

Area X.O — Drive the Future

Four DRobotics® Corp

The Story

Four DRobotics® Corp (FDR) is a small and medium sized enterprise (SME) located in Ottawa and Beloeil, Quebec. FDR is bringing to market the Autonomous Vehicles as a Service (AVaaS) solution for the deployment and management of teams of autonomous uncrewed vehicles. Co-founder and CTO Jeremy James has a BSCEE and MSCEE from the University of Calgary where he conducted research in the automatic control of power generation. James moved to Ottawa after graduation and worked for: Bell Northern Research, DY-4 Systems, and Arc Cores where he was a co-founder of the world's first chipless fabless semiconductor vendor before co-founding Four DRobotics® Corp.

The Obstacle

Testing AVaaS vehicle control software on an autonomous vehicle is a complex and expensive activity that requires intensive field testing. Early in the development of AVaaS FDR determined that a full physics simulation of the autonomous vehicle would let FDR test the software early and cost-effectively in the lab before deployment in the field. The result is that the objectives of our field testing are being conducted efficiently with less time and cost expended.



The Solution

The project used ODE and WeBots to simulate vehicle dynamics in Area X.O's 'School Zone'. FDR used high-resolution satellite imagery and the Government of Canada's High-Resolution Digital Elevation Model (HRDEM) to create a scaled 3D image of the School Zone. However, the result was unsuitable for public display due to its small subset. Area X.O was shown the solution, and FDR was invited to codevelop an environment simulator using Area X.O's high-resolution 3D mapping of the 1,866 acre site, including links to the Ansys simulation tool used at Area X.O.

The Update and the Future

A great benefit of the Area X.O simulation portal powered by Ansys is simulation of sensor data from radars, lidars, and thermal cameras. These sensors obtain data from objects depending on metallic, dielectric, temperature, and radiation properties in addition to colour. Objects and materials in the current simulation don't have these same in-depth properties. The sensor data obtained from the Ansys simulator should be more life-like in the future. FDR's autonomous service vehicle also uses: RGB cameras, an IMU, GNSS, proximity sensors, and inclinometers. The ability to simulate these behaviours, and test object detection and classification algorithms that fuse: optical, lidar, radar, and thermal data will also be vital. In the future FDR will use the simulator to test additional vehicles provided by clients or developed to FDR's client specifications.



Testimonial

“Simulation is a core components of FDR's software product development process. We use simulation: to test new algorithms, as a sales tool and as a customer training tool. The quality of our autonomous vehicle simulation has progressed significantly since we started our collaboration with Area X.O. Today we can run autonomous vehicle missions, in near real-time, on a high resolution map of the Area X.O private test facility, including 9km of roads. The simulation team at Area X.O has provided great support applying their knowledge and

experience. With both on-site and remote access to the simulation tools at Area X.O, we have advanced our simulation capabilities faster than expected.”

— Jeremy James, President and CTO, Four DRobotics® Corp

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Jeremy James, President and CTO
Four DRobotics® Corp

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