

Human Autonomy Teaming (HAT) based on an enhanced Bidirectional Communication (COMBI)

The value for cockpit
operations

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The need of assistance in cockpit operations

- Pilots must manage complex situations (bad weather, complicated terrain, dense traffic, technical failures, human errors, etc.)
- To solve these problems, Intelligent Assistance Functions are being developed.

- But all that **efficiency is threatened** when there is a communication breakdown **between operator and technology**, because of :
 - Unpredictable failure (system)
 - Unpredictable event (situation/environment)
 - Operator cognitive resources impairment (fatigue, illness, ageing, ...)

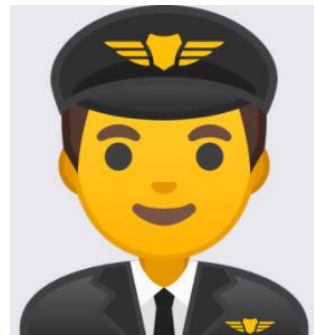
The operator doesn't know what the system is doing...
The system can't figure out what the operator wants...
... No HMI is designed to resolve that situation

*XAI: Explainable AI

How to reduce COMPLEXITY ?

Maintain human in/on the loop when AI is used in the cockpit

- ▶ management by the highest level of abstraction, the one relative to pilot's INTENTIONS
- ▶ an easy human/machine bidirectional dialogue (translation in same semantic field and explainability)

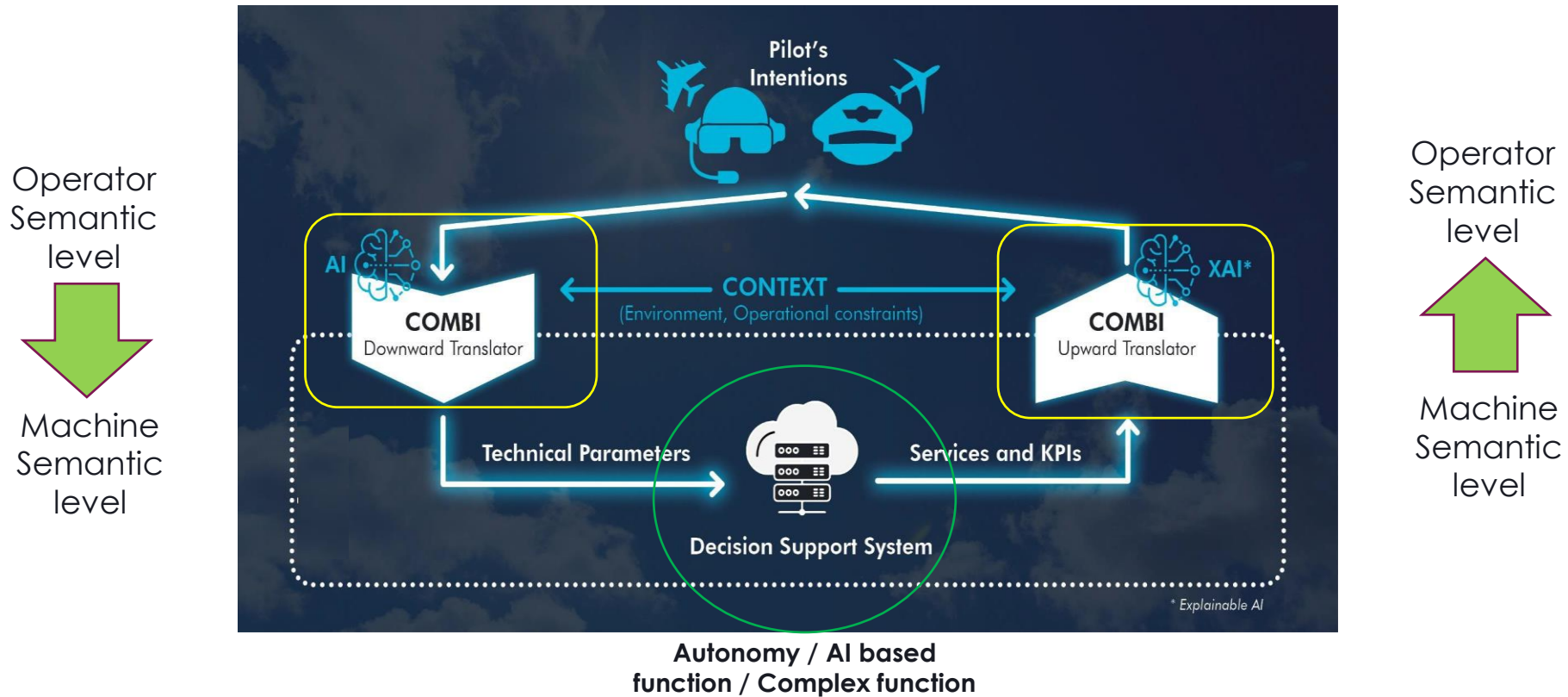


OPEN



Bidirectional Communication (COMBI) for HAT

COMBI is an interpreter between pilots and Intelligent Systems, to facilitate mission management, using the highest level of abstraction, the one relative to pilot's **INTENTIONS (cost, green, comfort, etc.)**.




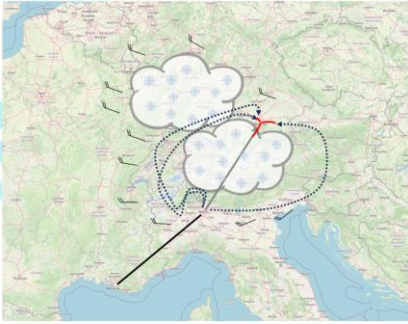
*XAI: Explainable AI

HAIKU Project: The need of assistance in cockpit operations

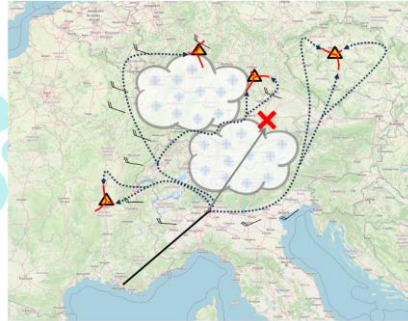


What complexity level to justify an assistance ?

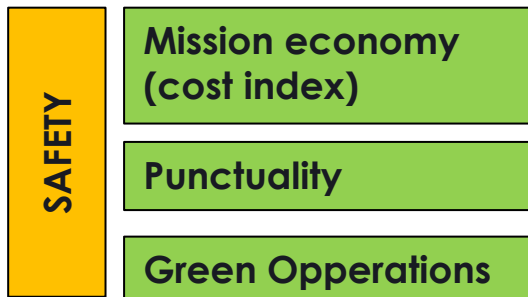
Use case : « reroute » 



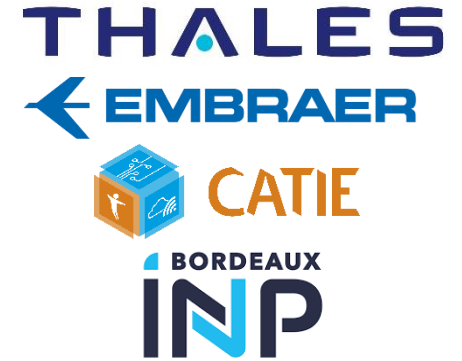
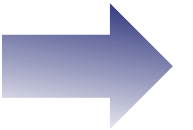
Use case : « diversion » 



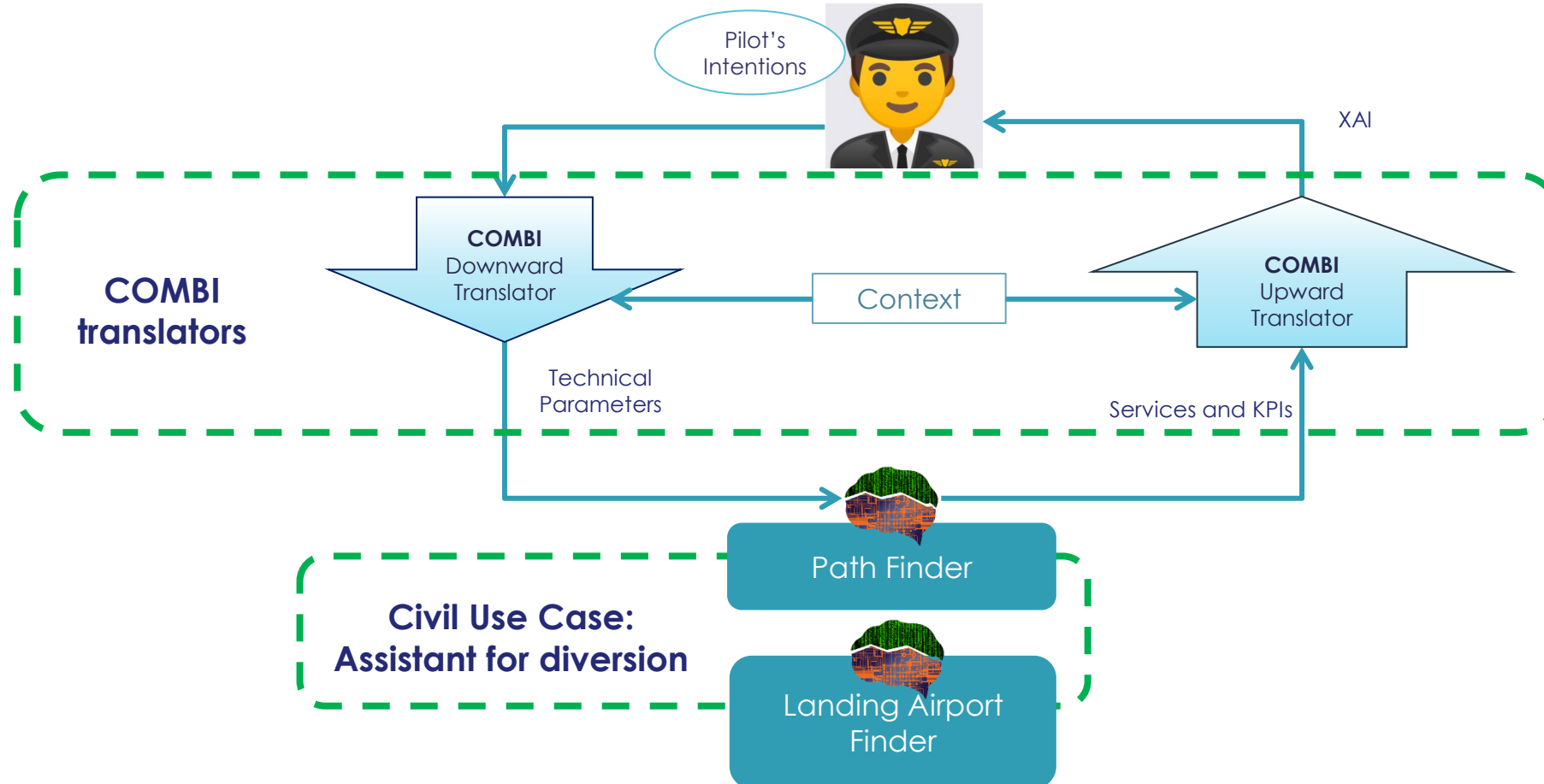
What are operational intentions in commercial aviation?



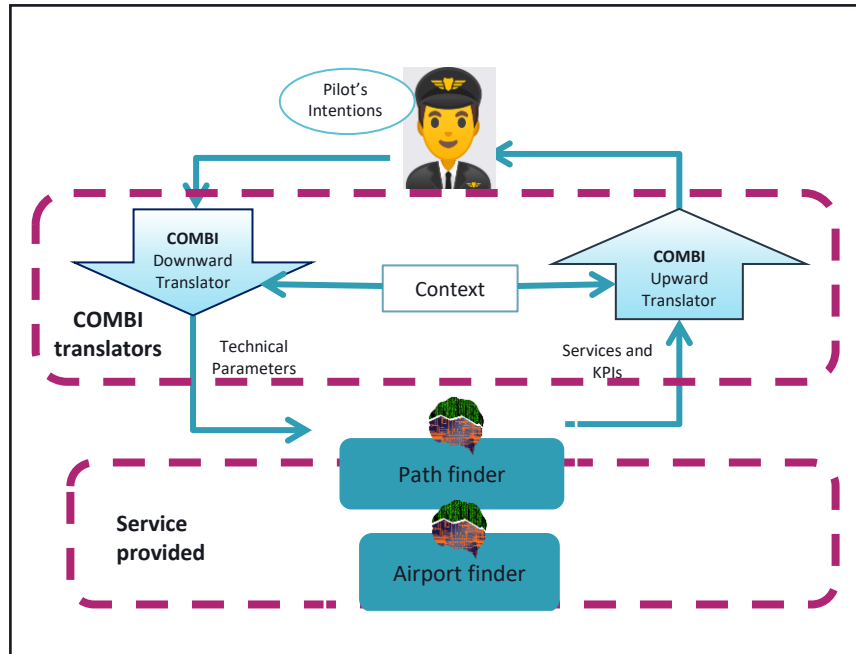
What system architecture is need to ensure performance and safety of HAT solution?



The need of assistance in cockpit operations



The need of assistance in cockpit operations



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Thank you

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