ARFF and virtual reality simulation

Marco van Wijngaarden, Director of the Simulation Division of ETC, comments on some of the key market drivers and trends in current ARFF simulation training.

First is a growing interest in the use of simulation to meet US FAA requirements (Part 139) on driver training (including emergency response vehicles), which under federal aviation regulations in the USA is required for everyone who drives in an Aircraft Operations Area (AOA), and which in a large airport can literally involve thousands of people.

Secondly, across the pond, new EU regulations to promote road safety truck drivers (not yet applicable to the emergency response vehicles) have just come into force in Europe, requiring professional drivers to undertake a one-day training programme every year over five years, or 35 hours every five years. “So as a truck driver you will need to do simulator time. I think this will push legislation for the emergency services to undergo similar training under the same type of legislation,” remarks Marco.

On more general terms, a large part of learning how to drive fire trucks in the AOA does not actually necessitate live training – an in fact live training can be impractical, says Marco. “When you look at an airport, one of the first things you have to learn are the airside road rules and how to behave correctly in the AOA.

Some people might say, ‘I don’t need a simulator because I have a big truck’, but then there is always the ‘cost vs effectiveness’ question. For instance, there are constraints in using the real truck when you are learning night-time driving in airports, not to mention having to organise training for everyone during night shifts – it is virtually impossible.”

It is in these kinds of scenarios where Marco sees desktop simulation training as coming into its own – and not just for learning airside rules. “For example, firefighters have to learn how to operate the ARFF truck and again, to do this you don’t have to use a real one at first.

“That’s not to say getting as close to reality as possible isn’t necessary. Driving a real truck at speed involves curves and g-forces, which is relevant if you want to teach students about not rolling trucks.”

Mid point between the desktop approach and the live approach are truck driver simulators consisting of full-sized cabinets that can be used to represent a variety of vehicles. Customers using full cabin solutions include Minneapolis St. Paul International Airport and Nashville International Airport.

So should airports have a three-pronged approach, using life-sized cabin simulators, desktop learning and live training?

“It depends on the training objectives and the vision of the airport. For a mid to small-sized airport with two trucks, even operating these vehicles the fuel and fire costs will be substantial. It would be more economical to carry out 75% of training time on a desktop simulator and use the real vehicle for the rest of the time.”

Most airports send their fire crews for live training once a year at live fire training facilities, many of them are fuelled by propane. “I would question how realistic that is, as most facilities have fixed rigs. These types of facilities are good to learn the drills, experience the sensation of real firefighting, and build confidence. But I doubt the effect of having one such training event per year. The other problem of those types of training facilities are they also have to deal with environmental and safety constraints, so at some facilities you cannot use foam and exercise scenarios are limited to have safe training. And in many cases you are not training with your own vehicle. So how effective is this training? My viewpoint is yes, keep the live training but use virtual reality truck simulators at the fire station, and train scenarios that go beyond live training – such as the fact you can have people evacuating the aircraft, choose the incident conditions as you like. I recommend fire crews retain live training and also keep the learning curve pointing upwards with other learning models.”

The escalating realism of virtual simulation has resulted in questions being posed regarding its perceived growing complexity. Is this accusersation fair? Marco doesn’t believe so. “There are two aspects to complexity. Training staff and firefighters want fresh scenarios that require the ability to create exercises themselves, as well as the ability to use an instructor’s tool set for observation and scoring. Contrary to what some say, this is no more complicated than using an Internet browser as it is all point and click. The complexity comes not from the simulator but from the knowledge of how to create a good exercise.”

Virtual reality solutions can be made to be as complex or as simple as necessary. Last year ETC developed a training simulator for Rosenbauer HRET (High Reach Extendable Turret) crash tenders and deliveries have been made to Pittsburgh International, Laredo International and Yampa Valley Regional Airport. “For the Rosenbauer simulator that goes to airports where there isn’t an in-house instructor we include a set of default exercises. This means that they can just start up, select the exercise and train. However, even for more complex scenarios an experienced instructor would only need typically 15 minutes to create an exercise from scratch.”

ETC developed a special HRET (High Reach Extendable Turret) simulator for Rosenbauer’s Panther crash tenders.
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