

VR/AR/XR and Metaverse technologies for Defense & Aerospace

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Who are Varjo and what do we do?

- > Enterprise-grade, photorealistic mixed reality and virtual reality headsets and Metaverse software/cloud services
- > Advanced customers in automotive, defense, aerospace, medical, research
- > Founded and based in Finland with US & UK (NEW!) teams, and selling into 40+ market
- > Video pass-through mixed reality blending real and virtual seamlessly
- > Highest resolution across 115° field of view Integrated eye tracking at 200Hz
- > State of the art B2B cloud services



VARJO

The world stands before the next platform leap for the Metaverse



THE SHIFT TO IMMERSIVE TECHNOLOGIES – THE PLATFORM LEAP

The next platform leap is no longer a question of if, but when.
Tech giants are committing tremendous resources towards the race

facebook



Meta

\$10bn invested in 2021 into building the Metaverse & 10,000 new Metaverse staff to be hired in Europe



Microsoft is betting on the HoloLens powered by Azure Cloud



Nvidia is making massive bets with Omniverse, racing to segment a core position in running the Metaverse.
Its CEO predicts metaverse will outpace our current world economy

THE IMMERSIVE TECH SPECTRUM – SOLVING THE PROBLEM

PHYSICAL WORLD

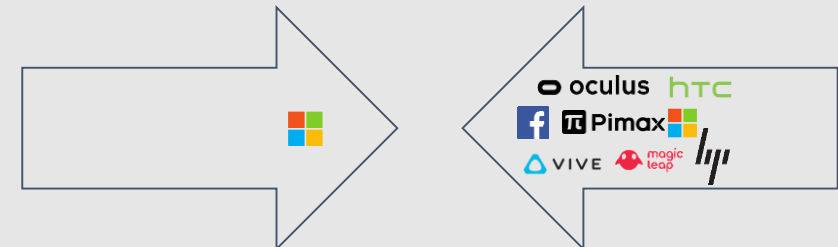


DIGITAL WORLD



CURRENT
IMMERSIVE TECH

AR / VR

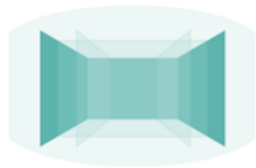


Quick overview of XR/VR Technologies



VIRTUAL REALITY (VR)

Fully artificial environment



Full immersion in virtual environment



AUGMENTED REALITY (AR)

Virtual objects overlaid on real-world environment



The real world enhanced with digital objects



MIXED REALITY (XR)

Virtual environment combined with real world



Interact with both the real world and the virtual environment



The Metaverse



A mixed-reality space in which users can interact with a computer-generated environment and other users.

COOL TECH ALERT

MILITARY METAVERSE

In the future, Soldiers could "drop in" to a virtual environment to conduct mission planning prior to execution.



Military VR/XR & Metaverse use case examples



TRAINING, STRATEGY, AND REMOTE OPERATION

- ✓ Pilot training: fixed wing & helicopter VR/XR simulators & LVC
- ✓ Anti Aircraft & Anti Tank VR/XR simulators
- ✓ Tank & vehicle operations VR/ XR training
- ✓ JTAC & fire control VR/XR training
- ✓ Maintenance VR/XR training
- ✓ Command & control and battlefield planning with VR/XR
- ✓ Drones & UAV control with VR/XR
- ✓ Naval training: control rooms, weapons system, maintenance

MVRsimulation Part Task Mission Trainer



PART TASK MISSION TRAINER



LVC connected cloud training system with XR & pilot performance data with the Finnish Air Force

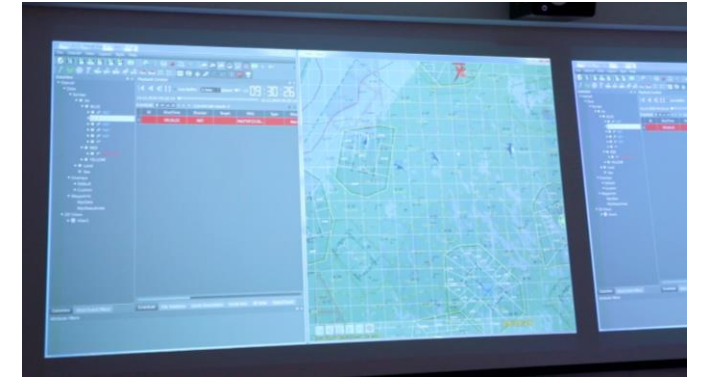
Patria



FEDERATED VARJO XR-3 MIXED REALITY SIMULATORS ON THE GROUND



FINNISH AIR FORCE BAE HAWK FIGHTER JETS IN THE AIR



REAL TIME COMMAND & CONTROL / MONITORING AI GENERATED TARGETS



BOHEMIA VBS BLUE IG IMAGE GENERATORS



PATRIA PILOT PERFORMANCE ANALYTICS



FEDERATED SIMULATORS AND SIMULATOR CLASSROOMS ON THE GROUND

LVC connected cloud training system with XR & pilot performance data with the **Patria** Finnish Air Force and Patria





“The Varjo VR x ITKK AA gun trainers already enables a better training experience with the human eye resolution visual fidelity & immersive 360 scenario than any traditional training systems”

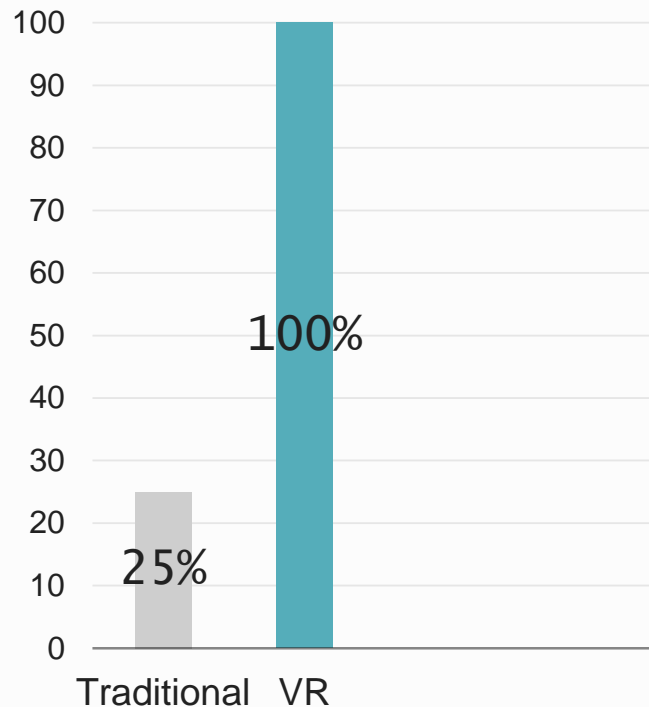
Superior results with AR/VR training over traditional learning methods



Finnish Defense Forces 12,7mm Anti Aircraft Gun AR/VR Training 2021 Study

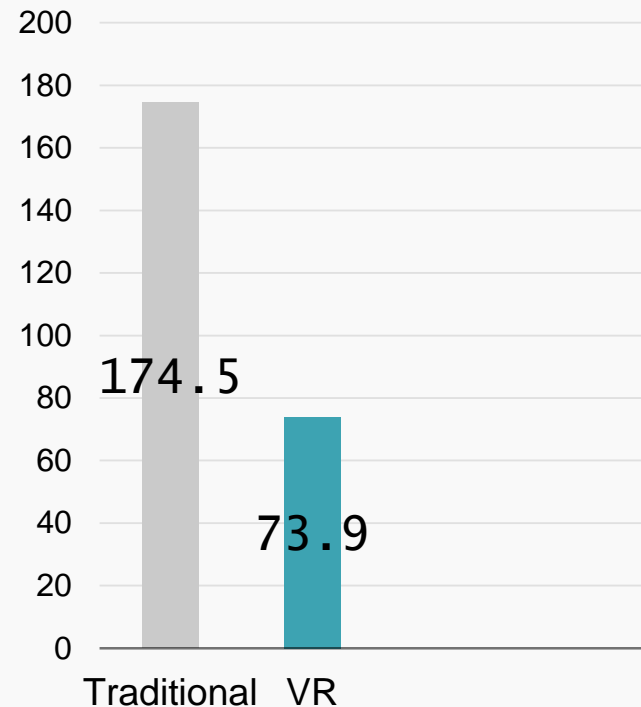
4X better training task completion pass rate with VR/AR

Able to complete the task after training (%)



...and for those who completed the, the VR/AR was 42% faster....

Average completion time(s)



Varjo mixed reality for US Navy Riverine Small Boat Trainers

Nov-1-2021 Aero Simulation Inc awarded Rivierine Small Boat TRainer for Naval Air Warfare Center Training Systems Division (NAWCTSD)

Reconfigurable crew trainers for the Riverine-Small Boat Trainer (R-SBT) to the Coastal Riverine Force (CRF).

The project will leverage high fidelity mixed reality Varjo XR-3 devices from Varjo



Worlds 1st EASA qualified VR training

Now also Airbus Helicopters leveraging VRM x Varjo VR-3 & Aero



Summary of lessons learned to date of VR/XR in Defense & Aerospace



BENEFITS OF VR/XR

- ✓ Size and weight reduction / portability
- ✓ More sets & reps
- ✓ Networked training / collaboration (LVC, cloud)
- ✓ Train things not possible
- ✓ Flexibility



Summary of lessons learned to date of VR/XR in Defense & Aerospace



CONSIDERATIONS

- ✓ Ways of working innovation key for success
 - ✓ Military know how x high tech know partnerships for innovation
 - ✓ Content creation & use case understanding vs tech understanding
 - ✓ Embedded OEM simulators vs 3D gaming technologies & COTS
 - ✓ Security of supply vs speed of innovation
- ✓ Ease of use & ergonomics in use and operation
- ✓ Wireless solutions (cloud compute, battery & thermal)
- ✓ Cyber security



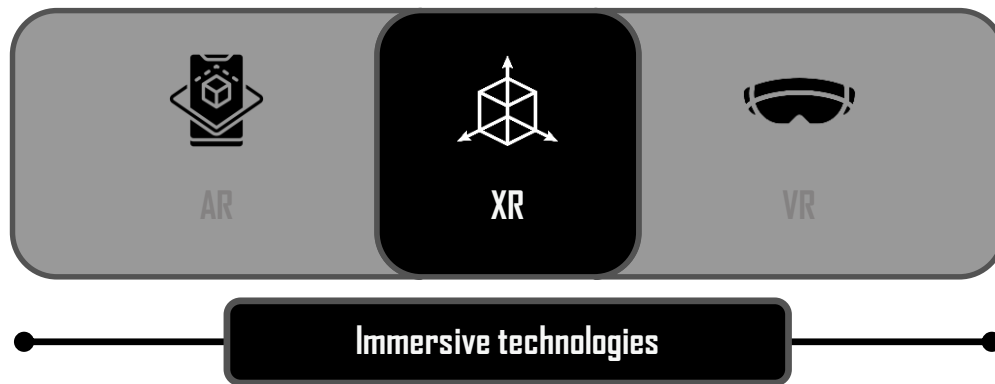
Varjo's Trade Agreements Act (TAA/BAA)
Compliant Mixed Reality Products Now
Available in the U.S.



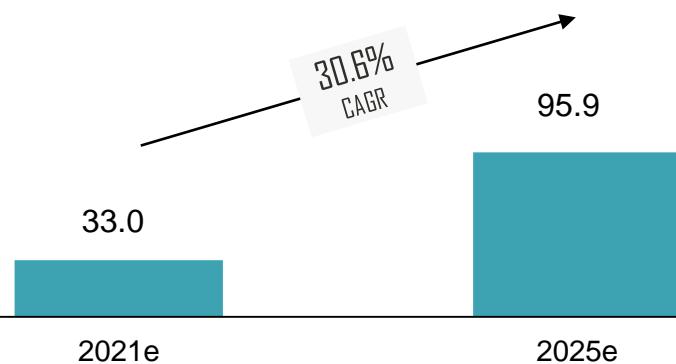
Immersive Technologies Market: VR/XR and Metaverse cloud solutions are set accelerate the next 2-3 years



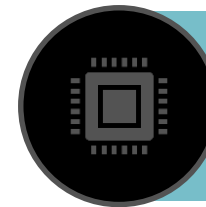
The platform leap into immersion...



■ Total XR Market Size (\$bn)



...driven by shifting reality and dawning realization of benefits



Technology advances

Strong investment in both VR & AR has led to significant improvements in hardware such as displays and eye-tracking, resulting in a richer immersive experience



Increased adoption due to COVID-19

Accelerated adoption beyond gaming and entertainment as pandemic increased need for new ways of business collaboration



Growing amount of use cases

Ongoing digital transformation is increasing demand in various verticals for technologies that reduce costs, improve efficiency and optimize processes



Rise of 5G and faster devices

Enhanced product viability as 5G promises to change how people use the internet through lightning-fast connection speed, lower latency etc.

Unexploited Benefits of VR/XR in Defence & Aerospace next 2-3 years



- ✓ Several use cases are mature for deployment
 - ✓ Pilot training: fixed & rotor, LVC
 - ✓ Fire control JTAC
 - ✓ Anti - ank & Anti Air training
 - ✓ Tanks and driving
 - ✓ Maintenance training
 - ✓ Naval training eg ship bridges
- ✓ Military + civilian cooperation key for technology edge, speed & cost effectiveness
- ✓ Eye tracking & biometric data for enhanced learning
- ✓ Cloud / Metaverse solutions will emerge; piloting



Thank you !
Want to know more ?
Pls visit us at ITEC April 26-28



Demo Varjo virtual and mixed reality at IT2EC on 26-28 April

On the **26-28th of April**, Varjo will be exhibiting at **IT²EC** in London. Will you be attending?

If so, we'd love to meet with you.



Varjo Booth E5:

- Fixed-wing mixed reality Lockheed Martin F-35 flight simulator in Prepar3D on Varjo XR-3
- Helicopter flight simulator featuring ED Mission Systems' MCS and the Helimod Mk III seat by Ryan Aerospace on Varjo XR-3

Partner Booth:

Our local UK reselling partner, SystemActive, will be demoing in the Technology Lounge, where you can experience Microsoft Flight Simulator on Varjo Aero.