

# JEVONS ROBOTICS PTY. LTD.

SPEEDING DEVELOPMENT OF HAZARDOUS MATERIAL TRANSPORT ROBOTS WITH  
3DEXPERIENCE WORKS SOLUTIONS

## Case Study



Jevons Robotics chose to replace its design software with 3DEXPERIENCE Works modeling, design, data management, simulation, collaboration, and communication solutions in order to quickly and cost-effectively fulfill its mission to improve the safety of delivering explosives and other hazardous materials in the high-risk, difficult terrain of open-pit mining sites through the use of its innovative ARTEV6000 hazardous materials transport robot.

### Challenge:

Quickly and cost-effectively develop an automated electric robotic vehicle for use by the mining industry when traveling in difficult, dangerous terrain and when carrying hazardous materials, such as explosives, to meet several customer deadlines.

### Solution:

Implement modeling, design, data management, simulation, collaboration, and communication solutions from the **3DEXPERIENCE** Works portfolio, which operate on the cloud-based **3DEXPERIENCE** platform.

### Results:

- Accelerated development
- Saved time and money with simulation
- Reduced fabrication iterations
- Improved assembly build time while reducing costs

Jevons Robotics Pty. Ltd. is a Perth, Australia-based startup that is developing cutting-edge robotic solutions to improve safety in the mining industry using advanced control techniques, artificial intelligence (AI), robotics, high-end computer processing unit (CPU)/graphics processing unit (GPU) advances, and battery-electric technologies. Founded in 2021 and staffed by professionals with extensive mining experience, Jevons is on a mission to improve the safety of delivering explosives and other hazardous materials in high-risk and difficult terrain.

Following tragic incidents in which workers have lost their lives while working in hazardous situations, Jevons is developing the vehicles and autonomous requirements to physically deliver explosives and other dangerous materials in high-risk and difficult terrain, which are present on open-pit mining sites. With an initial focus on the Pilbara iron ore mining area in northwestern Australia, Jevons designs robotic vehicles from scratch, maximizing efficiency for customers while collaborating with partners to develop solutions that enable customers to automate and electrify their operations.

According to Chief Operating Officer (COO) David Crosbie, the company's first product—the ARTEV™6000 (Automated Remote Terrain Electric Vehicle rated for up to 6000 kg)—passed proof of concept testing in



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– David Crosbie, Chief Operating Officer

early 2024 and is scheduled for deployment in the Pilbara region in mid-2024. Crosbie explains that when the company was founded in 2021, it faced the daunting task of developing the robotic vehicle quickly and cost-effectively to meet tight deadlines from critically important customers. "We needed to complete development of an innovative product in record time, which is why we decided to replace our original design software that one of our colleagues recommended when the company was founded," Crosbie recounts.

"Almost immediately, we faced business issues related to finding designers and engineers who already knew how to use the package we started with," Crosbie continues. "As a startup, we were trying to develop products and grow very quickly, and we didn't want a package with a steep learning curve that required costly and extensive training. Most of the designers and engineers we interviewed already knew how to use SOLIDWORKS® software. SOLIDWORKS appeared to be the most ubiquitous and well-known design package in Australia, with a huge talent pool available. In looking into acquiring SOLIDWORKS, we learned about **3DEXPERIENCE**® Works solutions from our reseller, Central Innovation."

Jevons chose to replace their design software with modeling, design, data management, simulation,

collaboration, and communication solutions from the **3DEXPERIENCE** Works portfolio, which operate on the cloud-based **3DEXPERIENCE** platform. "We were initially attracted to **3DEXPERIENCE** Works solutions because of wide familiarity among designers and engineers in Australia with **SOLIDWORKS**," Crosbie points out.

"However, once we started working in the cloud, we realized how much the **3DEXPERIENCE** platform would help us to grow," Crosbie adds. "Transparent data management in the cloud will definitely help us support growth, but without a doubt, the biggest savings was in helping us get up and running so quickly due to the lack of a learning curve and training requirements."

### MEETING TIGHT DEADLINES VIA COLLABORATION

With the greater collaboration supported by **3DEXPERIENCE** Works solutions, Jevons has been able to meet tight deadlines for designing and manufacturing several subsystems in parallel for the ARTEV6000. "Being able to have constant updates on the development of other subsystems designed and iterated by different design engineers on the main assembly is the type of collaboration that really speeds things up," says Senior Engineer Adrian Gil. "When subsystems are designed concurrently and share common space within the robot chassis, collaboration is imperative for managing space as well as validating healthy interactions among these systems, such as eliminating mechanical interferences, assembly problems, installation issues, and electrical/wiring interferences."

"Working in the cloud opens up the entire world to us and enables us to work efficiently using both internal and external resources," Crosbie notes. "For example, separating design from detailing represents a major advantage for us moving forward because we can allocate resources in a manner that is most cost-effective."

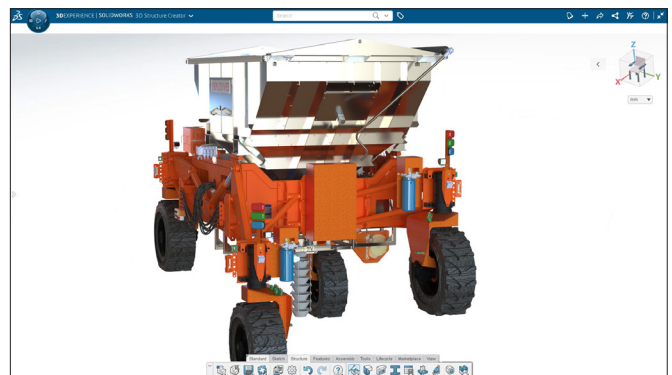
### VALIDATING SAFETY, SAVING TIME AND MONEY WITH SIMULATION

Using **3DEXPERIENCE** Works integrated simulation tools, Jevons conducted linear static stress analyses for load-bearing components for



"The simulation studies that we ran using **3DEXPERIENCE** Works solutions resulted in faster development time because we can rapidly validate new ideas and concepts. We also conducted simulations on important systems affecting performance, such as the chassis, fine positioning system frames, and high-voltage module latch components. When we ran factor-of-safety analyses on each subsystem, to comply with safety requirements, we were able to quickly turn around concept improvements that increased safety. At the same time, we were able to use simulation to reduce fabrication iteration requirements, which helps us optimize build and assembly time to reduce costs."

— Adrian Gil, Senior Engineer



With the ability to collaborate more effectively and simulate design performance more quickly in the cloud, Jevons Robotics was able to meet tight deadlines for its the ARTEV 6000 hazardous materials transport robot while simultaneously improving safety and saving time and money.



both geometry and material optimization, as well as factor-of-safety requirements for each subsystem. "The simulation studies that we ran using **3DEXPERIENCE** Works solutions resulted in faster development time because we can rapidly validate new ideas and concepts," Gil stresses. "We also conducted simulations on important systems affecting performance, such as the chassis, fine positioning system frames, and high-voltage module latch components.

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### HAVING A ROBOT DO THE DIRTY WORK

The first application for which the ARTEV6000 will be deployed involves transporting an explosive mixture of ammonium nitrate and fuel oil—referred to as "ANFO"—to already-drilled holes awaiting an explosive charge for clearing earth in open pit mining, which is used for mining iron ore. Traditionally, the explosive mixture was delivered by a human driving a vehicle. However, because contours are rarely level in open pit mines, a team of people carry buckets of explosive for steep, hard-to-reach blast holes, increasing the likelihood of accidents. Jevons is aiming to make the process

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**VAR: Central Innovation, Redcliffe,  
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safer and more efficient with the ARTEV6000 robot.

"**3DEXPERIENCE** Works solutions have played a major role in helping us develop products that remove people from hazardous situations," Crosbie stresses. "These cloud-based tools have proven to be a great advantage to us as we resolve this safety issue in the mining industry and a couple of other industries with similar problems."

#### Products:

- **3DEXPERIENCE** SOLIDWORKS Premium
- **3DEXPERIENCE** SOLIDWORKS Simulation Designer
- **3DEXPERIENCE** Learner
- Collaborative Designer for SOLIDWORKS
- Collaborative Industry Innovator
- 3DSwymer

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