

Lemur Remote Weapon Station Training for Vehicle Crews

Ground operations of the last two decades have shifted the military's attention to the role of the light vehicle. In asymmetric wars they are a preferred target for ambush – partly due to their greater number in theater, partly due to the insurgents' perception that they are easier targets with similar reward, the death or injury of its occupants. With the vulnerability of light vehicles exposed during those operations, armies are adapting to these circumstances. Currently, legacy fleets are gradually being replaced with new designs that withstand rifle fire and protect the crew from RPG and IED attacks as well as the general mine threat. Another reaction is to add armament beyond the vehicle crews' personal weapons, and without the necessity to expose them to small arms fire as it happens with traditional MGs on a hatch ring mount.



Piranha-IIIIC with Lemur RWS
(40mm AGL configuration)



Eagle IV with Lemur RWS
(12.7mm HMG configuration)

Industry has responded to this demand with the development of remote weapon stations (RWS), among which the most frequently picked variants offer freedom of choice to the customer to equip the station with 12.7mm heavy MG or 40mm grenade launcher gun. This spectrum of weapons seems to cover the current operational necessities in most cases.

Equipping vehicles with a remote weapon station is important – but equally important is to provide the necessary training tools, ideally beyond a mere

shooting gallery. In just twenty weeks of development time eSim Games modified its virtual simulation *Steel Beasts Professional* for the Danish Army during the *Lemur RWS* acquisition process with multiple software prototypes, passing acceptance test, and final delivery. As a contributing factor to this remarkable success *Steel Beasts Professional* already covered much of the training requirements given its decade-long history as a tactical, gunnery, and crew procedure simulator for armored fighting vehicles. This



Lemur RWS operator screen, Daysight

simulation includes a number of external ballistic factors as well as terminal ballistic performance approximation as it keeps track of the vehicle's armor protection and component localization. These elements are vital for crew procedure training, and they are useful for the constructive simulation in its role for tactical education.

eSim Games also helped the Danish Army to shape its requirements for a systems upgrade two years later. *Steel Beasts Professional* was modified to incorporate a number of potential upgrade options which could then be evaluated for their tactical potential inside the virtual environment. As a consequence, a missing feature was identified and the most promising options were selected for the upgrade. Rapid software prototyping in early stages of an acquisition process can clearly help to avoid costly corrections later.

Another often overlooked aspect is the time savings resulting from parallelization of certain training steps. Boresighting is such an example. Prior to receiving simulation support, crews of the remote weapon station had to be instructed in serial fashion on a single available weapon station; a process that took several days in a packed training schedule.

Once that the boresighting procedure could be replicated inside of *Steel Beasts Professional*, training the entire class required a mere twenty minutes, freeing up several days for other training activities.

RWS equipped vehicles are now force multipliers; each has a thermal imager for better target detection, is stabilized to allow convoy protection on the move, and is equipped with a laser range finder for long range precision fire. Even though the user interfaces make the station operator's job relatively easy, *some* of the skills that are being taught to snipers in year-long training are still needed for the successful employment of RWSs in the surveillance and long-range engagement role.



Lemur RWS operator screen, Thermal Sight

The training requirements are as manifold as the new employment roles. Basically, every soldier tasked with the use of a remote weapon station must learn to interpret thermal signatures – still a novelty feature for logistics troops. Crews manning an outpost on silent watch must plan for periods to recharge the batteries, which has implications for the tactical employment of their vehicles. Cant sensors and other components may fail, and require the crew to adapt and overcome adversity. Crews may need to engage targets beyond tracer burn-out range, and must understand that tracer rounds may have different ballistic properties, if they want to apply precision fire instead of an area effect with its implications for collateral damage.

In short, the introduction of remote weapon stations requires intensification of vehicle crew training in army branches that used to focus less on combat-related tasks, and a low-cost desktop trainer can help to bring the required training quickly to the soldiers that need it. *Lemur RWS* gunnery training will be supported by using 3rd party control handle replicas to build desktop trainer stations.

The After-Action Review module will capture 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.

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 km². 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.

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.

Each exercise ends with the After-Action Review (AAR). The AAR starts with presenting the instructor with a pre-screening of gunnery performance which can be filtered and reviewed for each student to identify key elements like laser range finder usage, aim at the moment of weapon release, impact location analysis, and eventually the procedures to correct the aim. Once that the pre-screening is complete the AAR for the whole audience can start (or be saved for later). Eventual comments on the pre-screened events can now be seen as well as all tactical events and the flow of forces in the map view as well as the virtual environment.

Finally, *Steel Beasts Professional* creates a tabular overview over the logistical footprint of an exercise as well as a complete and detailed event list which can be accessed with a normal web browser or a spreadsheet calculation which allows the customer to pull the relevant information into a training database for further statistical analysis.

As a desktop trainer *Steel Beasts Professional* offers a wide range of functionality at an unprecedented price point of under 15,000.- 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.



Desktop Trainer Station with Control Handle Replica, Battlefield Management System

About eSim Games

eSim Games is an independent software developer from Mountain View, California. After debuting the consumer market with the armor simulation *Steel Beasts* in 2000, a strategic pivot was made to cater to the market for military training and simulation by introducing *Steel Beasts Professional*.

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