Wayne’s World: Autonomy in Australia
Cobot works alongside humans

BY GEORDINA RAMIN, BOEING WRITER

When “Wayne” enters the room, people take notice. A rhythmic beeping and flashing orange light signal the entrance of this autonomous mobile collaborative robot – known as a cobot.

A welcome sight at Boeing’s 787 Dreamliner production area in Melbourne, Australia, Wayne works on the shop floor together with human teammates. The cobot carries out tasks that previously caused repetitive strain injuries.
Australia is the first Boeing site to use such technology. Since its introduction two years ago, workplace injuries in the 787 area have significantly decreased. While other safety measures were also put in place during that time, the team believes Wayne played a significant role in getting the numbers down.

“Getting the 787 wing tools or mandrels ready for manufacturing in the tool preparation area was important but repetitive work,” explained Josip Mihalik, team lead in the Boeing Aerostructures Australia 787 factory. “Now it’s all offloaded to the cobot, so we can focus on more valuable and meaningful tasks.”

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JOSEP MIHALIK
BOEING AEROSTRUCTURES AUSTRALIA

SANDM RA
Technician Josip Mihalik replaces a sanding pad on Wayne’s end-effector.

PHOTO: WESCHER/MILBC/BOEING

COBOT COLLAB
(From left) Boeing Australia teammate Laszlo Denes, Josip Mihalik, Brooke Agostini, William Xu, Ashlan Ambrozieti and Dominik Wierzchicki experience the benefits of robotics every day manufacturing airplanes next to Wayne the Cobot.

PHOTO: WESCHER/MILBC/BOEING
Mihalik and his colleagues are reaping the benefits of Boeing’s investment in R&D. Boeing Australia teammates have been coding the blueprint for safe and trusted artificial intelligence (AI) and autonomous behaviors in uncrewed aircraft and robotics.

Boeing Research & Technology (BR&T) aerospace engineers in Australia designed and engineered the autonomy built into many of Boeing’s cobots. These teams are pushing the limits of what can be achieved in a complex factory environment.

You can find Wayne self-navigating around the 787 factory, avoiding people and obstacles, and using its handy mechanical arm to carry out sanding and cleaning along with manufacturing staff. The teams plan to implement a second cobot for 737 production.

Boeing Australia has long been a test bed of innovation for autonomous technology for The Boeing Company, thanks to a unique partnership between BR&T Australia and Phantom Works Global.

**Australian-Made Boeing Autonomous Technologies**

**MQ-28 Ghost Bat**
The Boeing Airpower Teaming System created the first military aircraft designed, developed and manufactured in Australia in half a century. The MQ-28 is an uncrewed aircraft made to work as a smart team with other military aircraft to expand and extend airborne mission capabilities.

**ScanEagle**
Insitu Pacific’s ScanEagle detect and avoid software enhances safe airspace integration of uncrewed aircraft systems (UAS).

**Machine-learning software**
Phantom Works Global’s uncrewed technology teaches UAS to detect, decide and act during missions.
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In addition, the country offers wide-open spaces ideal for safe testing. R&D is also supported by the Civil Aviation Safety Authority and military and resource industries, all with a strong interest in integrating autonomous systems.

“Continued investment by Boeing in the region, strong government support and safety-focused regulators make Australia the perfect testing environment for new commercial and defense products,” said Michael Edwards, director of ER&T – Asia Pacific.

The critical AI knowledge and coding skills required to develop autonomous behaviours and navigation are key factors in Boeing Australia’s success. For example, the “brain” on board the mission system of Boeing’s smaller test assets, the MQ-28 Ghost Bat and cobots like Wayne each have unique software that automates different tasks.

Phantom Works Global, the defence rapid prototyping arm of Boeing Australia, tested autonomous behaviours in the early phases of the Airpower Teaming System (now known as MQ-28 Ghost Bat) and is expanding into multiple domains.

“Our focus is on creating systems that team together to work as one across air, land, sea and space,” said Emily Hughes, director of Phantom Works Global.

“We are refining our work in autonomy and AI to provide new autonomous teaming solutions to the Australian Defence Force.”

From cobots like Wayne that reduce workplace injuries to uncrewed systems protecting Australia’s national interests, humans are quickly learning — as fast as the machines they make — how important these technologies are to create opportunities and confront future challenges. IQ

Meet Australia’s Autonomous Tech Experts

Nathan Bick
Operations analyst, Phantom Works Global
Expert in using modelling and simulation to facilitate the process of making complex decisions.

“Working on autonomous technology and pushing the boundaries of what’s possible is a fantastic experience. Our team focuses on collaboration to overcome challenges and deliver a system that successfully blends human ingenuity with the capabilities of the machines the humans themselves built. This technology increases our safety and supports our future.”

Natasha Moffat
Senior software engineer, Inuvo Pacific
Leads autonomous software development to help safely integrate UAS into complex airspace.

“I love working in autonomy because everything has so much potential, the work always feels worthwhile, and nothing beats being able to flight test your work.”

William Ko
Automation research engineer, ER&T Australia
Designs and develops advanced robotic systems that enhance safety, quality and efficiency of aerospace production systems.

“[ER&T] we push the boundaries of technology, building robotic systems you cannot find anywhere else in the world. It is deeply satisfying to solve a huge range of problems unique to aerospace side by side with engineers who are the best in their fields.”