

What's Up MÄK

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Amping Up the Realism of Mixed-Reality Training

How MÄK helped create a hyper-realistic environment for Pararescue trainees



A trio of pararescuemen exit a HH-60G Pavehawk helicopter during training. Photo from <http://www.americanspecialops.com/photos>.

A US soldier is trapped under rubble from a damaged building in hostile territory. As a Pararescuer, your team must get in, stabilize the situation, and get out – skins intact.

The rescue mission begins with a helicopter ride over to the site - the ride is bumpy and loud as combat zones dot the geography below. The war worn building comes into view and when you arrive, you fast rope out of the helo and into the rubble. You navigate to the trapped soldier and as you begin to address the situation and tend to the rock pinning him down, there's an explosion. Even more smoke, debris, and confusion fill the area; when the dust settles, you learn that more soldiers are injured, even a civilian is hurt.

What do you do? How do you react?

Quick reactions, clear thinking, and expert medical and rescue skills are what pararescuers are known for and it is in situations like this when they excel. With their medical and rescue expertise, alongside their deployment capabilities, Pararescuers are able to perform life-saving missions in the world's most remote areas. But they don't gain those skills overnight. They must endure years of physical and mental training to ready themselves for conventional and unconventional rescue situations – that training must be the best.

National Center for Health Care Informatics (NCHCI) is developing and creating an environment of unparalleled operational reality for mixed-reality pararescue training. The goal is to build an immersive training environment where pararescue trainees can experience all the elements of a rescue mission including mission orientation, transport ingress, paramedic training, self-protection, and transport egress. This mixed-reality setting combines static set elements like mock helicopters, rubble piles, and medical mannequins, with virtual simulation of the tactical situation and human characters, as well as live actors as victims.

The challenge is clear: make the simulated parts of the training just as realistic and believable as the static, real-life elements to build the most immersive training environment possible. **Keep reading...**

Mixed-reality training continued...

The simulated human characters must act and look as believable as possible in the virtual scenes to match the level of realism played by live actors.

To ensure top-notch quality and believability of the simulated humans, NCHCI chose MÄK's human simulation software, DI-Guy. DI-Guy's virtual human characters increase the operational complexity of the mission. As scenarios play out, pararescue trainees must beware of threats and are confronted with explosions of Improvised Explosive Devices (IED), which injure virtual soldiers and civilians in the scenes. The injuries to these DI-Guy characters include shrapnel wounds, leg gashes, and abdominal lacerations. NCHCI connected a high-fidelity, physiological-model-based control system to the DI-Guy characters to create additional behaviors to be consistent with their injuries. By incorporating accurate behavioral subtleties in the virtual humans, they are able to maintain the suspension of disbelief needed for effective training of the pararescuers.

To learn more about how we can help you create your ultra-realistic mixed-reality training environment, reach out today at info@mak.com! 🌸

Customer Use Case

Teaching Marine Commanders to Detect Hidden Threats

Your squad has been tasked with a convoy mission through a town with suspected insurgent activity. As a surveillance operator, you need to spot the threats and alert your team before it's too late.

You peer down from a UAV through an infrared camera analyzing and scrutinizing the happenings of a seemingly ordinary town. You see farmers in fields, children coming from and going to school, families en route to and from the marketplace, and religious services – everything seems normal but your training tells you that you need to look ahead. That's when you notice signs of suspicious behavior: people moving to rooftops looking to the sky for incoming aircraft, armed civilians lurking behind corners, and most dangerous of all, a child wearing a heavily laden vest. You use your comms channels and report the potential threat to your squad leader.



The ability to remotely monitor the activities and behavior of people near your troops, gives you the chance to avert disaster.

To successfully protect troops in the modern world, military commanders need the tools and the training to “get eyes on” potential threats, detect suspicious behavior, and identify dangerous situations. But seeing a threat isn't enough! You have to know how to communicate using the proper channels to be successful. Learning these skills takes training. With simulation, you can launch a UAV with an infrared sensor in a threatening environment and practice virtually how you would handle the situation.

The U.S. Marine Corps Tactical Operations Group (MCTOG) wanted to create an environment for exactly this reason. Their goal was to have company commanders envision training missions and in the same day, work with staff to quickly populate a virtual environment that modeled those missions, then train ISR tactics, techniques, and procedures. MCTOG's simulation needed friendly forces, opposing forces, and civilian populations acting naturally (pattern-of-life), as well as networks of insurgents covertly working to emplace improvised explosive devices (IED) in this crowded setting. To be effective, the process had to happen quickly.

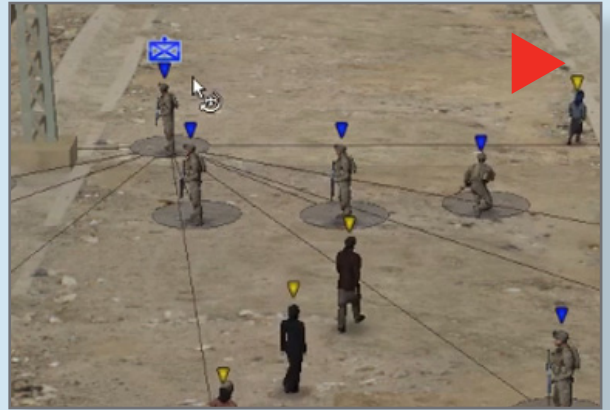
MÄK worked with the Marines to build the training environment they were looking for. MÄK's ECOSim helped paint this picture of the civilian/insurgent town environment, in combination with their Semi-Autonomous Force (SAF). With ECOSim, Marine captains practice commanding searches, patrols, and detentions, all while monitoring the town using ISR data provided by UAS, stationary cameras, and other report feeds. MÄK worked with the Marines to develop artificial intelligence (AI) models of all the needed behaviors, 3D models of buildings and human characters, and user interface enhancements to make scenario creation simple enough to learn and use in the same day.

With a simple mouse click, the small unit leader places an entire building full of people in the simulated town. By adding a dwelling, a farm, or a market place, he's placing more than just that structure; he's giving the scenario a network of simulated characters that come with the building, each character already programmed to go on with its daily activities. With a virtual world full of characters milling about, the bad guys plotting to detonate an IED become that much more difficult to detect. [Continue reading on the MÄK blog!](#) 🌸

ECOSim - Human Tactics for First Person Simulation

ECOSim makes training scenario-creation so quick and easy that missions envisioned at 0600 can be ready at the start of the 0900 training exercise. During the exercise, trainees control the squad leader; the simulated troops obey and, using layers of AI, carry out their orders. The result: an engaging environment for first person training.

Curious? [Watch the video](#) or get in touch with us at info@mak.com.



VT MÄK Named one of MT2's 2015 Top Simulation and Training Companies

MÄK continues to invent and adapt advances from broader commercial markets, as well as defense contracts, to deliver visualization, simulation, and interoperability products that make M&S better, easier, and more cost effective. [Learn more about why we were selected as a top simulation company!](#)

MÄKer Spotlight: Ryan McMahon

Software Engineer



Meet Ryan McMahon, a software engineer at MÄK who specializes in all things DI-Guy. From character AI, to our UAV system, to vehicles, to networking, to improving our camera system, Ryan does a little bit of everything.

Ryan started his career as a video game programmer, working on the popular Tony Hawk's Pro Skater games and several others. It took a while to convince his parents that this was a legitimate career path, but it's proof that there's hope for your game-obsessed teenager. He later switched to simulation when he saw that Boston Dynamics was hiring -- who doesn't want to share an office with Big Dog the robot? He's been a member of the DI-Guy team ever since and is always thinking about how to apply video game innovations to this field.

Ryan graduated from the University of Notre Dame, where he learned a lot about football, tailgating, and how to play DOOM on the engineering lab network. Plus some computer engineering stuff, here and there.

When asked about fun facts, Ryan says, "Nobody expects my dance moves. Nobody forgets them." He won both first and second place in a bad dancing competition last year; his repertoire of moves runs the gamut from robot to lawn sprinkler.

In addition to bad dance moves, Ryan has a passion for AI, systems, and solving problems that involve math. He enjoys bicycling, running, reading books of all kinds, history, and gardening.

We hope we've piqued your interest in getting to know the MÄK team! Stay tuned to our [blog](#) and [twitter](#) to get the latest on MÄK happenings! 🌸