

PICTURE

PERCEVAL

# Will we find the Holy Grail of training...

...by bringing facts and metrics to Evidence Based Training?

[www.thalesgroup.com](http://www.thalesgroup.com)



## PERCEVAL (R&T) PROJECT OBJECTIVE

Validate a **tooled approach to Evidence Based Training**, for pilots and air traffic controllers, bringing together tech, science and operational expertise, with the sponsorship of French National Aviation Authority, DGAC

« Increase safety & reduce instructor workload by introducing facts and metrics »

# Evidence Based Training, EBT

## NEW TRAINING PARADIGM

### COMPETENCES & OBSERVED BEHAVIOUR

Teamwork, communication, situational awareness, decision making,...

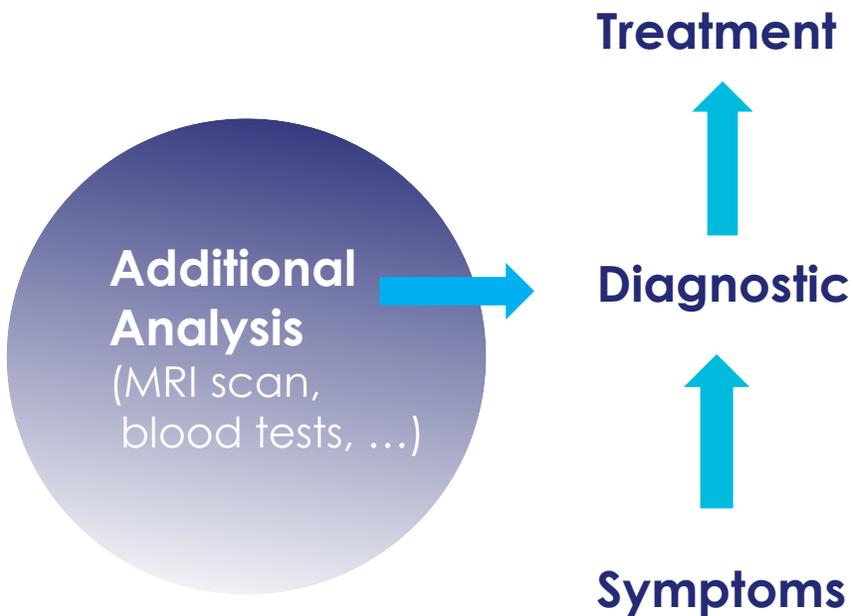
# Instructor Training **KEY STONE**



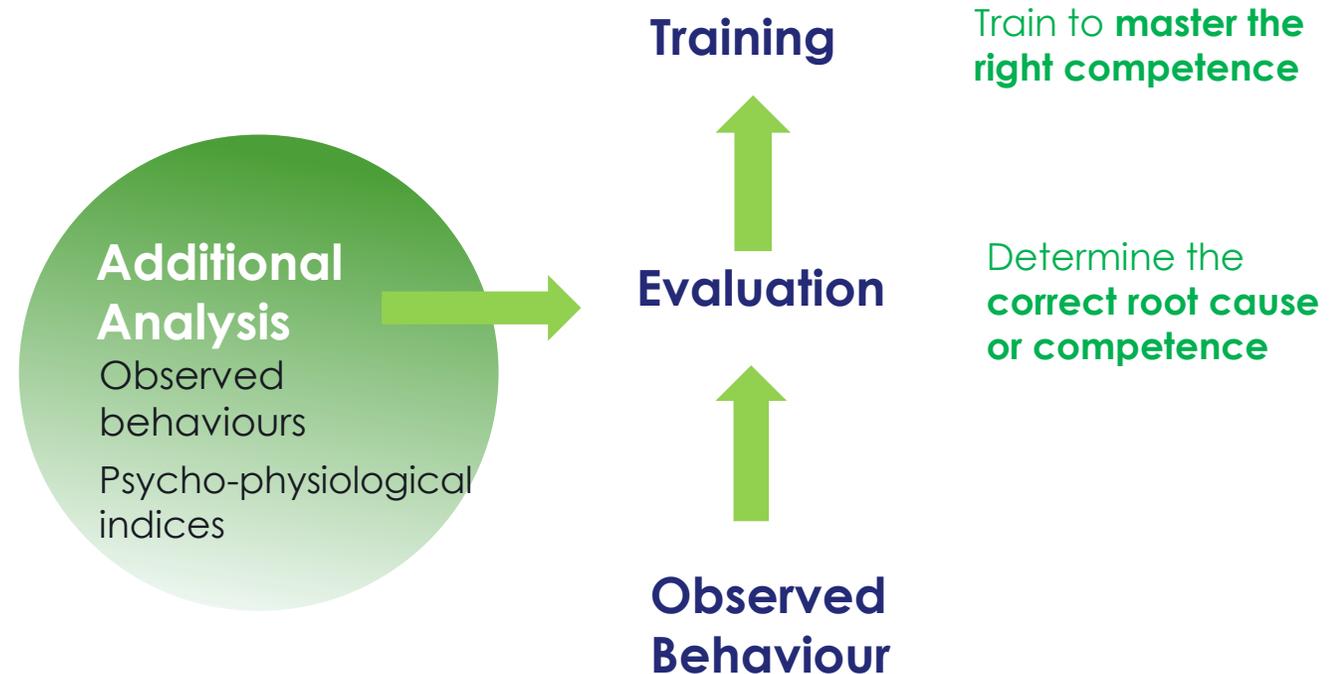
Observation is  
**subjective & partial**

# Improving the acuity of the instructor

## The doctor and the patient



## The instructor and the crew



# APP

Behaviour  
Analysis & Restitution

**THE VALUE** Supports  
the instructor evaluation  
with timely data and  
analysis



## DATA CAPTURE

**ENABLER : DATA**  
Multimodal data acquisition  
from crew & « aircraft »

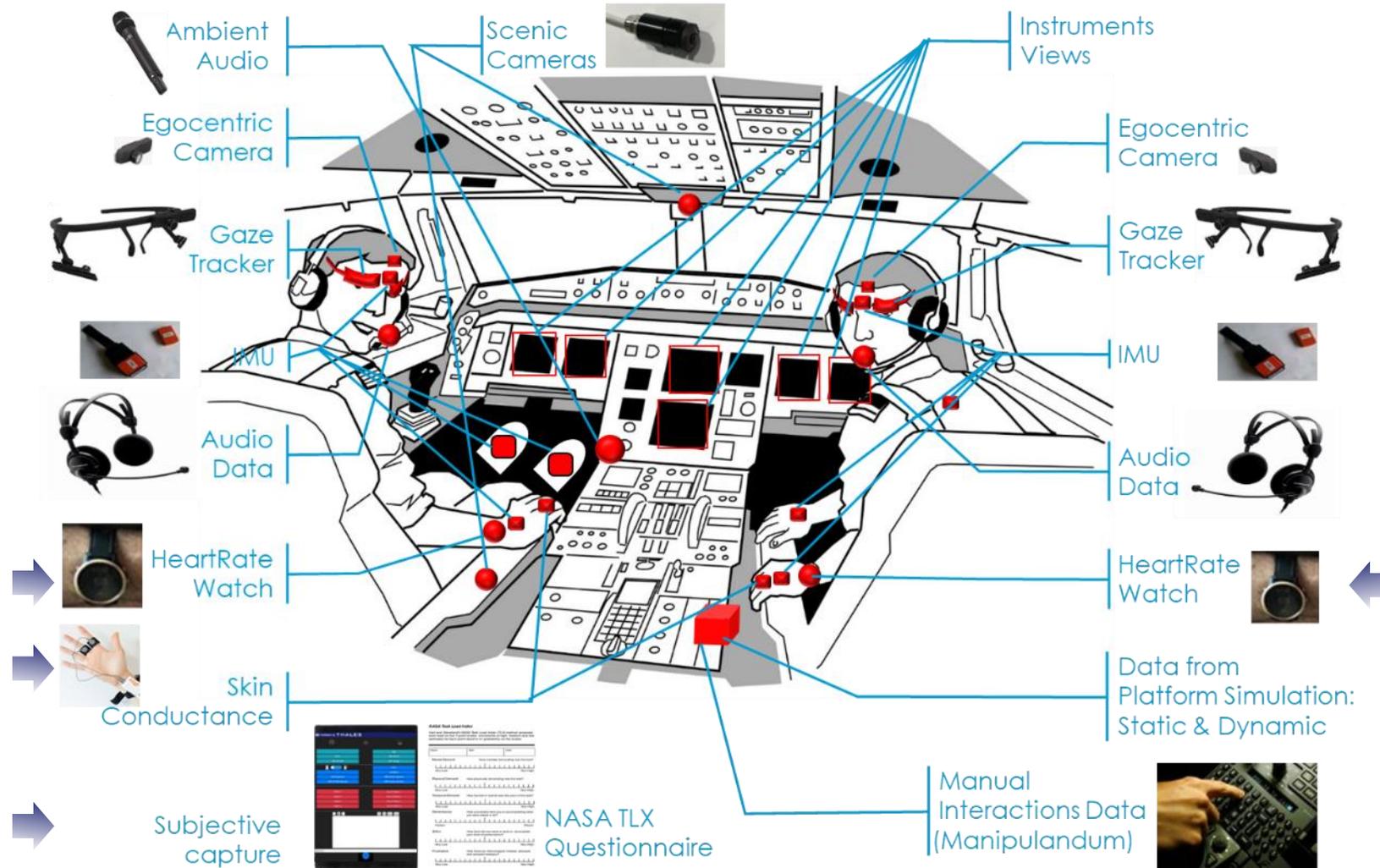
## APPLICATION

- Training context
- Cognitive indicators
- Behaviour evaluation
- « Observables » detection
  - Action sequences
  - Crew interaction

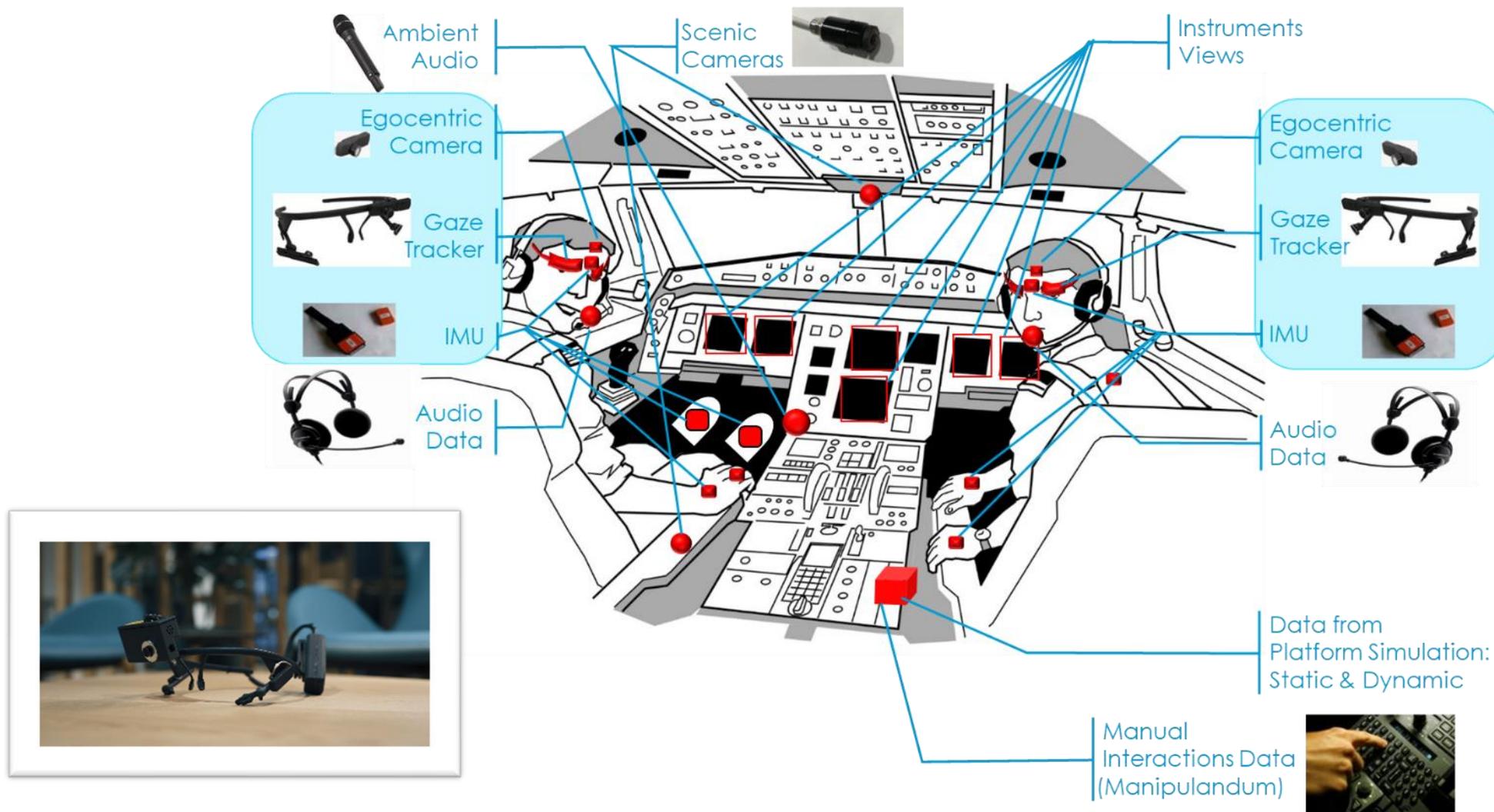
## DATA CAPTURE

- Speech, gaze, touch  
*non intrusive*
- Aircraft state
- Flight context

# Full experimental set up – data recording for model construction



# What the crew notices



# Overview of workstreams and use cases

<b>Concept &amp; tool development in support of EBT</b>		<b>First version of tool set</b> for acquiring (data capture) and analyzing observed behaviors of pilots and operators. <b>Understand &amp; define the concepts of use for the different scenarios</b>  <i>Instructor workshops – discussions and interviews – tech development</i>
<b>Crew training of pilots /FNPT</b>		Adapt and deploy tool set for FNPT <b>A320</b> simulator and the use case of <b>crew training, skills assessment and learning.</b>  <i>Experimental runs with cockpit crews</i>
<b>Recurrent training of pilots /FFS</b>		Adapt and deploy tool set for FFS <b>A330</b> simulator and the use case of <b>recurrent training and longitudinal monitoring of pilots.</b>  <i>Experimental runs with cockpit crews</i>
<b>Initial training of pilots /FNPT</b>		Adapt and deploy tool set for FNPT <b>A320</b> simulator and the use case of <b>initial training and learning level assessment.</b>  <i>Experimental runs with first time learner pilots</i>
<b>Training of air traffic controllers /ATC simulator</b>		Adapt concept and tool set to <b>training of air traffic controllers (CA)</b> and deploy on the <b>ATC simulator.</b>  <i>Experimental runs with air traffic controllers</i>

# Recording session – two pilots 4h night session



# 1st Restitution and Analysis

The screenshot displays a flight simulator analysis interface. On the left, three video feeds show different cockpit perspectives: the instrument panel, the pilots, and the rear view. The main central area shows a top-down view of the cockpit with a central panel of lights and instruments. On the right, a 'Pilot Monitoring' panel lists performance events for two roles: Commander (pilot.two@testlab.com) and Flight Officer (pilot.one@testlab.com). The events include:

- "Confirm" (0:01:53)
- Seq6.2: Appropriate call 'Confirmed', Correct phraseology and Sufficient voice volume by PF. (0:01:53)
- PF visual circuit: ND and PFD but without ECAM completed within every 15s. Timeout (0:01:54)
- "Off" (0:01:55)
- Seq6.3: Appropriate call 'Engine Master 1, OFF', Correct phraseology and Sufficient voice volume by PM. (0:01:55)
- PF visual circuit: ND and PFD but without ECAM completed within every 15s. (0:01:56)
- Seq6.4: PM to look at the Engine Master within 4 seconds. Timeout (0:01:57)
- PF visual circuit: ND and PFD but without ECAM completed within every 15s. (0:01:58)

At the bottom, a timeline shows the progression of the session with various icons representing different states or events. The current time is 00:01:53.

# Results

## > Non intrusive data capture OK: everything on the data capture side is up, running and functioning

Gaze tracking precision 1-2 degrees, picks up gaze « anywhere » in cockpit; Represents with trails and high lights the instrument regarded

Voice analysis of cockpit crew, air traffic controllers; who says what, when

Manipulandum: what is touched, actioned and when

Data, video, audio: correlated, timestamped and synchronized

## > Analysis of crew action sequences OK: Analysis, in context, of cockpit crew multimodal action sequences to correctly assess observed behaviours

« in context »: Training Scenario/exercise, Aircraft state, flight sequences, environment form the back drop against which the above is analysed

## > « Observable behaviours »/ « Competences » with Explainable AI OK

# Preliminary results

## Acceptability

### > Pilot comfort: ongoing with head gear, initial results positive (limited number of participants!)

Prototype; light weight, works well with glasses, no discomfort after 4h, does not impede fringe vision (sides, up/down)

### > ATOs preparing dossiers to DGAC: objective to ensure « no impact » on simulator certification; same for airline on training course.

Preparatory work and discussions OK

# What's next?

## Experimental runs set to start in earnest

- > Continuing on acceptability / regulatory
- > Cognitive indices work to follow

## News on the above towards the end of the year

## GET INVOLVED !

### PERCEVAL Online Community

Join the discussion via [PERCEVAL LANDING PAGE](#)

### GETTING PRACTICAL; with

### « The Tester » Perceval Breakout Stream:

Integrating into Instructor workflow – efforts published in the Instructor « test » tool: interactive and based on prerecorded data

**Test & give your view! The floor is yours...**

# Contact

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## PERCEVAL

Landing page

 <https://lnkd.in/ejf762hD>