



# Haiku

Human AI teaming Knowledge and  
Understanding for aviation safety

## **HAIKU: An overview of the project's 1st year results**

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## Our goal

is to pave the way for **human-centric-AI** via the exploration of interactive **AI prototypes** in a **wide range of aviation contexts**

## Our challenge

is to deliver **truly *human-centric* Intelligent Assistants**, capable to **'fit' the way humans work.**

In the first year of the project, the HAIKU consortium tried to look into the **future of aviation.**



# How?

**40+**

**DOCUMENTS  
ANALYSED**

To explore the **vision** of aviation key players, tech and consulting companies, European bodies, research centres, and other research projects

**11**

**INTERVIEWS**

To understand the point of view of selected **aviation Subject Matter Experts**, mostly focusing on **key operational, technological** and **human** aspects

**2**

**WORKSHOPS**

To apply the findings to the **HAIKU use cases**, and identify the **future key challenges for aviation**



# Future landscapes for aviation



# Main challenges for aviation

- A** MAINTAIN **HIGH LEVEL SAFETY STANDARDS**
- B** MAINTAIN A **STRONG SAFETY CULTURE**
- C** ENABLING **ADAPTIVE REGULATION**
- D** ENABLING THE SHIFT **FROM SEGREGATION TO INTEGRATION**
- E** MINIMISE **CARBON FOOTPRINT**
- F** PRODUCE **SUSTAINABLE FUEL SOURCES**
- G** BE CAPABLE OF ADAPTING TO **EXTREME WEATHER EVENTS**
- H** ENABLING THE SHIFT TOWARDS **MULTIMODAL TRANSPORT SYSTEM**
- I** **INTEGRATE SYSTEMS**
- J** ENSURING **CYBER-RESILIENCE**





Artificial Intelligence could  
be **key** for addressing  
some of these challenges...  
if proper **Human-AI**  
**Teaming** is envisaged



# IA Concepts with Human-AI Teaming



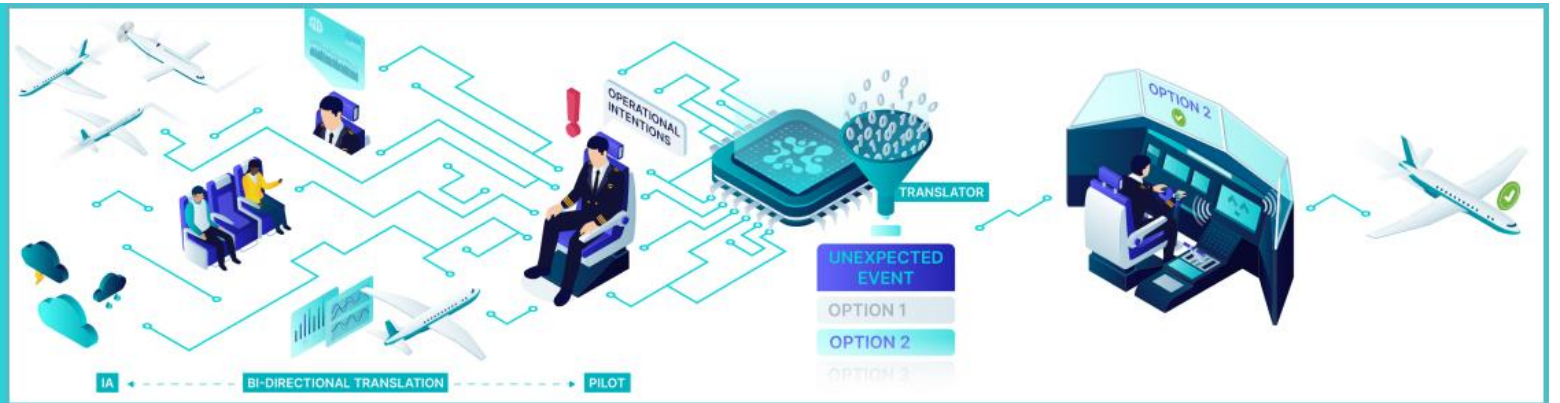
## AIRPORT SAFETY FIRST (ASF) Intelligent Assistant Concept

ASF leverages historical data to enhance the safety of day-to-day airport operations. It issues safety warnings based on predictions.

## Intention-Based Communicator (IBC)

Intelligent Assistant Concept

IBS helps the aircraft and the pilots in reaching a shared understanding of the mission and the joint resolution of situations.





# IA Concepts with Human-AI Teaming



## AIRPORT AWARENESS SYSTEM

Intelligent Assistant Concept

AAS monitors and coordinates all planned and unplanned activities related to the airport, including the vehicle movements, people on RWY, taxiway, and apron.

## DIGITAL ASSISTANT FOR UAM COORDINATOR (DUC)

Intelligent Assistant Concept

The DUC monitors UAM operations, ground events and city social life

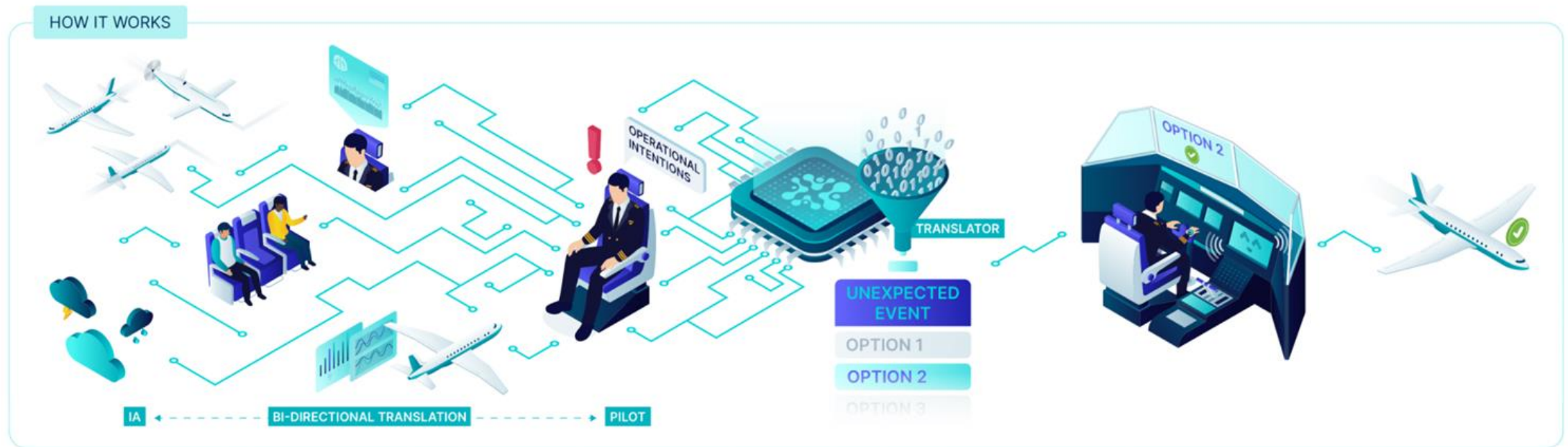


# IA Concepts with Human-AI Teaming

Let's focus more on the IBC IA..

The IBC IA is what we are focusing on HAIKU's Use Case 2, Led by [Thales](#)

**Intelligent Assistant in the cockpit to assist in route planning/replanning.**



# IA Concepts with Human-AI Teaming

Let's focus more on the IBC IA..

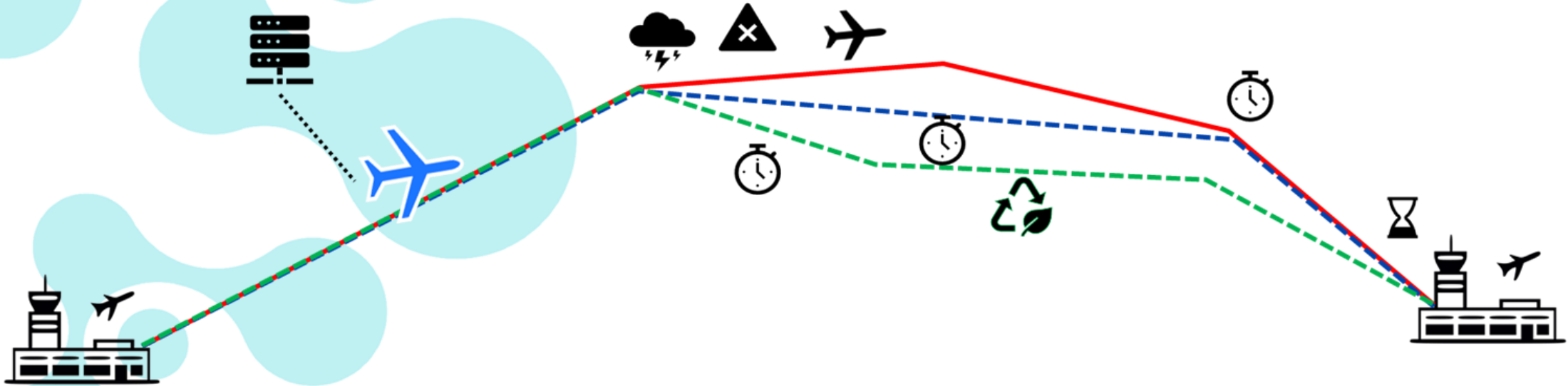
**Target user:** Pilots

**Supported task:** Route planning/replanning

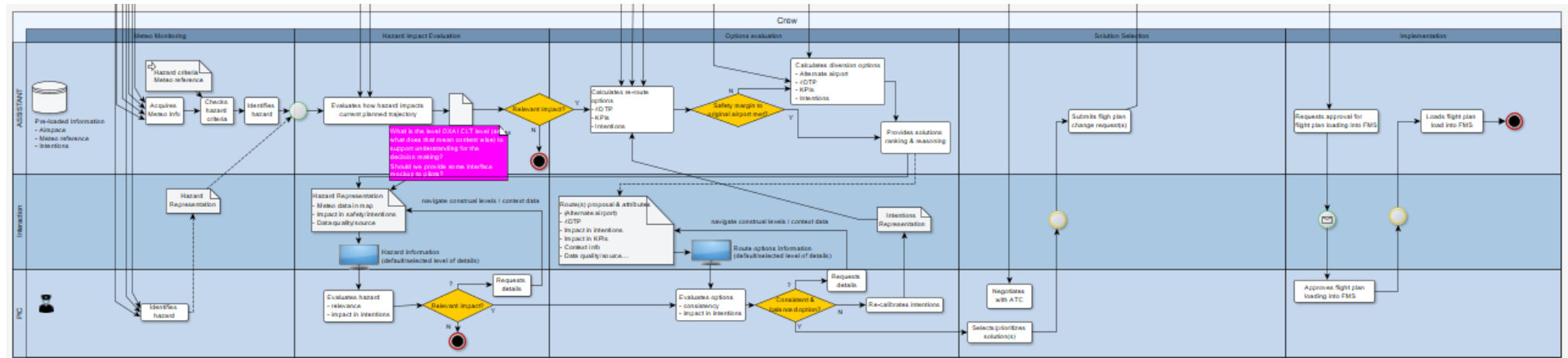
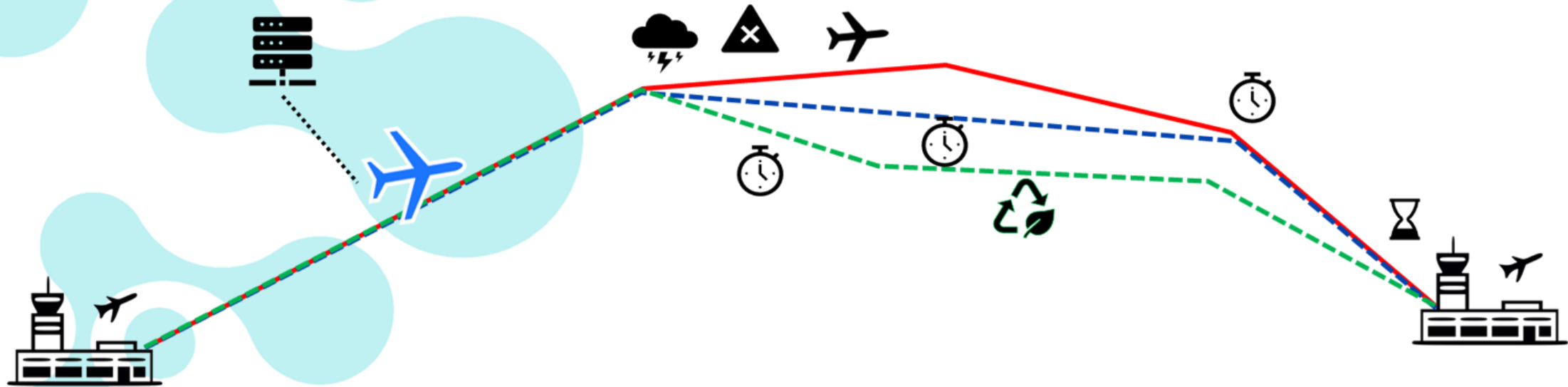
**Solution in a nutshell:** Pilots' operational intentions and response from the systems will be translated by the IA in order to make decision-making regarding planning/replanning routes much more efficient.



# Assistant for re-route/diversion

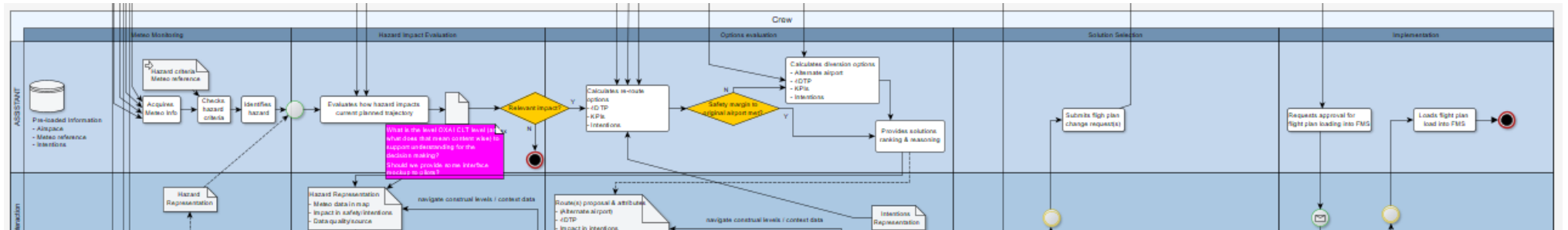
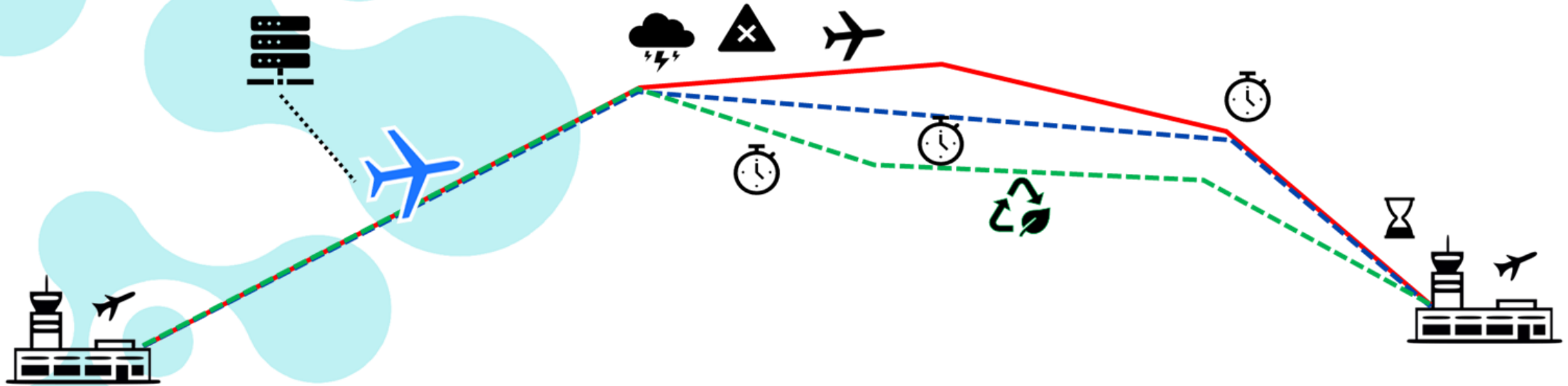


# Assistant for re-route/diversion





# Assistant for re-route/diversion



What kind of **Human-AI teaming** does this IA entail?

# IA Concepts with Human-AI Teaming

## Our own Human-AI Teaming Matrix

	To analyse	To manage	To act
	<i>A intelligent assistant <b>providing information</b> to the user by capturing, processing, and analyzing data...</i>	<i>A intelligent assistant supporting the user in <b>managing the workflow, organizing and prioritizing tasks</b>...</i>	<i>A intelligent assistant capable of <b>performing actions/tasks</b> (to face a situation or recover from errors)...</i>
<i>... on-demand</i>	<b>Observer</b>	<b>Secretary</b>	<b>Rescuer</b>
<i>... proactively</i>	<b>Informer</b>	<b>Coordinator</b>	<b>Executor</b>

*Human-AI Teaming Matrix created and used internally within HAIKU, inspired by Belbin's social roles.*



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# IA Concepts with Human-AI Teaming

## EASA Classification

### Level 1 AI: Assistance to Human

- Level 1A: Human augmentation
- Level 1B: Human cognitive assistance in decision and action selection

### Level 2 AI: Human/machine teaming

- Level 2A: Human and AI-based system cooperation
- Level 2B: Human and AI-based system collaboration

### Level 3 AI: More autonomous machines

- Level 3A: The AI-based system performs decisions and actions, overridable by the human.
- Level 3B: The AI-based systems performs decisions and actions.

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# Final Considerations

What we have done so far:	What we will do in the next months, to expect from next EASN:
- Future Aviation Landscapes	/
- Use Cases CONOPS	- A look at the first version of IA prototypes - Results of first validation sessions
- Initial Human/AI Teaming classification (o model/s)	- More robust Human/AI Teaming requirements definition
- Preliminary XAI strategies	- Communication Models for XAI in Human-AI Teaming
- Preliminary insights on the human role in future aviation	- Future workforce transformation map (competence-centred career paths)
- Preliminary mapping of the legal and regulatory framework applicable to AI in aviation  - First application of the HAIKU integrated SHS-L validation framework to the UCs	- Concepts improvement according to the SHS-L assessment



# Thanks for your attention!



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