The ethics of Artificial Intelligence in Aviation

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EASA
European Union Aviation Safety Agency

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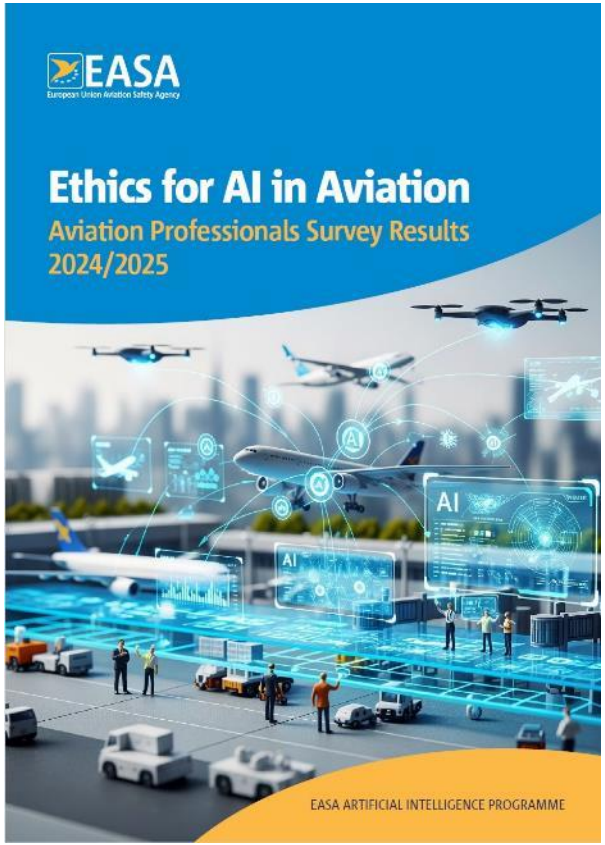
An Agency of the European Union

What about Ethics? Ethics based assessment:



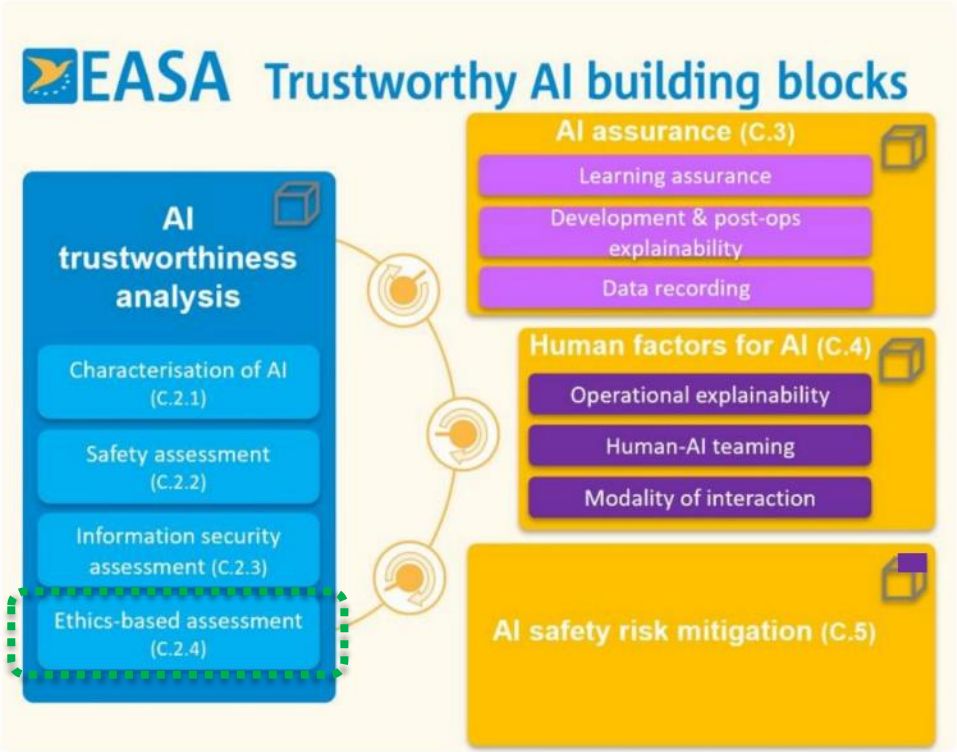


Figure 3 — EASA AI trustworthiness building blocks

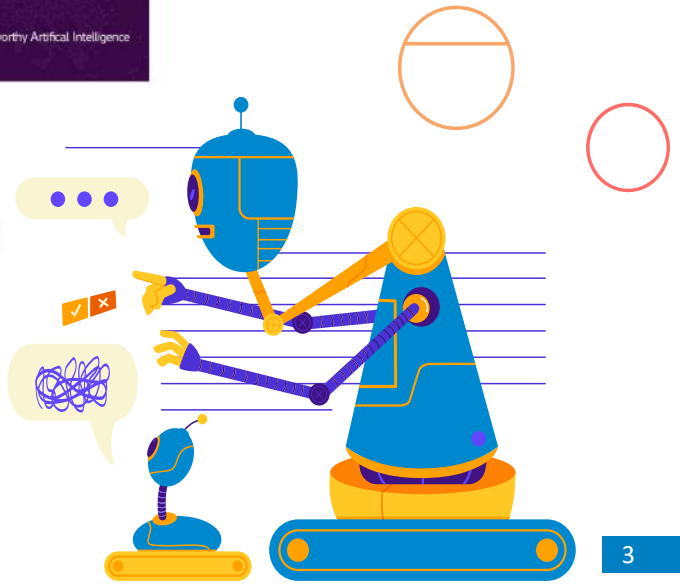
What was our starting point?

Assessment List for Trustworthy Artificial Intelligence (ALTAI) for self-assessment

Related topics

Artificial intelligence

Advanced Digital Technologies



Chapter 2 Article 9

Risk management system health and fundamental rights

…the identification and analysis of the known and ***the reasonably*** foreseeable risks ***that the high-risk AI system can pose to health, safety or fundamental rights when the*** high-risk AI system ***is used in accordance with its intended purpose;***

Chapter 2 Article 10

Data and data governance

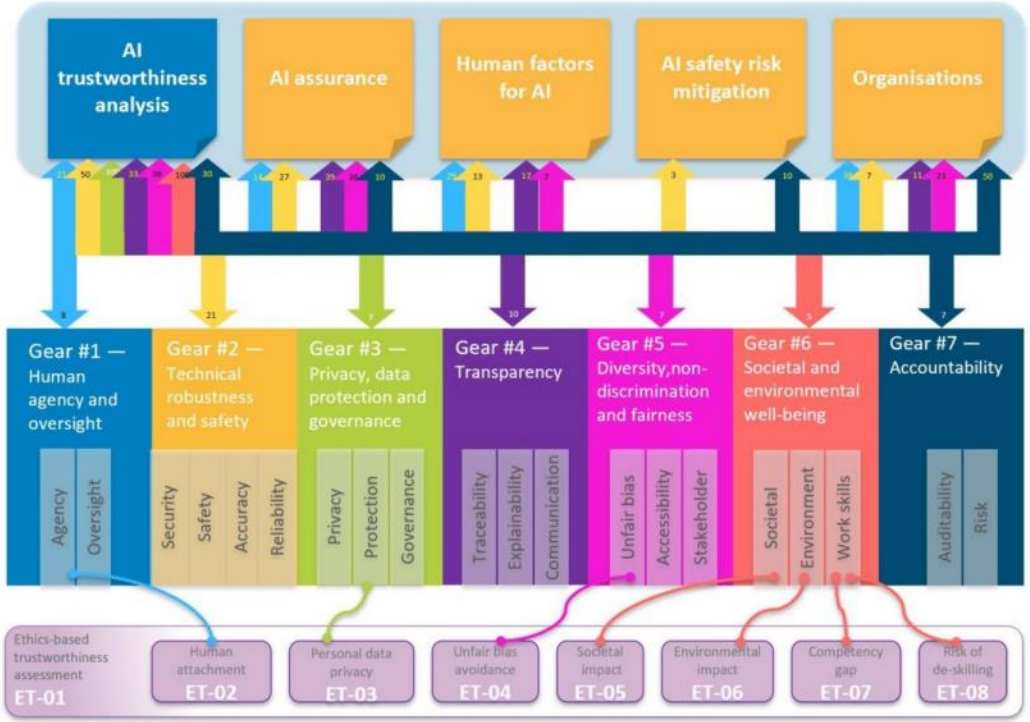
…Training, validation and testing data sets shall be subject to data governance and management…(b) **data collection processes and the origin of data, and in the case of personal data, the original purpose of the data collection**; **(f) examination in view of possible biases that are likely to affect the health and safety of persons, have a negative impact on fundamental rights or lead to discrimination…**

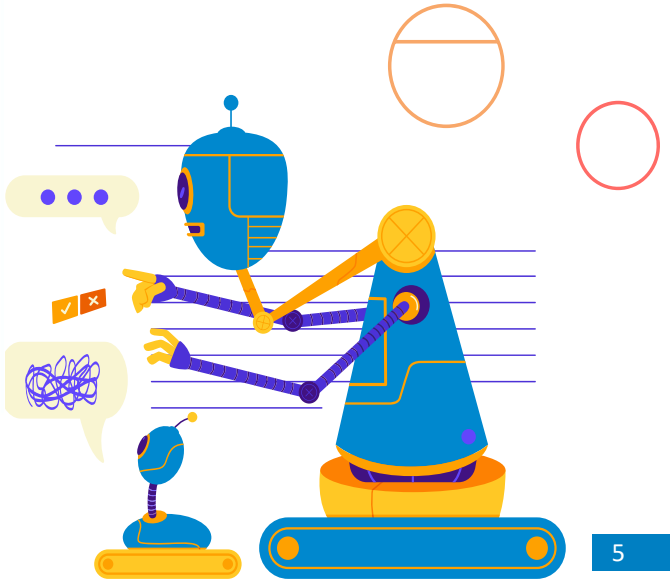
Chapter 2 Article 14

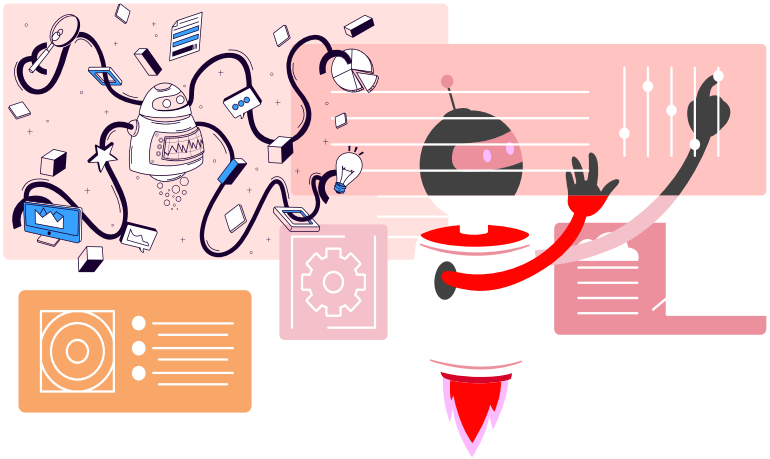
Human oversight

4 (b) to remain aware of the **possible tendency of automatically relying or over-relying on the output produced by a high-risk AI system (automation bias)**, in particular for high-risk AI systems **used to provide information or recommendations for decisions to be taken by natural persons;**

What was our starting point?







How to measure Ethics?

To listen to the people directly.

People's consideration about Ethics - key concepts in AI for certain specific concrete situations in the Aviation context.

- **Comfort**: How much are we comfortable with the situation meaning *comfort* as the feeling of being relaxed and free from tension and negative thoughts,
- **Trust**: How much do we trust on it meaning *trust* the belief that something is safe and reliable, and
- **Acceptance**: How much will we be willing to accept the situation meaning *acceptance* as the fact that you can agree and approve something.

1. Pilot physiological data monitoring

2. Pilot support in ‘go-around’ situations

3. Maintaining aircraft structures

4. Airport allocation of airlines to a terminal


EASA survey on Ethics in Artificial Intelligence for Aviation

Welcome to the EASA survey about Ethics in Artificial Intelligence for Aviation

EASA
European Union Aviation Safety Agency

EASA is preparing the second edition of the AI Concept Paper for future applications concerning the certification or approval of AI-based products for aviation. Safety assurance remains the most important stream of action, and now new areas of interest can be discussed such as the ethical impact of the introduction of such products.

We count on you to share your position and thoughts about the topic by replying to this survey. All your replies are anonymous and confidential, and we are very interested in your honest and personal opinion.

The survey is divided in two sections: the first section with a set of situational cases, and the second section with a set of social, psychological and demographic indicators. It will take circa 60 minutes of your time.

The conclusions of this study will be published on the EASA website at https://www.easa.europa.eu/ai and will be incorporated in the drafting of the AI Concept Paper to be published in 2021.

If you want to have more information, please drop us an email to ai@easa.europa.eu
We thank you in advance for your participation.

5. Airline crew members attribution to flights

6. Speech recognition in voice communication

7. Risk of de-skilling

8a. New competencies when teaming with AI

8b. Responsibility & accountability when teaming with AI

Sociodemographic characteristics of these 231 professionals:

circa 80% male, 20% female,

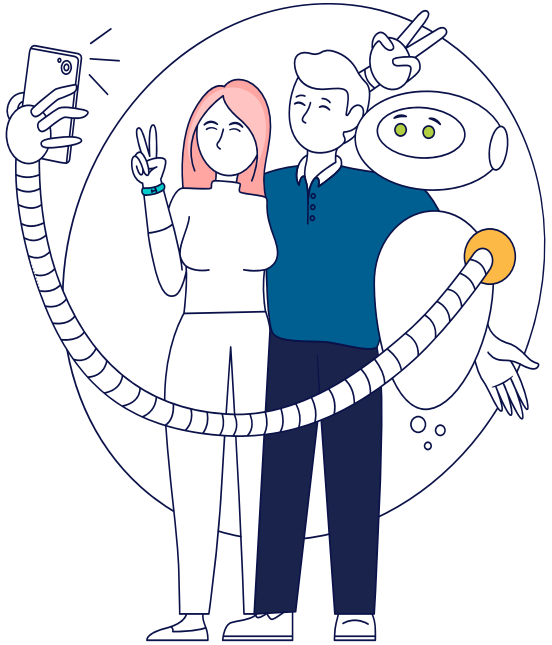
62% between 40 to 59 years old.

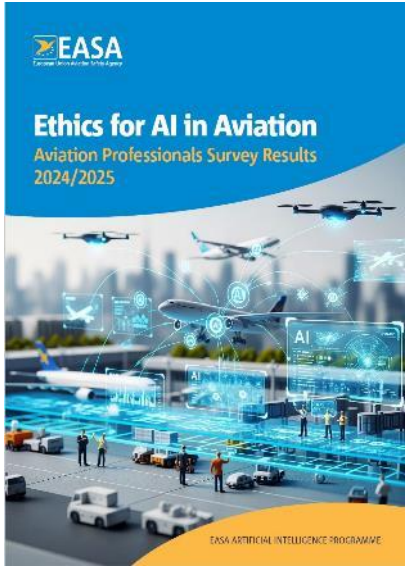
Mainly seniors meaning with more than 10 years of professional experience, considering themselves as having a good understanding of AI for aviation, and saying that their teams detain a medium understanding of AI in Aviation.

Circa 80% work in different technical aviation domains and 20% belong to the National Aviation Authorities.

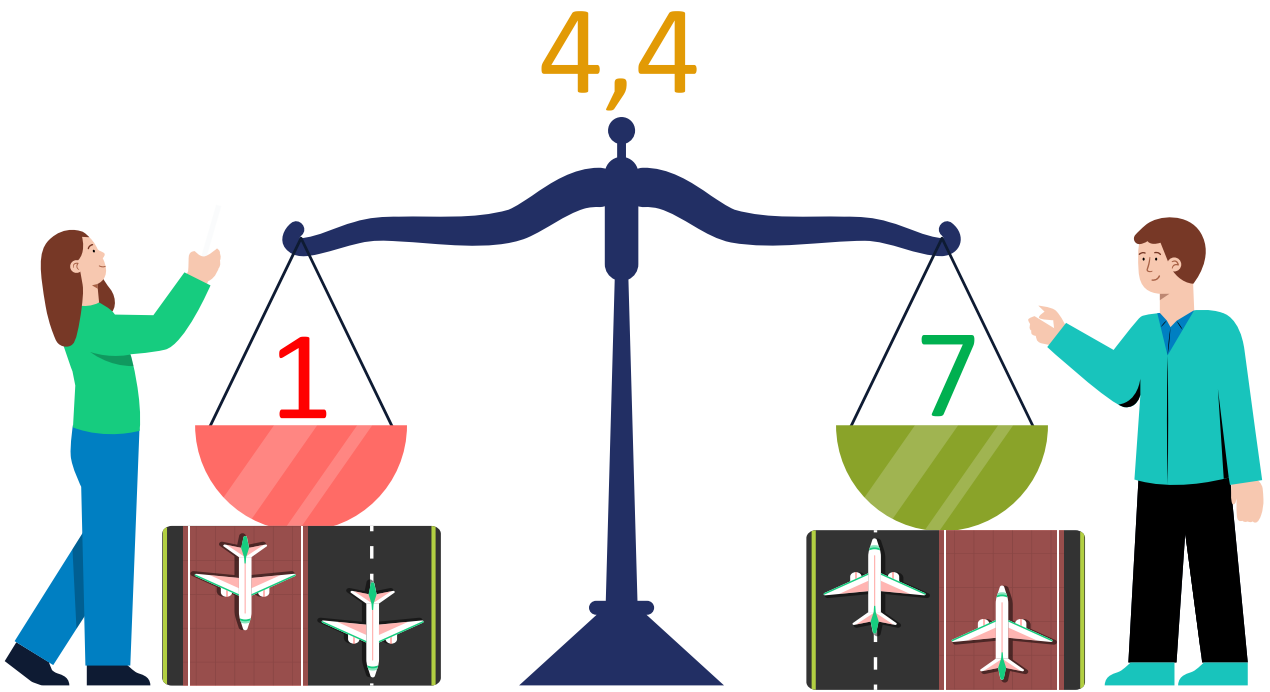
Working directly with AI-based systems 76,2% (being the biggest group 20% users of AI-based systems).

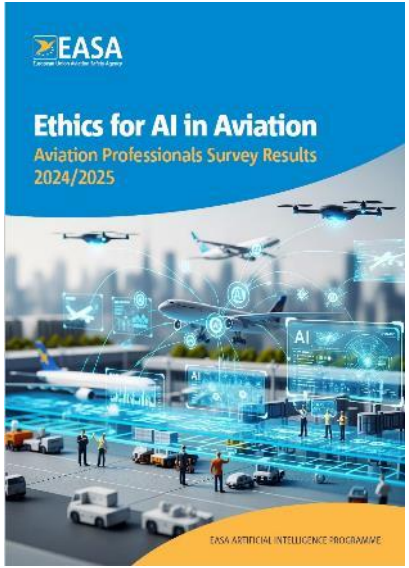
Feeling quite satisfied with their own work.



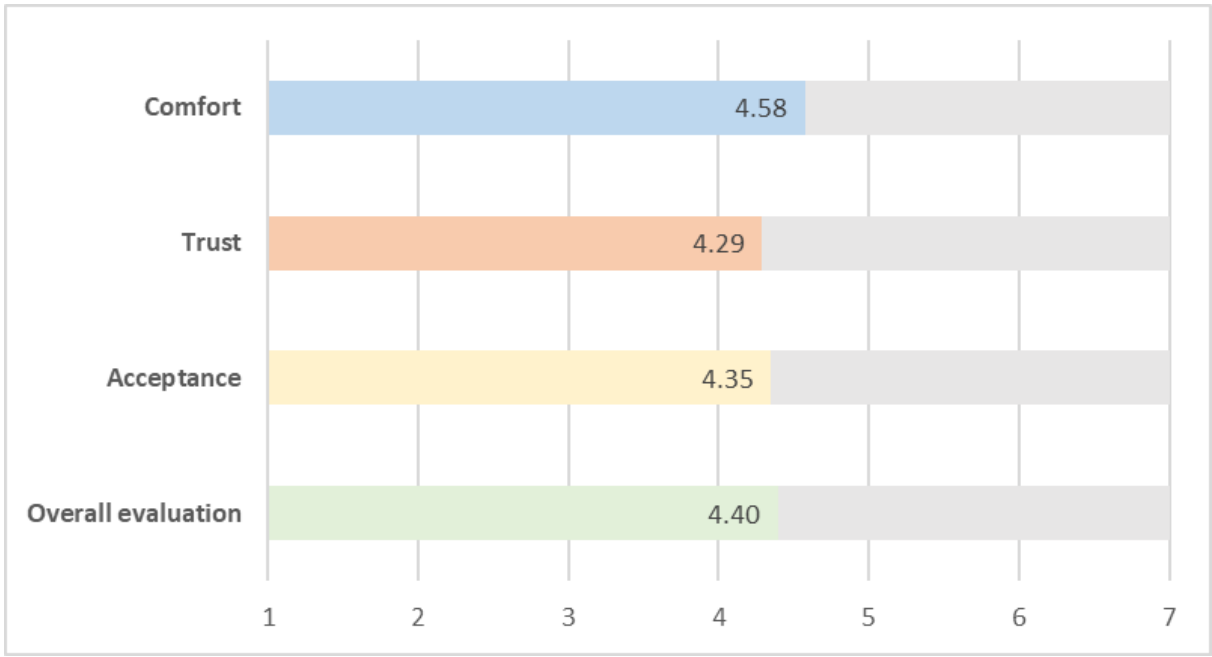


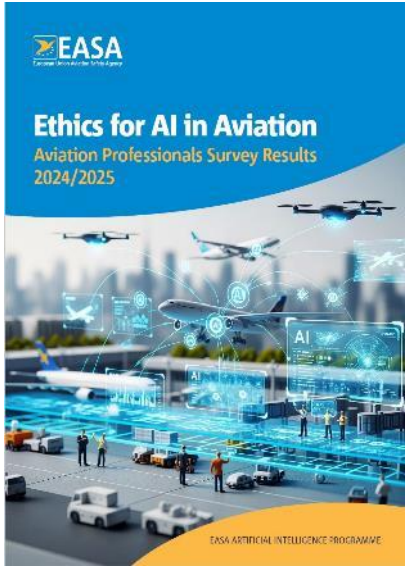
Ethical scale concerning AI-based systems for Aviation:



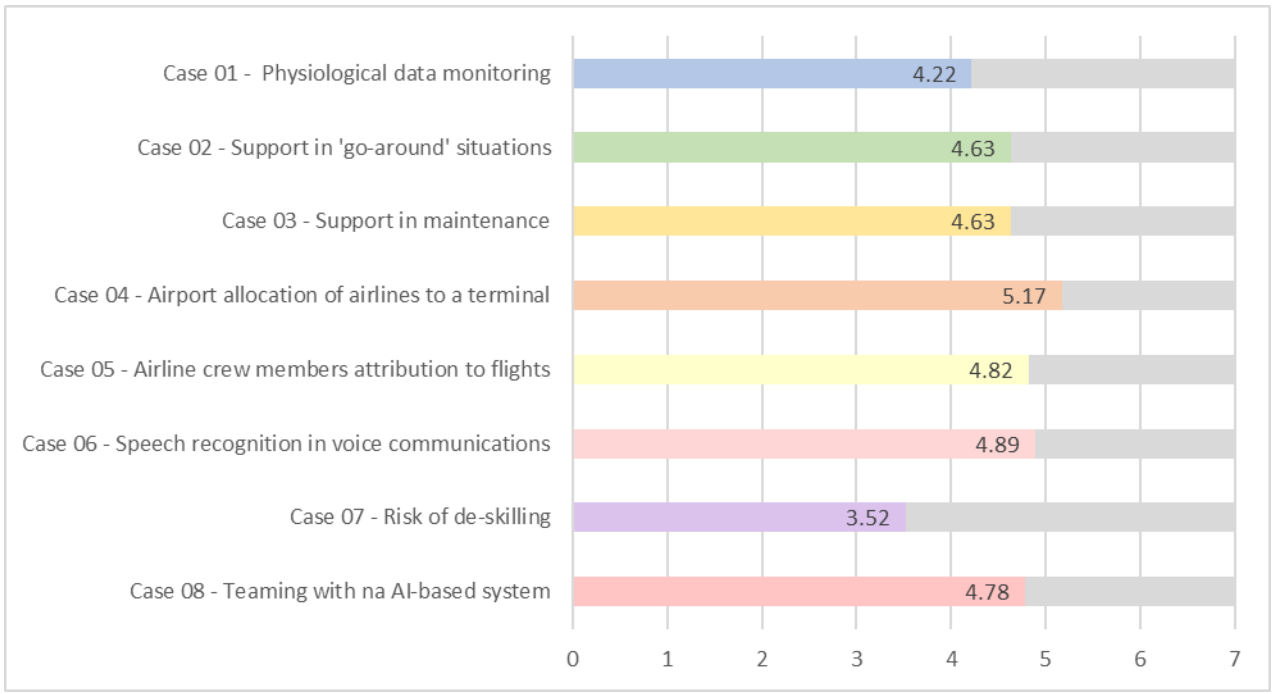


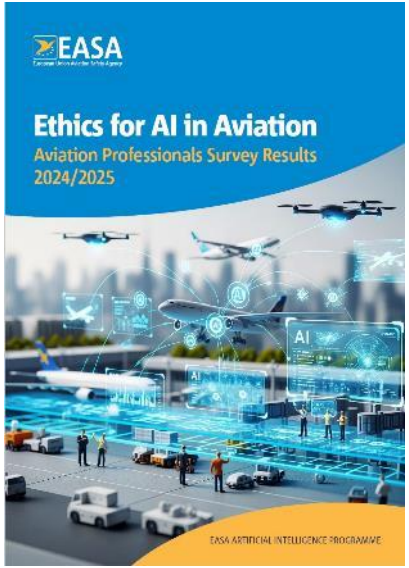
Ethical Average for all cases:



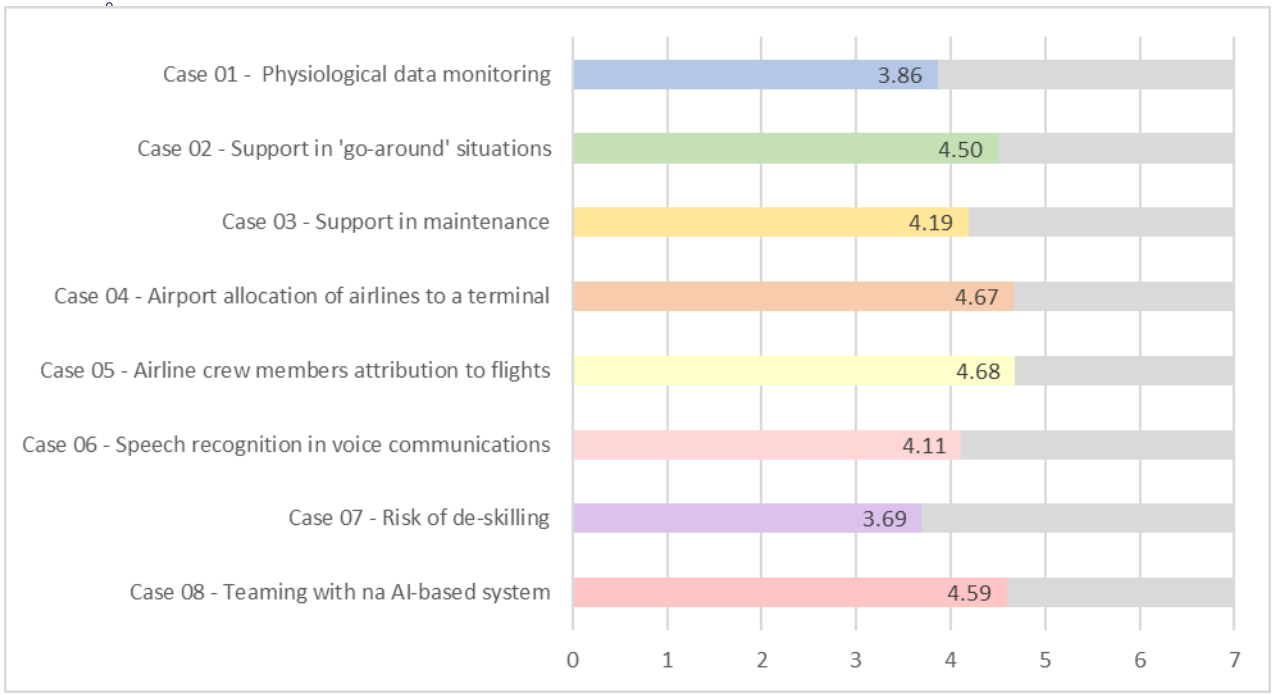


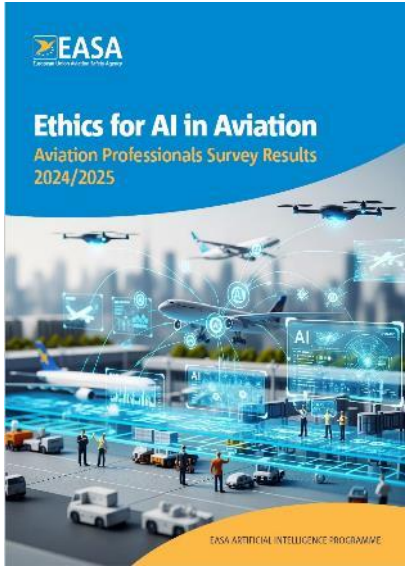
Comfort average for all cases:



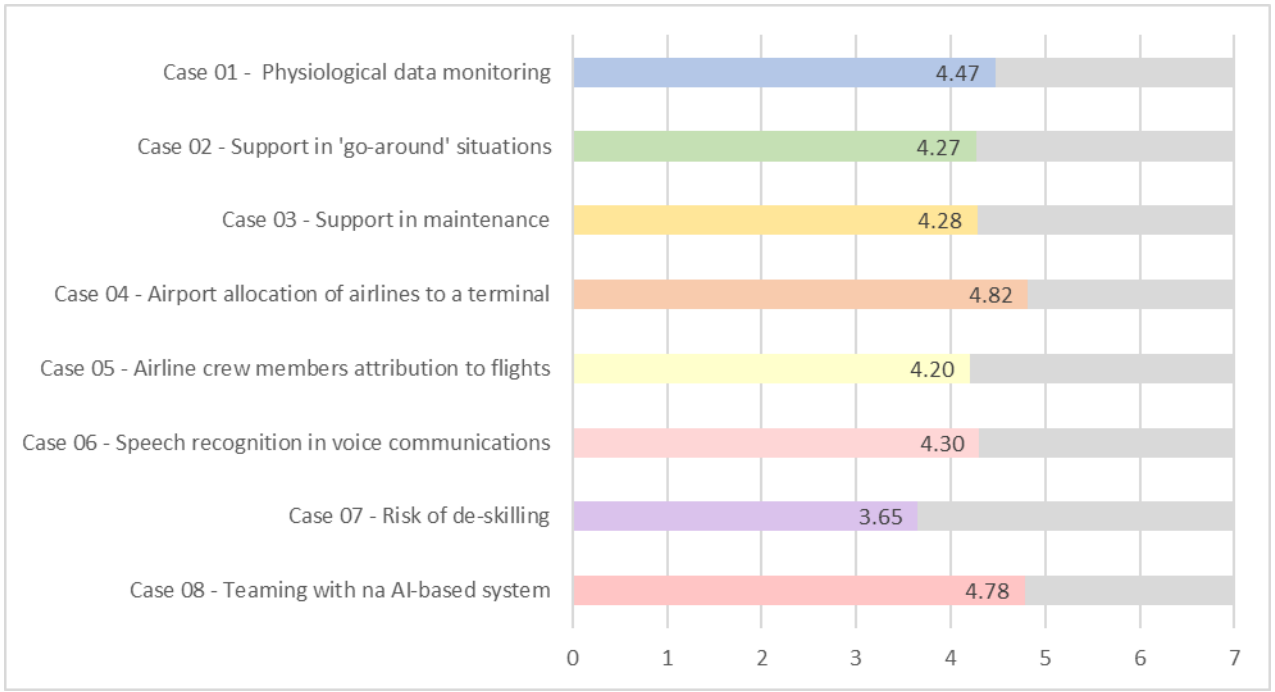


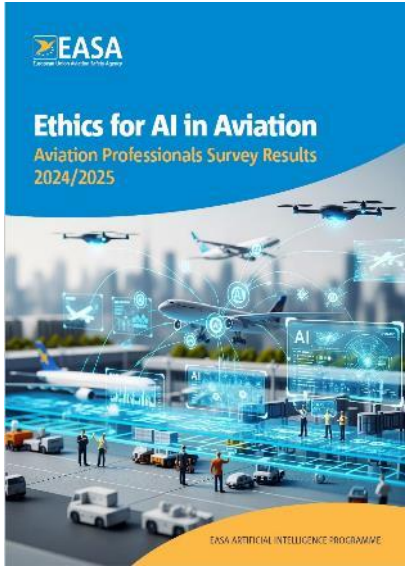
Trust average for all cases:





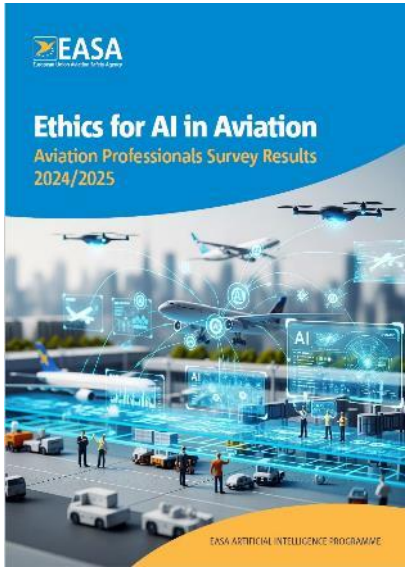
Acceptance average for all cases:





Need for Regulation % results:

	Pilot physiological data monitoring CASE 01	Airport allocation of airlines to a terminal CASE 04	Airline crew members attribution to flights CASE 05	Speech recognition in voice communication CASE 06	Risk of de-skilling CASE 07	Teaming with AI CASE 08
NO	6,9	19,5	17,3	12,1	10,8	1,7
YES	93,1	80,5	82,7	87,9	89,2	98,3
Total	100,0	100,0	100,0	100,0	100,0	100,0
EASA doing oversight	60,1	58,6	51,8	58,8	76,5	68,0

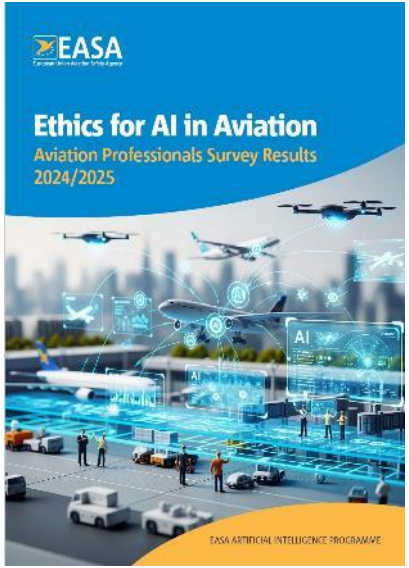


2395 reasons for not accepting AI in Aviation:

Aviation professionals have mainly ethical concerns about:

- the **AI-based system itself** (30 %),
- about the consequent **negative impact on humans** when using such systems (28 %),
- about **how their data is used** by the technology (11 %), and
- about AI-based systems **putting aviation safety at risk** (6 %).

In the logic of protecting ethical values, aviation professionals expect from first-line aviation industry to ensure that AI-based systems are **transparent, explainable, reliable and perform to the standards** they are supposed to perform.

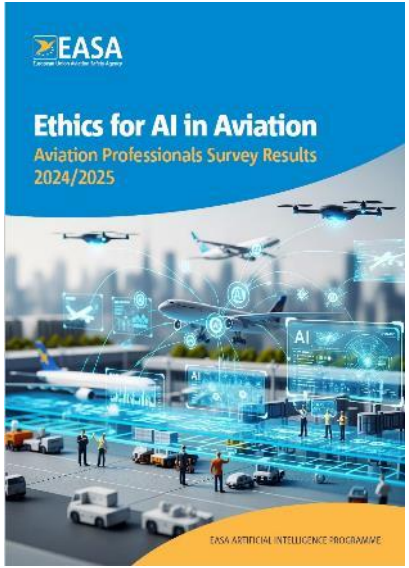


More to know:

- humans should remain autonomous when making decisions and overseeing systems,
- and should have the power to maintain their autonomy.
- They should not feel psychologically uncomfortable, and be able to face an AI-based system as merely a machine.

AI-based systems should not be a source of threat to aviation professionals, meaning that AI-based systems should not compromise the ability of humans to:

- perform their job,
- should not lead or pose a risk to deskilling, and
- should not jeopardise employment by replacing human roles.



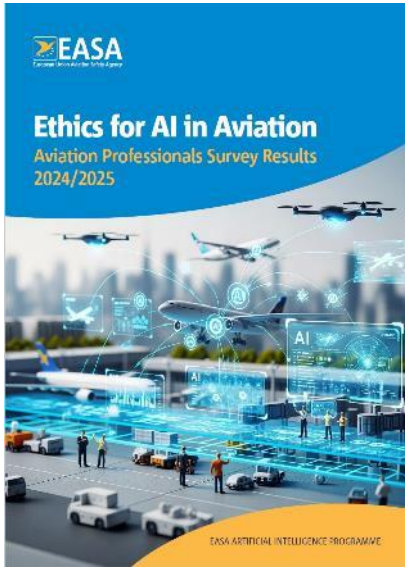
More to know:

- Professional development must be ensured by maintaining and/or developing professional competencies and

- by gaining experience with AI-based systems;

- maintaining manual practice is very relevant too.

- a sound process for competence assessment and relevant training should be in place.



More to know:

- concerning **accountability**, a very clear line should be drawn between responsibility and accountability of the human element versus the AI-based system,

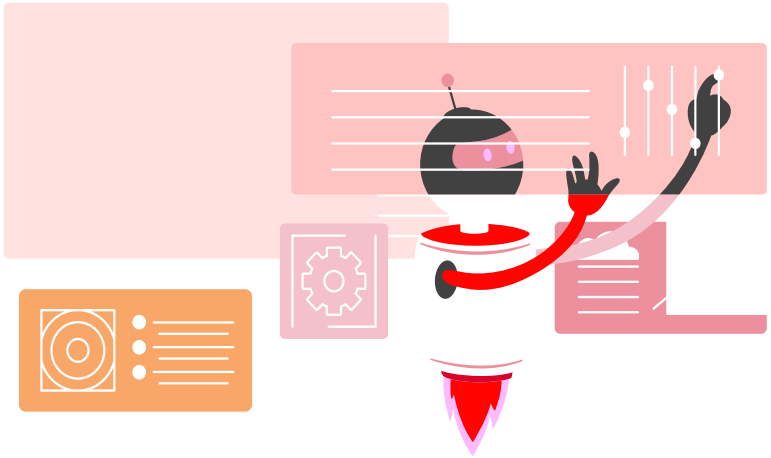
- and such clear definition should apply especially in situations of shared responsibility.

- individuals' **privacy** should be ensured and the General Data Protection Regulation should be implemented.

- unbiased AI-based system behaviour should be ensured: **bias** should be identified, monitored and eventually eliminated.

What next?

Rulemaking exercise:



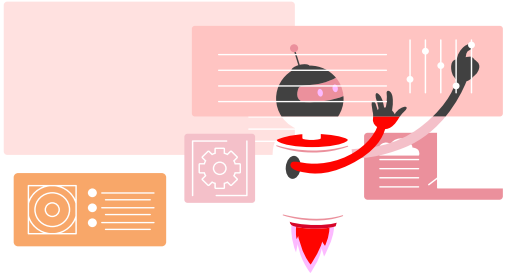
AI-based system ethics-based assessment

An ethics-based assessment for the AI-based system should be performed to identify potential risks introduced by the use of the AI-based system.

Ensure that the creation or reinforcement of **unfair bias** during the operations involving the AI-based system, regarding both the data sets and the trained models, is avoided.

For Level 2 AI-based systems, ensure that the AI-based system bears no risk of creating **attachment, stimulating addictive behaviour, or manipulating the end user's behaviour**.

For Level 2 AI-based systems, ensure that the AI-based system and its associated ConOps **does not present socially unacceptable characteristics**



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Thank you for your attention

Please help shape our rules - NPA 2025-07

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