FirstSimVR

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Problems & Goals

- **Problems**
  - Experimental **tools are not ready** to be used or fully tested
  - Difficult to **evaluate & optimize** interfaces **in context**
  - Today's best VR is designed for entertainment, **not public safety**
  - Current simulations are not able to convey **physical touch**

- **Goals**
  - **Goal 1:** AR/VR Technology **Development & Prototyping**
  - **Goal 2: Research** Effectiveness & Transferability of AR/VR Simulations

Overarching Objective

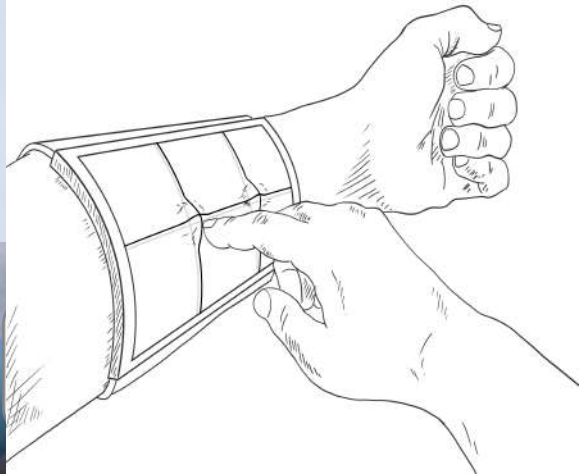
- Provide **simulations** specific to public safety needs based on **extensive feedback** from **first responders**
  - Hired two first responders part time
    - **Blake Boyd** – Data Analyst, Cary Fire Department
    - **Charles Laird** – Program Specialist, NC First Responder Emerging Technologies Program
  - Supported by by **North Carolina Department of Information Technology**
    - **Red Grasso** – Program Director, NC First Responder Emerging Technologies & FirstNet PSOC for NC
  - Many first responders & departments

Progress of Objectives

1. Create a versatile framework
2. Simulate scenarios
3. Improve simulations based on feedback from first responders
4. Augment virtual interactions with real physical touch
5. Create example tactile interface specific to first-responder needs
6. Minimize motion sickness & maximize safety
7. Integrate with existing systems
8. Evaluate how touch transfers to real-world first-responder tasks
9. Disseminate research findings

Objectives—First Responder Interfaces

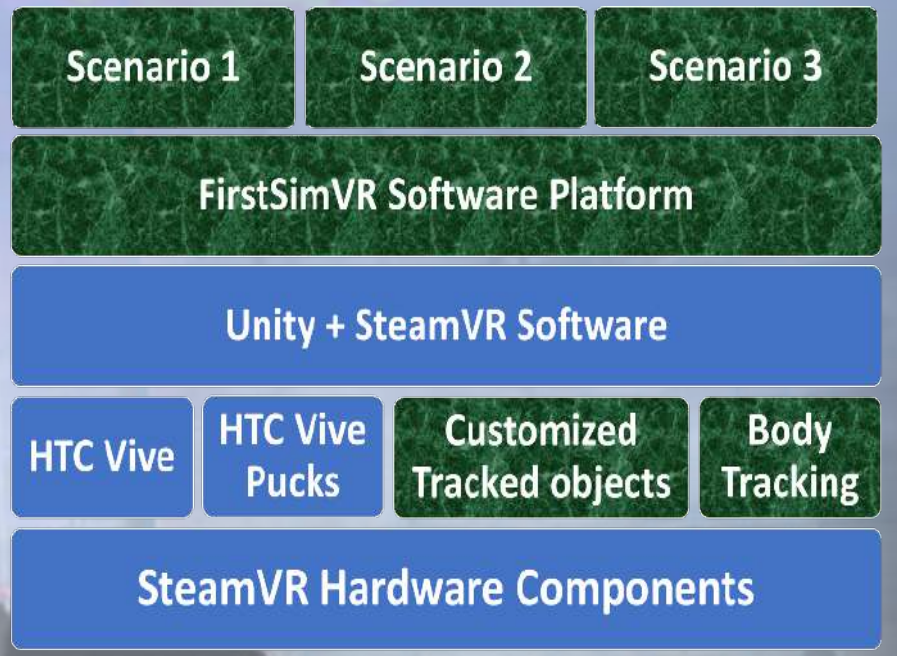
- **Simulate** future first responder interfaces in context using **multimodal cues**
  - Visual
  - Audio
  - Touch
- Augment virtual interactions with **real physical touch**
  - **Passive Haptics**
- Create an **example next-generation tactile interface**



NEXTGEN Interactions

Objectives—System

- **Minimize motion sickness** & **maximize safety**
- Create a **versatile framework** offering different configuration options
  - Wireless
  - Full body tracking
  - Multi user
  - Physical props
- **Integrate with existing systems** for easy access to the public safety stakeholder community
  - Standard HTC Vive
  - HTC Vive with customized hardware



Objectives—Research

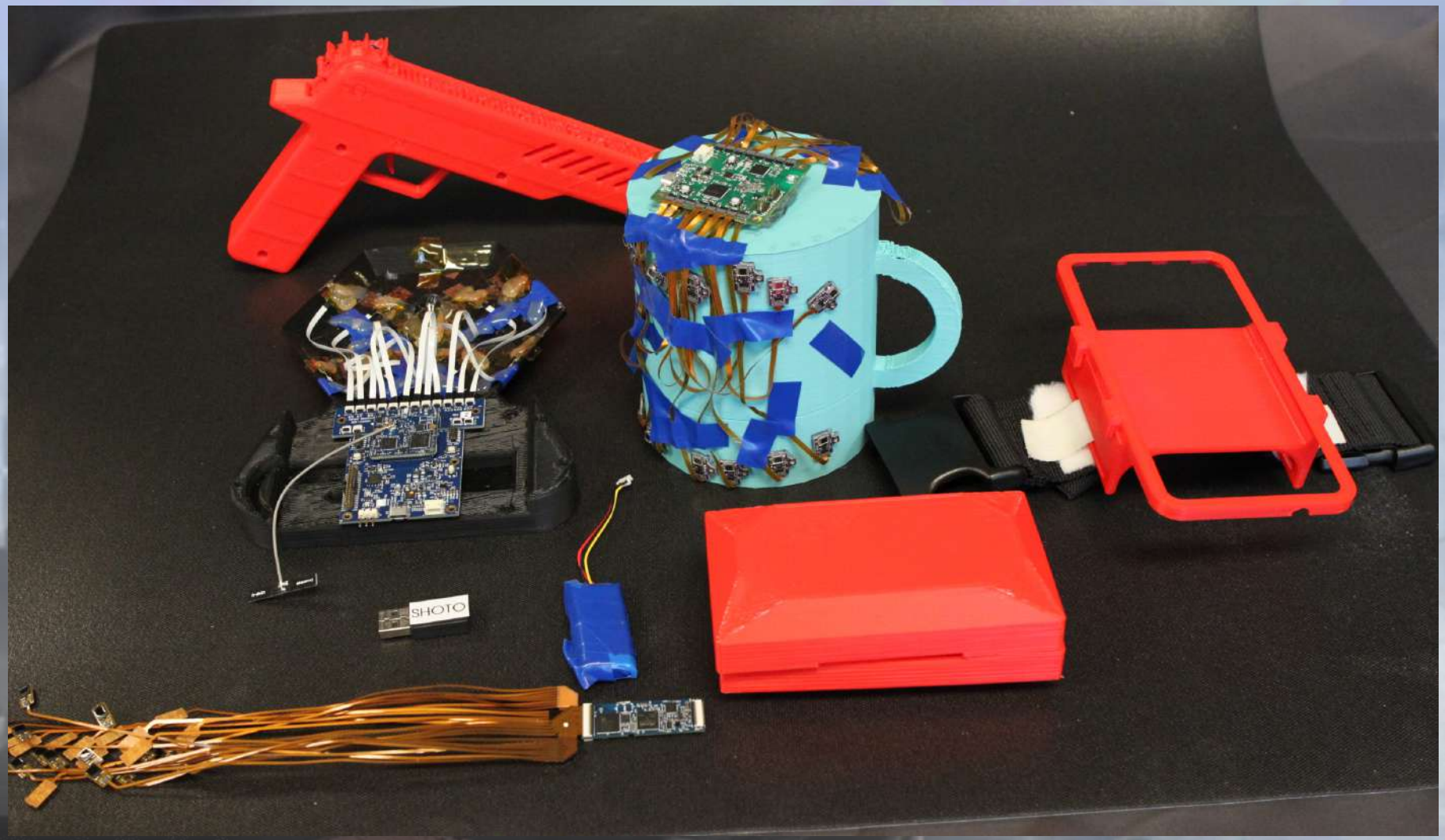
- Simulate & iterate upon **three scenarios**
  - **Firefighter** assessment of hazardous materials
  - **EMS** response to cardiopulmonary arrest
  - **Police** Traffic Stop

- **Evaluate** how simulating **physical touch transfers to real-world** first-responder tasks
  - Does performance of first responder tasks using **VR that utilizes passive haptics** match **equivalent real-world tasks** better than the same tasks using **VR without passive haptics**?
  - Three user studies

Major Milestones/Deliverables

- Hardware
  - A **high-end VR system** that incorporates physical touch
  - **Physical props** with embedded sensors
  - A tactile **armband interface** that does not require looking at
- Software
  - **Three example scenarios** that run on a standard Vive & Vive enhanced with tracked props
- Research
  - **Three user studies** evaluating how having physical touch in VR can better match real-world performance
- Dissemination
  - **Demonstrate & publish** at conferences
  - **White paper** summarizing our findings
  - A set of **guidelines** to inform first responders where VR (with or without physical objects) is appropriate
  - Anonymized **datasets**

Tracked Props



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Futuristic Firetruck Pump Panel

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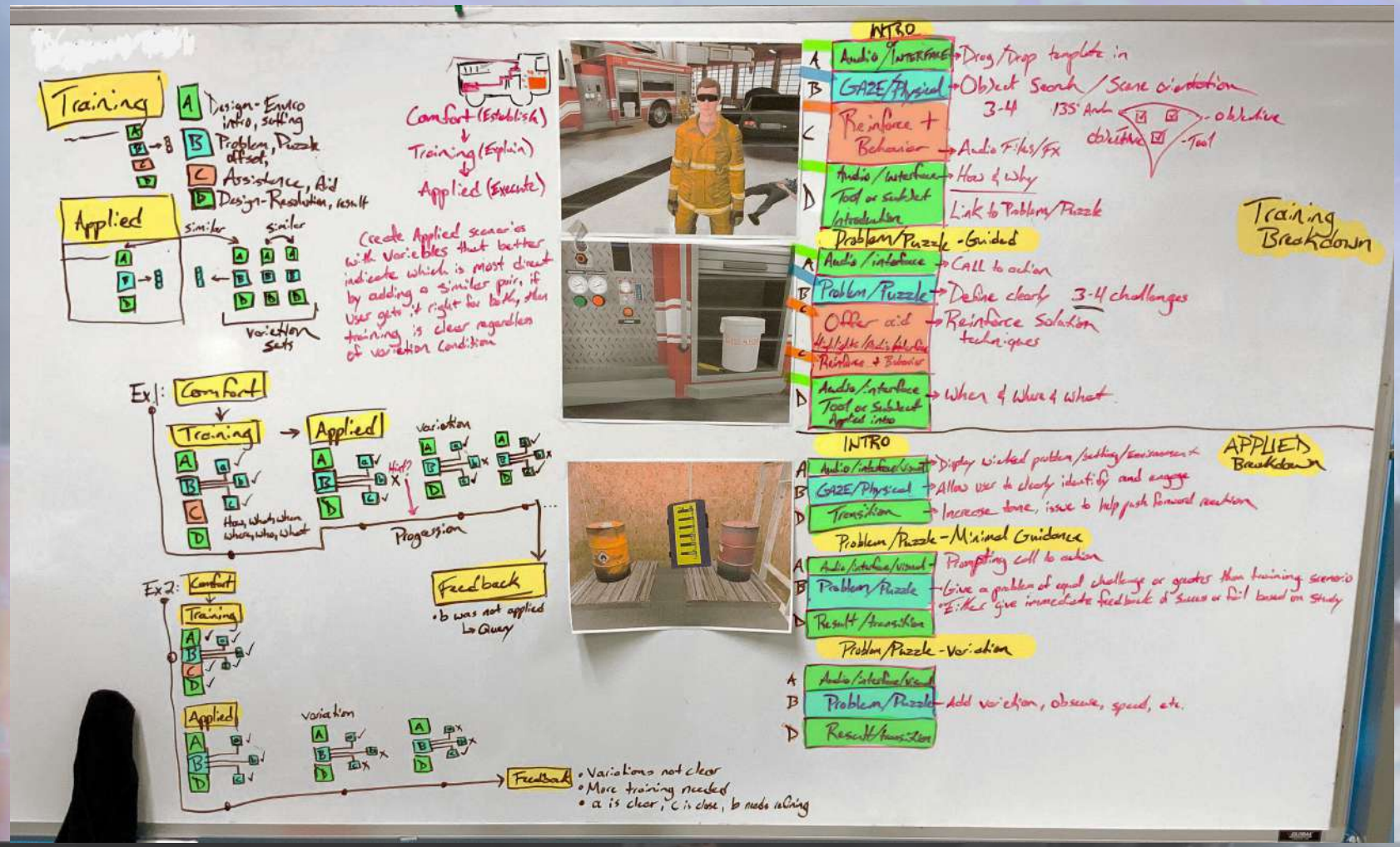
Design



- Problem solving through scenario design
- User stories/maps
- Concise & clear narrative
- Data collection for future evaluation & implementation

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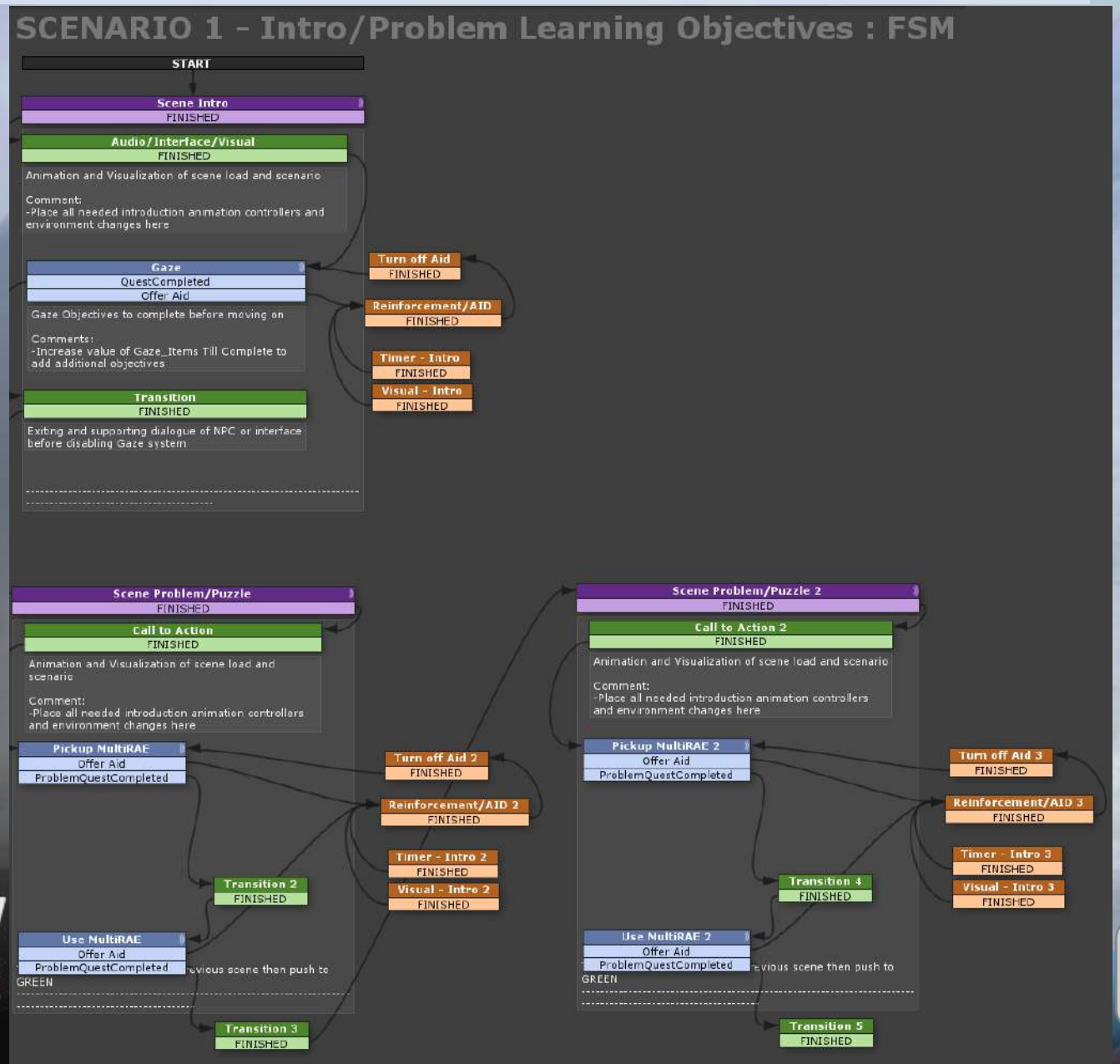
Establish, Train, Apply

- Establish
  - Create **comfort**, **confidence**, & **presence**
  - Define **goals** & assist with **understanding**
  - Reduce user **confusion & error**
- Train
  - Teach how to use & practice
  - Learn all core systems
- Apply
  - Similar conditions as training but with variation
  - Test performance & if user forms own conclusions

Scenario Example



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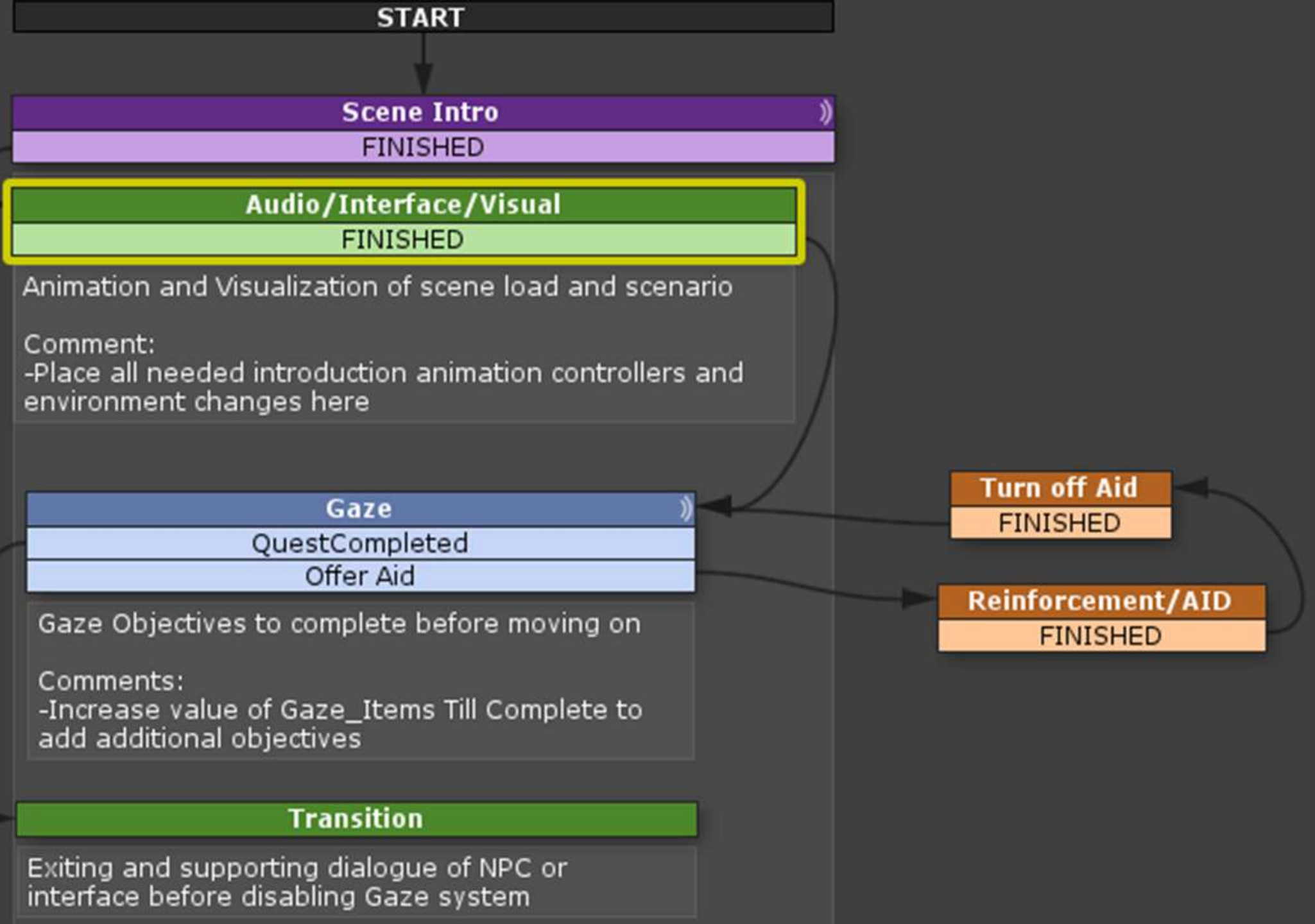
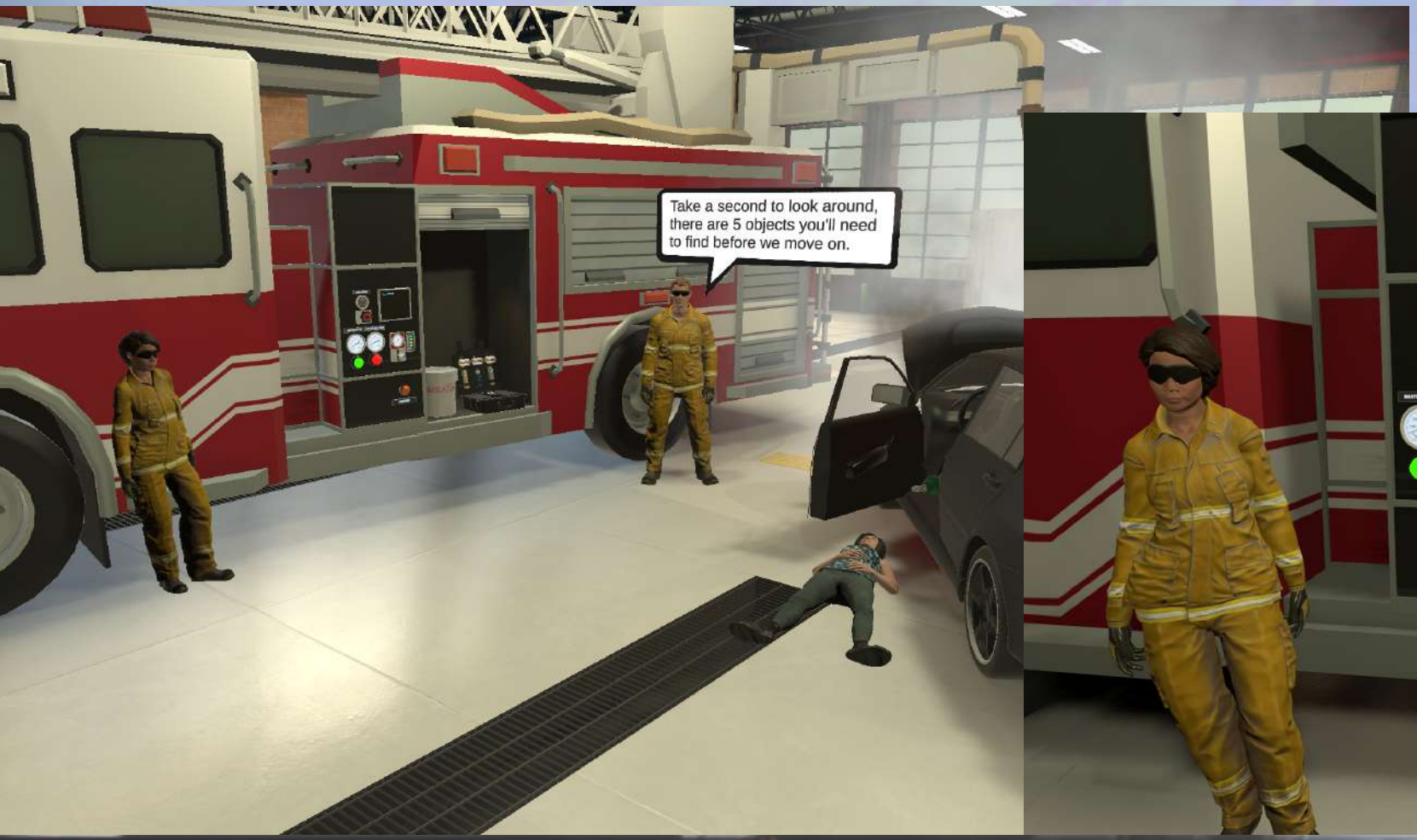
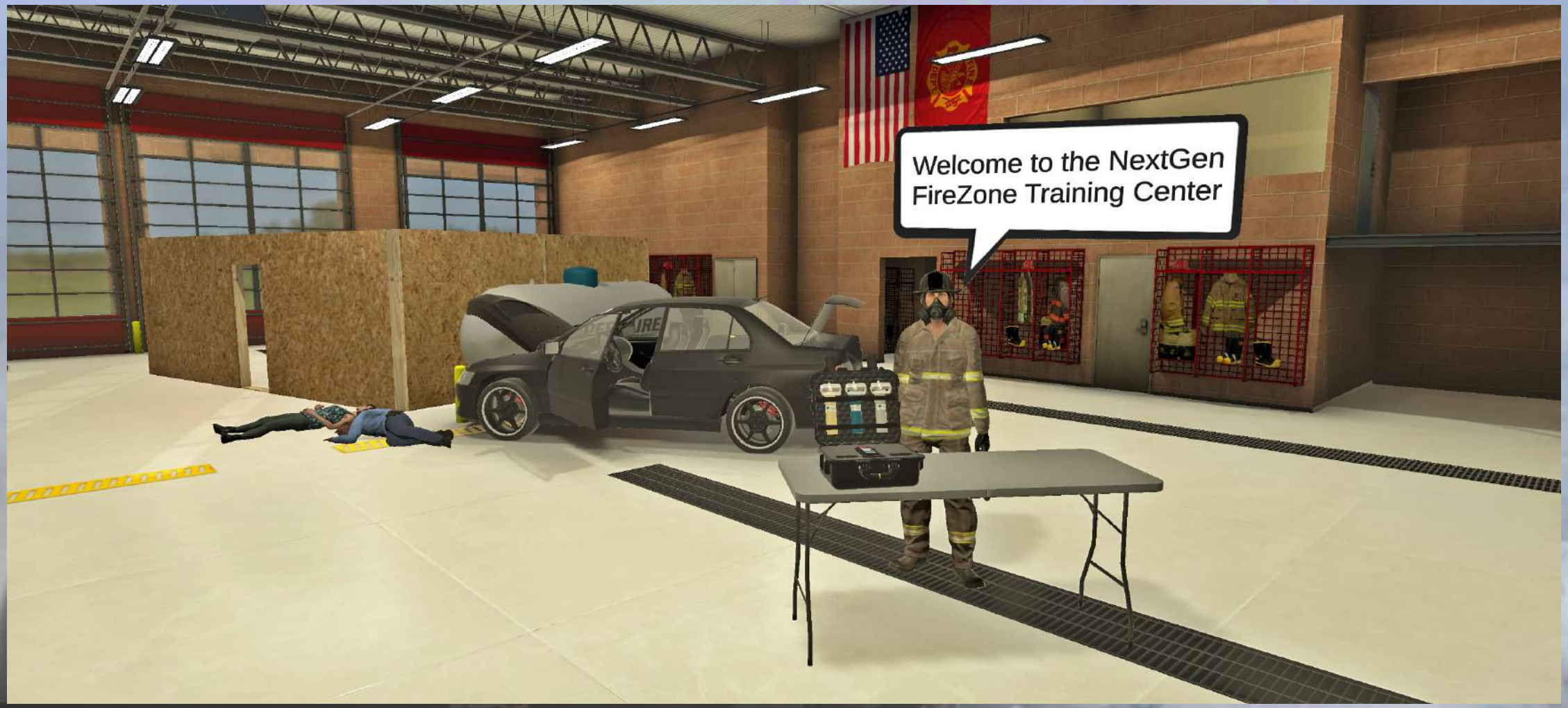

START
Scene Intro
FINISHED
Audio/Interface/Visual
FINISHED
Animation and Visualization of scene load and scenario
Comment:
-Place all needed introduction animation controllers and environment changes here
Gaze
QuestCompleted
Offer Aid
Gaze Objectives to complete before moving on
Comments:
-Increase value of Gaze_Items Till Complete to add additional objectives
Transition
Exiting and supporting dialogue of NPC or interface before disabling Gaze system
Turn off Aid
FINISHED
Reinforcement/AID
FINISHED

The Comfort Stage - Office Training Center

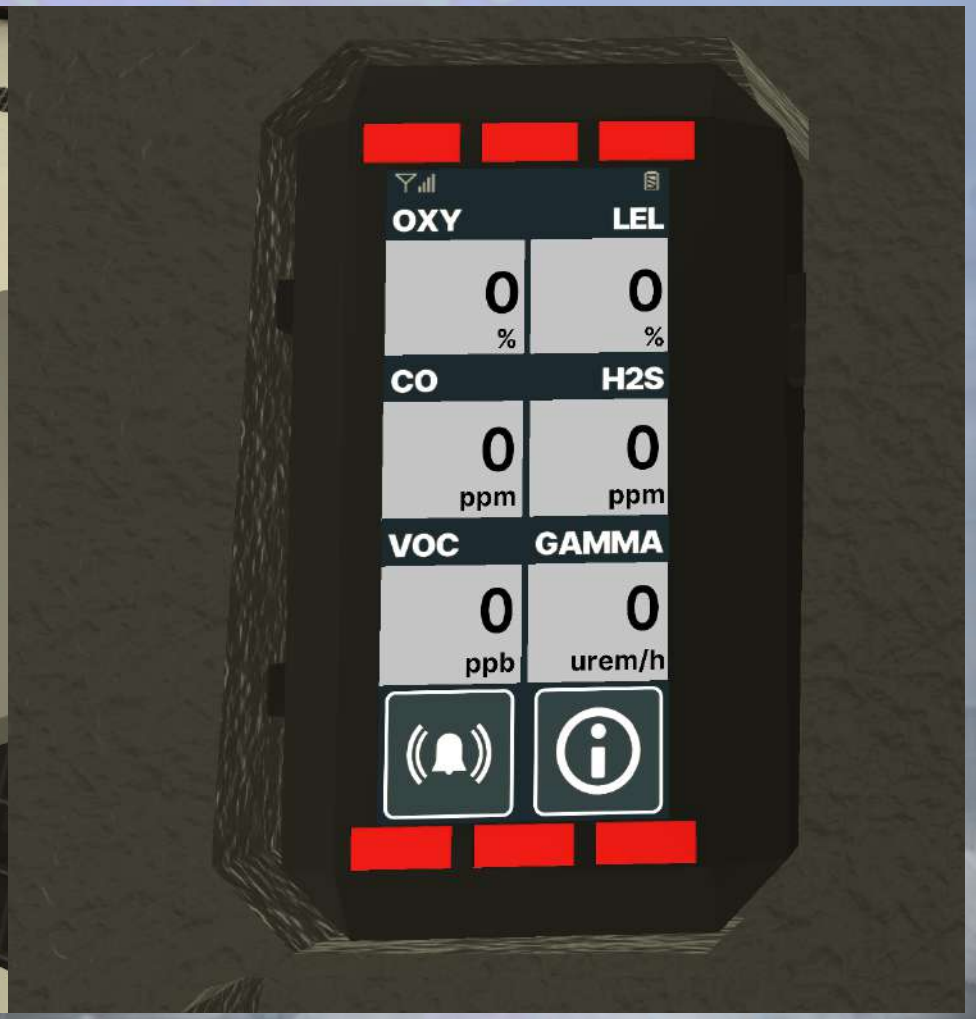
Introduction / Overview Scene



Hazmat Scenario



MultiRAE



What's Next

- Two more scenarios
  - **EMS** – patient diagnosis
  - **Law enforcement** – vehicle search
- User studies
  - Compare real world performance to
    - Standard HTC Vive
    - HTC Vive with custom tracked physical props
  - Better VR performance is **not necessarily better**
  - Evaluation of **matching real world performance**

Expected Impact

- Better prepared first responders **save more lives**
  - **Improved evaluation** of interfaces & processes
  - **Increased safety** through the use of better-designed tools
  - **Decreased cognitive load** as a result of tactile interaction
  - **Better training transfer**
  - **Faster response** to critical incidents

Questions?

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Get your hands on the tech!

Demos Open

BACK TOMORROW

8:00 AM