

**TECH OFFER**

**Outdoor Mobile Robotic Platform**



**KEY INFORMATION**

TECHNOLOGY CATEGORY:

**Manufacturing** - Assembly, Automation & Robotics

**Logistics** - Transportation

**Waste Management & Recycling** - Automation &

Productivity Enhancement Systems

TECHNOLOGY READINESS LEVEL (TRL): **TRL6**

COUNTRY: **SINGAPORE**

ID NUMBER: **TO175188**

**OVERVIEW**

Industrial robots are typically deployed indoors in factories for industrial automation applications such as manufacturing and production. Outdoor deployment in the absence of the traditional work cell boundaries, will typically necessitate safety precautions and perimeter fencing in order to maintain a safe working perimeter between the robot and any surrounding personnel. A Singapore-based research team has developed an integrated Outdoor Mobile Robotic Platform capable of executing the manual operations of human workers outdoors. The solution is based around the concept of a weather-resistant industrial robot arm mounted on a mobile vehicle platform. The system is integrated with vision systems and sensors to provide the appropriate safety zone monitoring and offers versatility catering to various use-cases via custom end effectors.

## TECHNOLOGY FEATURES & SPECIFICATIONS

The system primarily comprises the use of a 6-axis industrial robot arm at the rear end of a truck. The effective reach of the robot is further enhanced through a customised linear track to extend to either ends of the vehicle. Depending on the application, an operator may be on deck to control, facilitate, and provide a watchful eye on the operations.

A combination of vision cameras, laser sensors, and other sensor systems provide the necessary safety zone monitoring and perimeter fencing, while a linear track extends the robot's reach and dexterity to cover a multitude of functions.

The Outdoor Mobile Robotic Platform system translates the strengths of the industrial robot arm from the factory floor to the outdoor environment, by utilising the robot arm to execute labour intensive manual operations at higher efficiency and precision.

## POTENTIAL APPLICATIONS

The Outdoor Mobile Robotic Platform system has been used to develop a solution for the automation of lane closure, by executing the deployment and eventual retrieval of traffic cones and signages without the need for human operators to be exposed on the road. The same system has also been pivoted to execute maintenance works for roadside installations. Both the above two use cases have successfully navigated through the concept prototype phase and is in the midst of advanced development.

By customising the end effector and/or incorporating a tool changer, the same system may also be applied to a multitude of use cases in similarly demanding outdoor environments

## UNIQUE VALUE PROPOSITION

The value that the Outdoor Mobile Robotic Platform system brings is to translate the efficiency and consistency of industrial robot arms to the outdoor environment, and in particular, the construction sector. By harnessing the advantages of the industrial robot arm to perform a variety of tasks that are currently being performed by human effort, the Outdoor Mobile Robotic Platform system enables automation and robotics to be applied to traditionally manual applications. In such cases, improvements in safety and efficiency can be achieved.