

## CV90/35 Infantry Fighting Vehicle Simulator for the Danish Army

By Nils Hinrichsen, Director Marketing & Business Development, eSim Games LLC

With the procurement of the new infantry fighting vehicle CV90/35 from BAE Hägglunds the necessity for a training solution appeared on the agenda of the Danish Army. eSim Games took the responsibility to provide the software for gunnery and crew procedure training within the well-known tactical environment of *Steel Beasts Professional*. The development was contracted in autumn 2007, with frequent prototype updates once that the first vehicle was actually delivered to the Combat School in southwest Denmark in summer 2008. Less than one year later the latest version 2.480 has now passed the acceptance test, ready to support the training of future vehicle crews. Once again eSim Games has proven its competence to replicate fire control systems of armored fighting vehicles (AFVs) even for arguably one of the most advanced systems of the world.



The CV90/35-DK in *Steel Beasts Professional*

The CV90/35's fire control system revolves around the capabilities of the 35mm Kinetic Energy Timed Fuze (KETF) ammunition. The projectile features a very small charge to burst the projectile shell, relying on projectile spin to disperse the tungsten pellets to saturate the target area forward of the bursting point with fragments to neutralize a wide variety of targets. As the performance of the projectile depends to a large degree on the precise positioning of the detonation point for optimal pellet dispersion the fire control system includes the usual meteorological data, two-axis stabilization, cant compensation, laser range finder, lead prediction, and the measurement of each projectile's muzzle velocity with inductive timer fuze programming after the projectile has left the barrel.

All of these elements that have an impact on gunnery and crew procedure training are replicated or approximated with a sufficient degree of fidelity by *Steel Beasts Professional*, including weapons performance and a simulation of the vehicle's armor protection and component localization with subsequent simulation of the effects of component failures; this is partially required for crew training, but also for the constructive simulation element that is required for the tactical education at the Danish Officers' School. In addition, *Steel Beasts Professional* replicates the CV90/35's built-in crew information system with multi function displays to provide all crew stations including the leader of the dismount element with system state and sensor information that is crucial for the crew to develop situational awareness, especially prior to dismounting the vehicle.



Above: The vehicle commander's position

Below: The CV90/35 in a desert environment

The After Action Review module will capture both all tactical events as well as crucial steps in the gunnery engagement procedure like laser range finder operation, weapons release, and terminal effect/impact localization in the 3D environment. In addition tabular summaries are generated for each mission for further aggregated statistical analysis of training results, both for the individual crew member as well as the tactical performance of units, or comparative studies of the quality of training among units.

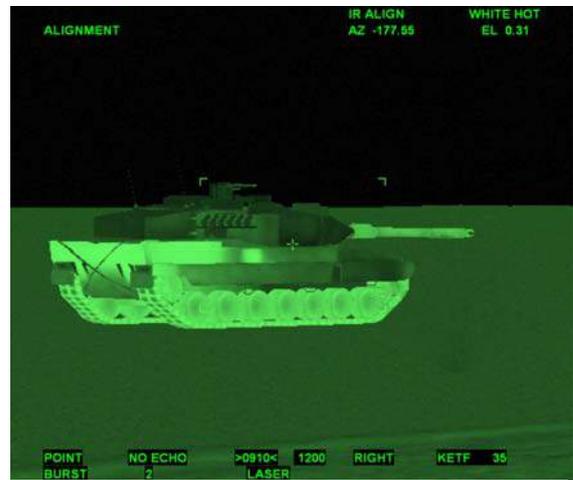


Gunnery training is supported by using 3<sup>rd</sup> party control handle replicas, or by integration of the software into new or existing crew trainer cabins (CTC). The Danish Army is currently building a new series of CTCs, based on previous experiences with self-made Leopard 1A5 and 2A5 cabin trainers.

The Danish Army has decided to rely completely on *Steel Beasts Professional* as a means to deliver virtual simulation based training to its AFV crews, which is a step beyond the role for which it was originally designed. A decade of experience in AFV fire control systems replication for user training has matured the software into a product which, despite its radically reduced costs, offers the required functionality for crew training without serious reductions in fidelity. At the same time the software offers more than traditional “stove pipe designs” in the crew trainer business.



As it includes not just a single vehicle’s fire control system but that of many different AFVs as well as an advanced editor to allow instructors a wide range of tactically challenging scenarios each crew may train in a sophisticated combined arms tactical environment involving forces beyond battalion strength in map areas of up to 100 x 100 km<sup>2</sup>. CTCs can be networked with desktop trainer dominated classrooms for cooperative and force on force collective training. In addition the *Personal Edition* is being given to all officer cadets for the duration of their career courses for installation on their personal PCs for solitaire self-learning and tactical homework.



The CV90/35 gunner’s position, and thermal sight view replication

As such, *Steel Beasts Pro PE* marks a watershed in the training paradigm from an instructor-centric frontal lesson type towards explorative learning under the guidance of experienced soldiers.

As a desktop trainer *Steel Beasts Professional* offers a wide range of functionality at an unprecedented price point of under 10,000.- EUR per workplace, including PC hardware and gunnery handle replica. This enables to use the solution as a supplement to traditional simulator training for better crew preparation prior to simulator rotations, and better retainment of acquired know-how and skills after simulator training, or even during deployment where patrol and guard duty might otherwise result in a deterioration of skills in medium and high intensity combined arms operations.

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Nils Hinrichsen is Director Marketing & Business Development of independent software developer eSim Games.

Mr. Hinrichsen has served in the German Bundeswehr as an armor officer, and has studied industrial engineering in Hamburg and Albstadt-Sigmaringen. During university he formed the eSim Games team with lead developer and president of eSim Games, Mr. Alexander H. Delaney, to debut the market with the armor simulation *Steel Beasts* in 2000.

Mr. Hinrichsen is married, 42 years old, and leading the eSim Games office in Hannover, Germany.