

## Vortex Drives EADS\* robot simulator for the Belgian army

\*EADS has been rebranded as Airbus Group as of January 2, 2014



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This study analyses the realization of a 3D-simulator for training conditions with Explosive Ordnance Device (EOD) robots. EOD robots perform essential but very difficult work. They are very expensive to build and a challenge to operate in these conditions, posing many training issues. Thanks to the simulation capabilities the Airbus Group accelerated development, exceeded requirements, and delivered a superb training solution.

### Simulation and Forecasting Technology role

3D-simulation for training

### Sector

Aerospace and Defence

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Customer Case Study


**The product itself and the support from the Vortex team have been outstanding. The team is quick to respond and provides very helpful**

**Vortex Delivers Superior Robot Realism Like Climbing and Grasping**  
With Vortex, EADS recreated the entire range of robot movement, including precise balancing while climbing up or down stairs, accurately positioning the arms joint-by-joint, varying grip-arm sensitivity and carefully grasping explosives to move them to a safe location.

**Customer Case Study**

### Vortex Drives EADS Robot Simulator for the Belgian Army

- The Company**  
EADS is a global leader in aerospace, defence and related services. The Group includes Airbus, Airbus Military Eurocopter, and EADS Astrium.
- The Situation**  
Explosive ordnance device (EOD) robots perform essential but very difficult work. The threat of an imminent explosion means they must be deployed quickly and accurately but they are very expensive to build and a challenge to operate in these conditions, posing many training issues.
- The Solution**  
To address these issues, the Belgian Army decided to develop an immersive, man-in-the-loop 3D simulator to bolster their training regimen. They picked EADS to create an EOD robot simulator, and EADS selected Vortex to provide the high-fidelity, off-the-shelf physics capabilities, test performance and required realism.
- The Results**  
Belgian Army operators now train on a completely realistic EOD robot that they manipulate in many different environments. They gain essential mission rehearsal skills and operational experience with no risk to expensive equipment. With Vortex, EADS accelerated development, exceeded requirements, and delivered a superb training solution.



The Belgian Army uses explosive ordnance device (EOD) robots to perform important security tasks such as finding, disarming and removing explosive devices. The robots are tele-operated and feature multi-jointed arms with hand-like manipulators. Since they perform a crucial service they are almost always in use or on call, limiting their availability for training. As well, because they are expensive, operator mistakes can be costly.

To increase training opportunities and safety, and lower operational risks, the Belgian Army decided to implement a fully featured high-fidelity EOD robot simulator. To develop their simulator, they contracted with the **European Aeronautics Defence and Space Company (EADS)**—one of the largest aerospace companies in the world—because the EADS military aircraft division has extensive experience designing and deploying world-class simulators of flight-control systems.

**Vortex Saves R&D Costs while Delivering an Advanced Feature Set**


Early in the project, EADS realized that building their own robot simulation solution would have required intensive research and development. As well, it was clear that EADS needed physics software that would accurately simulate the movement and interactive behaviour of the robot. The solution also needed to be fast since the simulator would be user-controlled. After initial research, EADS selected Vortex, a commercial-off-the-shelf (COTS) SDK. Vortex not only impressed EADS, it exceeded their requirement specifications.

EADS chose Vortex because it delivers the expertise, physics toolkit and capabilities that have put Vortex-powered realism, motion and accurate behaviour at the forefront of the simulation industry. Vortex provides advanced modeling capabilities for physics-based vehicles, machines and robots, and includes libraries for real-time dynamics, collision detection and force reaction. Vortex was ideally suited for developing EADS' interactive EOD robot training simulator.

**Operator can prevent** operator errors before the simulator, EOD accidents cost the operator a million euros.

**Operators can practice** tricky operations like opening car doors and trunks, climbing stairs, and avoiding clumsy movements that might trigger an explosive device.

**behaviour in motion**



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