

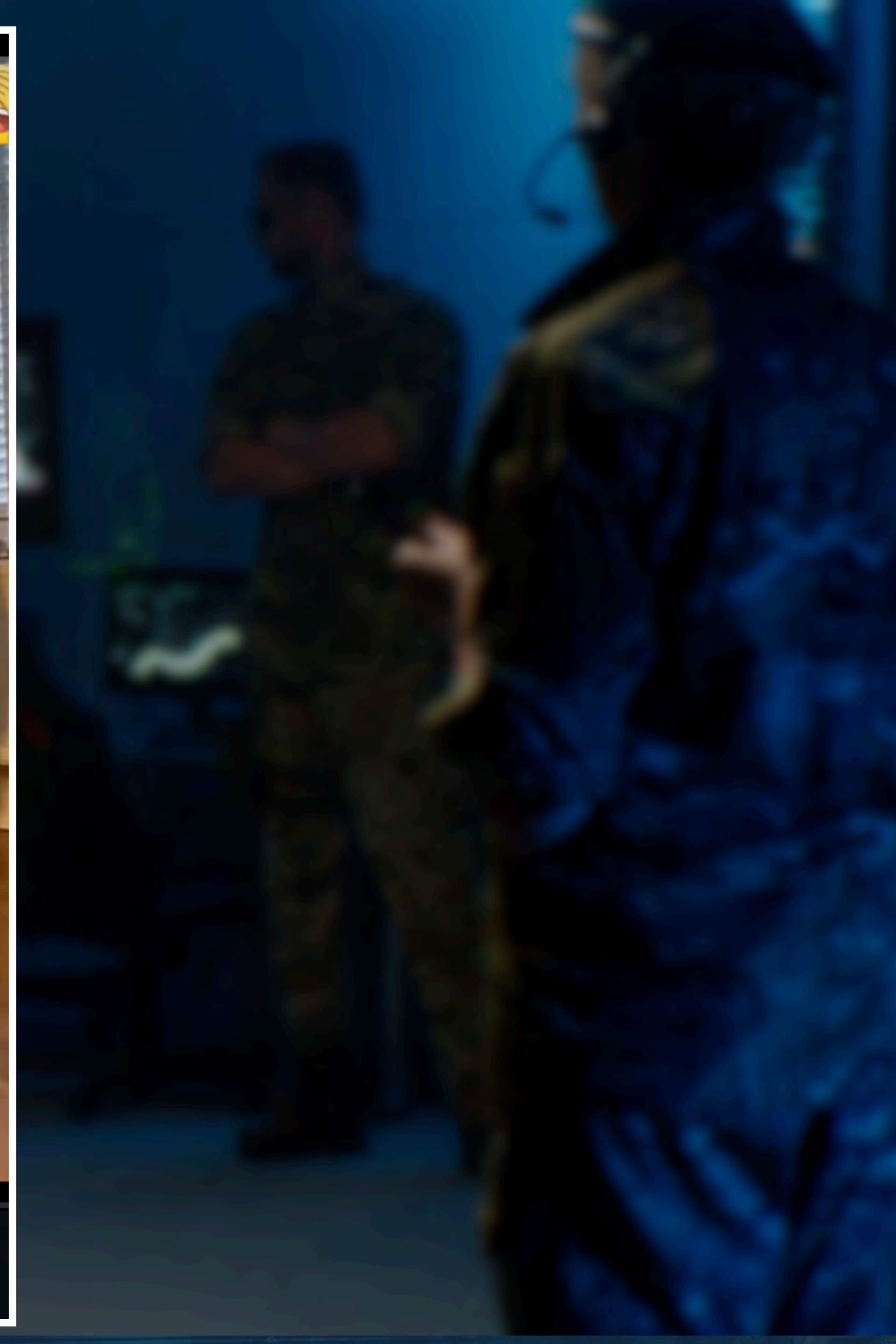


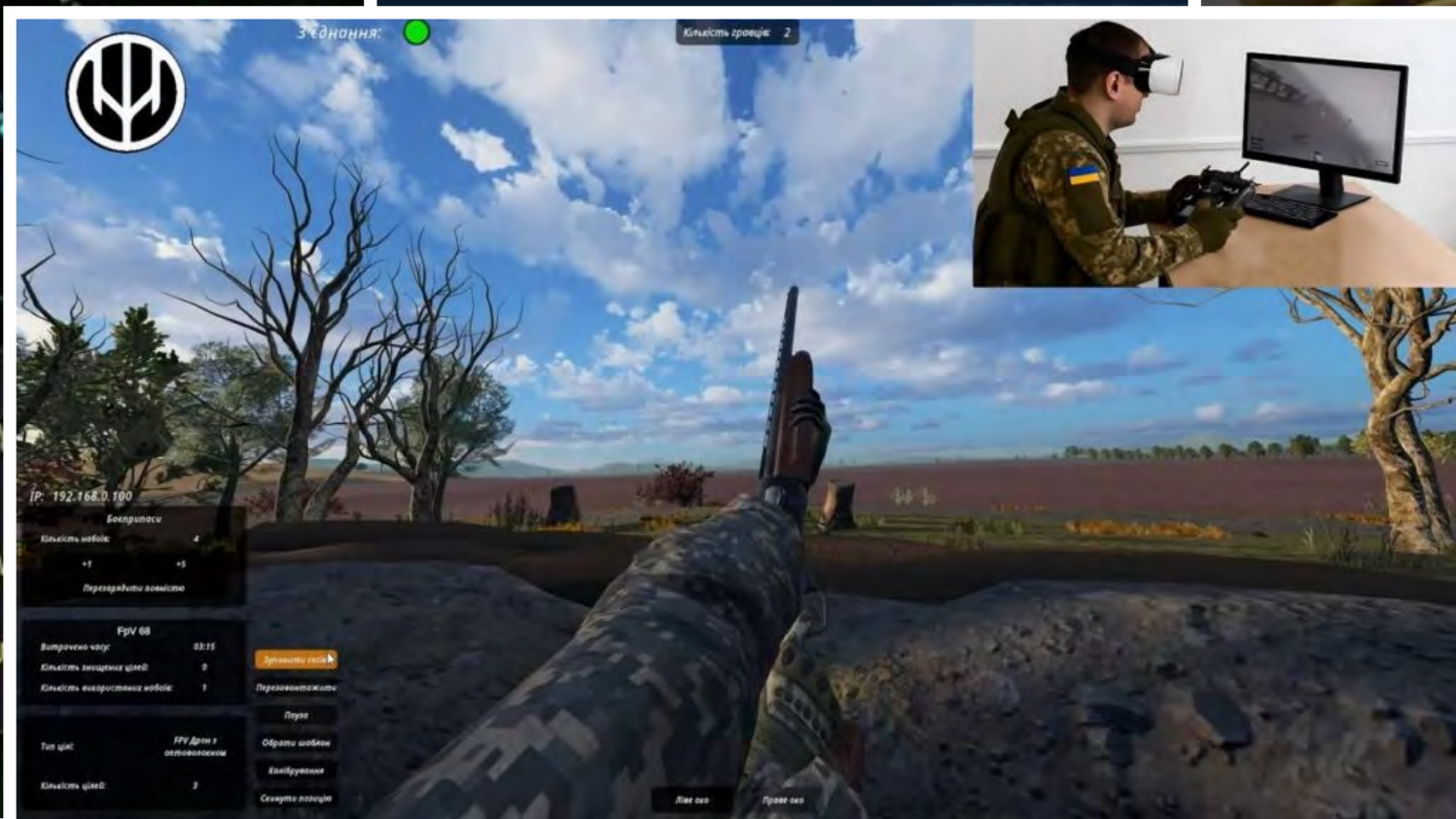
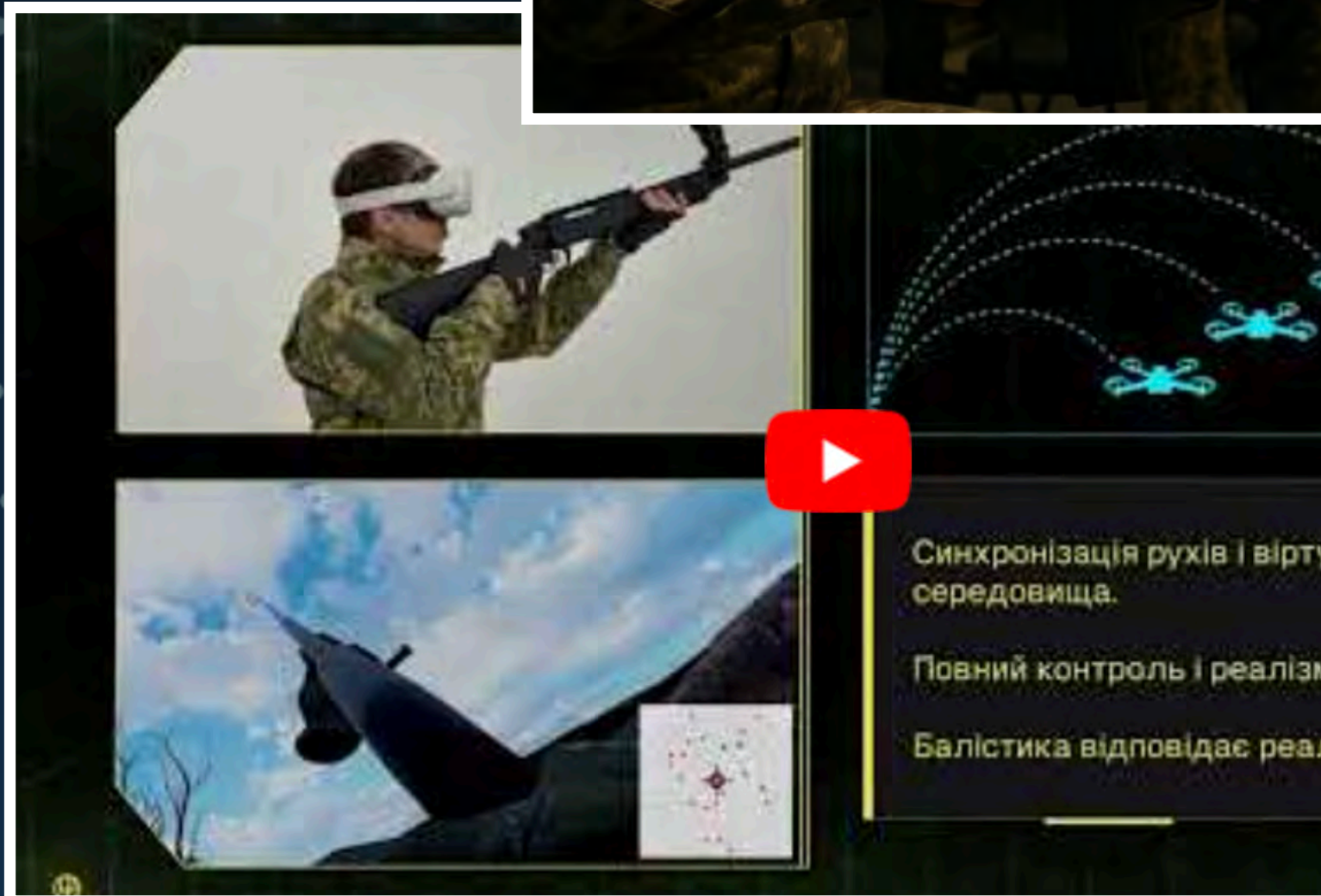
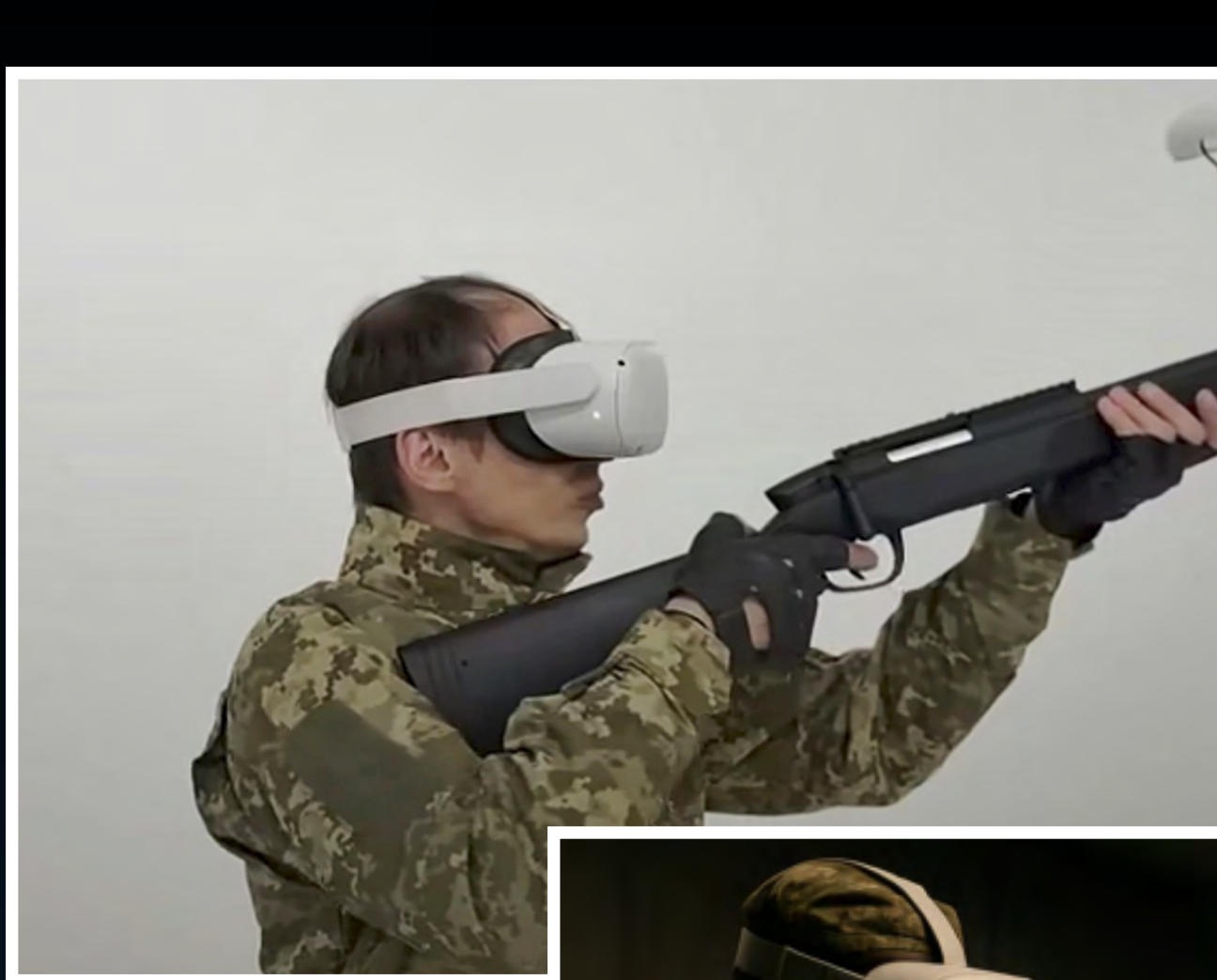
DR. KOVÁCS GERGELY Ph.D

HEAD OF XR CENTRE OF EXCELLENCE, EDA MARS Chairman

VIKI - DEFENSE INNOVATION RESEARCH INSTITUTE _ HUN MOD

**Digital Twin and XR-Based Adaptive Training Ecosystems
for Mass Military Training**





COMMON CHALLENGES

- 1 LIMITED TRAINING TIME / RAPIDLY CHANGING TRAINING CONTENT
- 2 LIMITED RESOURCES: BUDGET, TRAINERS, TRAINING FACILITIES
- 3 TIME PRESSURE

4

SKILLS

Running, swimming, climbing, survival techniques, first aid, drone operation, radio communication, satellite communication, map reading, GPS navigation, weapon knowledge, firearms handling, close combat, self-defense, basic cybersecurity, operation of robotic systems, AI-assisted decision-making, driving (off-road vehicles, armored vehicles), basic knowledge of aerial platforms, diving, explosive recognition, engineering rescue, firefighting techniques, urban and building combat knowledge, camouflage, surveillance, intelligence data analysis, counter-drone systems operation, night vision and thermal imaging equipment use, basic knowledge of air defense systems, foreign language proficiency, psychological resilience, teamwork, leadership skills, strategic thinking, stress management, rapid decision-making, precision shooting, communication protocols, logistics knowledge, operation of energy supply systems, sensor data interpretation, basic medical care, support of humanitarian operations, environmental protection knowledge, drone swarm control, data security, remote sensing, chemical and biological protection, training in artificial environments (VR/MR), tolerance to cold and heat, endurance, accuracy, self-

discipline.



CANDIDATES



LIMITED SOURCES (BUDGET, FACILITY AND HR)

Quality vs. Quantity



PRO - HIGH TECH

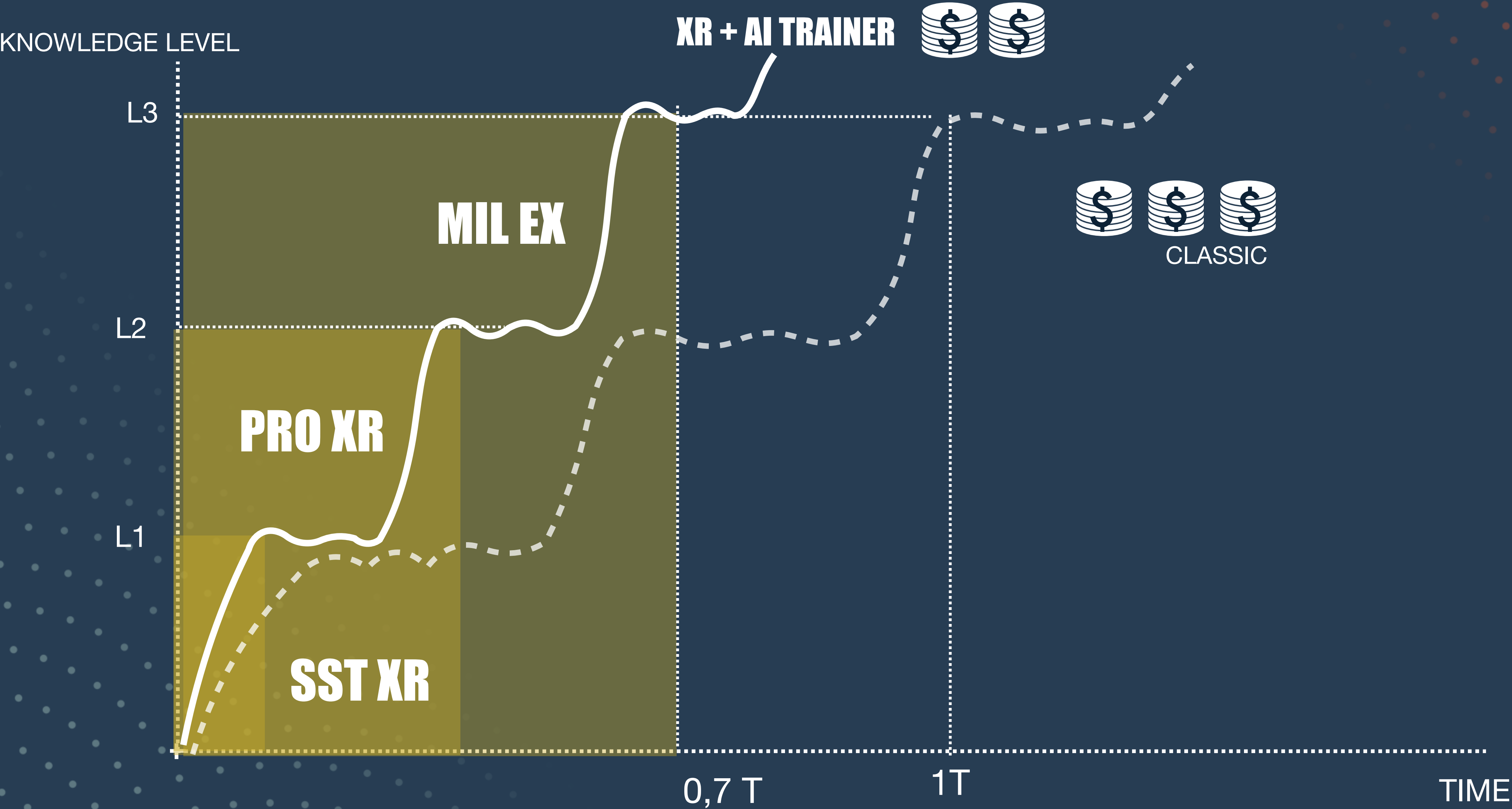
PILOT - SPECIAL FORCES etc..



SST - SIMPLE SMART TECH (MOTS, COTS)

TERITORIAL FORCES, HOME D. FORCES, SOCIAL FORCES

V-LEARNING



SST XR SIM

DECENTRALIZED TRAINING BOX – Self-training
for Auxiliary and SOCIAL FORCE units

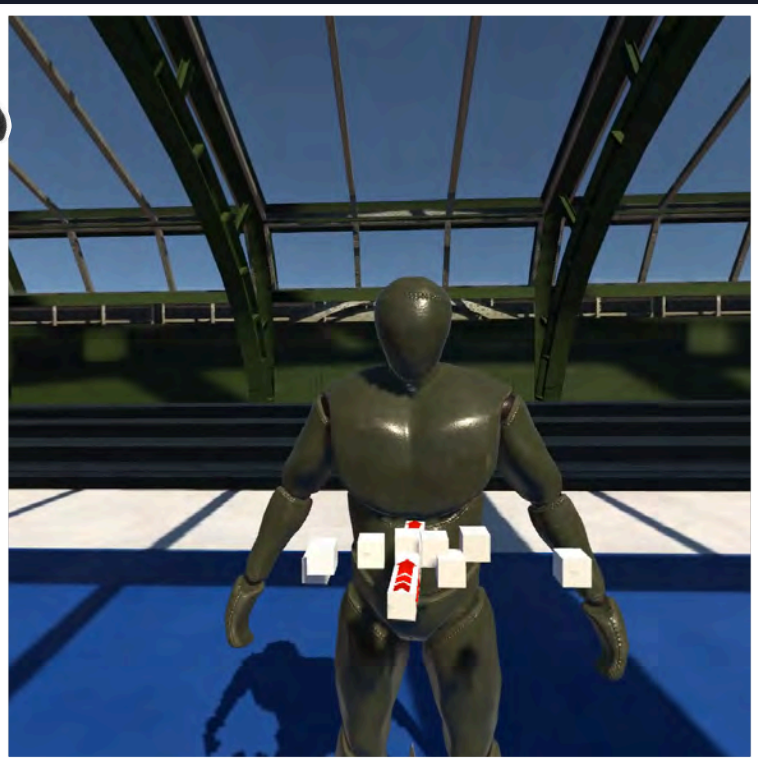
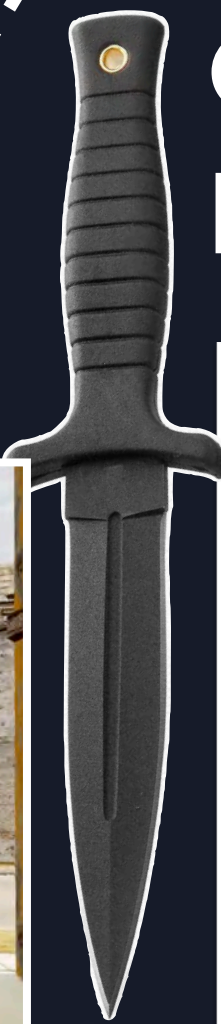
“COMBAT MEDIC”



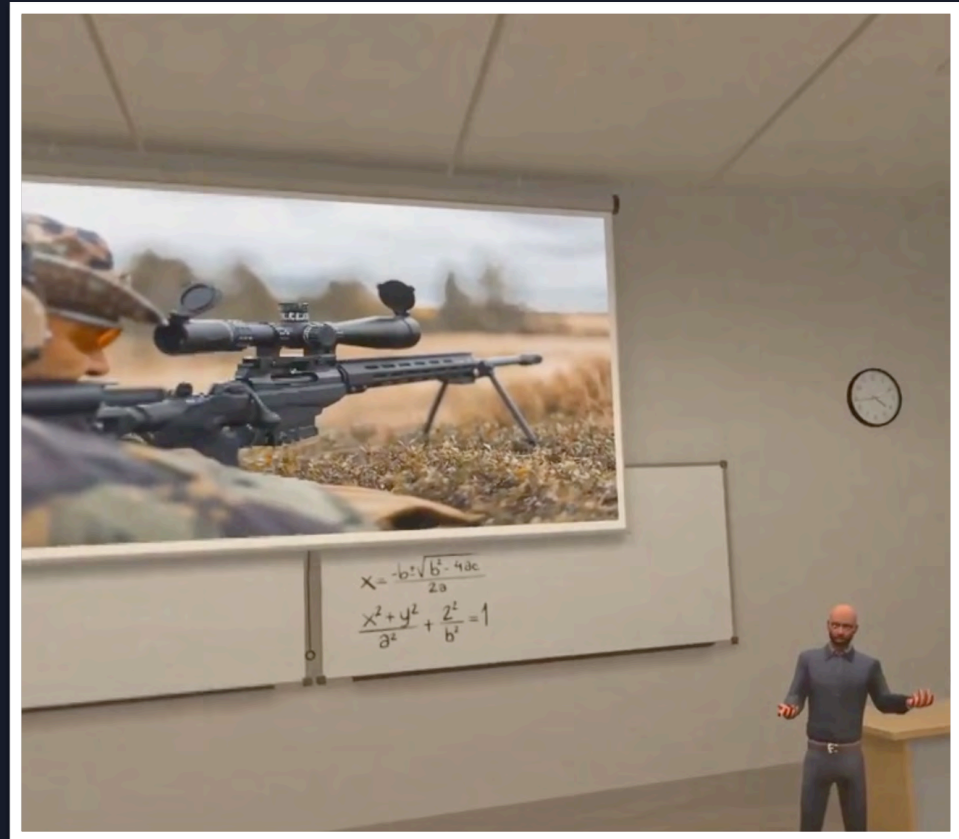
TACTICAL OPERATIONS



CLOSE COMBAT KNIFE FIGHT



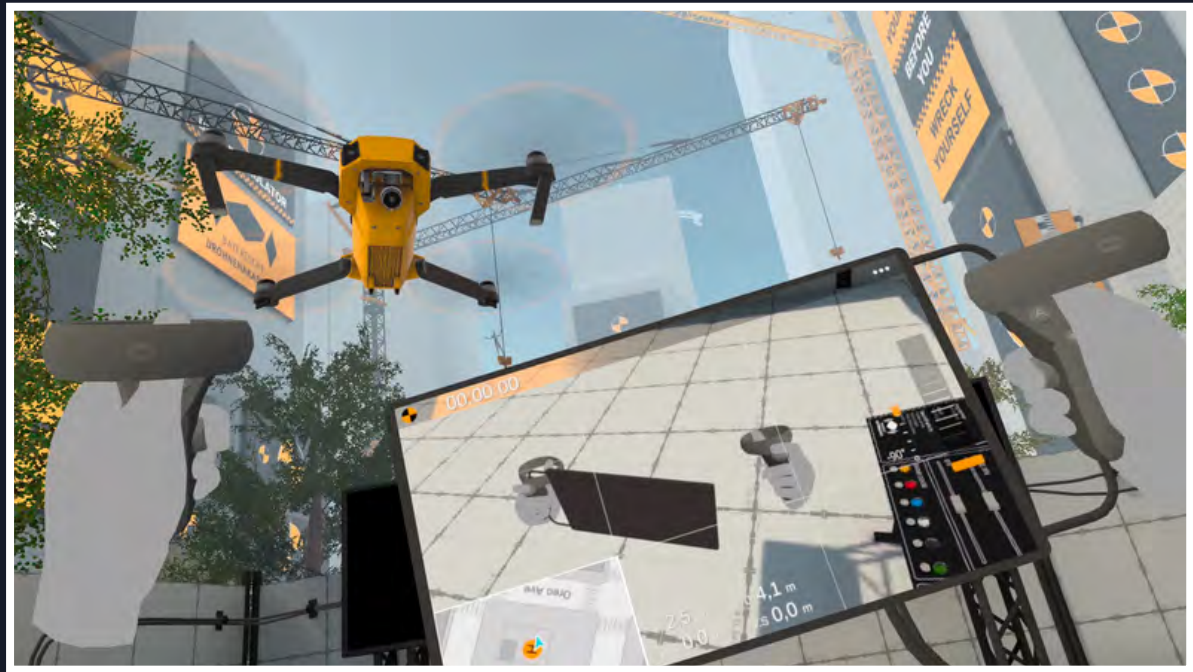
AI CLASSROOM



SNIPER



UAV



OUR RECIPE

- 1 RAPID VR CONTENT WORKFLOW - ADAPTIVITY**
- 2 AI SUPPORTED XR TRAINING**
- 3 5-10 MIN = SOLDIER DIGITAL TWIN**

RAPID VR CONTENT WORKFLOW

 24–48h target



Field lesson
learned



SME
notes



No-code
authoring



Validation/
Approval



Published
VR module

230%



Adaptive VR scenario– The Key to Motivation and Self Efficiency

RAPID VR CONTENT WORKFLOW



VIKI

VIKI PLATFORM

RAPID XR TRAINING FACTORY

DASHBOARD

LIBRARY

FIELD CAPTURE

AI-ASSISTED · SME-CONTROLLED

EDA MARS DEMO

STEP 01 / 11 · DASHBOARD

NEXT →

OPERATIONAL TRAINING PRODUCTION

Rapid XR Training Factory

Transform new operational knowledge into validated XR training at scale.

24-48H KNOWLEDGE-TO-TRAINING TARGET

FIELD

→

AI

→

SME

→

XR

→

HADIK

8

ACTIVE MODULES

3

IN VALIDATION

24

PUBLISHED

18,420

SOLDIERS REACHED

+ CREATE NEW TRAINING MODULE

FROM FIELD KNOWLEDGE TO SOLDIER SKILL

INCOMING FIELD KNOWLEDGE

● 1 NEW

FIELD-2026-0831-017

Counter-UAS Deployment Update

Source: VIKI Field Capture · Submitted: 14:42 · Priority: IMPORTANT

1 PHOTO

1 VOICE NOTE

1 DOCUMENT

1 FIELD NOTE

● NEW FIELD KNOWLEDGE

OPEN IN TRAINING FACTORY

OPEN MOBILE FIELD CAPTURE →

RECENT MODULES

MODULE	STATUS	PRIORITY	CREATION TIME	AUDIENCE	VERSION	
Counter-UAS Rapid Response	● IN VALIDATION	URGENT	3h 42m	Infantry	v1.0	OPEN →
Field Casualty Procedure Update	● PUBLISHED	HIGH	5h 10m	Combat Medic	v1.4	OPEN →

RAPID VR CONTENT WORKFLOW

 **FIELD CAPTURE**
CONNECTED TO RAPID XR TRAINING FACTORY

● SECURE

CAPTURE KNOWLEDGE WHERE IT HAPPENS.

Capture New Field Knowledge

Record what changed, what was learned, or what others need to know.



PHOTO / SCAN
Capture equipment, environment, procedure or field situation.



VOICE NOTE
Explain what happened or what changed.



UPLOAD DOCUMENT
PDF, briefing, SOP or field instruction.



TYPE NOTE
Write a short observation or lesson learned.

+ ADD ANOTHER SOURCE

0 ITEMS CAPTURED

MY SUBMISSIONS →

REVIEW & SEND

LESS THAN ONE MINUTE TO CONTRIBUTE.

 **FIELD CAPTURE**
CONNECTED TO RAPID XR TRAINING FACTORY

● SECURE

<

Photo / Scan

CAMERA VIEWFINDER (SIMULATED)

TAKE PHOTO

UPLOAD PHOTO

ADD FROM DEVICE

Only submit information authorised for this training environment. EDA MARS concept demonstrator.

 **FIELD CAPTURE**
CONNECTED TO RAPID XR TRAINING FACTORY

● SECURE

<

Quick Field Note

WHAT DID YOU LEARN?

Operators repeatedly connected the antenna after system activation. The revised sequence should explicitly require antenna connection before power-on.

CATEGORY

LESSON LEARNED

PROCEDURE CHANGE

EQUIPMENT UPDATE

THREAT UPDATE

SAFETY ISSUE

OTHER

SAVE NOTE

Only submit information authorised for this training environment. EDA MARS concept demonstrator.

 **FIELD CAPTURE**
CONNECTED TO RAPID XR TRAINING FACTORY

● SECURE

<

Voice Note

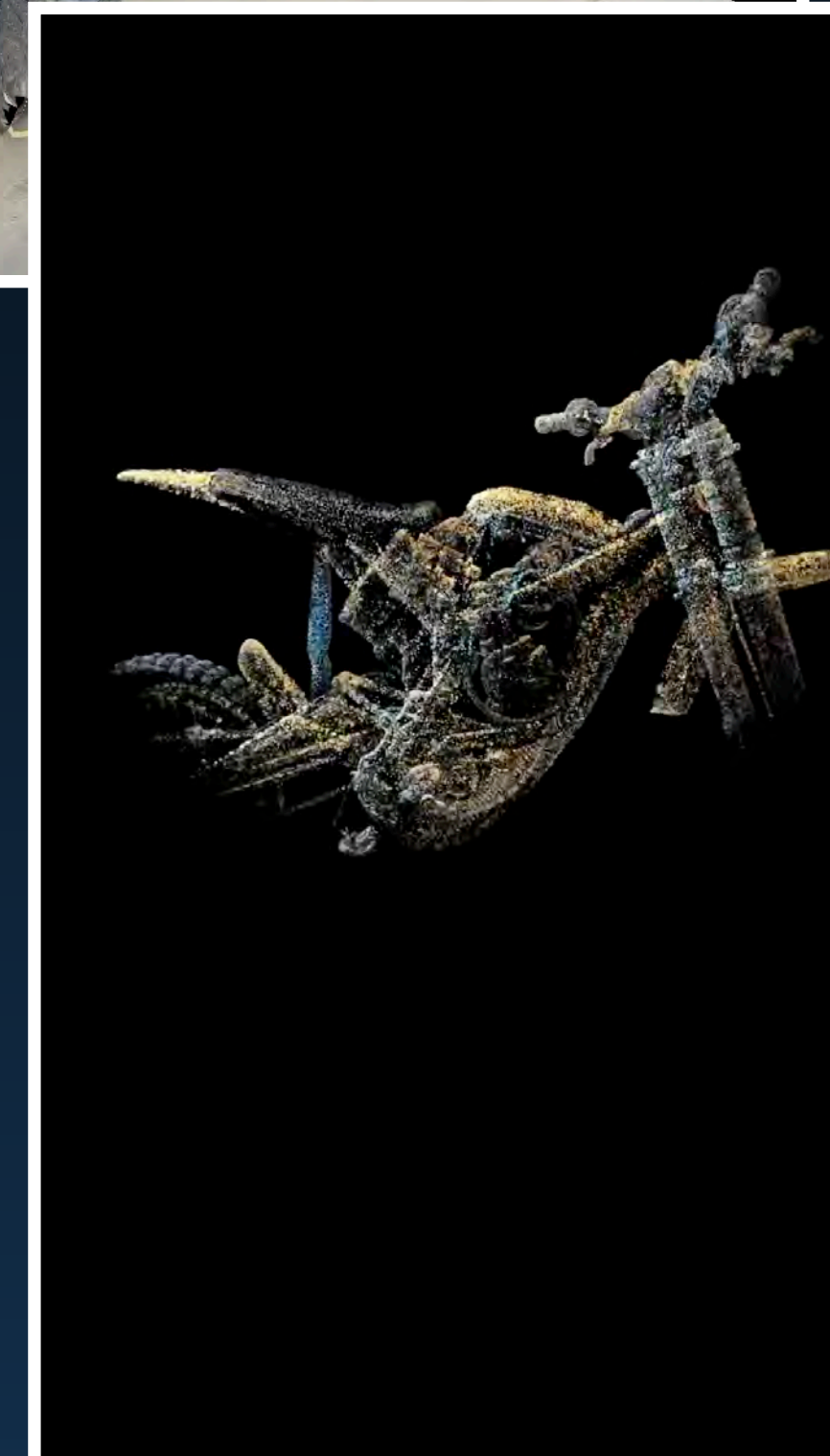
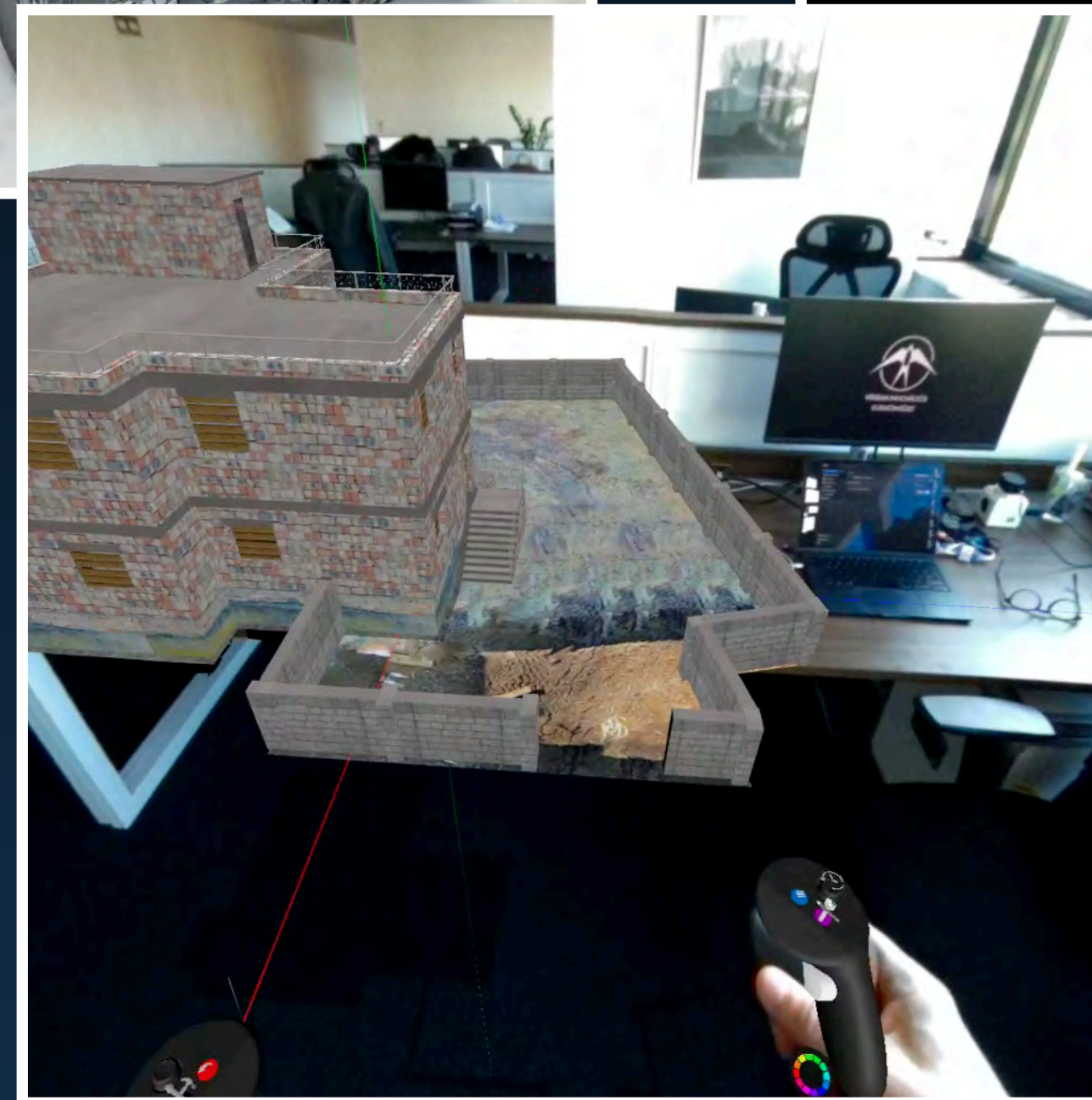
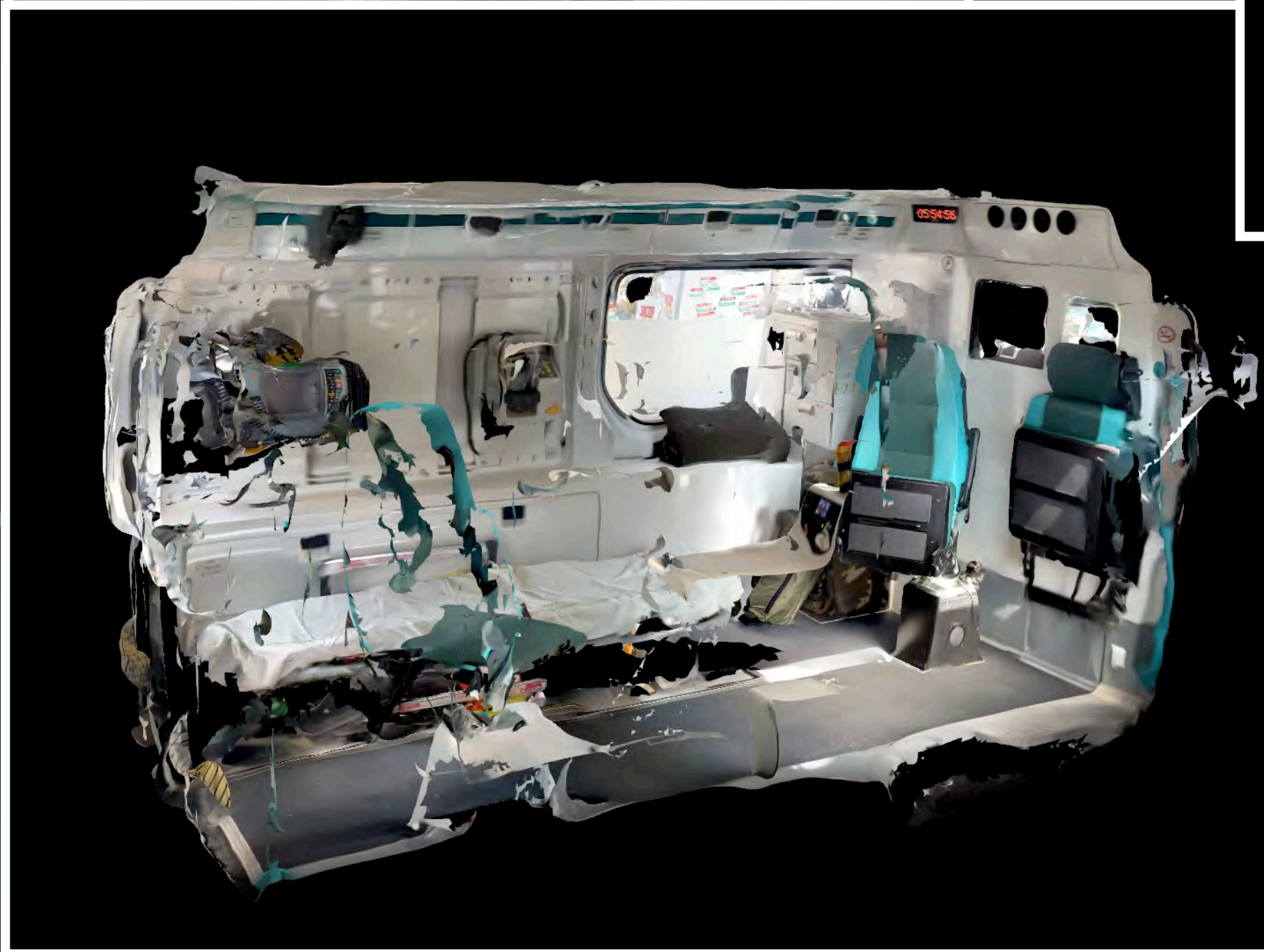
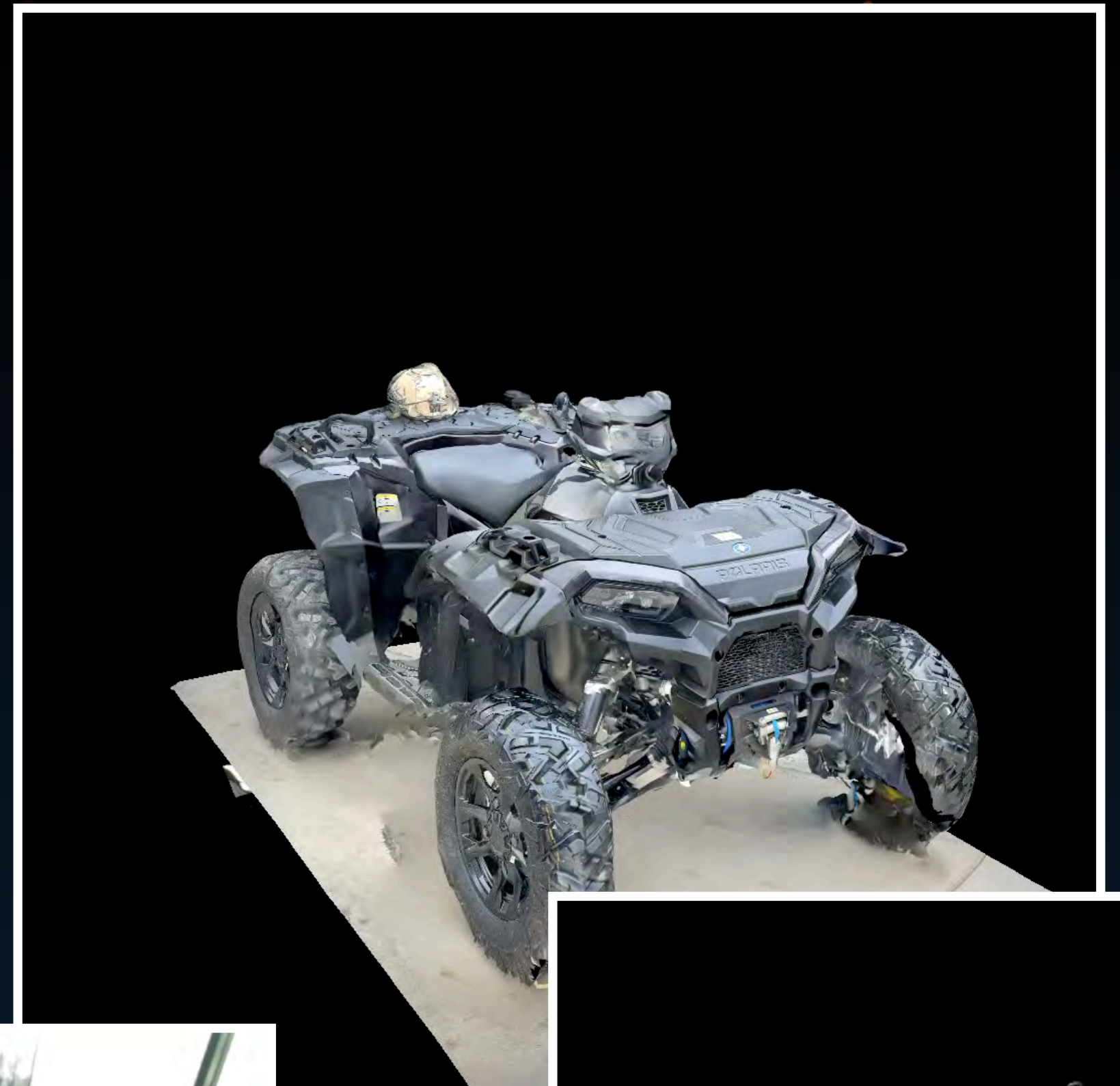
Tell us what changed.

00:00

TAP TO RECORD

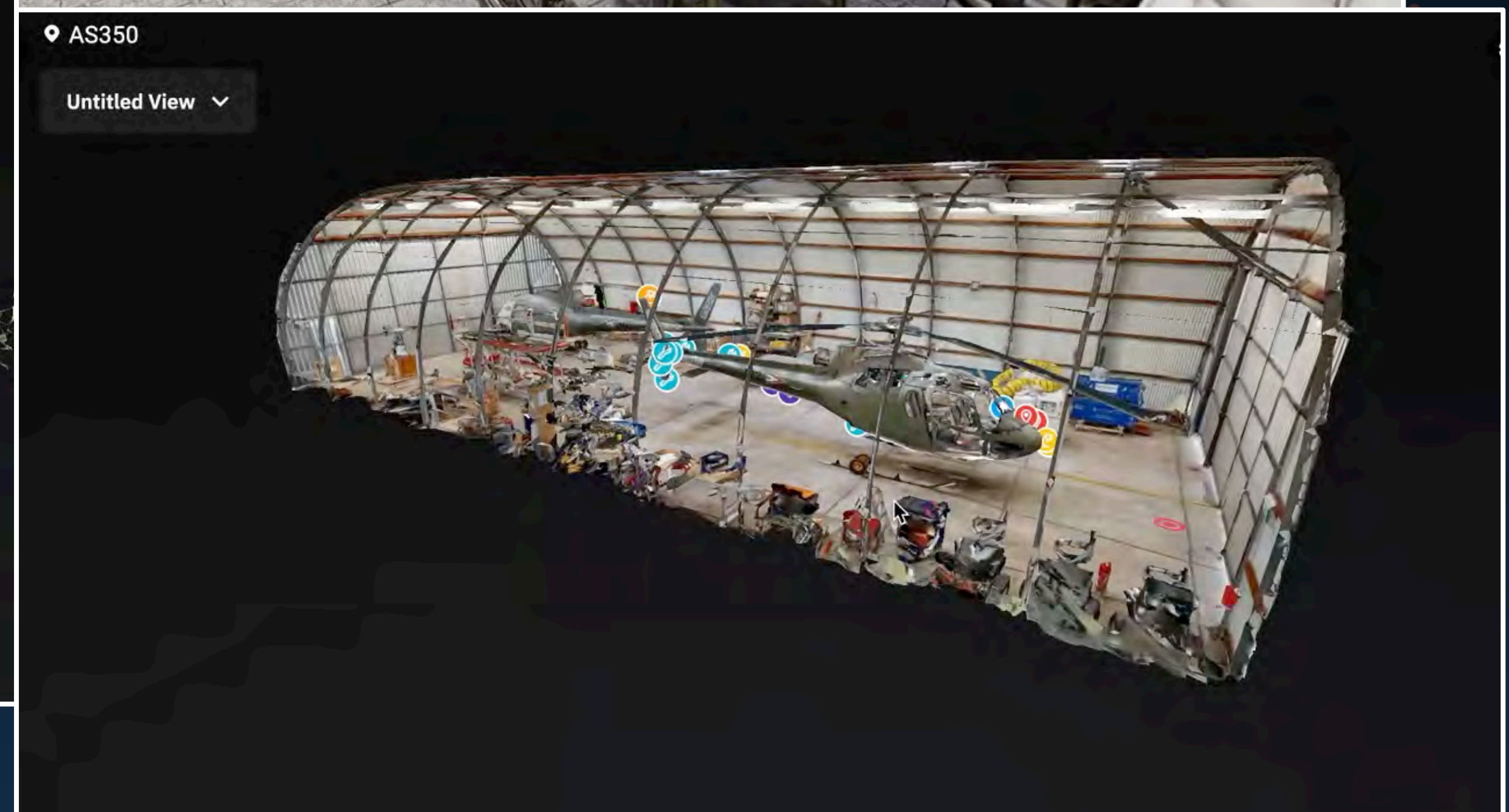
Only submit information authorised for this training environment. EDA MARS concept demonstrator.

TEST 01.231 VIBECODING CMS

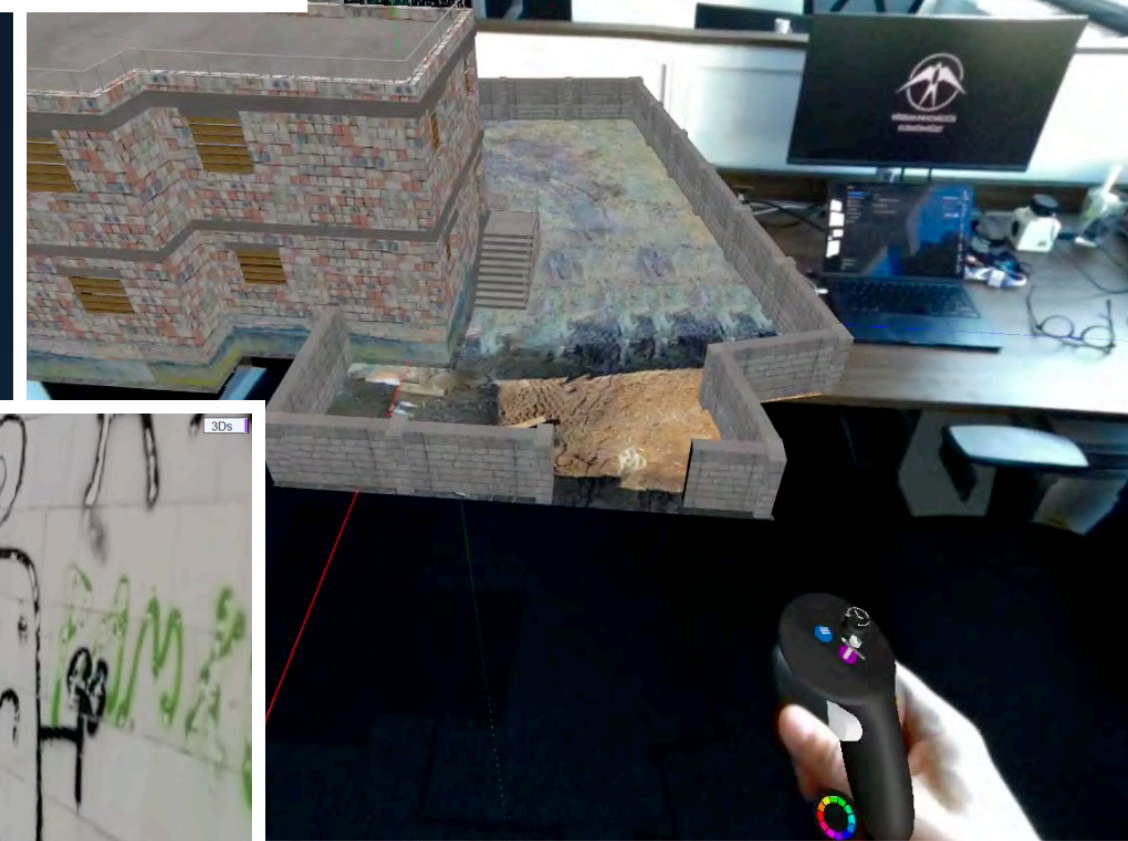
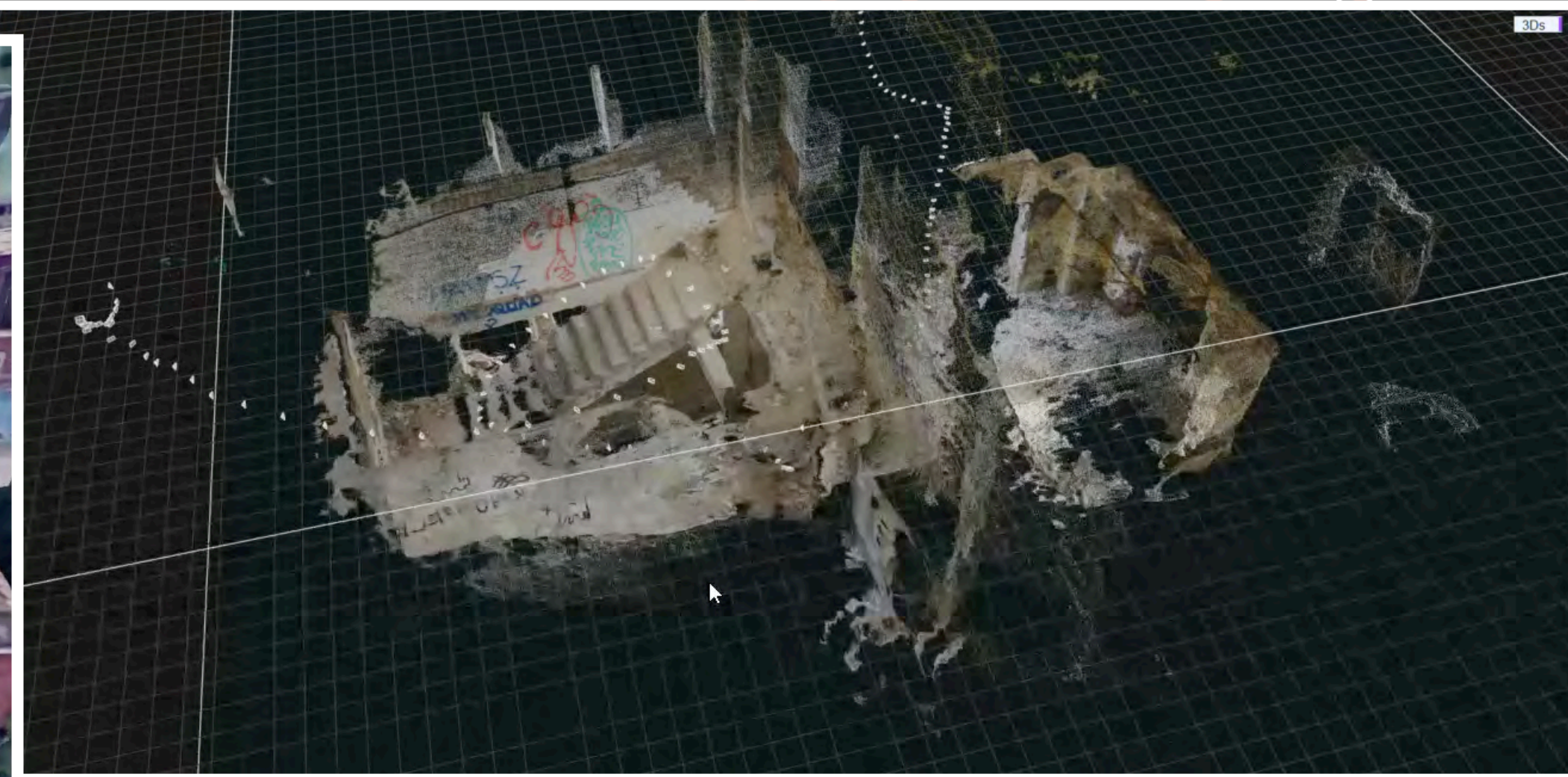


TEST 01.231

VIBECODING CMS



TEST 01.231



TEST 01.327



TEST 01.231 VIBECODING CMS HADIK GTS LITE



AI SUPPORTED XR TRAINING

Coach



Guided practice
& feedback

Buddy



Supportive
teammate/wingman

Ghost



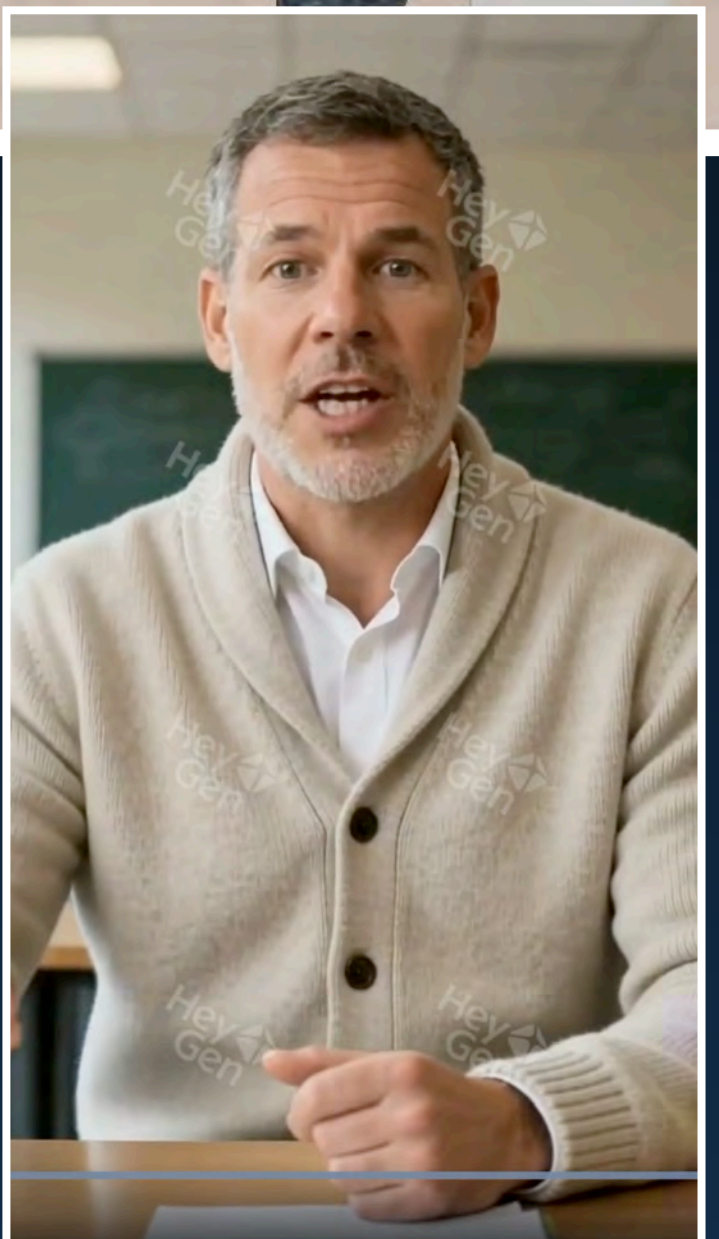
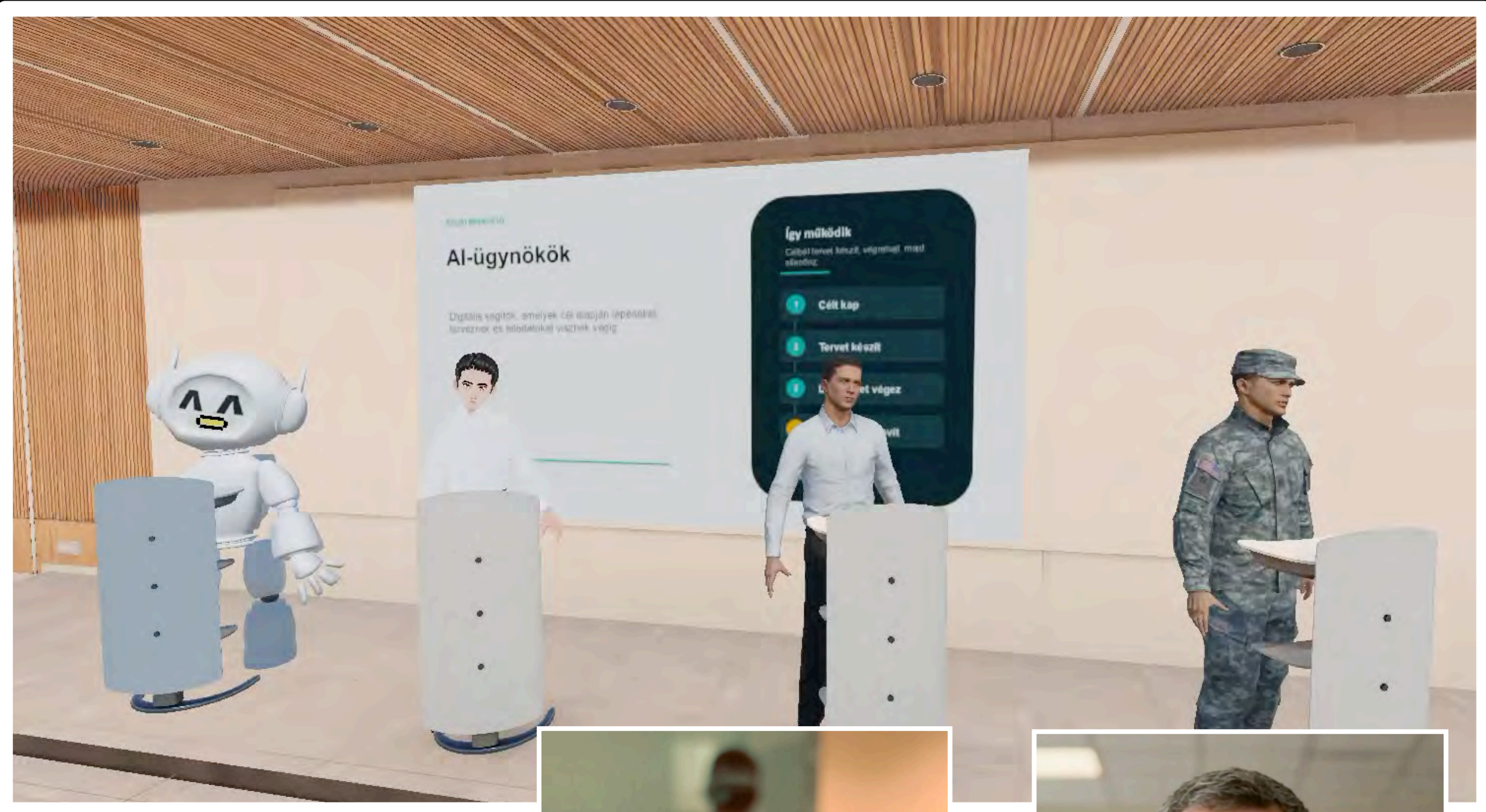
Simulated high-skill
opponent

Examiner



Objective performance
assessment

AI INSTRUCTOR/BUDDY/TRAINER



EASY TASKS = COMPETITIVE BUDDY

DIFF. TASKS = BUDDY "IN NEED"

IMPROVES THE SOLDIER'S PERFORMANCE BY

+16%



Teamwork - GHOST/BUDDY

Spatial Knowledge – Location, Structure

Conceptual Knowledge – Relationships

Factual Knowledge – Facts, Data

Avatar Exchange

Deeper Understanding of the Partner's
Work, Shared Goals

3 ADVANTEGES OF SDT

1 GO NO GO - BASED ON 5 MIN FAST CHECK

2 ADAPTIVE TRAINING

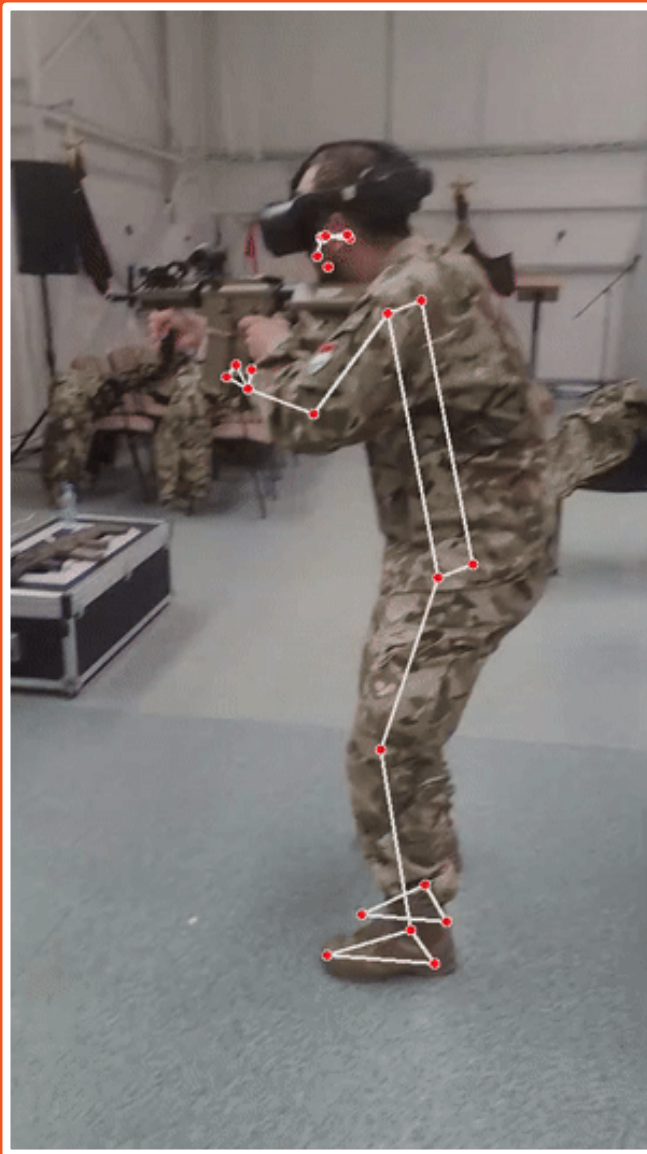
3 PRESELECTION



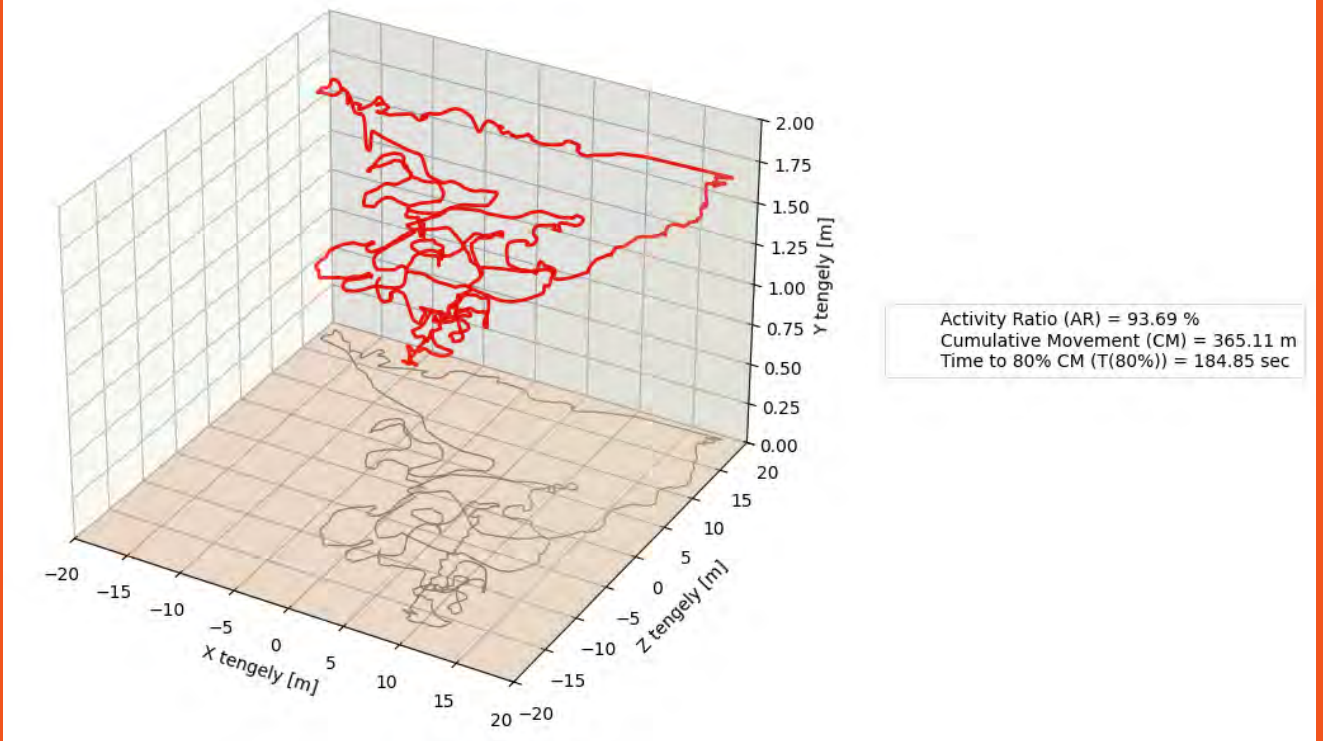
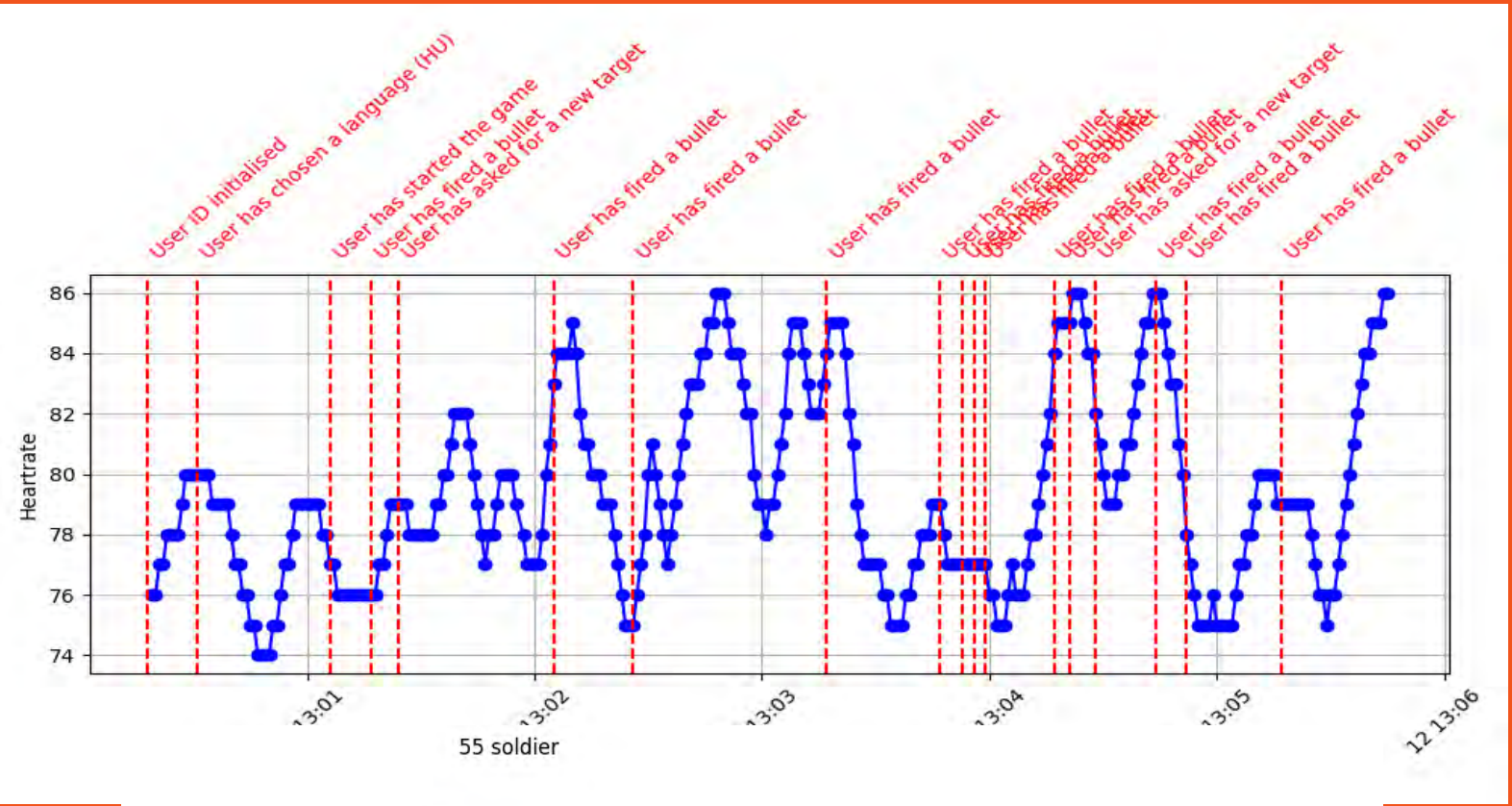
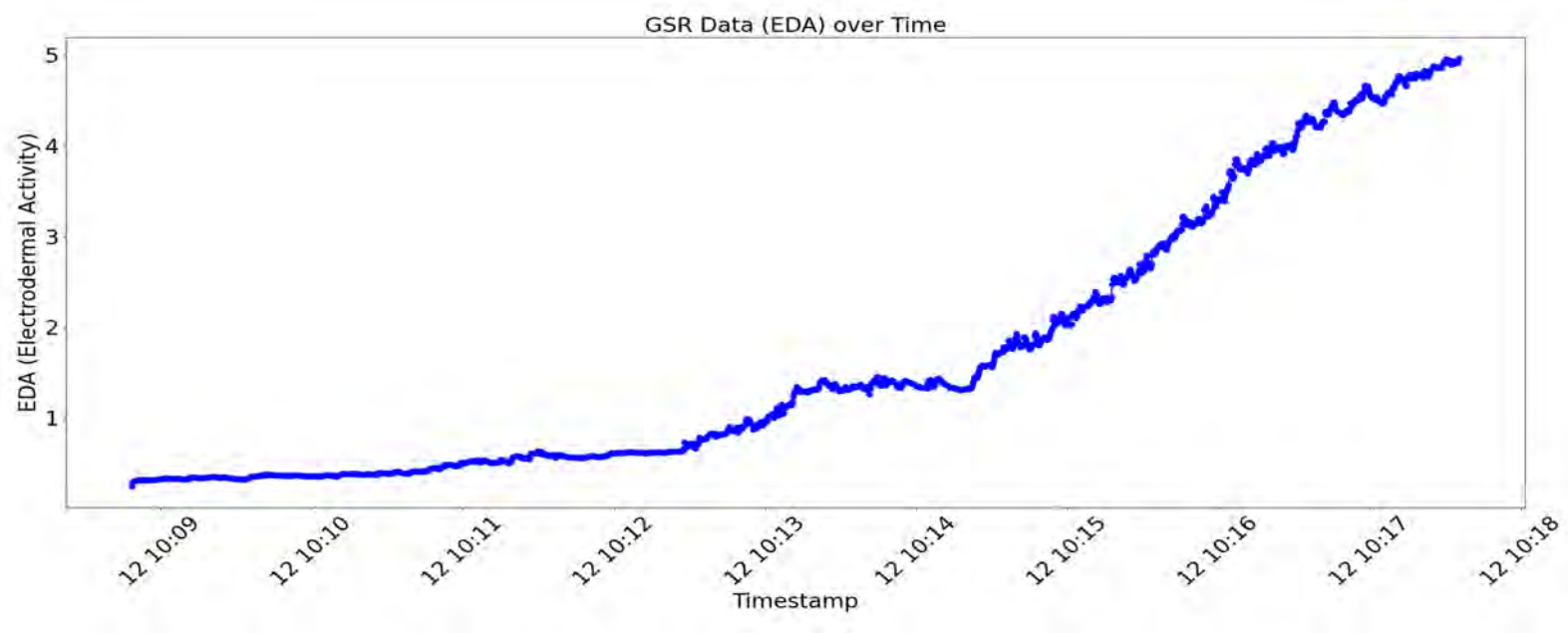
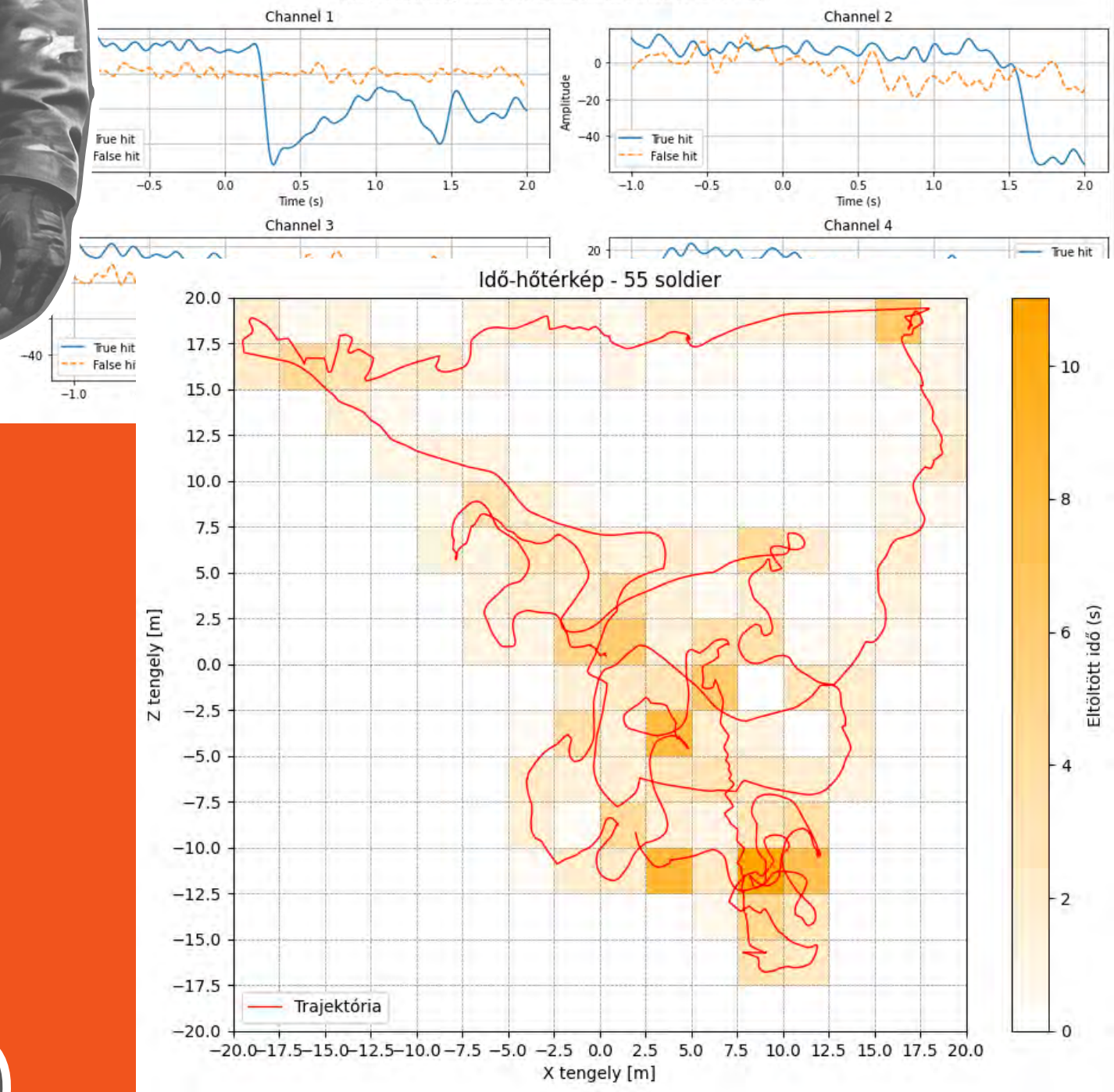
5-10 MIN = SOLDIER DIGITAL TWIN



SOLDIER DIGITAL TWIN PRESELECTION - ADAPTIVE PERSONAL TRAINING



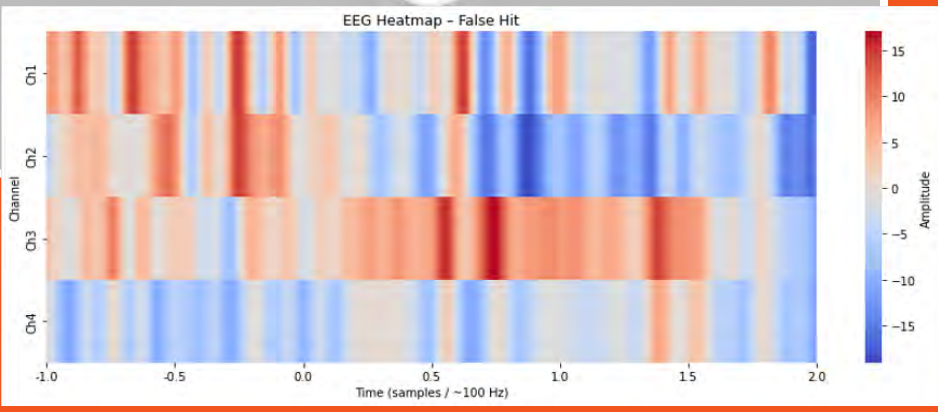
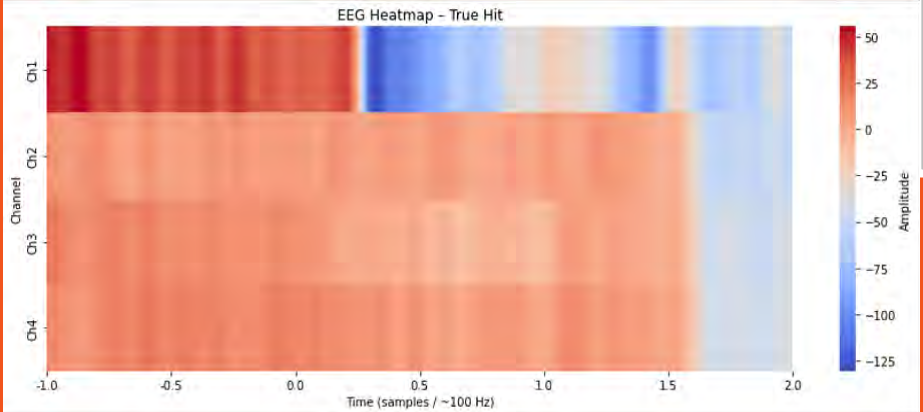
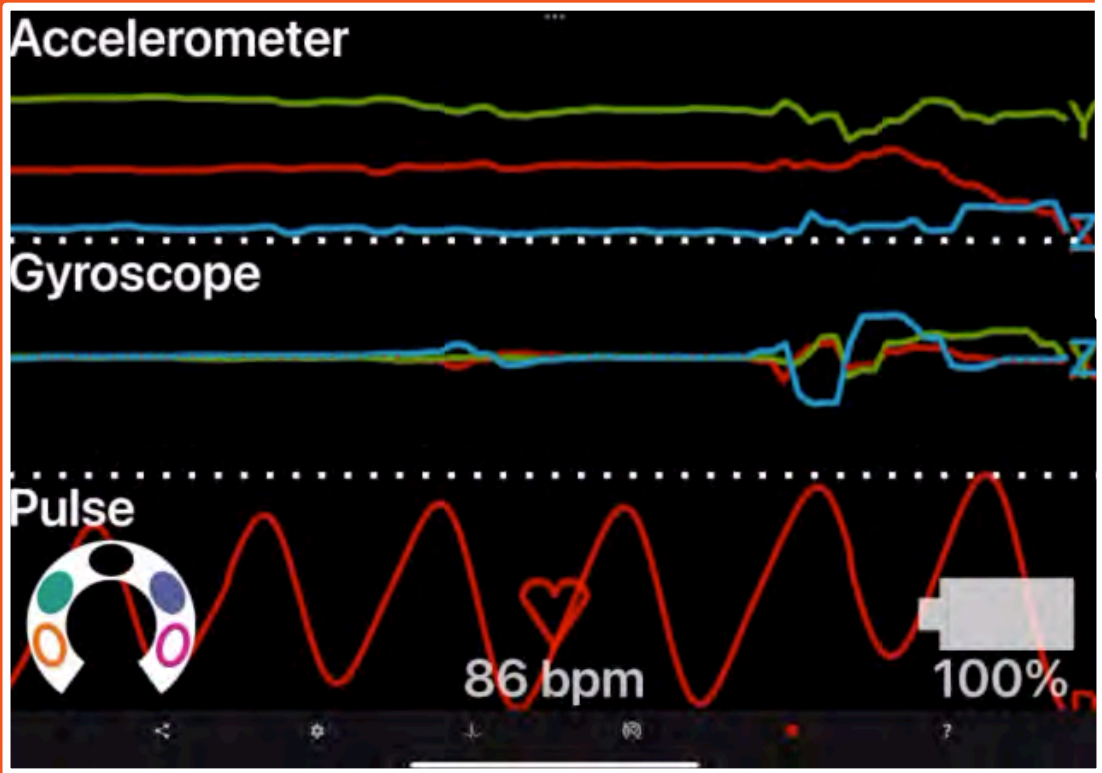
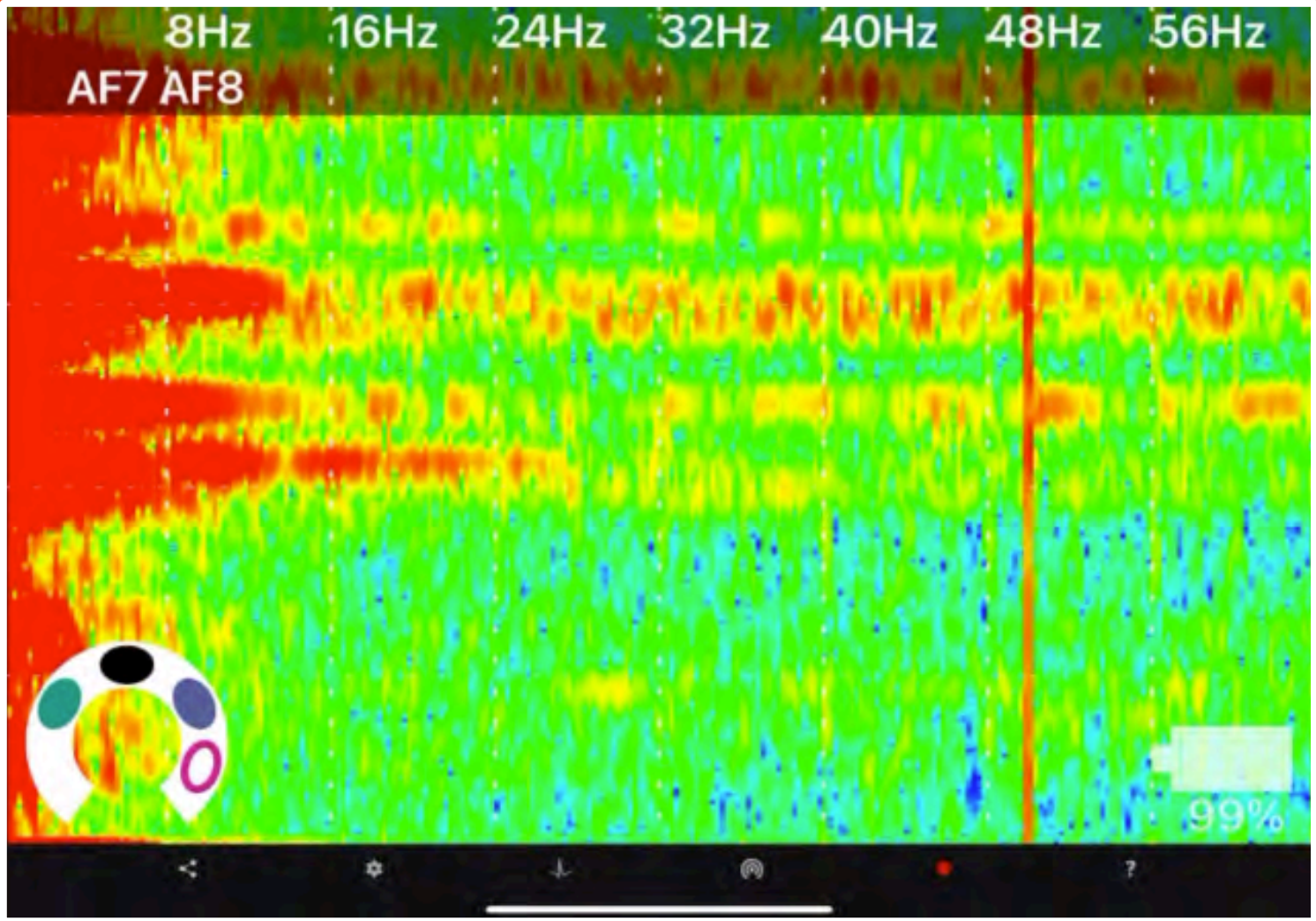
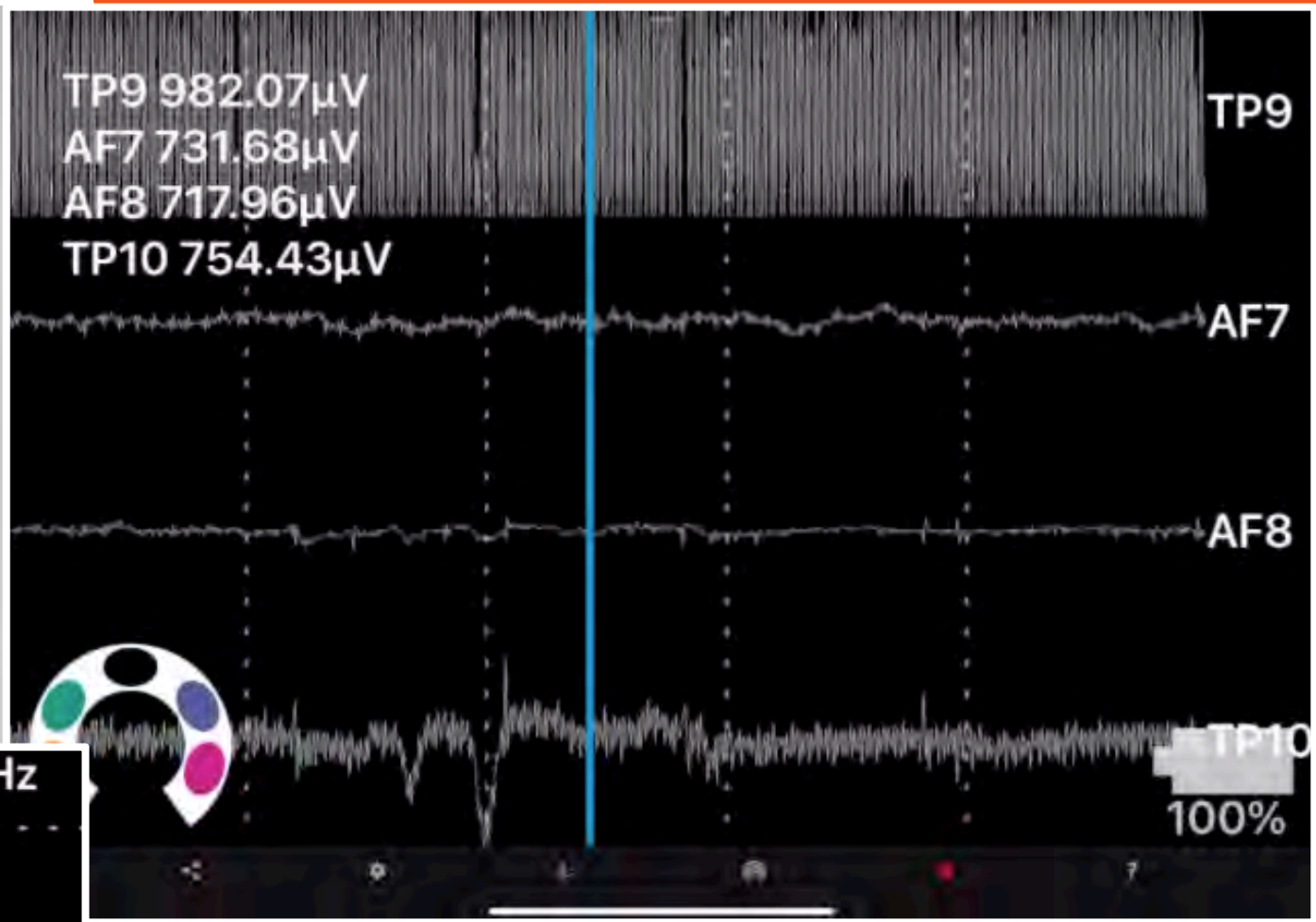
REBA score: 7,7
A. UPPER ARM ANGLE:
Right arm: 51
Left arm: 71
A. LOWER ARM ANGLE:
Right arm: 102
Left arm: 120
A. WRIST ANGLE:
Right arm: 8
Left arm: 19
B. NECK:
Neck angle: 36
B. TRUNK:
Trunk angle: 53



Biometry (Eye Tracking EEG,EMG, HRV)

(TELEMETRY) Skills

SOLDIER DIGITAL TWIN PRESELECTION - ADAPTIVE PERSONAL TRAINING



3 ADVANTEGES OF SDT

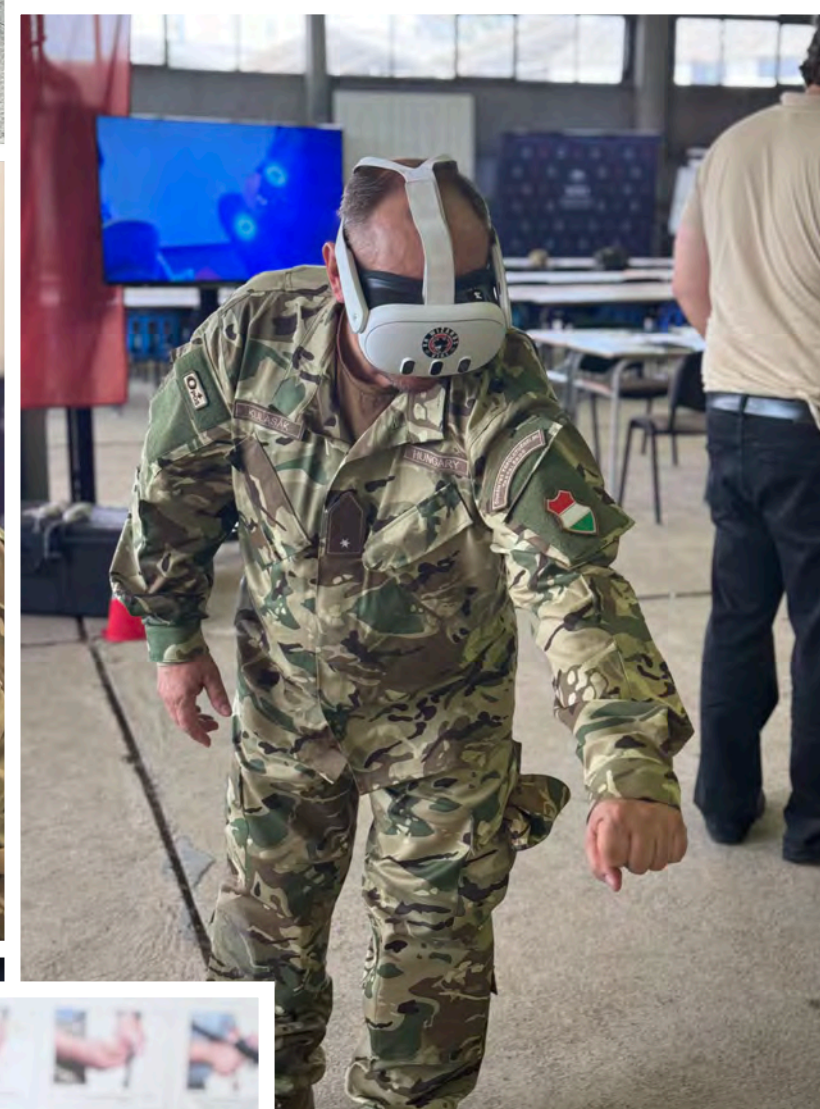
1 GO NO GO - BASED ON 5 MIN FAST CHECK

2 ADAPTIVE TRAINING

3 PRESELECTION

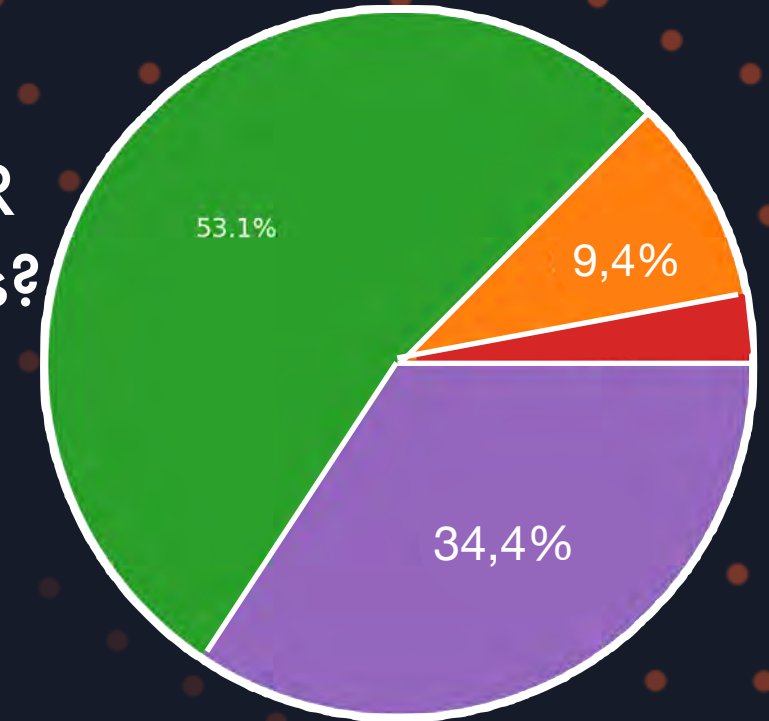


Tested 482 in 2025 and 'll 1200 in 2026/27



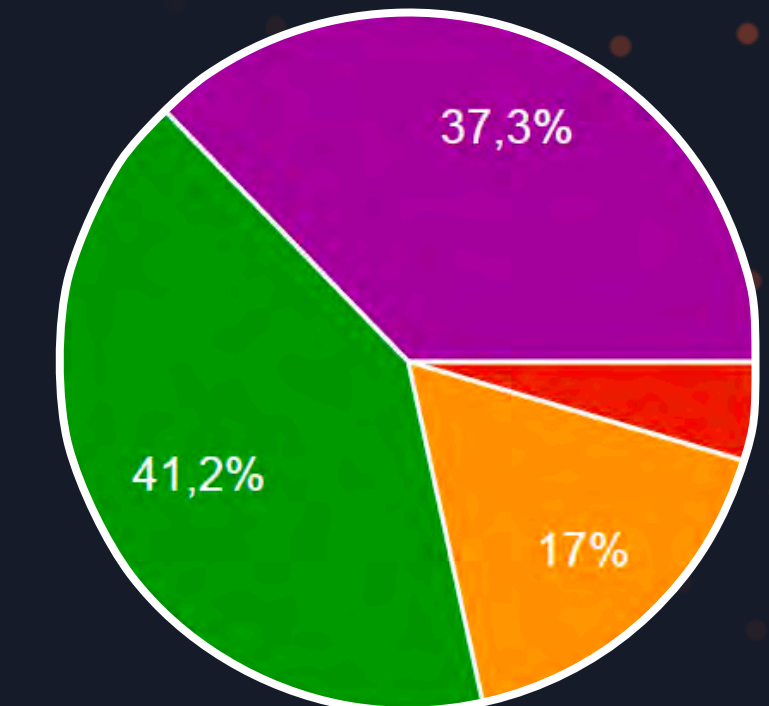
In your opinion, how usable is the SST VR simulator for training/education purposes?

- I believe it is already usable
- Yes, with minor improvements
- It still needs significant development
- Not usable at all



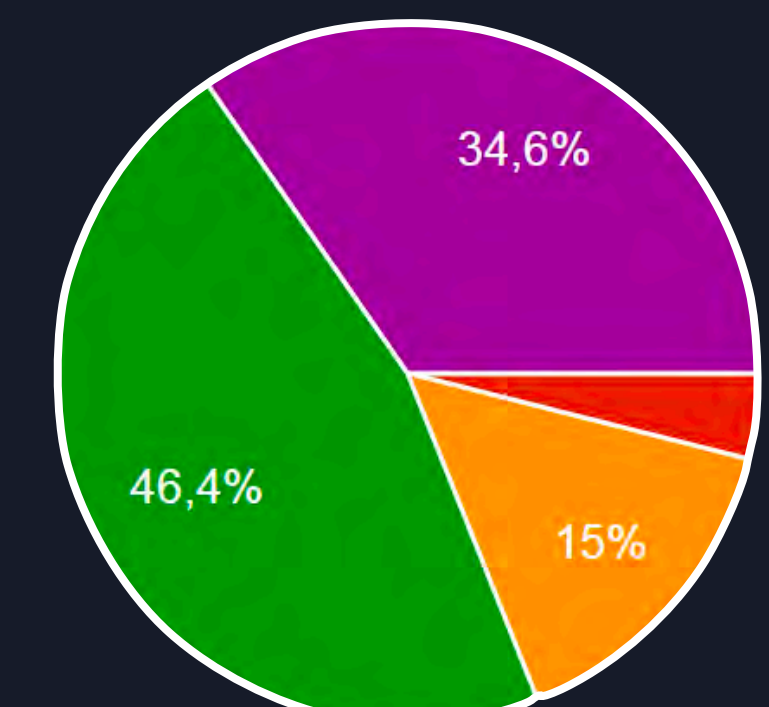
How quickly were you able to learn the basic functions of the platform?

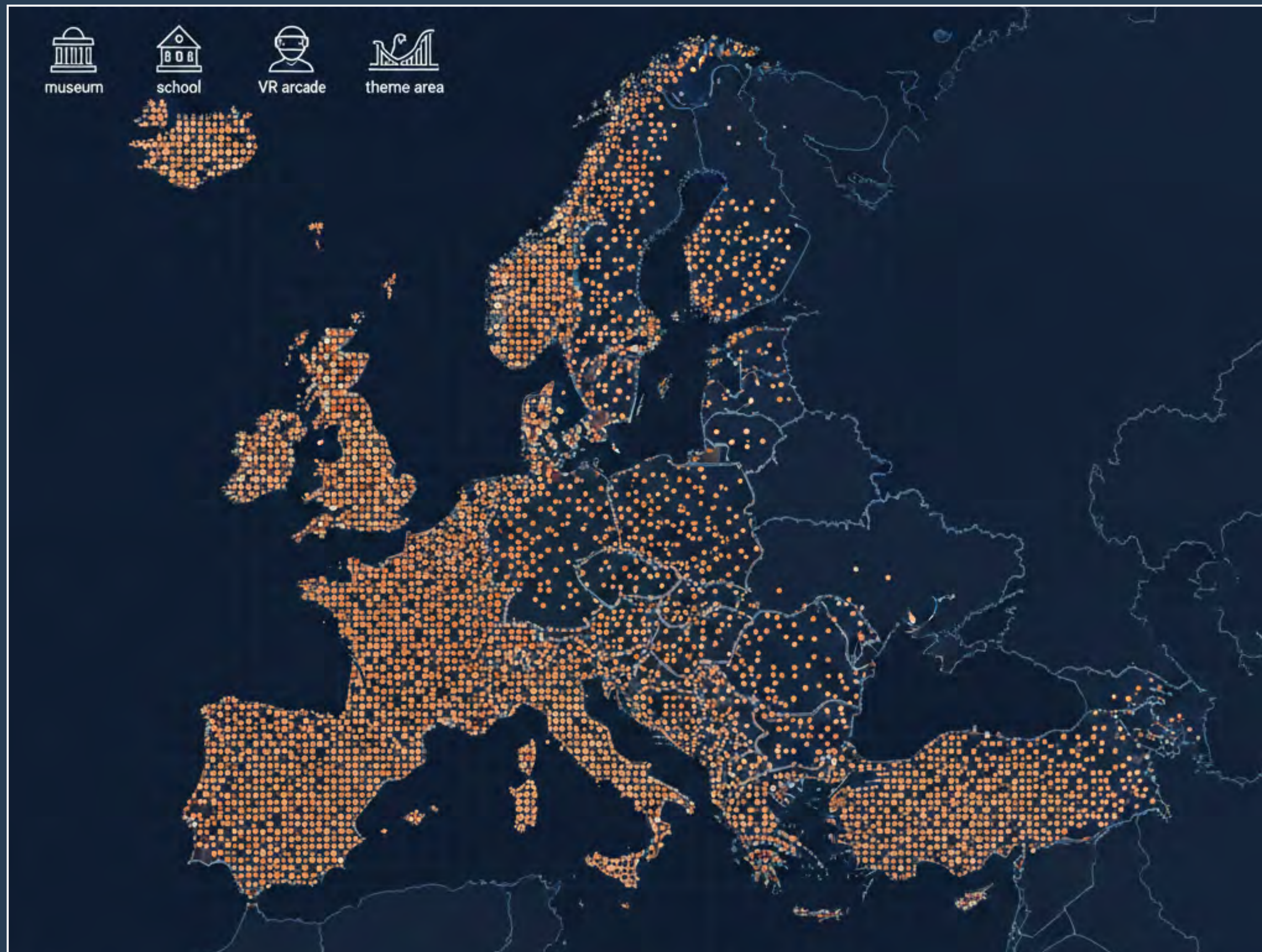
- Very quickly
- Quickly
- At an average pace
- Slower than expected



How would you rate the visual appearance of the SST VR Platform?

- Very appealing
- Rather appealing
- Neutral
- Rather unappealing
- Not appealing at all





SF

SOCIAL FORCE

SOCIAL FORCE XR

Hunter and VR owner

HUNTER VR



MUSEUM + SCHOOL VR



FPS ZERO CALIBER



NATO - EU

XR APP POOL



EUROPEAN DEFENCE AGENCY - MARS AHWG

Support the implementation of the Priority Implementation Roadmap (PIR) Future Soldier Systems by leveraging modern simulation technologies (VR/AR, AI, Digital Twins, gaming-based training) to prepare and initiate concrete multinational capability development projects.



1

MAP EXISTING NATIONAL SIMULATION CAPABILITIES CONCEPT FOR XR-BASED MASS TRAINING OF SOLDIERS

Develop a common concept for using XR and simulation technologies to rapidly train large numbers of soldiers in basic combat skills.



2

ESTABLISH A SHARED SIMULATION CONTENT LIBRARY

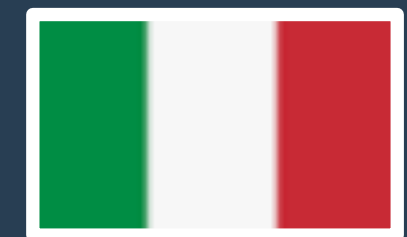
Create a common digital repository for simulation-based training content, scenarios, best practices and lessons learned.



3

PREPARE A JOINT EU SIMULATION TRAINING PLATFORM

Develop a business case and roadmap for a future multinational simulation training platform and joint procurement initiative.



4

CONNECT WITH ONGOING EU AND NATO PROGRAMS

Leverage synergies with EU stakeholders and ensure cooperation with Third Parties and NATO.





TO INFINITY AND BEYOND!



DR. KOVÁCS GERGELY Ph.D
HEAD OF XR CENTRE OF EXCELLENCE, EDA MARS CHAIRMEN
VIKI - DEFENSE INNOVATION RESEARCH INSTITUTE _ HUN MOD

THANK YOU!