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Down the Road

SIMULATORS ARE BEING IMPLEMENTED TO SUPPORT TRAINING FOR A WIDER RANGE OF VEHICLES. THEY ARE ALSO ENABLING TRAINING FOR MORE COMPLEX AND TECHNOLOGICALLY ADVANCED SKILLS WITHIN A SPECIFIC VEHICLE.

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Most people paying attention to the wheeled vehicle simulation industry know that it's a continually growing field. Simulators are being implemented to support training for a wider range of vehicles. They are also enabling training for more complex and technologically advanced skills within a specific vehicle.

There is a push to integrate training for newer vehicles like the MRAP all-terrain vehicle (M-ATV) and wheeled logistics equipment like forklifts and cranes. The industry of wheeled vehicle simulation is also gravitating toward trends of giving the trainee a higher-fidelity, more believable training experience, improving instruction, and exploring how to train operators for the newest technolo-

gies being installed on today's vehicles.

M-ATV TRAINING

SAIC is delivering M-ATV dash panels to fit into the existing Common Driver Trainer (CDT) MRAP virtual simulator vehicle cabin, built by SAIC. "The M-ATV was developed against an extremely aggressive schedule," said Mike Kerrigan, division manager and CDT product line manager. "The first M-ATV vehicles were being fielded in Afghanistan while SAIC was delivering the variant kits for the existing CDT and mobile variants at the Army training sites to support



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M-ATV driver training prior to going into theater."

Dutch Sley, SAIC's vice president and deputy director for virtual training products, said, "SAIC delivered the M-ATV variant kits ahead of schedule."

Raydon is also currently developing and incorporating an M-ATV simulator into its

family of route clearance training systems. Though an official release date has yet to be determined, "Our customers are anticipating the fielding of M-ATVs over the coming months," said Raydon's Army business developer, Greg Recker.

TRAINER FIDELITY

Recker said upgrades in store for the route clearance trainer include hardware upgrades such as seat shakers and force feedback steering, which should offer "a much increased fidelity to the driving experience."

There are also planned releases for Raydon's database family. At 2009 I/ITSEC, Raydon featured its Kandahar database, which Recker said includes over 200,000 culturally specific buildings, 30,000 road sections, mountainous areas, and highly detailed urban centers. "The database also allows its users to experience snow, haze, rain and muddy terrain in both day and night missions."



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What will be new for Raydon's MRAP virtual trainer in 2010? Recker said it will have a brand new Afghanistan terrain, along with "increased trainer seat fidelity with OEM and technology that interfaces with the user through the use of touch or haptic control, interface upgrades."

SAIC's CDT software updates will include a new image generator solution, which will decrease the cost of the system and increase the fidelity of the visuals. Also supporting the visuals of the trainer will

be a new curved display surface. Kerrigan said, "It gives you the same visual field, but it's not as large and it's not as deep. It also gives you a better visual representation of the synthetic environment."

"We actually have a very extensive program we're implementing this year," Kerrigan said. "We're going to do some things to increase the value of the product line." He said one of the first things SAIC is going to do is integrate different types of motion platforms. "Our current system



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uses a six-degree-of-motion platform. We are going to integrate a three-degree-of-motion platform,” he said. There are also plans to install motion devices on the bottom of the seats to create seat shakers.

Cubic Defense also has plans to improve its Reconfigurable MRAP Vehicle Trainer (RMVT) fidelity. Mark Saturno, director of business development, said, “We continue to refine the visual system on the RMVT in order to improve the fidelity of the training experience. Cubic’s virtual training systems software, powered by CryEngine, provides a very powerful platform upon which new scenarios and models can be introduced, so upgrades will be incorporated regularly.”

Mechanical Simulation, developer of automotive simulation software CarSim and TruckSim, is also planning upgrades to improve the training experience. Doug Orrin, director of new business development for Mechanical Simulation, said, “Later in the year, we’re going to come out with a new animator—a big upgrade. We have a good animator now, and it has been improved over the past 15 years, but a whole new version is coming out sometime this summer or fall.”

CURRICULUM IMPROVEMENTS

Raydon’s Recker said that changes in course curriculum are being made to prepare warfighters for the distinctive insurgent war strategies in Afghanistan and Iraq. “Artificial intelligence and autono-

mous characters have been added to the trainer, and the visual terrain rendering has been improved to provide the most beneficial training to the warfighter.”

SAIC’s CDT is also undergoing changes that will improve curriculum. The company has plans to enhance its scenario generation system, offering instructors greater ability to develop scenarios that better support the specific curriculum.

Thomas Gillespie, Ph.D., director of product planning at Mechanical Simulation, said TruckSim 8 has been released



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and has a number of new features that are of interest to users. He said a one-click operation does a whole series of tests of the vehicle. The new version has the ability to do some runtime programming and the added capability for the instructor to program certain desired scenarios. “The vehicle could be driving along and you could program a tire to go flat when the vehicle encounters some point in the road. Then it will change the vehicle properties to replicate behavior of a vehicle with a flat tire,” Gillespie said.

“And that’s important in simulators because people can learn how to drive when a tire blows out,” added Orrin.

MORE NEW CONCEPTS AND TECHNOLOGIES

One major upcoming initiative for SAIC is converting the CDT from purely a driver trainer into a crew trainer. This will be possible when a reconfigurable crew compartment is built. Kerrigan said the reconfigurable crew compartment will fit both on motion platforms and still be set up in various configurations inside of either a mobile facility or a mobile trailer. In expanding the CDT to a crew trainer, Kerrigan said that at least one and “probably” two gunnery solutions will be integrated.

Mechanical Simulation’s latest TruckSim software allows training for the newest built-in sensors that are increasingly being installed on vehicles. This will basically allow the software users to add dimensions to the driving scenario that would need a response from the driver. “So it will be able to detect what’s happening around it, using LiDAR, radar or ultrasound,” Gillespie said.

Though version 8 of TruckSim is now being released, Mechanical Simulation is already thinking about the next version. Gillespie said, “Probably within the next year, we’ll add a capability within models to hook up trains, if you will, of vehicles. So you could have a convoy with only one driver. You don’t want a sole driver in the lead among IEDs. So you want other vehicles that can find their way along the

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road that are in some way electronically or mechanically coupled to the vehicles behind it, so that you can have an operational convoy. We see that as another likely expansion of the modeling available within our software.”

Demonstrating that training simulators can be useful for more than the traditional combat and combat logistics support wheeled vehicles, GlobalSim, creator of the crane simulators first installed at Fort Eustis in 1997, developed the MasterLift 3000. The MasterLift 3000 is a simulator of the forklift ATLAS II, and is in use at the U.S. Army Transportation School.

Clyde Stauffer, senior vice president of sales, marketing and business development at GlobalSim, said that the simulator was designed to train for multiple arenas. Specifically, the MasterLift 3000 facilitates training for ammo loading or ammo handling in rough terrain, mud and snow. “So as an example, we actually put snow in the visual scene, and we change the coefficient of friction, so that as you drive on icier road conditions, you’ll get a lot more sliding, and you’ll get a lot less traction,” Stauffer said. “So we’re teaching them basic skill sets for driving in all of the environments that they would expect to use the ATLAS II in.”

Stauffer said the trainer is meant to prepare operators not only for driving conditions, but also for maneuvering the forklift among other equipment. Trainees practice loading and offloading pallets, loading and offloading ammo packs, working within a C-17 or C-130 aircraft,

including loading and unloading these aircraft, working within containers, and working with hazardous materials. “So all the different types of environments and materials they would expect to handle in the real operation,” Stauffer emphasized.

While GlobalSim does not currently have any plans to upgrade the primary system, Stauffer said there are plans in the works to add a night vision goggle option to allow training for night ops. “There’s a good chance it could be this year.” There are also talks within the company to add an armor kit option, because after all, “the armor kit does limit the visibility.” Being able to train under conditions of limited visibility is going to help the operators of the forklift when they actually face those conditions. Rather than actually adding a specific armor kit, GlobalSim would either downgrade or modify the visuals of the system “so that you only get the out-the-window displays that you would see with the armor kit installed. That’s probably next year also.”

EXPANDING USES

Both GlobalSim’s Stauffer and Mechanical Simulation’s Orrin noted what they see as expanding uses of simulators for training. Stauffer said that as computer technology has increased and the power of computers and graphics channels has increased, the cost has decreased. This has opened up opportunities to integrate simulation into a training environment. “Back 10 or 15 years ago, pretty much the only simulation you saw was in the air community.” Now, he said, “We see a lot

of devices like the forklift, which in the past, [organizations] never would have looked at it and said, ‘Hey, we need to use simulation for this training.’ With the cost dropping down to something that is a little more viable, they’re now looking at simulation for this equipment.” Stauffer said he’s seeing simulation for a lot of different pieces of equipment that in the past wasn’t seen.

An example of the expanding role of training simulators, a Navy contract with GlobalSim closed in February. To prepare its operators of JLG Industries’ new Millennium Military Vehicle, the Navy asked GlobalSim for a simulator of this new forklift. “The [Millennium] system is a bit shorter and wider, but it has pretty much the same operating characteristics as the ATLAS II,” which is also manufactured by JLG, Stauffer said.

“We see a growing use of driving simulators so people can safely learn how to handle a vehicle, any kind of vehicle, before they go out on the road and harm themselves or damage a prototype vehicle,” Orrin said. “So there’s more and more of that happening.” He said we’re even now seeing more uses for simulation to test actual hardware. This testing, called hardware-in-the-loop simulation, focuses on new steering and braking systems and even complete vehicles.

“So in the next year, we do see an opening up in the industry,” Stauffer said. ★

For more information, contact *MT2* Editor Marty Kauchak at martyk@kmmmediagroup.com or search our online archives for related stories at www.mt2-kmi.com.

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