HINFACT

Enhanced (and simplified) Pilot Training Management

The Convergence of Neuroergonomics and AI

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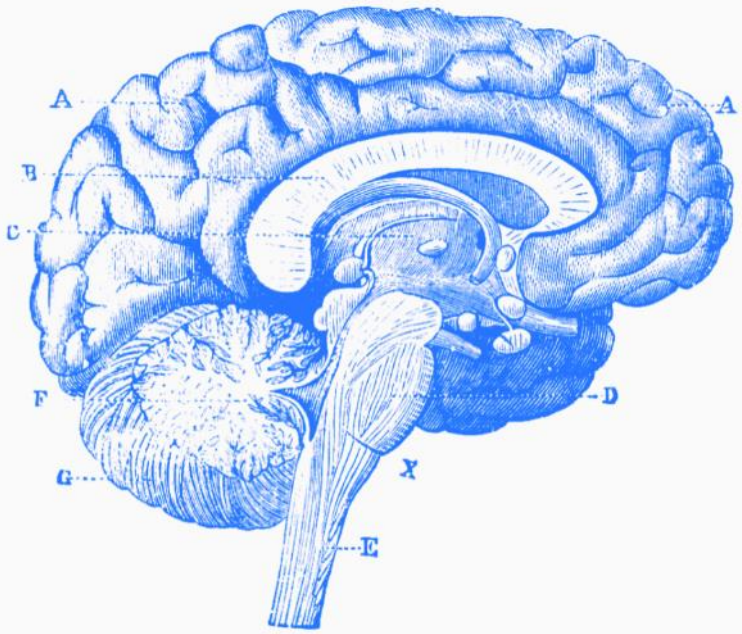


1. Neuroergonomics and AI

2. Application
   Pilot Training Management

3. Use Case for Airlines

1. Neuroergonomics & AI

Initial Statement in Neuroergonomics

Any Complex System or Organization should take into account Human Brain Mechanisms

Wearable Neuroimaging
Low fidelity

Ultra-Mobile Neuroimaging
Actual

Traditional Neuroimaging
Artificial

Mobile Neuroimaging
High fidelity

Hinfact is a Spin-off from ISAE-SUPAERO - AI & Neuroscience

> 20 years or research

2000 research citations

- Neuroscience
- Signal Processing
- Artificial Intelligence

“Neuroergonomics study **human behavior** at work

to increase their **performance and well-being**

by designing and engineering **Adapted Tools**”

Neuroergonomics framework to build Adapted Tools

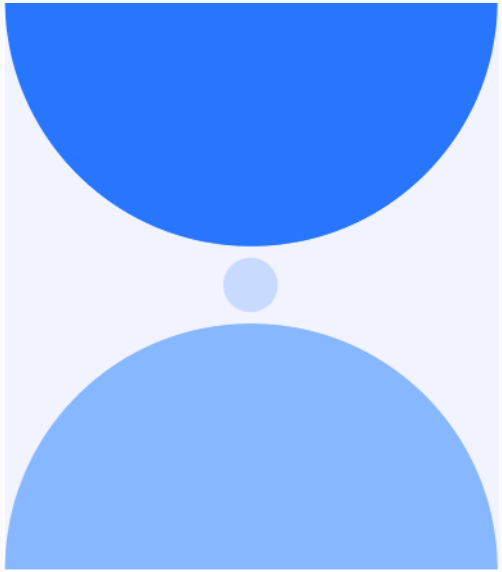
Adapted tools are always the enablers of all major evolutions

An adapted tool

- ✓ Unlock New Capabilities
- ✓ Human-Centric
- ✓ Easy-to-use

Merge of Neuroergonomics and AI

Artificial Intelligence combined with Neuroergonomics Approach as a Game Changer



✓ New Capabilities

✓ Human-Centric

✓ Easy-to-use

AI Techniques

- Deep Learning
- Machine Vision
- Reinforcement Learning (RL)
- . . .
- Natural Language Processing (NLP)
- Large Language Model (LLM)
- Reasoning
- . . .

2. Application
Pilot Training Management

Pilot Training Challenge

We all agree that Adaptive and Tailored training is a key factor of success for Operators

Individual Training Program

- ✓ Reinforce self-confidence — Pilot development
- ✓ Enhance Flight Safety — Risk-based
- ✓ Enhance Flight Efficiency — Performance-based
- ✓ Induce Major Cost savings — Cost-based

Statistical Analysis

Manual Processes

Too much data

Excel

Excel

Are we really doing it today ?

Excel

Checking the box for authorities

Instructors biases

Non-reliable data

Black Swan

Pilot Training Challenge

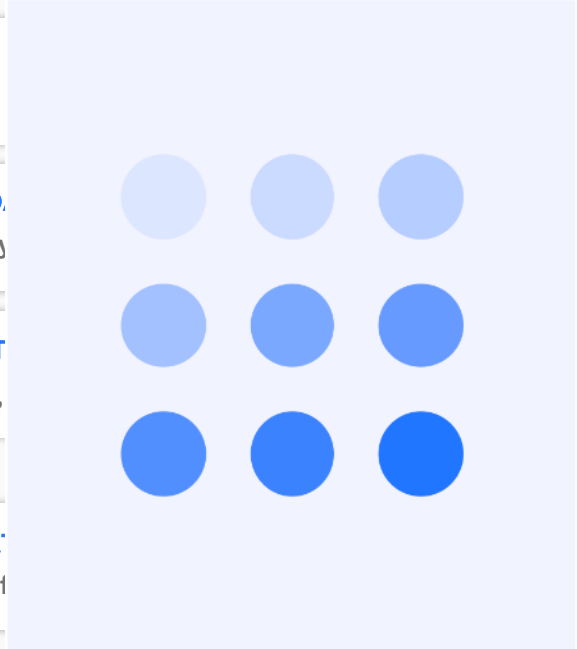
Operational implementation of this approach is complex

SMS INPUTS
Reports, risks

FLIGHT OPS D
Fuel efficiency

TRAINING DAT
Past gradings,

EXTERNAL DA
Aircraft Manuf



Individual Training Program

- Reinforce self-confidence
- Enhance Safety
- Enhance Flight Efficiency
- Induce Major Cost savings

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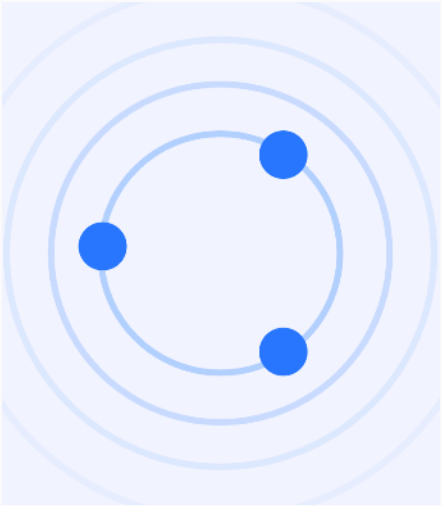
Using AI and Neuroergonomics
To build the new-generation Training Management System (TMS)

Unlock New Capabilities | Human-Centric | Easy-to-use

For Instructors

- Pilot performance assessment
- On-job Adaptive training



For Training Managers

- Training Needs Analysis
- Training Design
- Planning & Instructors allocation
- Compliance & Administrative Tasks

3. Use Case

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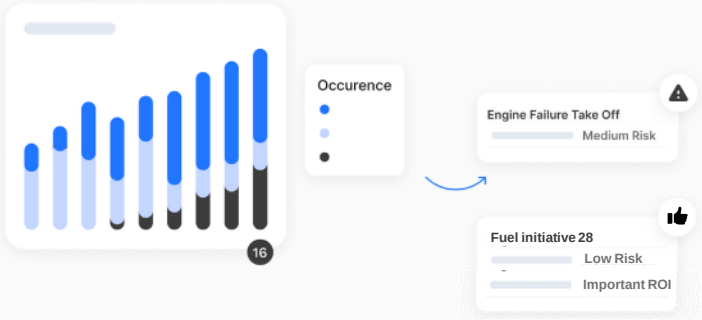
Use case

Augmented Training Manager for an optimal Training Design

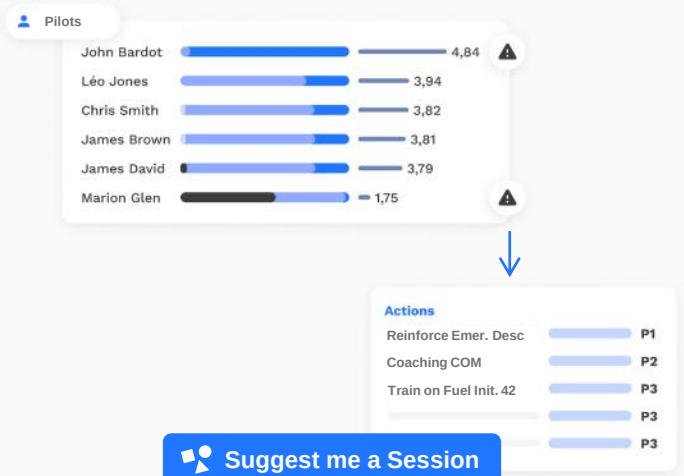
The Right Analysis

based on all data sources and AI suggestions
Strategy **done by the Training Manager**



Optimal Training Design

Supported by AI
From **the Training Manager's policy**

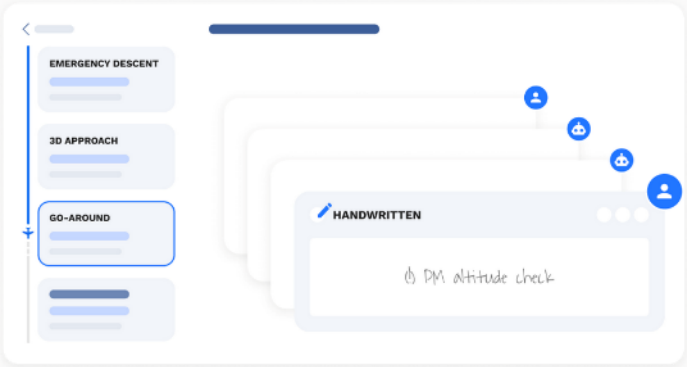


Use case

Augmented Instructor for an Optimal Tailored Training

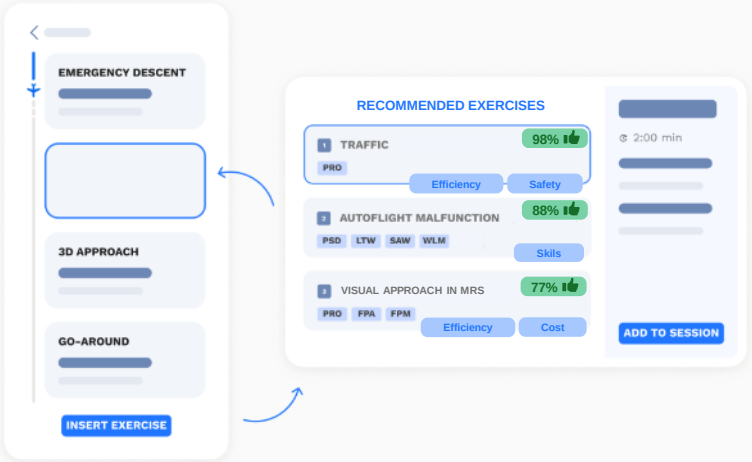
The Right Facilitation & Assessment

Supported by AI
Always **performed by the Instructor**



The Optimal Tailored Training

based on all data sources and observations
Always **refined by the Instructor**



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