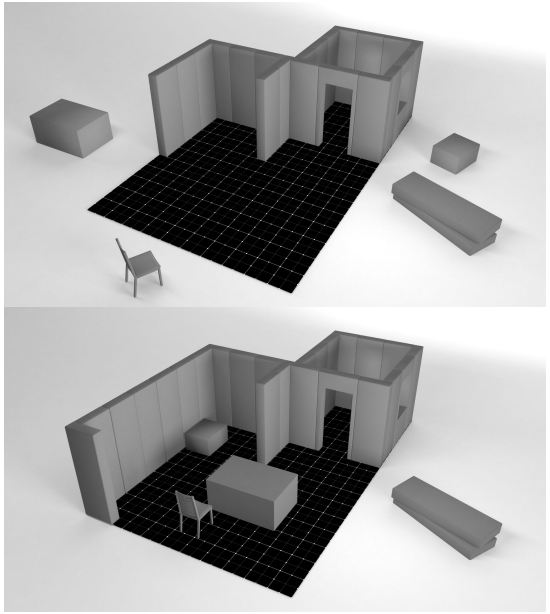
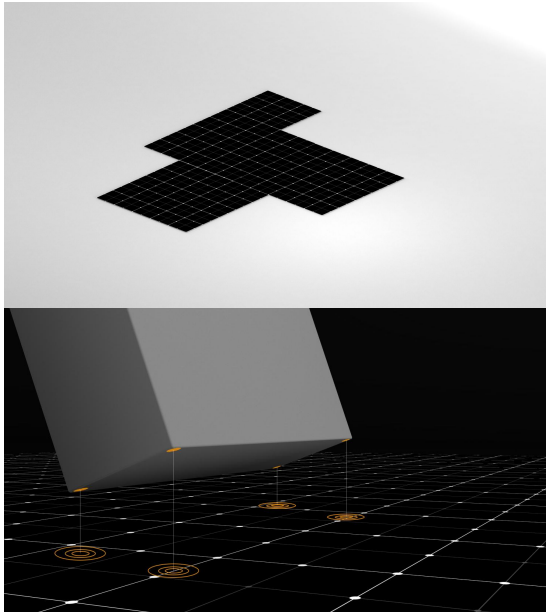
01 - BUILDING SPACES



Physical blocks

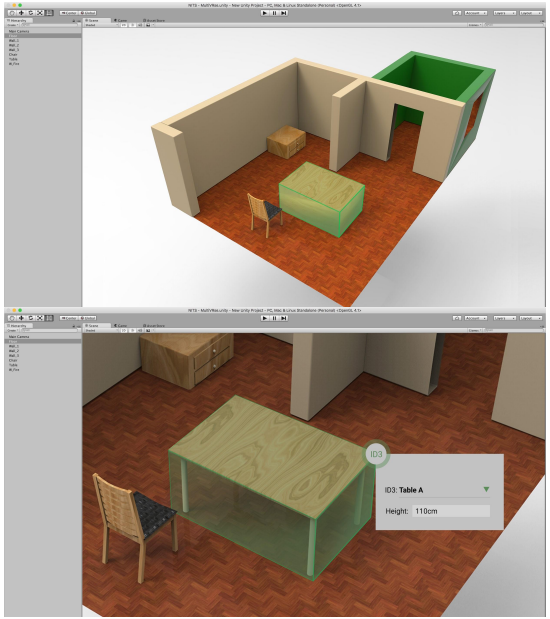
Quickly build diverse physical spaces from reusable blocks. Everything is Plug and Play! Blocks can remain entirely non-digital and can be built from e.g. recycled materials. Create / buy cheap generic blocks and quickly assemble spaces of any shape or size.

There are special “floor” blocks that other blocks can be mounted on top of.



Automatic VR model

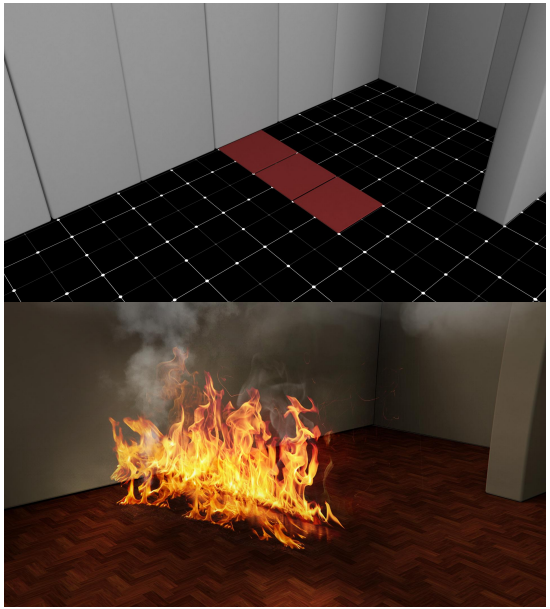
Attach durable and waterproof NFC stickers to each corner of the block. The floor contains NFC readers and when a block is put on top of it it recognizes all NFC tags from the same group - the object’s corners - to understand its shape. A PC instantaneously re-creates a matching virtual space without any tracking devices or cameras! You just specify the object’s height upon the first use which can be then saved for future uses of the same block. The virtual spaces matching the physical ones are generated automatically and live.



Customise visuals

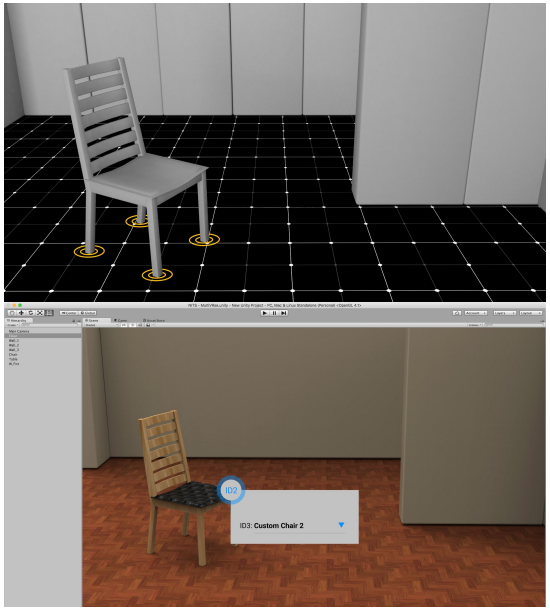
The physical blocks are generic but how they look in VR is entirely up to you. The solution is compatible with all VR game engines, including Unreal and Unity. Choose from predefined textures (walls, floors, decor etc.) or create custom ones. You can also place purely virtual objects at ease if a matching physical object is not necessary. Everything at high visual fidelity.

02 - BELIEVABLE PHYSICAL EXPERIENCE



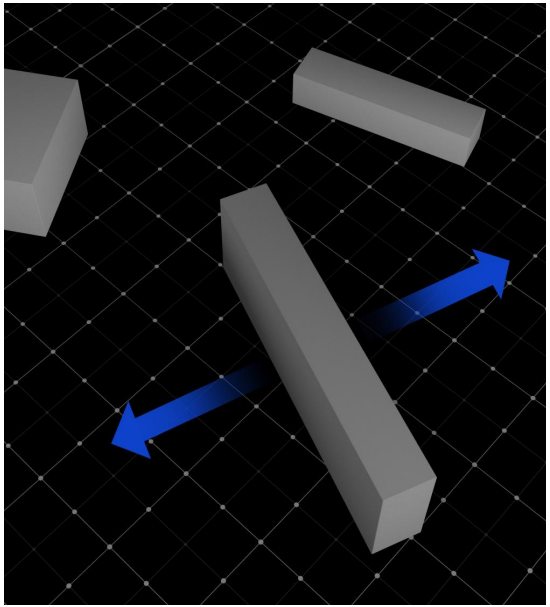
Functional blocks

Generic, non-digital blocks are cheap and handy to quickly build large physical spaces. However, blocks can also be mechanical and they can provide functionality. Add buttons, levers, heat generators and more. Or add a battery block to power the entire setup without plugging it to an electrical outlet. There are endless possibilities! Simply put a block on the floor and change its default role in Unity / Unreal, which again, can be saved for future uses of the same block.



Custom blocks

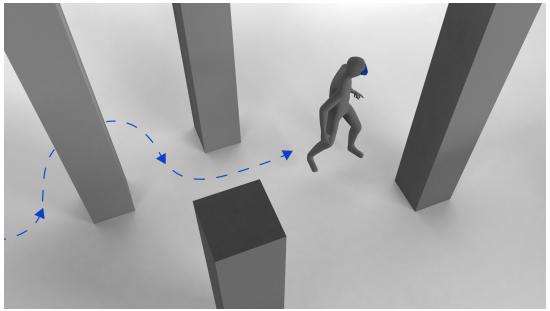
The idea for the generic and functional blocks is largely to enable mass production and reusability for quick build-out of physical spaces of any shape or size. But there are instances where highly custom, real-life objects are needed. No problem! Just stick NFC tags to the real-life object (e.g. a chair) and connect it to the system. Add a custom matching 3D model and you're done!



Adjust spaces live

The layout of the space can be changed at any time. Simply move the block to its new position and the system will automatically detect the change and it will update the VR model without requiring any action from your side. At this point all objects have their height (or special role) assigned so there is no need to supply it again!

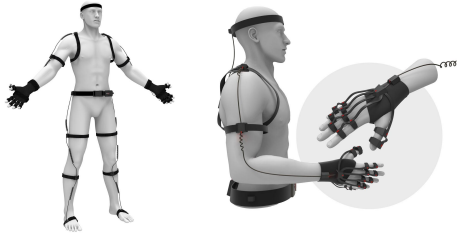
03 - BELIEVABLE VIRTUAL EXPERIENCE



Lightweight, untethered, unbounded VR/AR

Headsets like HTC Vive or Oculus Rift won't work for first responders!*

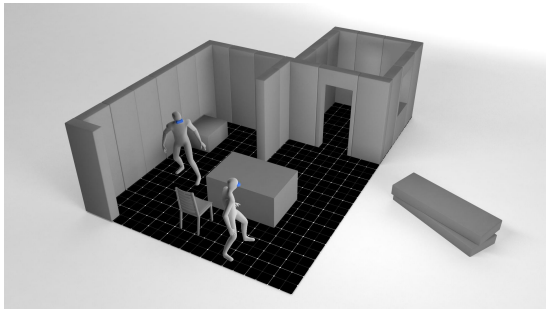
We will use BRIDGE headsets that are lightweight and untethered. BRIDGE uses self-contained optical tracking that allows to freely move between rooms, regardless or their shape, size or even floors! There are no separate tracking cameras / lighthouses required which also means there is no need to worry about occlusions. Augmented Reality mode is possible with the same setup!



Hands-free full body (and object) tracking

Being able to have the hands free to operate tools or investigate the surroundings is essential to realistically simulate first responder scenarios.

We will use Perception Neuron full-body motion capture system to achieve this. It is wireless and can be scaled from tracking a single arm to tracking full body up to individual fingers for maximum immersion. It can also be attached to objects in the room to track their position when lifted and moved in the air.

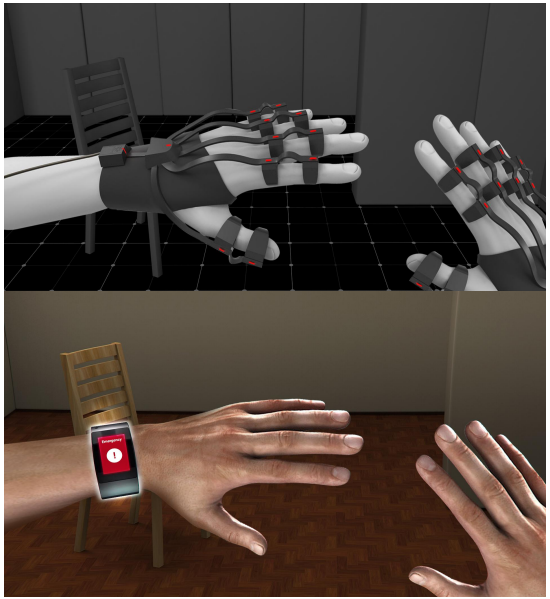


Multi-user / co-op, comms

Everything that the first responder needs to use the VR system is on them - a mobile headset and motion capture system. Adding more first responders is not a problem then! They can also see each other in VR and easily co-operate or compete. All this without a need for more cables, trackers, PCs or computational power. What's more, first responders will be able to hear spatial environment sound (via wireless headphones for athletes) and they will be able to chat with other users live.

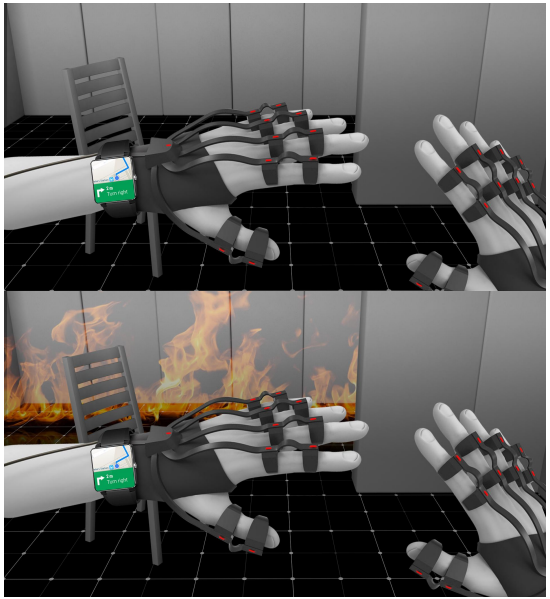
*They are too heavy to run with them, they usually require cables attached, the tracking zone (~4x4m) is too small for real-life scenarios and they require separate tracking devices that won't work if there is occlusion between them and the headset.

04 - TESTING DEVICES AND SOLUTIONS



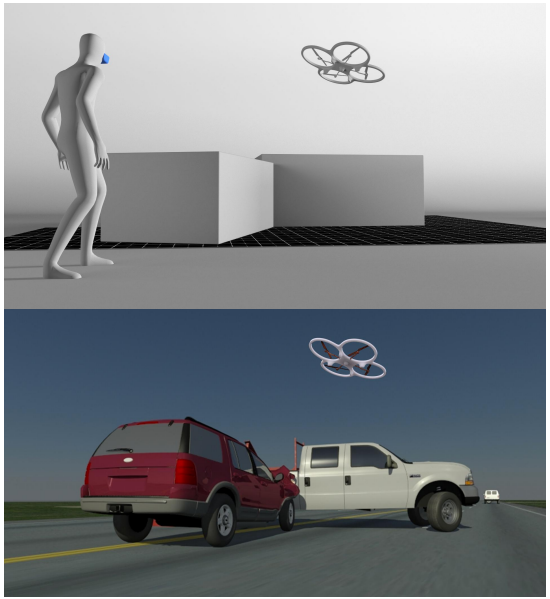
Virtual devices: VR / AR

The proposed setup enables testing of new device concepts before they are even manufactured! They can be simulated in VR and in AR. Existing devices can be virtually simulated the same way. Anything from HUDs / helmet data overlays, throwable flares to autonomous drones that navigate around the physically created environment - it can all be visualised in both VR and AR (the user seeing the real world and virtual items overlaid on top) at no extra hardware cost or setup! The first responder can operate them as in real life thanks to the full body motion tracking system.



Physical devices: AR

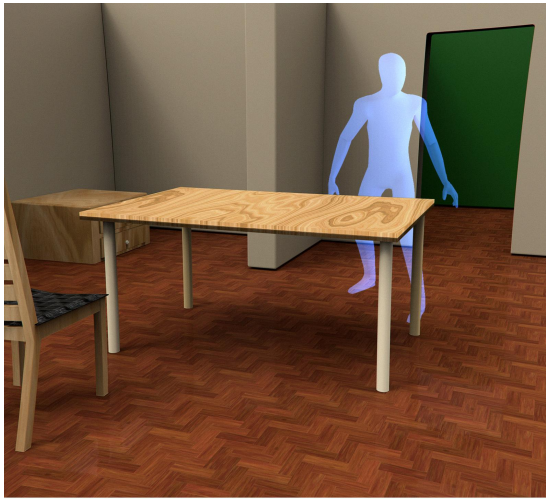
With our setup it is also possible to test real, physical devices. One way to do that is to switch to the Augmented Reality mode (seeing the physical environment and having virtual overlays on top of it). The first responder can operate real life objects like smart watches, levers, touchscreens or fire extinguishers, seeing that object and the physical surroundings.



Physical devices: VR

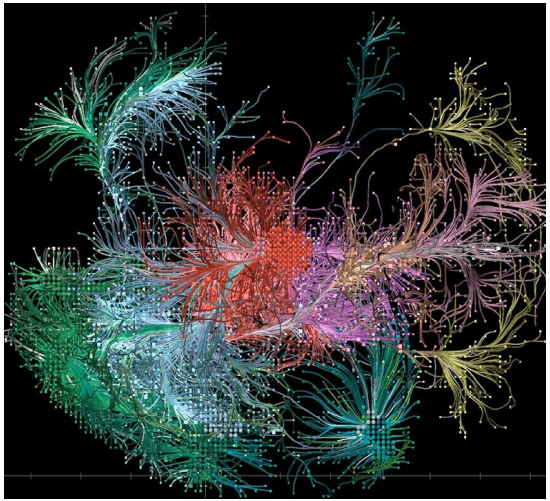
Physical objects can be easily motion- and position-tracked with the Perception Neuron sensors used for body tracking so you can e.g. stick the sensor on top of an actual drone to visualise it in VR (while having the actual device simultaneously operate in real world). It would be the real drone navigating in the real, physical environment and by having its position tracked, it could be visualised in VR without having to re-implement its autonomy or functional logic.

05 - MEASUREMENTS



Motion capture & ghost challenges

At all times, the user's body motion would be tracked thanks to Perception Neuron. The data would be stored which would allow for precise analysis of the first responder's behavior and performance. It's like a video recording that you can scrub back and forth, just in 3D and with extreme precision. What's more, this data could be used to visualize a "ghost" that the first responder can challenge in real time. Add to that having recordings for each technological aid tested (e.g. one for using a smartwatch, one for using an AR data overlay) and you can easily see and compare their benefits!



Other data + Machine Learning / AI

As the system is already capturing the entire first responder's body position and pose throughout the duration of the test runs, there is no issue with adding additional data overlays to the "ghost" recordings for further analysis or comparison. Additional measurement equipment like heart rate monitor or heat cameras can be plugged and synchronised at ease. What's more, our system will provide a Machine Learning layer on top to spot and learn facts that may not be obvious to the human eye. Which equipment setup is the best for the first responder? Is it only time that matters? AI will help answer that.

Supervisor / spectators / comms

Supervisors will be able to see, monitor and analyze the performance of the first responder live, in AR, using Microsoft HoloLens AR goggles or the same BRIDGE headset! In such approach, a simplified version of the VR environment (without walls) would be overlaid on top of the real world environment. The actual first responder would be seen as is in real life with their position being highlighted even through walls. Additional HUD and data overlays as well as controls are also possible. The spectator / supervisor will also be able to have A/V communication with the first responder.