Haiku

Human AI teaming Knowledge and Understanding for aviation safety

The Future Impact of AI on the Human Role in Aviation: a case study of Pilots

June 25th, 2025

Vanessa Arrigoni, Veronika Takacs, Nicola Cavagnetto, Simone Pozzi (DEEP BLUE)

This project has received funding by the European Union's Horizon Europe research and innovation programme HORIZON-CL5-2021-D6-01-13 under Grant Agreement no 101075332

About me

deepblue
consulting & research

- SME based in **Rome (Italy)**
- We operate in **Research and Development**, feeding into **Consultancy** and **Training**
- Core competencies: **Human Factors** & **Safety**

Aviation | Aerospace | Unmanned Systems | Manufacturing

Healthcare | Maritime | Rail | Energy & Climate

Haiku

Vanessa Arrigoni
Lead Consultant

Area of expertise
Human Factors, Training

Type of projects
Research, Consulting

Domain
Aviation, Healthcare, Aerospace, Maritime

The HAIKU Project

Start: Sept. 2022 - End: Aug: 2025

GOAL

Developing **Human-Centred AI-Based Intelligent Assistants** for **safe**, **secure**, **trustworthy** and **effective** **Human-AI partnerships** in **aviation** systems.

6 USE CASES

2 cockpit, 1 ATM, 1 UAM, 2 Airport (safety & passenger)

6 TRANSVERSAL STREAMS OF WORK

Explainability, Human Factors assurance, Liability & Ethics, **Future human roles and skills**, Safety Culture, Societal acceptance

15 PARTNERS | 10 COUNTRIES | 3 COMMUNITIES

(HF, end-users, technology suppliers)

deepblue PROJECT COORDINATOR · EUROCONTROL · CHPR · EMBRAER · ENAC · skyway · LINKÖPING UNIVERSITY · LFV · THALES · BORDEAUX INP · CATIE · DFKI · ENGINEERING THE DIGITAL TRANSFORMATION COMPANY · Suite5 We Deliver Intelligence · CERTH CENTRE FOR RESEARCH & TECHNOLOGY HELLAS

Scan for our website

The Future Impact of AI on the Human Role in Aviation: *a case study of Pilots*

Haiku

OBJECTIVE

To explore the potential impact of the introduction of **AI** on **human roles**

FOCUS

Aviation industry, commercial airline **pilots**

STREAMS OF ANALYSIS

- Personality traits
- Competencies & Skills
- Training

Scan for our website

This project has received funding by the European Union's Horizon Europe research and innovation programme HORIZON-CL5-2021-D6-01-13 under Grant Agreement no 101075332

What have we done

FOCUS OF THIS PAPER

1 What will the **future** look like?

Landscape design

2 What may be the **impact** of future trends and AI on the **pilots role?**

Impact analysis

3 How may **personality traits**, **skills**, and **training** evolve?

Changes outlook

A key step when designing new technologies

Doing the same job with a digital assistant is not "doing the same job"

This project has received funding by the European Union's Horizon Europe research and innovation programme HORIZON-CL5-2021-D6-01-13 under Grant Agreement no 101075332

How did we work

2

IMPACT ANALYSIS

3 WORKSHOPS *(30 SME)*

To define the evolution of the human role in aviation from today to 2050.

Methodologies:

- *Backcasting (future to present)*
- *Forecasting (present to future outcome)*
- *Lotus blossom (deep dive on key themes)*

SEMI-STRUCTURED INTERVIEWS *(5 SME)*

To enrich and validate

3

CHANGE OUTLOOK

DESK RESEARCH

To explore the current state of personality profiles

2 WORKSHOPS *(8 SME, 2 scenarios)*

To understand the necessary skills

GAP ANALYSIS

To highlight key changes in skill sets and personality traits

SEMI-STRUCTURED INTERVIEW *(1 SME)*

To pinpoint necessary adjustments in training programs

OUTCOMES: 1 2 3 4

Outcomes

1

What impact?

The **pilots journey** from today to 2050

2

Who to train?

Key insights on **selection**

3

What to train?

CRM for the future

4

How to train?

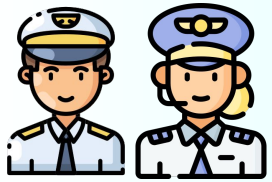
Recommendations for **future training**

This project has received funding by the European Union's Horizon Europe research and innovation programme HORIZON-CL5-2021-D6-01-13 under Grant Agreement no 101075332

1

The journey from today to 2050

The HAIKU Roadmap concentres uniquely on the human perspective on technological changes

	2025	2030	2035	2040	2050
 ***AI is going to support me in…***	• Identifying **optimal solution** and **priorities** • Performing **some simple and repetitive tasks**	• **Workload** management • Performing the **majority of repetitive tasks** • Performing **some initial complex tasks**	• **Managing nominal operations** • Alerting on **potential risks**	• Providing **advices** to prevent and manage **risky** and **off-nominal situations** • **Rescue** in case of imminent risk	
Main challenges from a human perspective	• Building pilots **trust** on AI	• Prevention of **basic technical skills degradation**	• Sustain humans' **situational awareness** and **vigilance**	• Prevention of **problem solving skills degradation**	

Ensure **job desira ility** and **attractiveness**

This project has received funding by the European Union's Horizon Europe rese nd innovation programme HORIZON-CL5-2021-D6-01-13 under Grant Agreement n 075332

2

Who to train?

Key insights on selection

Based on Five-Factor Model (Costa et al., 1992)

PERSONALITY TRAITS
EMOTIONAL STABILITY
EXTRAVERSION
AGREEABLENESS
OPENNESS TO EXPERIENCE
CONSCIOUSNESS

STEER FOR A FUTURE-READY SELECTION STRATEGY

- Update **personality profiles** in line with the expected evolution of roles
- Adapt **selection criteria** accordingly
- Rethink **job promotion strategies** to anticipate and address future generational needs

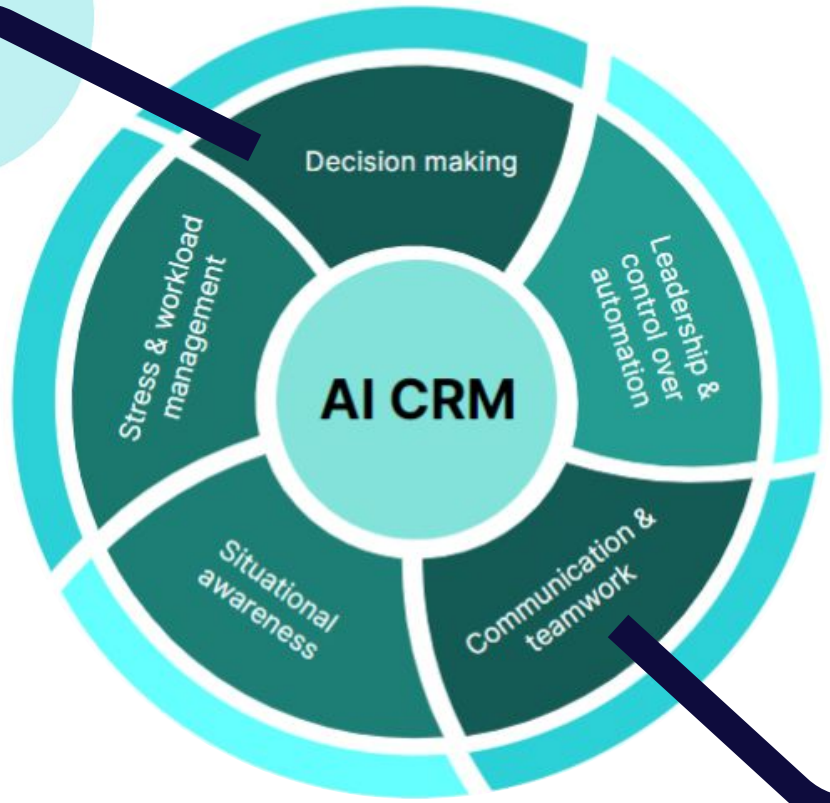
3

What to train?
AI-CRM

AI to be a **new member of the Team.**
This requires an **updates** of both the **Competency Model** and the existing **CRM…**

DECISION-MAKING

- How to make decisions when relying on a **single source of information**?
- How to empower humans to **critically evaluate** the support received and avoid overreliance?



COMM. & TEAMWORK

- How to effectively **convey human intents and goals** to the AI teammate, and vice-versa?
- How to build a **shared mental model** and **collaborate seamlessly** between two team members with different ways of processing information and communicating?

This project has received funding by the European Union's Horizon Europe research and innovation programme HORIZON-CL5-2021-D6-01-13 under Grant Agreement no 101075332

How to train?

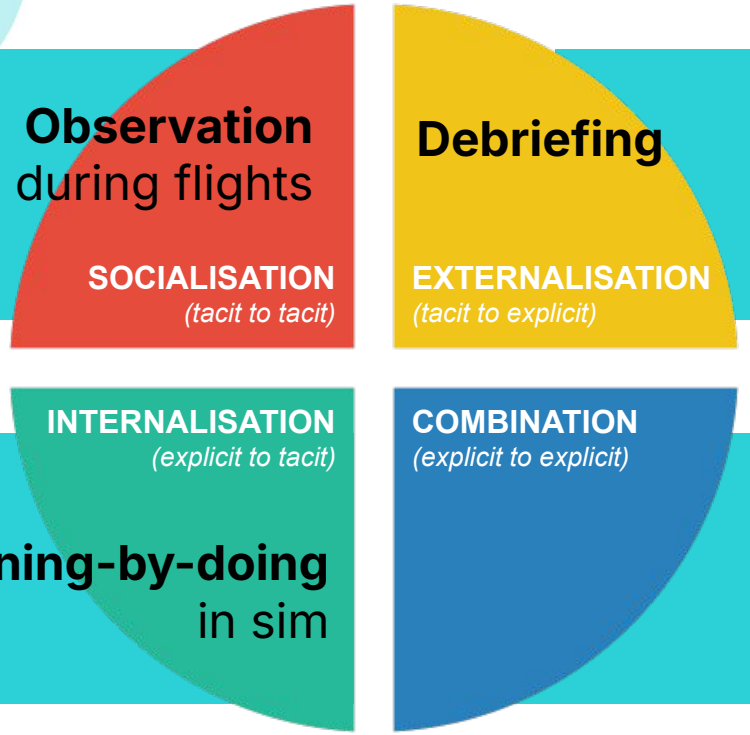
Recommendations for future training

Based on SECI Model of knowledge management (Nonaka et al., 1995)

HOW TODAY'S PILOTS LEARN

WHILE IN THE FUTURE

Reduced due to increased human-tech, less human-human interactions



May require **enhancement** via **structured and psychological support** for **emotional openness**

Increased session frequency may be needed

Where **AI** may play a key role by enabling **new explicit knowledge** by merging existing explicit knowledge

AI to be embedded as an active part of the training process

Conclusions

AI has the potential to be a **powerful means** for supporting aviation operators, helping aviation **adapt safely and effectively to future trends and challenges**.

Technological trajectories and **workforce development** should **go hand-in-hand**.

Actions for workforce must start now:

- Assess role evolution & impact
- Rethink recruitment strategies
- Identify new & evolving skills
- Update training programs

… as key actions to ensure job desirability and attractiveness!

This project has received funding by the European Union's Horizon Europe research and innovation programme HORIZON-CL5-2021-D6-01-13 under Grant Agreement no 101075332

THANK YOU!

Haiku
Human AI teaming Knowledge and Understanding for aviation safety

FOLLOW US

WEBSITE
https://haikuproject.eu/

LINKEDIN
HAIKU EU Project

X
@HAIKUproject_EU

Scan for our website

Vanessa Arrigoni
vanessa.arrigoni@dblue.it

Nicola Cavagnetto
nicola.cavagnetto@dblue.it

Veronika Takacs
veronika.takacs@dblue.it

Simone Pozzi
simone.pozzi@dblue.it

deepblue
consulting & research
www.dblue.it