Engage 2

Future ATM concepts, future workforce implications

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SESAR 3 Knowledge Transfer Network

deepblue

(coordinator)

EUROCONTROL

FREQUENTIS

innaxis

easn

UNIVERSITY OF BELGRADE

Technische Universität Braunschweig

UNIVERSITY OF TRIESTE

UNIVERSITY OF WESTMINSTER

ASDA

Association for the Scientific Development of ATM in Europe

https://engagektn.eu/

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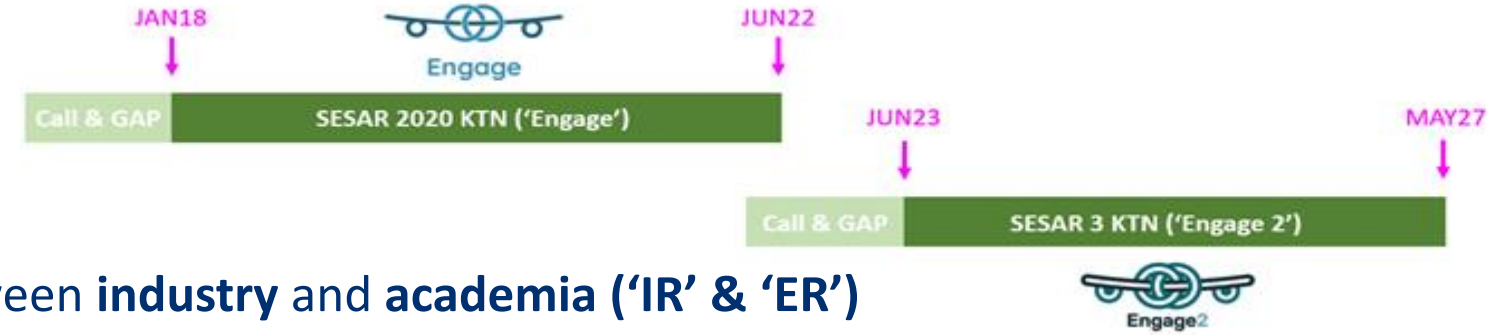
Timeframe, aims, target groups



- Bridge gap between **industry** and **academia ('IR' & 'ER')**
- Investigate future ATM, including **required skills**
- Inspire and support **next generation of aviation professionals** in facing digital era

Activities are focused on five main target groups:

1. **aviation academia and research**
2. **ATM industry**
3. **policy and decision makers**
4. **students**
5. **general public**

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Student-focusing activities

- financial support and mentoring for up to **10 PhD students** (Call closes **02APR24**)
- mentoring **MSc students**, including support for their Master theses
- three **summer schools**: Belgrade (**09-13SEP24**), Braunschweig (2025) and Trieste (2026)

- two hackathons; 24H coding events to solve ATM-related challenges
- three open days to attract, familiarise and inform students about ATM-related careers
- ATM job cards and videos to inform students in deciding future careers in ATM
- ‘serious games’ to support the orientation of students towards jobs in ATM

Engage KTN summer school 2019 (Belgrade, Serbia)

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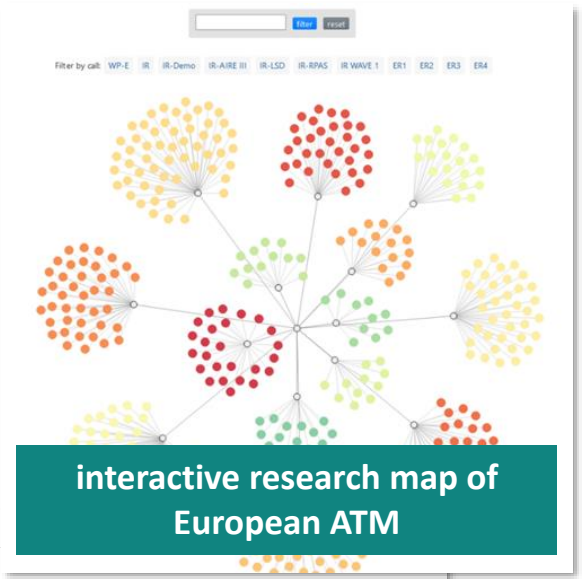
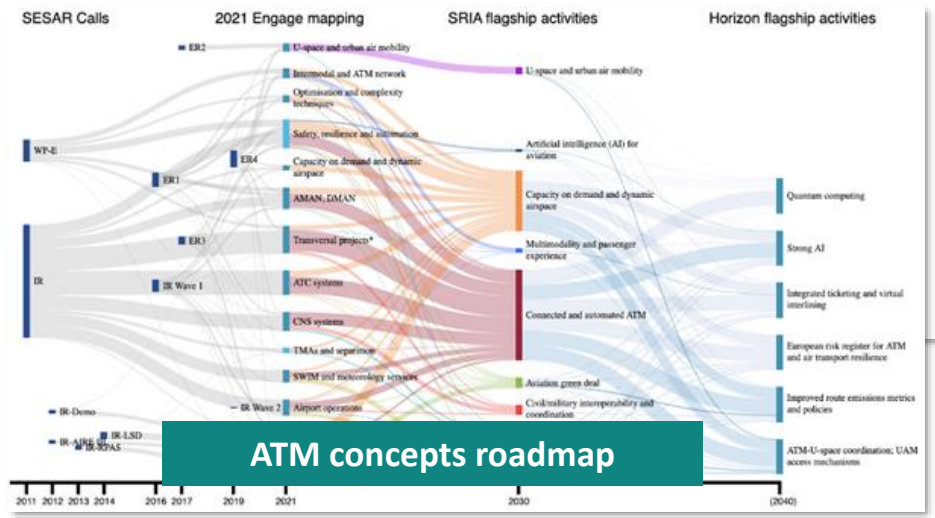
EngageWiki – building on a number of firsts

wikiengagektn.com/EngageWiki

- interactive research map of European ATM
- ATM concepts roadmap
- research repository
- European university programmes
- job opportunities



>2500 docs (Engage 1)
+ >1000 docs (Engage 2)
+ surveys …



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Future ATM concepts, future workforce implications

- Task 4.1: ID trends along with analysis of expected impacts on skills required from future ATM workforce
- Task 5.1: ATM concepts roadmap … an innovative set of concepts beyond the SESAR 3 timeframe
- **Task 4.1**
  - Classical literature review
  - Surveys
    - in-house, e.g. with industry: "[These] trends may have an **impact on the current and future workforce**. What are the **major challenges** you are expecting in that respect?"
    - external surveys, e.g. CANSO & EUROCAE WG-125 (see next presentation)
  - National progs / reports (Innovate UK's 50 Emerging Technologies; Airservices Australia, ...)
  - **Generative AI** (predictive models, e.g. generation of new content / ideas) (see next slide)
  - Critique and comparison of outputs

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Generative AI – anticipated next steps

Step 1 – ChatGPT

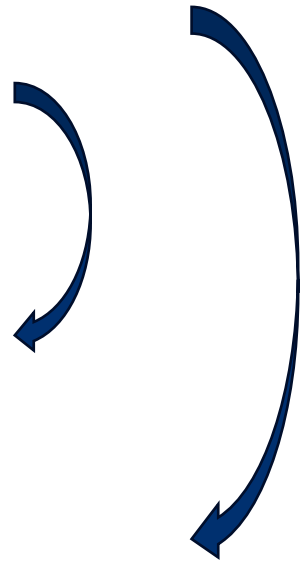
- Prompt: "Can you tell me which 10 technologies will be important for air transportation for the next 30 years?"
- Upload selected documents, e.g. SESAR Master Plan (focus/weight can be directed)
- Ask same question as previously, and ask for the logic behind the answers, and the sources
- Ask to consolidate X most important technologies from these two lists, for each:
  - ask for likely +ve/-ve **impacts for stakeholders**

Step 2 – SciSpace

- For each technology and stakeholder, ask for a **lit. review on impacts**, with sources and links

Step 3 – Consolidation (ChatGPT)

- Ask to put answers #1 and #2 into 'stakeholder/technology' table (albeit not adding extra info)
- Ask to give **likelihood** of implementation



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Thank you

Reporting:	summer 2024 (https://engagektn.eu/)
Thoughts / suggestions:	cookaj@westminster.ac.uk
Up next:	Cate Bichara on EUROCAE WG-125

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Stand-bys

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Generative AI – background

- Generative AI are predictive models that allow us to generate realistic output (e.g. text)
- Example applications:
  - generation of totally new content, e.g. new business idea
  - generation of re-worked content, e.g. summary of text
  - easier interaction with existing tools, e.g. web search engines
- Main limitation: reliability of output when looking for facts
- Some AI now connected to web and can cite sources for their facts,
  e.g. Microsoft Copilot, the AI-powered version of Bing
- Questions for our task:
  - can we use these new tools to build a reliable literature review?
  - can the ‘original content’ capabilities be used for trend forecasting?

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Generative AI – background

- Many AI tools are freely available; some are specialised at specific tasks
- For our purposes, we need tools able to:
  - produce high quality text based on complex prompts (=> ChatGPT 4.0)
  - connect to journals' repositories to cite sources (=> SciSpace)
  - review existing documents to extract knowledge (=> ChatGPT 4.0 or Powerdrill)
- Current cut-off date of ChatGPT: April 2023
- SciSpace seems to have various cut-off dates across journals
  - e.g. 2021 for *Nature*, 2023 for *Trans Res C*
  - not only open access; list of journals (around 100k): https://typeset.io/journals
  - reports on 5 (most relevant) hits within its library
- We might test Claude 3 (very recent new tool)

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Surveys

Engage 2 - Future trends & developments in aviation industry

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* Indicates required question

OPERATIONAL trends

Please rate the relevance of the following operational trends over the next **10 years**; provide your own trends in the next question if missing in the list. *

By 'relevance', we mean in terms of likely impact on the way operations will be performed in 10 years' time.

The above mentioned trends may have an **impact on the current and future workforce**. What are the major challenges you are expecting in that respect?

Your answer

Engage 2 | The impact of ATM Innovation on Academic Programmes

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* Indicates required question

Section 2

Your view on trends

Please rate the importance of having **further information on the exact skills required by employers** in the aviation industry regarding the following TECHNICAL trends within the next 10 years. *

(You can provide your own trends in the next question, if missing from the list)

Note: the same three items are also used in a survey with industry, which will allow us to compare the responses, but you can add your own choice(s) in the next question.

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Example of AI early output

Stakeholder	Positive Impacts of Hybrid Propulsion Systems	Positive Impacts of Hybrid-Electric Systems	Positive Impacts of Autonomous Flight Systems
Aircraft Manufacturers	Opportunity to lead in innovative aviation technologies. Diversification of product offerings.	Opportunity to innovate and lead in a new market segment. Potential for new revenue streams.	Opportunity to lead in an innovative market with autonomous aircraft. New revenue streams through advanced aircraft and systems.
Airlines	Potential operational cost savings. Enhanced brand image through adoption of greener technologies.	Reduced operational costs. Enhanced brand image as early adopters.	Operational efficiencies and cost savings. Enhanced safety through reduced human error. Likehood: • 15 years: Moderately likely, • 30 years: Highly likely, • 50 years: Very likely. Autonomous Flight Systems have several positive impacts on operational efficiencies, cost savings, and enhanced safety for airlines. These systems contribute to the reduction of flight crew workload, leading to increased operational efficiencies and cost savings. [1] Additionally, as autonomy increases, operator cognitive workload decreases, resulting in improved situation awareness and reduced human error. [2] The use of adaptive algorithms and machine learning systems in autonomous flight systems allows for the learning and adaptation of behavior based on flight experience, similar to human pilots. This enhances safety and robustness under all conditions. [3] Furthermore, the deployment of autonomous flight systems can lead to fuel savings and reduced emissions, especially on shorter flights between large airports. [4] Overall, autonomous flight systems offer the potential for improved operational efficiencies, cost savings, and enhanced safety through reduced human error for airlines.

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Thematic challenges underpin the KTN

- Climate impact analysis and mitigation for ATM-related non-CO_2 emissions
- Passenger-centric digital airport
- Disruptive ATM system modernization
- Integration of new entrants

Proposal Call open: https://engagektn.eu/calls/catalyst-funds/

- **thematic challenges (4 novel concepts beyond SESAR 3)**
- **'catalyst fund' projects** fast-track specific activities in support of developing solutions to **thematic challenges**; moving closer towards **industry goals/objectives** and higher TRLs
- financial support for **16 catalyst fund projects** through two Calls (in addition to PhD alignment)
- cross-fertilisation of knowledge from other disciplines to stimulate inputs from innovative, future-scoping and unconventional research into ATM
- series of **in-person and on-line workshops**

Invitation!

- **join Industry Board**
- **(co-)mentor catalyst projects**
- **shape/align work**
- **participate in events (workshops)**
- **access concept (etc.) surveys**

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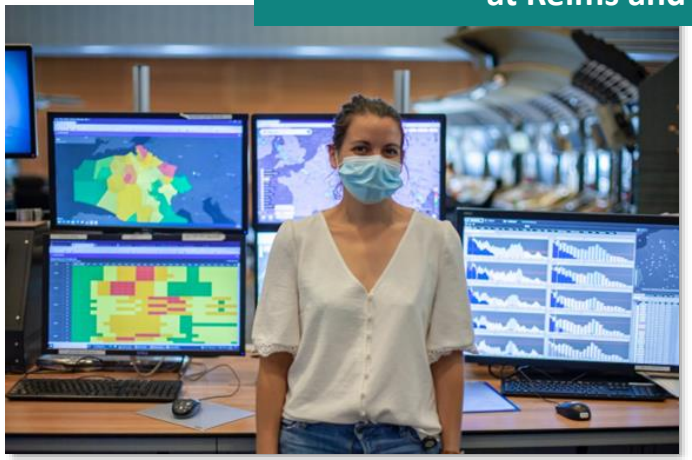
Engage KTN 'WIPA' project and its operational validation trial at Reims and Marseille ATC centres



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