



World's first autonomous cleaning robot for rollingstock

Invented by Australia's leading rail and transit systems provider

Downer, in partnership with Deakin University's Institute for Intelligent Systems Research and Innovation, have developed the world's first autonomous cleaning robots for train maintenance.

Two autonomous cleaning robots have been developed:

- one for floor cleaning which undertakes scrubbing, mopping and vacuuming simultaneously, improving efficiency and reducing time taken to clean the train
- one for surface cleaning which completes a deep clean on the seats and windows.

Both robots can also detect vandalism and hazards, signalling to the cleaning staff for a remedy.

The in-built cleaning programs have been custom designed to navigate the complex environment of a train interior including:

- the design of a low profile robot to navigate under seats for floor cleaning
- six degrees of freedom so the robot can manoeuvre around handrails and poles allowing for both seats and windows to be cleaned.





What makes our cleaning robot the most innovative in the world?

FULLY AUTONOMOUS POST DEPLOYMENT



DETECTS ALL MOBILE AND FIXED OBSTACLES DURING CLEANING



DESIGNED TO PERFORM THE HIGHEST QUALITY INDUSTRIAL OR COMMERCIAL FLOOR CLEANING



ECOLOGICAL, LOW-MAINTENANCE DESIGN



LOW PROFILE - WORKS UNDER CANTILEVERED SEATS AND CLEAN FLOOR TO WALL COVING



NO PRE-INSTALLATION REQUIREMENTS



ADVANCED LOCALISATION, NAVIGATION AND MAPPING



3D ENVIRONMENT PERCEPTION



CAN VACUUM AND MOP THE FLOORS



STEAM CLEANING SEATS/WINDOWS



RUBBISH DETECTION



Supporting cleaning staff

Our cleaning robots complete the most tedious and time-consuming cleaning tasks, enhancing the efficiency and productivity of cleaning staff.

The robots also drive Industry 4.0 practices and enhance the workforce by providing new skills in robotics, operations, and maintenance for cleaning staff.

Our autonomous cleaning robots better support workplace health and safety as they remove manual handling tasks for staff.

What's next for our cleaning robots?

These prototypes have been tested on Downer maintained fleets where cleanliness and passenger comfort is of the highest standard. The team are now looking at the next phase of the project, which includes optimising cleaning duration, expanding robot functionality and improving user interface.

To discuss how we can support you

Contact Mark Baxter on mark.baxter@downergroup.com to arrange a meeting today.

About Downer

Downer has over 150 years' rail experience delivering innovative transport solutions.

Today, we leverage our capabilities to offer rollingstock, infrastructure, rail systems, operation and maintenance, system integration, engineering innovations and digital and data solutions.

About Deakin University's Institute for Intelligent Systems Research and Innovation (IISRI)

IISRI's expertise spans across intelligent systems disciplines including motion simulation, simulation training and haptics, machine learning, autonomous systems, robotics and human performance. IISRI provides comprehensive and unique capabilities and facilities to design and develop both hardware devices and software packages from start to finish.