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Offworld Industries brings realistic infantry training to the simulation community

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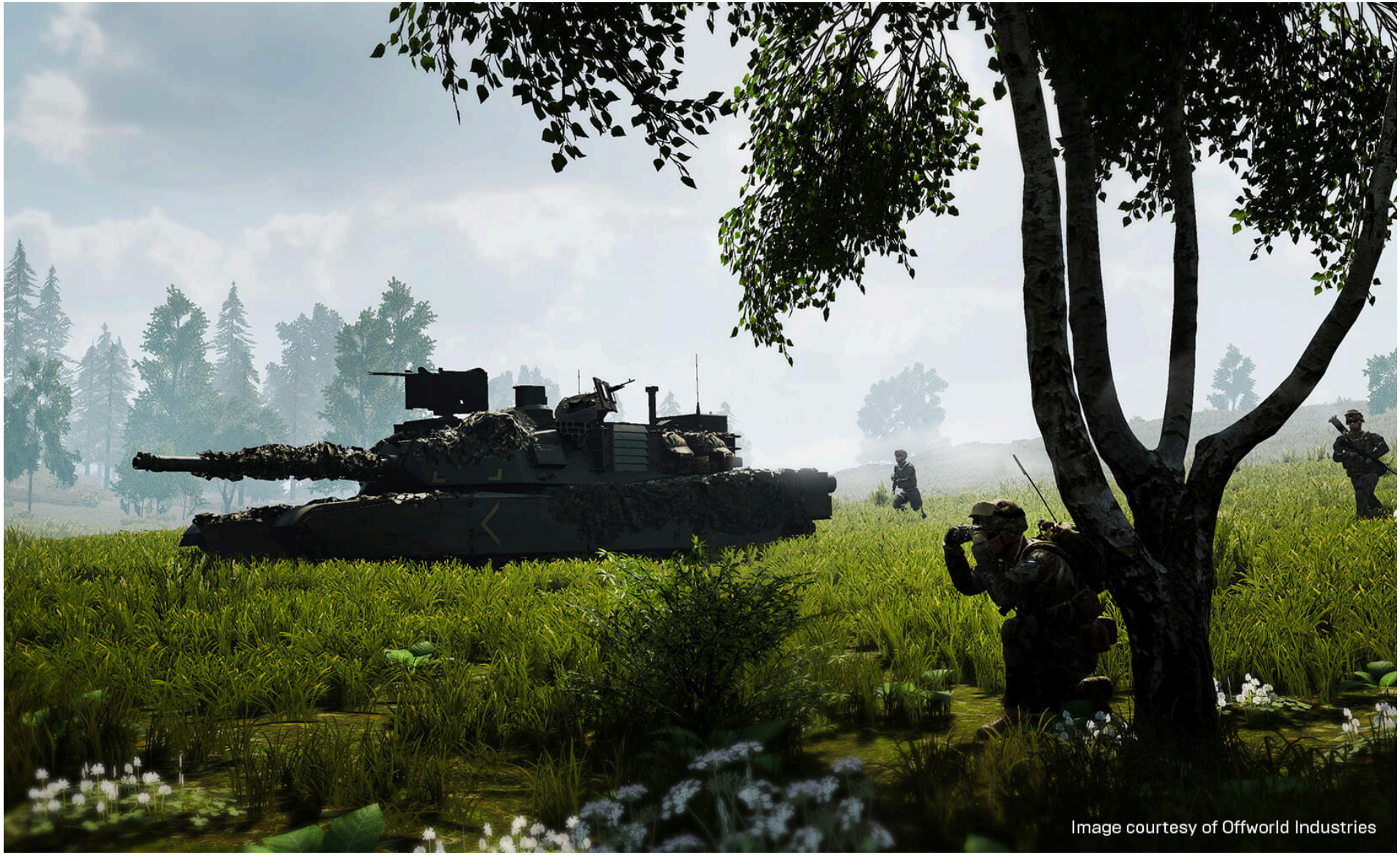
By Sébastien Lozé

The future of infantry training

Army personnel might already be familiar with Squad (https://store.steampowered.com/app/393380/Squad/), a moddable first-person shooter game where teams compete against each other in modern, realistic environments.

Squad's creators, Offworld Industries (OWI) (https://www.offworldindustries.com/), are working on an Unreal Engine-based VR framework for a custom army virtual training solution. Army organizations in the USA, UK, and abroad are exploring the use of this upcoming framework to develop immersive VR training, offering their personnel safe instruction for unsafe environments.



The ever-evolving need for training in a safe, controllable environment has driven innovation in the field of training and simulation (T&S) for many years. But the two sides of the T&S coin—an understanding of how personnel learn and retain knowledge, and the computer graphics technology to make use of this understanding—haven't always advanced at the

same pace.

Only ten years ago, training techniques for military applications were ahead of the technology curve. Independent of the larger computer graphics industry, the defense sector continued to develop applications for its own needs. The evolutions of the operation doctrines and tactics have been the drivers of CGFs, SAFs, and geospatial intelligence software innovation, and continue to drive more innovation to this day.

Paradoxically, traditional virtual training software, while focusing on applications layers, has incurred a technology debt at its core level over the last decade. Compared to what we could call traditional training solutions, the next era of digitization will be less hardware-intensive and more software-intensive, which will cause it to incur even more technology debt if the issue of software is not addressed. To bridge the gap between the opportunities presented by high-performance hardware and the inherent limitations of older T&S software, game engines have emerged as a solution.

Experienced T&S experts have identified phases, or eras, in the evolution of virtual training, going from monolithic prime-delivered solutions to defense-industry-grown COTS solutions. Because of the immense technology and content-creation effort assumed by all the actors of the simulation niche, the industry never had a chance to change its mindset and its business model. We are now at the beginning of a new era—not only is the technology ready, but new actors who can tackle a larger audience are joining the training and simulation efforts as well, leading to a strong change in the business model.

In this new era of training, companies like Offworld Industries, leveraging their expertise in Unreal Engine, can draw a bridge between these two worlds and generate training experiences that mix a high level of trainee involvement with the accuracy of a well-defined curriculum. Based on the same philosophy as Unreal Engine, OWI solutions are open and allow for an unlocked content pipeline, putting end users back in charge of their own destiny and their own data.

Birth of a military sim game

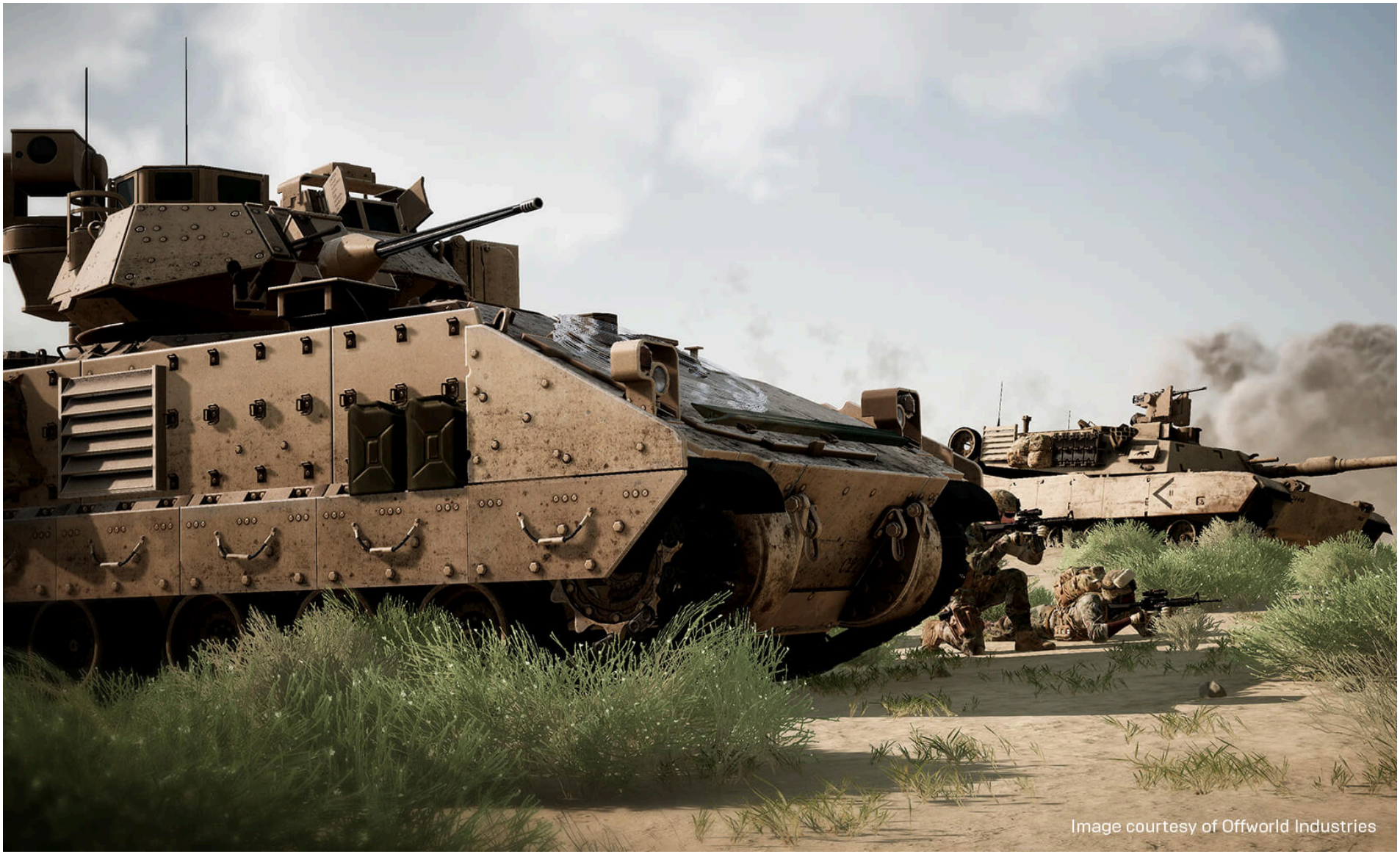
It all started with *Battlefield 2*, a 2005 first-person shooter game where players form teams and use modern military weapons and tactics. Chris Greig, Business Development Lead at Offworld Industries, and a colleague, Will Stahl, had developed a realism mod for *Battlefield 2* called *Project Reality* that not only provided additional landscapes, maps, and

weapons, but also placed greater emphasis on teamwork and communication than the original game.

Stahl wanted to take the ethos and team-working portions of *Project Reality* and turn them into a game that could also serve as a training and simulation product for the military. Stahl eventually became CEO and Co-Founder of Offworld Industries.

It wasn't long after *Squad's* alpha release in 2015 that military personnel started discussing the game on their own forums,

lauding it for its realistic situations, graphics, and audio.



Squad: more than a game

Squad, currently available as an alpha (https://store.steampowered.com/app/393380/Squad/), is technically a game. But with its focus on duplicating real-life military situations, it is also a scalable solution for military training that lets users stay focused during a fire-fight and make critical decisions in the heat of combat.

"What we're most interested in is a human side, and that's getting the reaction, that real, true, honest reaction out of a player," says Greig. "We work with a lot of ex-military, and we make sure that the crack of that bullet, or the smoke, or the explosion, really does simulate what they experienced when they were in conflicts."

This attention to realism, and Offworld's background in storytelling, has naturally led to military and police organizations taking an interest in *Squad* as a customizable solution for their own training. Organizations from the USA, UK, and Ukraine have reached out to Offworld to help them develop VR simulations to train their own personnel.

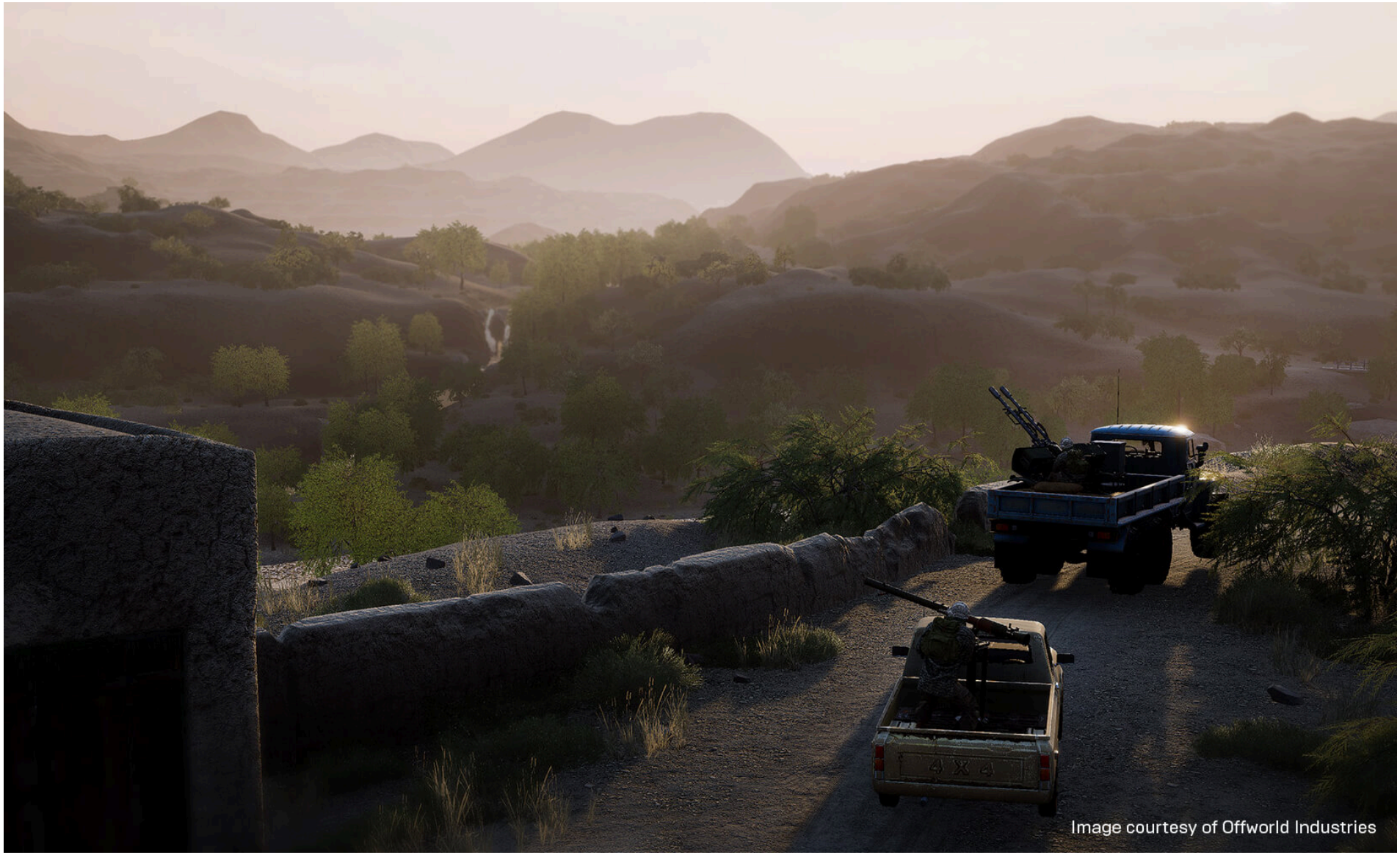


Image courtesy of Offworld Industries

“What we hear from our clients is that they want to spend most of their time running experiments, but that they end up spending most of their time in preparation,” says Greig. “The goal of these tools, and of using Unreal Engine for them, is that they spend less time preparing and more time actually executing their experiments.”

On the data end, Offworld couples Unreal Engine's realistic graphics output with its Blueprint visual scripting (https://docs.unrealengine.com/en-US/Engine/Blueprints/index.html) system to handle any body of data that needs to be incorporated into the training. Between Offworld's attention to realism and their deep knowledge of Unreal Engine, they are able to produce flexible, effective, custom simulation environments that match their clients' physical environments while also maximizing training transfer.

"When we meet with stakeholders for the first time, we explain that we can quickly prototype a system that meets their needs, to show them the fidelity," says Greig. "The system has access to the source code (https://docs.unrealengine.com/en-US/GettingStarted/DownloadingUnrealEngine/index.html), which means whatever data they want to collect is limitless. There's also a lot of flexibility as to sources of assets, which doesn't lock them into any one provider."

Becoming a key defense player

The popularity and success of *Squad* generated a multitude of requests from defense end users to add functionality that went beyond a modifiable game. These requests prompted Offworld to create a framework beyond the game itself.

The framework is a set of plugins, assets, vehicles, and human representations dedicated to defense applications, a true-to-life sound effects generation system, and map terrains representative of field operation stages. All are geared toward creating an applicative software layer that can be used to create training exercises. The framework is built on top of Unreal Engine, which is Offworld's core platform.

The plugins themselves are written in C++ with Unreal Engine's Blueprint visual scripting system, making them easily modifiable and customizable to any military application.

"Right now, our focus is on proving the framework—prototype quickly, prove the capabilities, then look at the future where we can develop platforms together using Unreal Engine," says Greig. "We want to teach them to fish rather than fishing for them."

“The goal here is to be able to grow it, and grow it, and grow it, and eventually provide all the tools that anybody might need to do military research on top of Unreal Engine.”

Offworld chose Unreal Engine for its realism, robust toolset, and flexibility in producing real-time scenarios. “The realism we can get out of Unreal is unparalleled by any other real-time engine,” says Greig. “That, plus the breadth of tools we can create and customize within the engine, made Unreal the natural choice for military applications.”

Interested in finding out what UE4 can do for your training and simulation requirements? Get in touch (mailto:simulation@epicgames.com) and let’s start that conversation.

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