XR Pilot Training
Use Cases, Challenges, Successes

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Technological Trends: Hardware

- **Lighter, more portable** devices
- Higher **resolution**
- New market player(s)

- **Personalization** (vision correction)
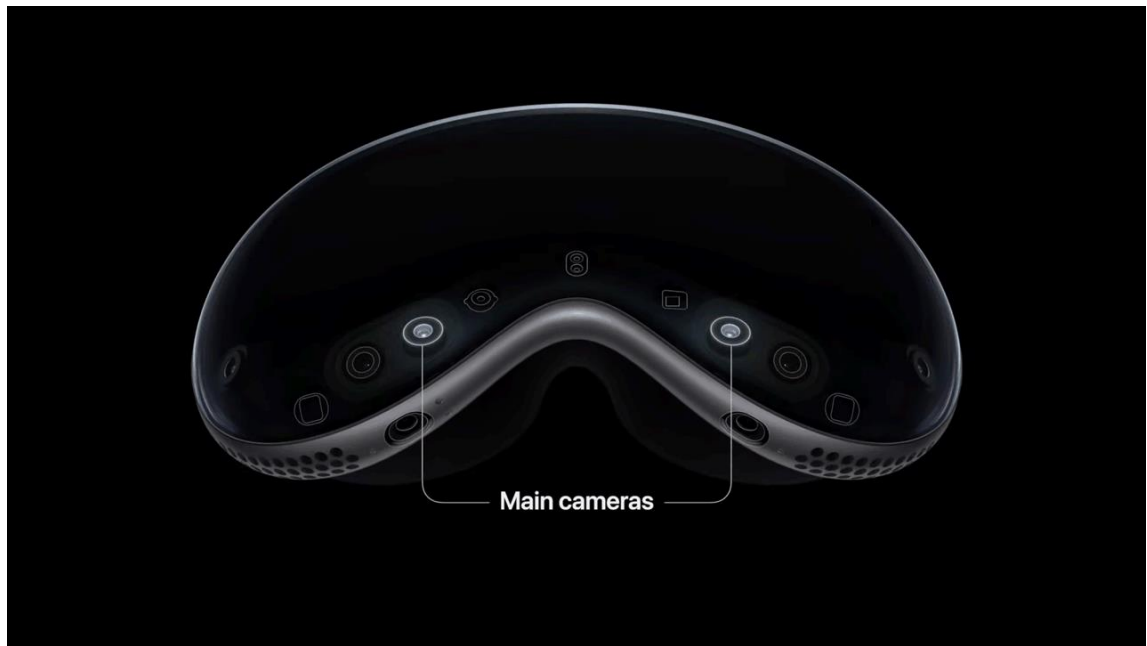- **AR** and **VR** functionalities

- Pancake **Lenses**
- Viable **standalone** capability

Sources: Apple, Meta

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Technological Trends: Improved Sensors

Source: Apple

Allowing:

- Rapid **room setup**
- **In-Real-Life (IRL) Roaming**

- Quick **passthrough**
- Easier **AR** development
- **Hand Tracking**
- **Eye Tracking**
    - **Virtual eyes - External**

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Technological Trends: Accessible AR - Meta Quest 3
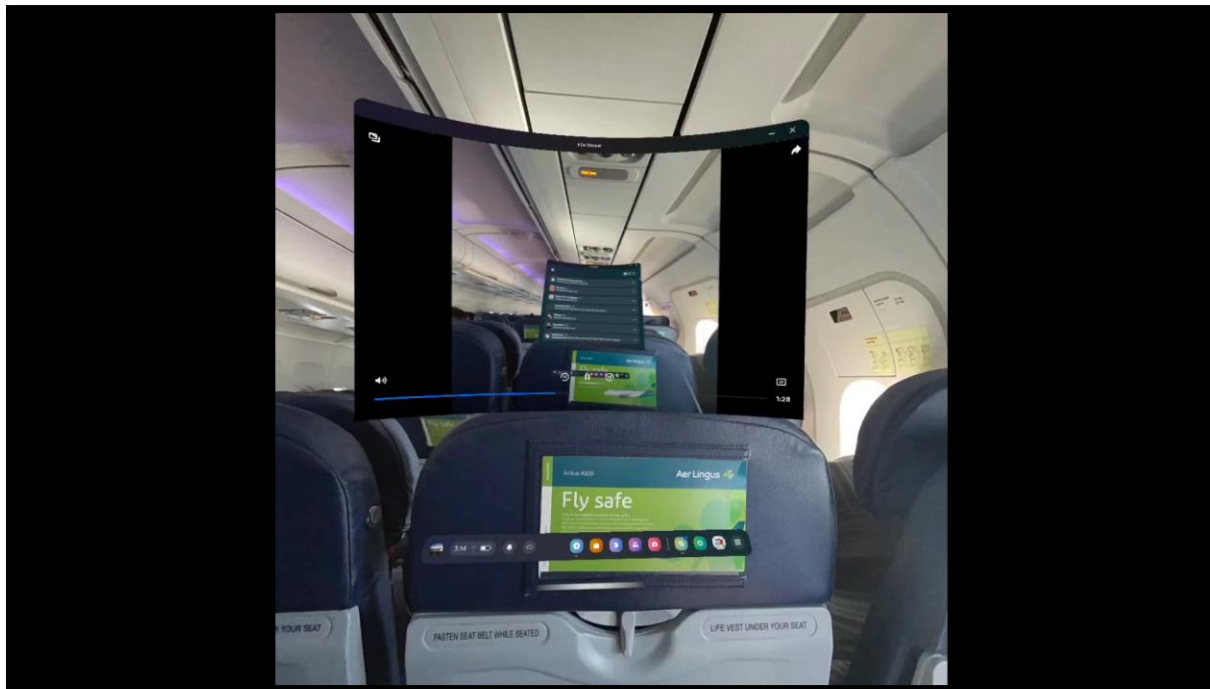
AR Experiences

In flight video of …

… an in-flight video

Infinite canvass

Real and Virtual

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Technological Trends: Software

Focused Design

- Train solo or train as a crew with remote and multi-user capabilities

- Use of Avatars to reflect different roles (crew, passengers, instructors)

- Multitude of devices to consume media – eg VR or iPad offer users the choice

Conversational User Interface (UI)

- Natural Speech

- Integration of Large Language Models (LLMs)

- Embedding of various data sources

Consideration of Competencies

- Tracking of key competencies (e.g. application of procedures, situational awareness)

- Personalized reports and debriefing options

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XR Training 2023: Use Cases
Lufthansa Experience with XR

100.000+ Training Sessions

- Born from the need to **substitute real aircraft training** for Aircraft Security Search

- Meets **regulatory requirements**, approved by NAAs

- **VR Hubs** implemented in FRA & MUC

- Initially based on HTC Vive Pro & Leap Motion

- Viable **business case**

- **High acceptance** by trainees
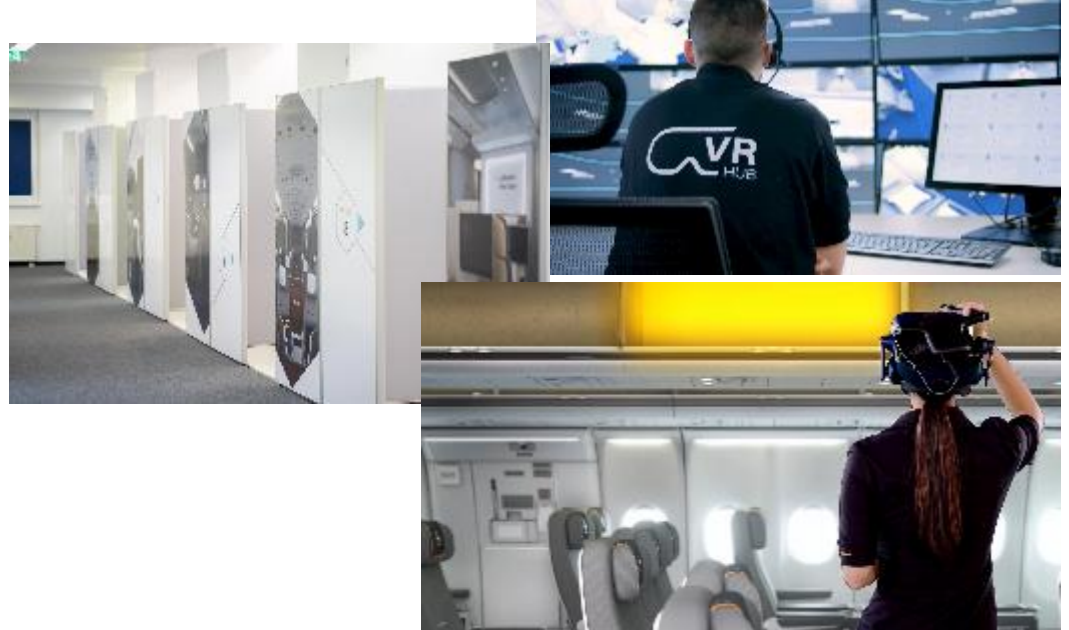
Source: Lufthansa Aviation Training

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XR Training 2023: Use Cases
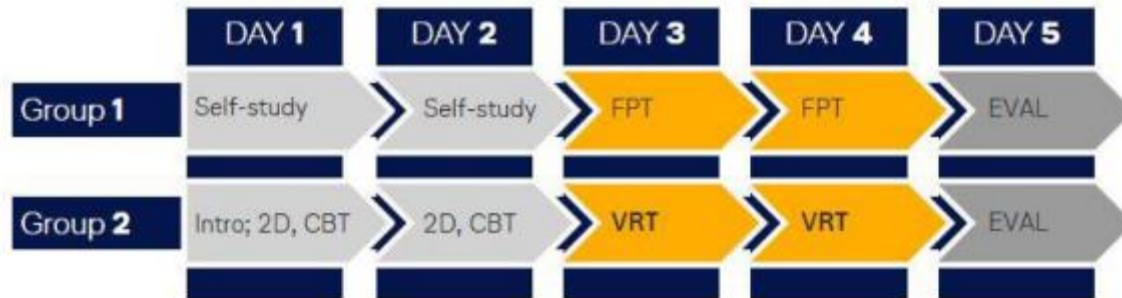## LH Group Trial: Airbus Virtual Procedure Trainer (VPT)

Demo at Lufthansa Aviation Training Center, VIE

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LH Group Trial: Airbus Virtual Procedure Trainer (VPT)

- Two separate trial groups (16 trainees total) without previous Airbus experience to enable **comparability**

- On-site setup in FRA & VIE based on **Varjo Aero** headsets with instructor support (observer role)

	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5
Group 1	Self-study	Self-study	FPT	FPT	EVAL
Group 2	Intro; 2D, CBT	2D, CBT	VRT	VRT	EVAL

- **Evaluation session** in FTD Level 2 or FFS for competency assessment

- Additional **survey** for VPT group delivering further insights and context

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XR Training 2023: Use Cases
LH Group Trial: Airbus Virtual Procedure Trainer (VPT)

💡 Key Findings

- Overall high **acceptance** through all age groups
- Partially, **fatigue** effects documented based on weight of VR headset and training execution
- Content and lesson design should be expanded to cover min. **two conventional training days**
- **Remote training option** desirable
- Added value of tablet-based software due to increase of **accessibility** and **repeatability**
- **Operator-specific** procedures to be considered

▶▶▶ Mitigations / Comments

- Limitation of training time per session (**20 min**.) & day (**80 min**.)
- **Additional content** to be provided (e.g. abnormals, dynamic lessons)
- To be considered based on hardware availability
- Implementation into adapted training concept

- Operator-specific procedure packages, i.a.

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XR Training 2023: Use Cases
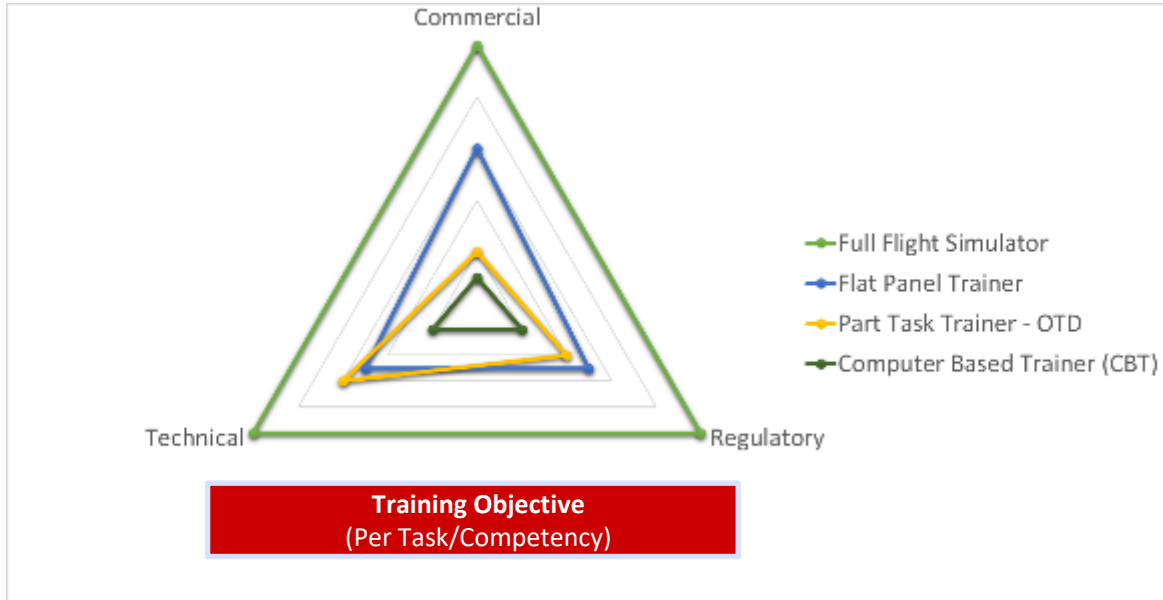## Brunner DA42 XR Prototype

- **6 DOF** NOVASIM MR platform by Brunner
- Varjo XR-3 Focal Edition headset
- Ongoing **EASA certification**
- Potential solution for **EVTOL & helicopters**

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Value Proposition – Design and Implementation

Full Flight Simulator
Flat Panel Trainer
Part Task Trainer - OTD
Computer Based Trainer (CBT)

Axes: Commercial, Regulatory, Technical

Training Objective
(Per Task/Competency)

Consider Additional Capabilities

- Remote vs Onsite Use
- Repeatability (Affordability)
- Availability (Casual vs planned)
- Solo vs Multi-user Operation

Best Practices

Design:
- Seek both trainee and expert input
- Iterate with agile development process
- Have strong pedagogical rationales

Implementation:
- Apply the appropriate tool
- Change management / User Acceptance
- Implementation strategy

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What's next?
Future Development

Immersive Training Solutions bring value now – and they will only improve

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- Smart Learning Hub platform including XR interface
- Multiple XR modules building on airline evidence ("real-world" scenarios)
- Customized solutions based on 3D aircraft database
- Collaboration on ICAO and EASA level - let's join forces!

A320neo
A330
A350

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Airbus Virtual Procedure Trainer (VPT) - A320/A330/A350
- Extended procedures w/dynamic lessons
- Abnormal Procedures into 2024
- Investigating
  - Cabin / Maintenance
  - Simulation Integration Strategy
- Engage with Industry (including Regulators and Working groups)

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Thank You

Q&A

Booth #203 – VPT Demo Available

Shane CARROLL - Head of Training Software

Booth #308 – XR Tech Demo Available

Gilad SCHERPF - Head of Aviation Training Development

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