspective. This foundational knowledge is essential to encourage acceptance of AI technologies.
    - Recommendation #2 – **Involve end-users throughout the design process.**
    Involving end-users throughout the entire design and implementation process—especially in safety-critical fields like aviation—ensures that AI systems are built with real-world needs and operational realities in mind. This collaboration helps users understand the system better and fosters trust, making adoption smoother and more effective.

2. ***"People won't take a bigger step than they are ready for"***: While there is a general openness and curiosity toward AI, people need time to become familiar with it and build trust before they feel comfortable delegating critical tasks such as coordination and decision-making. Our analysis reveals a strong correlation between AI knowledge and its usage: individuals with limited familiarity tend to start using AI for simple, every-day-life activities, gradually expanding to professional and more complex applications as their understanding grows. This insight leads to the third recommendation:
    - Recommendation #3 - **Design AI to help humans with what they are not good at.** Rather than aiming immediately for complex AI applications, begin by developing systems that assist with tasks they find challenging or tedious - such as data processing or analysis. Demonstrating AI's value in these areas helps users gain confidence, paving the way for adoption in more critical, high-stakes activities.

3. ***"People are the most critical - yet most effective - safety layer"***: People are aware of their own fallibility, but they also recognize their irreplaceable flexibility and

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responsiveness in complex or high-stakes situations. This points to the final recommendation:

- Recommendation #4 - **Avoid assigning AI a critical role in operations**
  Design AI systems that prevent human failures, without introducing additional critical elements that humans must manage other than humans themselves. Humans should remain the most vital, adaptable, and ultimate safety layer, and AI should be developed with this principle in mind.

To conclude, it cannot be overlooked that despite the growing interest and adoption of AI, there is still very limited recognition of AI as a true teammate. For most people, AI remains primarily a tool rather than a collaborative partner. This highlights just **how far we are from realizing genuine Human-AI Teaming in practice**. Significant societal preparation and understanding are required before such a fundamental shift can be embraced in real-world operations. The recommendations presented here serve as essential steps to support and facilitate this important transition.

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SECTION 2: Report on end-users and stakeholders engagement activities

Over the three-year course of the HAIKU project, a wide range of end-users, stakeholders, and individuals from the broader public were actively involved to provide feedback at different stages. Their contributions supported the development of the six IA prototypes (WPs 3, 4, 5, and 6) and informed broader reflections on AI in relation to topics such as safety culture, future workforce and skills (WP8), and societal acceptance (WP2).

This section presents the stakeholder engagement activities carried out during the project, structured in two chapters:

- Chapter 1 provides a mapping of the relevant stakeholders for each use case and describes the strategy used to identify the most important stakeholders to involve in the prototypes design process.
- Chapter 2 offers a quantitative overview of the stakeholder engagement efforts, with a detailed breakdown by aviation segments and project work streams.

2.1. Engagement Strategy

In research activities adopting a user-centred design approach, there is often a tendency to limit stakeholder involvement in the development and validation phases to primary end-users only. This overlooks the fact that other stakeholders - beyond the primary users - may either significantly influence the development process or be affected by the introduction of the technology.
To overcome this limitation and ensure a more comprehensive approach to stakeholder selection and engagement, a structured analysis was conducted, leading to the development of detailed stakeholder maps for each HAIKU use case.

2.1.1. Methodology

The stakeholder mapping aimed to identify all actors who may be directly or indirectly impacted by the development and implementation of the HAIKU IAs. The objective was to establish a high-level strategy for stakeholder engagement and to design targeted actions tailored to the needs and roles of the identified stakeholders.

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The methodology used to develop the stakeholder maps was structured into three main steps:

- **Stakeholder Identification**: A broad range of potential stakeholders was identified across the different use cases, considering their relevance to the development, deployment, and adoption of the IAs.
- **Stakeholder Assessment**: Each stakeholder was assessed based on two key criteria:
  - **Active Impact**: *Does the stakeholder influence the technology?*
    - Yes: Stakeholders with the potential to influence the development or implementation of the technology.
    - No: Stakeholders with limited or no capacity to influence technological development or decision-making processes.
  - **Passive impact:** *How much does the technology impact the stakeholder?*
    - High: Stakeholders who will directly use the technology.
    - Medium: Stakeholders not directly using the technology but directly involved or affected by its implementation.
    - Low: Stakeholders indirectly impacted by the technology, without a direct role in its implementation.
- **Stakeholder Categorisation**: Based on the combination of active and passive impact, stakeholders were grouped into three levels:
  - **Primary Stakeholders**: High passive impact and active influence.
  - **Secondary Stakeholders**: Medium passive impact, with or without active influence.
  - **Tertiary Stakeholders**: Low passive impact and no active influence.

2.1.2. Engagement approach

The high-level engagement strategy, agreed upon and adopted at the project level across all UCs, is outlined as follows:

- Primary stakeholders were involved in all use cases, both in the design and validation of the IAs, as well as in the societal acceptance questionnaire.
- Selected Secondary stakeholders were involved only when their active impact was assessed as relevant. This decision was made in consultation with each UC leader.
- Tertiary stakeholders were not involved, as they were assessed as neither influencing nor being significantly impacted by the technology under development. As such, they were not considered relevant to the design process, especially considering the level of maturity of the HAIKU IAs.

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- The general public (passengers) was involved regardless of the impact level assigned, in order to explore overall perceptions of AI usage and identify perceived benefits and key areas of concern (as reported in Section 1, Chapter 2 of this document).

2.1.3. UCs Stakeholders maps

The stakeholder maps resulting from this activity are presented in Figures 27–32 below. Each map is accompanied by a brief explanation outlining how the high-level engagement strategy was applied to the corresponding use case.

2.1.3.1. UC1 Stakeholders map

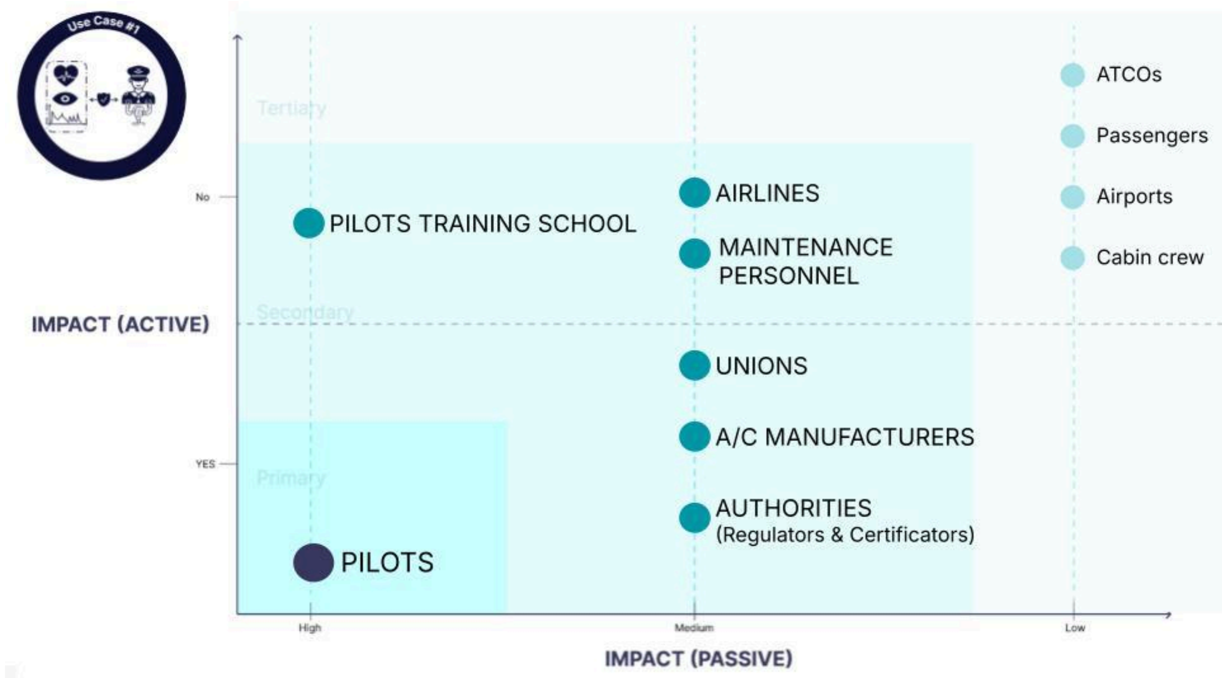

Figure 27: UC1 Stakeholders map

The high-level engagement strategy was applied to UC1 as follows:

- Primary stakeholders – Pilots, identified as the main users of the FOCUS IA, were actively involved in both the design and validation phases.
- Secondary stakeholders with relevant active impact were engaged as follows:
  - Unions: UC1 was presented to European Cockpit Association's members, who provided feedback and shared perspectives on the proposed solution.

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- ○ Authorities: The use case was shared with EASA and used to test their guidance materials. Feedback on the application was collected and discussed.
- ○ Aircraft manufacturers were not involved in this iteration, as the current maturity level of FOCUS (achieved TRL: 4) was deemed too preliminary to justify their engagement.
- Additional engagement of a tertiary stakeholder: Instructors from the ENAC flight school were involved to explore the potential use of FOCUS in training scenarios. They also supported activities within WP8 aimed at assessing the potential impact of FOCUS on pilot skills and training requirements.

2.1.3.2. UC2 Stakeholders map

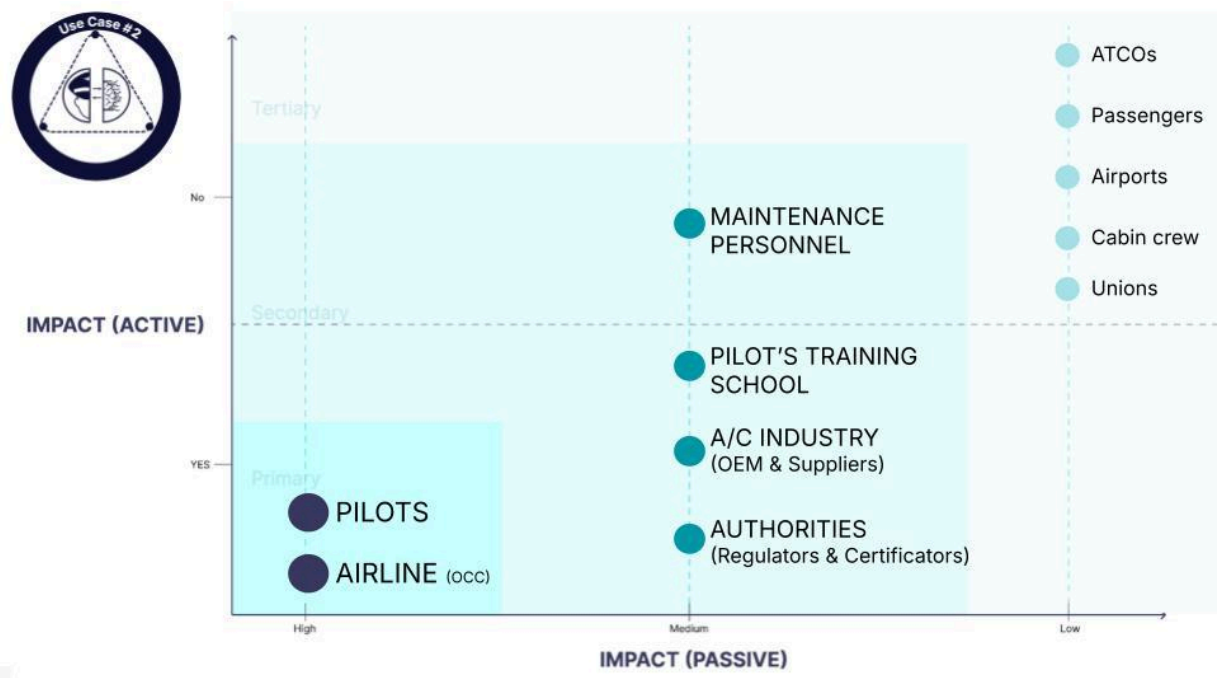

Figure 28: UC2 Stakeholders map

The high-level engagement strategy was applied to UC2 as follows:

- Primary stakeholders – Pilots from a mix of low-cost and major airlines were actively involved in both the design and validation phases.
- Secondary stakeholders with relevant active impact were engaged as follows:
  - ○ Pilots training school: instructors from different training academies were involved to explore the potential impact of OLIVIA on pilot skills and training requirements (WP8).

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- ○ Authorities: UC2 was shared with EASA and used to test their guidance materials. Feedback on the application was collected and discussed.
- ○ Actors from the aircraft industry were inherently involved in the design phase, as both Thales and Embraer are members of the HAIKU consortium and part of the UC2 team. Both partners presented their use case internally on multiple occasions to gather feedback from various departments within their organisations.

- Additional engagement of a tertiary stakeholder: UC2 was presented to European Cockpit Association's members, who provided feedback and shared perspectives on the proposed solution.

2.1.3.3. UC3 Stakeholders map

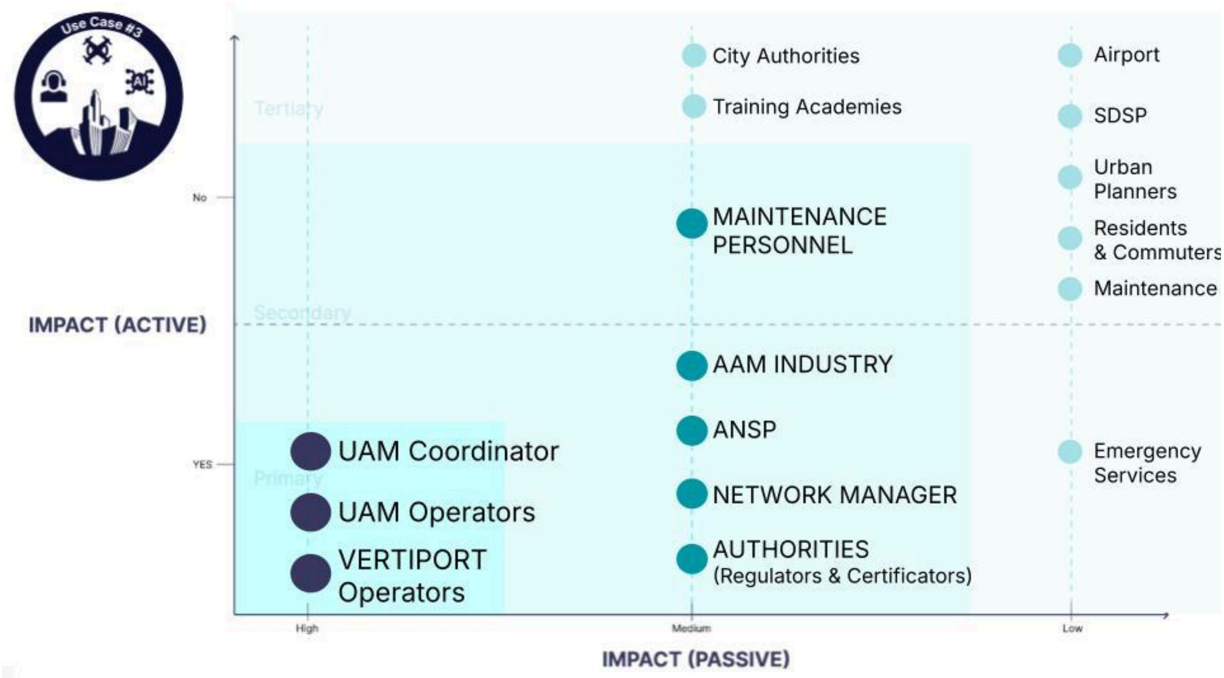

Figure 29: UC3 Stakeholders map

The high-level engagement strategy was applied to UC3 as follows:

- Primary stakeholders:
  - ○ Since the role of UAM Coordinator does not yet formally exist, Air Traffic Controllers (ATCOs) were involved as primary users throughout both the design and validation phases. They also contributed to shaping this future role within the activities of WP8.
  - ○ UAM and Vertiport Operators were not involved at this stage, as the current maturity level of the UC and its IA (TRL4-2) was considered too

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early for their engagement. However, their involvement is identified as a key step for the further development and real-world implementation of the solution beyond the HAIKU Project.

- Secondary stakeholders with relevant active impact were engaged as follows:
  - Advanced Air Mobility (AAM) industry players: Key representatives from EVA Air Mobility were involved at various stages to support the refinement of both the broader UAM concept and the operational scenarios specific to UC3.
  - ANSPs: As noted above, ATCOs contributed to the design and validation of the DUC (Digital UAM Coordinator).
  - Network Manager: Experts from EUROCONTROL were engaged to ensure alignment between the UC3 Concept of Operations and the broader European UAM framework, including SESAR activities. They also played a role in shaping the UAM Coordinator concept.
  - Authorities: UC3 was shared with EASA and used to test their guidance materials. Feedback on the application was collected and discussed.
- Additional engagement of a tertiary stakeholder: UC3 included the involvement of selected stakeholders from Emergency Services, specifically through interviews with representatives of the Swedish Joint Rescue Coordination Centre. Their input contributed to the definition of the emergency management scenario.
- Furthermore, UC3 was also presented to the European Cockpit Association.

2.1.3.4. UC4 Stakeholders map

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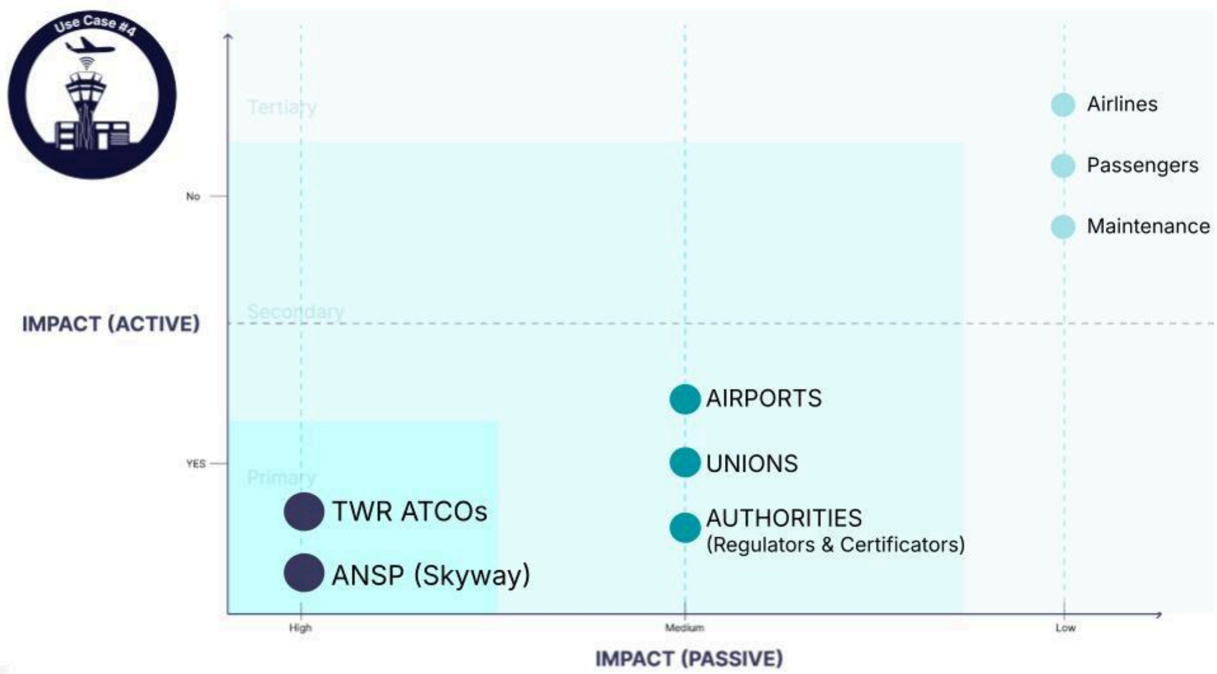

Figure 30: UC4 Stakeholders map

The high-level engagement strategy was applied to UC4 as follows:

- Primary stakeholders - Tower ATCOs from Skyway, identified as the main users of ISA, were actively involved in both the design and validation phases.
- Secondary stakeholders with relevant active impact were engaged as follows:
  - Authorities: UC4 was shared with EASA and used to test their guidance materials. Feedback on the use case and its alignment with regulatory expectations was collected and discussed.
  - Unions: UC4 was presented to members of the European Cockpit Association.
  - Airports were not involved, as their role was not considered directly relevant to the development of ISA. Indeed, their interest typically lies in the overall performance of airport operations - such as capacity and efficiency - which are effectively addressed by ISA, rather than in the specific tools used for traffic management.

2.1.3.5. UC5 Stakeholders map

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Figure 31: UC5 Stakeholders map

The high-level engagement strategy was applied to UC5 as follows:

- Primary stakeholders – LLA's Airside Safety and Operational Staff members were actively involved throughout both the design and validation phases, contributing through multiple iterations focused on continuous improvement. This collaborative approach enabled the ASW Dashboard to reach TRL9 and become fully integrated into LLA's safety management infrastructure.
- Secondary stakeholders – Use Case 5 has been progressively presented and discussed during recurring Luton Safety Stack meetings, which included presentations, testing activities, and HAZOP analyses. These meetings also provided an opportunity to engage airline representatives and ANSP personnel (including ATCOs) as active participants in the Safety Stack discussions.

2.1.3.6. UC6 Stakeholders map

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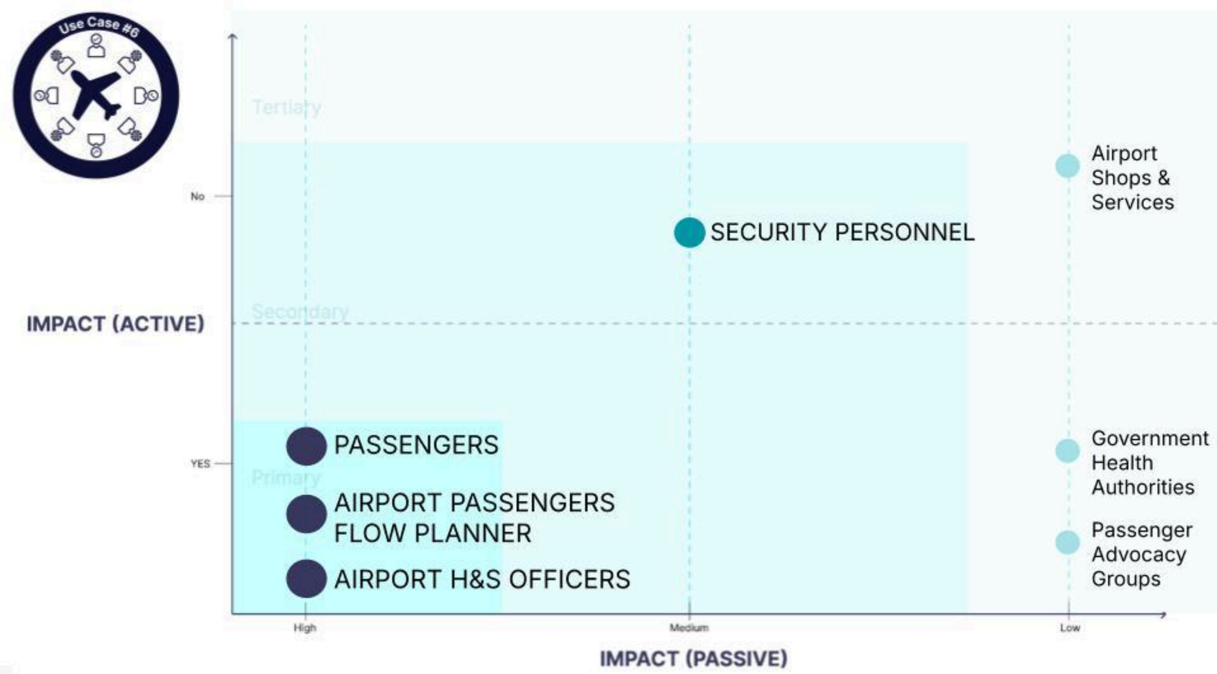

Figure 32: UC6 Stakeholders map

The high-level engagement strategy was applied to UC6 as follows:

- Primary stakeholders:
    - Passengers, identified as the main users of COVAID, were actively involved in both the design and validation phases.
    - Airport Health and Safety (H&S) Officers also contributed to the use case by providing input and feedback throughout the process.
    - In contrast, Airport Passenger Flow Planners were not involved at this stage, as COVAID is still at an early maturity level (TRL5). However, their engagement is considered essential for future phases beyond HAIKU, with the aim of sharing data and collaboratively enhancing COVAID's predictive capabilities.
- Security personnel are the only secondary stakeholders identified for this use case. No engagement activities have been carried out in this direction, as such involvement was deemed premature given the current maturity level of COVAID.

2.2 Engagement Report

A quantitative overview of the end-users and stakeholders involved during the 3-year duration of HAIKU is presented in Table 2.

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Table 2: N. of end-users and stakeholders engaged along the duration of HAIKU

AVIATION SEGMENT	ORGANISATIONS	N. OF ITERATIONS	N. OF PEOPLE (with gender breakdown)		
			TOT	F	M
AIRLINE & AIRSIDE EXPERTS	Brussels Airlines Corsair ECA Easyjet Embraer ENAC EVA Airways HOP (Air France) ITA Airways Norwegian Airline Lufthansa Ryanair Ryanair TAP Thales Vueling *Other major airlines (not disclosable)*	**73**	**47**	8	39
ATM	ANACNA EASA EUROCONTROL ENAV Sky guide LFV NASA NATS SESAR SKYWAY	**68**	**48**	11	37
UTM	DBL Drone Radar EUROCONTROL Embraer EVE AIR MOBILITY Euro-USC JEDA LFV	**17**	**12**	1	11

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AVIATION SEGMENT	ORGANISATIONS	N. OF ITERATIONS	N. OF PEOPLE (with gender breakdown)		
			TOT	F	M
AIRPORT	Dublin Airport Bologna Airport Egnatia Aviation LGKM LLA Schiphol airport	**~35**[1]	**8**	-	8
REGULATOR	EASA UK CAAi	**5**	**5**	2	3
RESEARCH/ CONSULTING	CERTH Egnatia Aviation HAFA INNAXIS THALES TU Munich	**8**	**8**	5	3
EMERGENCY SERVICES	Joint Rescue Coordinator Centre	**2**	**2**	2	0
PASSENGERS	-	**628**	**628**[2]	255	363
TOTAL N.		**~836**	**758**	284	464

[1] The approximate number cannot be precisely determined due to the continuous and iterative interactions with airport stakeholders throughout Use Case 5.
[2] 10 participants preferred not to disclose their gender.

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Annex A

Table 3: Societal Acceptance Assessed Dimensions

Dimension 1: **PERCEIVED USEFULNESS**	
Definition	Individuals' perceptions regarding how users view the technology as advantageous and valuable in their day-to-day activities.
Assessed factors	**Task Efficiency** *Q1: Using "IA" would enable me to accomplish "task name" more quickly.*
	Productivity Enhancement *Q2: Using "IA" would enhance my productivity.*
	Workload Balancing *Q3: "Using "IA" would support and optimise workload balancing.*
Dimension 2: **PERCEIVED EASE of USE**	
Definition	Individuals' perceptions regarding the ease or difficulty of utilising the IA, examines how straightforward and convenient it is to operate a technological device or system.
Assessed factors	**Reduced Mental Effort** *Q1: "Interacting with "IA" would reduce the mental effort required to accomplish the "task name.*
	Intuitiveness *Q2: The "IA" would be intuitive and easy to use.*
Dimension 3: **SUBJECTIVE NORMS**	
Definition	The impact of social norms and others' opinions on individuals' perceptions of the usefulness of the IA and their attitude toward its use, measuring the influence of social norms and external opinions on individuals' perspectives regarding the utility of the IA, their attitude toward its use, and their behavioural intention.
Assessed factors	**Individual Values and Morality** *Q1: My individual values and beliefs morally support the introduction and use of the "IA."*

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	Societal Approval *Q2: Society would be in favour of introducing "IA" into operation.*
	Perceived Societal Benefits *Q3: Society would perceive the introduction of "IA" into operation as safety and/or efficiency improvement.*
Dimension 4: **FACILITATING CONDITIONS**	
Definition	The perceived availability of resources, support, and conditions that ease the use of the IA, pertains to the support and resources accessible to users to effectively utilise the technology. This encompasses elements like technical support, training, and infrastructure.
Assessed factors	**Knowledge and Experience** *Q1: I have sufficient knowledge and experience to use "IA" effectively.*
	Training Requirement *Q2: I would be able to use "IA" without receiving specific training.*
	Guidance Need *Q3: I would not need guidance to consult in case I need help on understanding the "IA" behaviours.*
	Safety Assurance *Q4: I would feel able to keep operating safely in case of "IA" failures.*
Dimension 5: **PERCEIVED RISKS**	
Definition	The potential risks and negative consequences linked to using the IA, evaluates the possible drawbacks and adverse outcomes associated with the utilisation of UA. This factor directly influences an individual's attitude toward the IA.
Assessed factors	**Threats and Risks** *Q1: Using "IA" would not pose new potential threats and risks to myself and/or society.*
	Safety Undermining

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	Q2: "IA" malfunctions may not undermine safety.
	Skills Degradation *Q3: An extensive usage of "IA" may not lead towards skills degradation.*
	Cost Concerns *Q4: The costs associated with acquiring, operating, and maintaining "IA" may not be cause for concern.*
Dimension 6: **ATTITUDE TOWARD USE**	
Definition	The individuals' comprehensive attitude and emotional response to using the IA, is linked to the individuals' overall sentiment and emotional reaction when engaging with the IA.
Assessed factors	**Personal Desirability** *Q1: It is desirable to use "IA".*
	Safety Perception *Q2: Using "IA" would enhance safety.*
Dimension 7: **BEHAVIOURAL INTENTION**	
Definition	The individuals' intentions to use the Intelligent Assistant (IA) are influenced by their attitude, and include various elements that shape users' inclinations toward adopting and utilising IA. The associations involve users' overall attitudes toward the IA, incorporating their perceptions, sentiments, and emotional responses.
Assessed factors	**Preference in Complex Scenarios** *Q1: When engaging in complex scenarios, opting for "IA" would be my preferred choice.*
	Recommendation to Colleagues *Q2: I would recommend using "IA" in complex scenarios to my colleagues.*
Dimension 8: **TRUST**	

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Definition	Trust enables individuals to make decisions that often involve vulnerability and reliance on a given technology or system, and is pivotal to users' belief that the IA will effectively and reliably help them achieve their desired goals.
Assessed factors	**Reliability in Task Assistance** *Q1: I trust that "IA" would reliably assist me in "task".*
	Accuracy and Reliability *Q2: I trust that the "IA" suggestions and/or actions would be accurate and reliable.*
	Confidence in Security and Privacy Measures *Q3: I have confidence in the security and privacy measures of "IA".*

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Annex B

Table 4: Societal Acceptance Questionnaire for the General Public

SECTION 1: Preliminary information

Q1: How knowledgeable are you about artificial intelligence (AI)?
I know nothing about this topic.
I've heard of it but don't understand it well.
I have a basic understanding of the key concepts.
I have a solid understanding and can explain it to others.
I am an expert and deeply knowledgeable about this topic.

Q2: How knowledgeable are you about aviation?
I know nothing about this topic.
I don't understand it well.
I have a basic understanding of the key concepts.
I have a solid understanding and can explain it to others.
I am an expert and deeply knowledgeable about this topic.

SECTION 2: Demographic

Q3: What is your age group?
18-24 years
25-34 years
35-44 years
45-54 years
55-64 years

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65+ years

Q4: What is your gender?
Male
Female
Prefer not to say

Q5: What is your highest level of education?
Middle school
High school
Bachelor’s degree
Master’s degree or equivalent
PhD or higher
Other: _____

Q6: What is your current occupation?
Student
Employee
Manager
Freelancer
Unemployed
Retired
Other: _____

Q7: In which country do you live?
Italy

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Germany
Greece
Portugal
France
Cyprus
Spain
Sweden
Belgium
Other: ____

SECTION 3: PERCEPTION OF AI

Q8: Over the last 10 years, which of the following technological innovations have had the most impact on your life? (Select up to 3 options)
Virtual assistants in smartphones (e.g. siri)
Social media platforms
Smart home devices
On-demand streaming services
E-commerce platforms with personalised recommendations
Assisted-driving cars
Chat GPT (and advanced Chatbots, in general)
Virtual/Augmented Reality
Wearable fitness and health tracking devices (e.g., smartwatches, fitness bands)
Voice recognition and transcription software
Drones

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Q9: What benefits have you experienced from these innovations? (select up to 3 options)
Increased productivity or efficiency
Improved convenience in daily life
Enhanced connectivity with others
Better health awareness and fitness
Cost savings or financial benefits
Environmental impact reduction
Improved learning or skill development
Enhanced safety or security
Simplified or faster access to services

Q10: Artificial Intelligence is increasingly recognised as an innovation that will significantly reshape our lives in the near future. What feelings does the concept of AI evoke in you? (select up to 3 options)
Excitement
Optimism
Curiosity
Hope
Enthusiasm
Joy
Inspiration
Trust
Anxiety
Pessimism
Fear

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Skepticism
Reluctance
Worry
Caution
Suspicion

Q11: Imagine yourself in 5 years. What roles do you expect AI to take in your daily life? (Select up to 3 options)
Digital analyst
Digital Informer
Digital Secretary
Digital Complexity Manager
Digital Problem Solver
Digital Decision-Maker
Digital friend
Digital colleague
Digital innovator
Digital personal trainer
Digital enemy
Digital spy
Digital imitator
Digital deceiver

Q12: What do you think are the main benefits that AI could bring? (unlimited selection of options)
Enhanced data analysis and insights

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Improved and quicker understanding of complex situation with multiple information sources
Improved organisation and prioritisation of individual activities and tasks (both work and non-work related)
Enhanced organisation and coordination of groups' activities (both work and non-work related)
Improved accuracy in decision-making
Increased efficiency in tasks execution
Enhanced safety in safety-critical domains
Increased productivity
Personalisation of services
None

Q13: What are your main concerns regarding the use of AI? (unlimited selection of options)
Job displacement and unemployment
Loss of important skills and competencies that may be necessary in case of AI malfunctions
Increased dependence on technology
Privacy (i.e.: AI creates user profile leveraging data that users don't want to share)
Data security (i.e.: AI algorithms can be employed by cybercriminals)
Safety in critical applications (i.e. transportation)
Misuse or unethical use of AI (i.e.: creation of autonomous weapons)
Lack of transparency in AI decision-making
Potential biases in AI algorithms (i.e.: AI discriminating people based on gender or other characteristics)
Aggressive marketing for political and/or economic purposes
Creation and spread of fake news

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None

SECTION 4: ACCEPTANCE OF THE FUTURE OF AVIATION

SECTION INTRO: Imagine to be in 2050 where AI may be highly used in the transportation and good delivery systems.

Q14: You may have already experienced a trip on a driver-less train, nowadays available in a variety of cities in the world. In 2050 pilot-less aircraft flown by AI-based technologies may be available on short-haul commercial routes offering you a possibility to fly cheaper compared to the manned aircraft option. How would you approach this situation?
I would definitely choose pilot-less flights
I would consider the possibility to fly on a pilot-less flight if I hear positive feedback on the airline company
I would never choose pilot-less flights

Q15: Nowadays, when you are at the airport, you are asked to check-in and pass security checks before boarding the aircraft. In 2050, quick autonomous check-in procedures and automatic time-less security checks may be in place thanks to the usage of biometric recognition systems (e.g., facial recognition). This means that you may be able to drop your bag in places closed to your house and quickly access the gate without in-person controls. How would you approach this situation?
I would be extremely happy as this would avoid waste of time
I would accept it
I would be extremely unhappy due to concerns about the correct transfer of my luggage and the usage of my personal data by digital systems

Q16: You may not know that, nowadays, the air traffic flow is managed by air traffic controllers who follow and instruct each aircraft. In 2050, air traffic may be autonomously managed by AI-based technologies with physical operators trained to intervene only in case of anomalies and emergencies. How would you approach this situation?

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I would still feel safe as I feel today
I would accept it but I would feel less safe than I feel today
I would definitely feel unsafe so I may decide to choose a different transport mode

Q17: Nowadays, on-line purchases have become pretty widespread. Indeed, you, or your family members, may have already experienced it (to buy food, medicines, clothes, house stuff, etc.), receiving your goods via carrier directly at home in a few days. In 2050, you may be able to receive a good amount of goods at home in a few hours thanks to fleets of pilot-less drones automatically instructed. How would you approach this situation?
I would definitely love it
I would use it only in case of urgent purchases (e.g. medicines)
I would not use it as I would hate seeing a lot of drones flying above my head

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