

FACT SHEET - Bridging the Capability Gap – Adding A Sense Of Touch

A Haptically Operated Counter Explosive Robot has been developed by The Centre for Intelligent Systems Research at Deakin University. Defence has funded the development under the Capability Technology Demonstrator (CTD) program to the level of functional prototype, for evaluation by key defence personnel.

The Defence Capability and Technology Demonstrator Program, managed by the Defence Science and Technology Organisation, assists in the improvement of priority Defence capability by providing Australian industry with an opportunity to demonstrate their technology. This enables Defence to assess the potential of the technology to enhance military capability as well as the likely risks associated with acquiring the technology.

Haptic technology refers to the modality of touch and associated sensory feedback allowing an operator to manipulate and feel both virtual and remote objects. For the purposes of the CTD, haptically enabled hardware has been developed to provide force-feedback to an operator of the robot's remote manipulator arm. Picking up a remote object, feeling centre of mass, density and consistency is now possible.

Filling the capability gap between current COTS robotic arms, the haptic manipulator could be added to any existing robotic platform with minimal modifications. For the purposes of the CTD, the haptic manipulator has been mounted on an 'OzBot' mobile platform, which has been developed by The Centre for Intelligent Systems Research specifically for under-vehicle inspection and remote observation.

In addition to the Haptic manipulator, the OzBot platform has been fitted with a custom stereoscopic camera system to allow increased operator immersion with the aim of dramatically reducing operator training liability.

Technical specifications Haptic Manipulator Prototype

Arm Weight:	12kg
Arm Reach:	1.0m
Arm Payload:	~1kg at full reach
Battery life:	~2hrs
Construction:	Carbon Fibre, ABS plastic and 6061 Aluminium
Speed:	Up to 4m per second translation – high speed mode



Technical Specifications OzBot

Vehicle weight:	20kg (Platform only)
Vehicle dimensions:	694 x 462 x 143mm (LWH)
Battery life:	2hrs (typical driving) 6hrs (Stationary transmitting video)
Speed:	0-3.5 km/hr
Communications:	Wireless (900Mhz) 802.11b protocol encryption using 128-bit security (104-bitkey and 24-bit initialisation vector)
Wireless Range:	500m line-of-sight, 200m urban environments, 100m within building
Payload:	20kg (100kg with limited mobility)
Chassis:	6061 Aluminium, stainless steel axles
Drive:	2 high torque, low noise DC gear-motors



Platform features

Colour/B&W cameras housed in front module, internal lithium primary battery, variable brightness IR and white LED lighting, dual external battery bays. Auxiliary expansion bay with capacity for: 4 external video inputs, bi-directional audio, trigger for external firing circuit, 2 digital and 2 analogue (0-5v) external inputs, 2 digital outputs, interfaces including RS232/RS485/IEEE 802.3/I2C/1-wire, optional external microphone/speaker, mechanical mounting points at top/rear/sides of platform for payloads, external charging port.

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