



ROBOTIC & AUTONOMOUS SYSTEMS IMPLEMENTATION & COORDINATION OFFICE



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LTCOL Alex Palmer SO1 Emerging Technology RICO, FLW, AHQ







- Strategic Context
- Role
- Application
 - Quantum
 - Power & Energy
 - RAS
 - Small Robots
 - OCCV
 - Lead-Follower
 - Al
- Challenges & Future
- Discussion







Future Land Warfare Branch





• Force Structure Plan

- RICO Creation
 - The establishment of a coordination office for the implementation of robotics and autonomous systems across the land force to enable, enhance and protect platforms and personnel in combat.
- RAS up to Brigade
 - Acquisition of a fleet, up to a brigade in size, of un-crewed systems, to include vehicles, to support operations by land forces. This will enhance the war-fighting capability of the ADF while also protecting Australian personnel.











ROBOTIC & AUTONOMOUS SYSTEMS IMPLEMENTATION & COORDINATION OFFICE

RICO explores, coordinates and develops concepts using disruptive technology. Focusing on robotic and autonomous systems (RAS) as well as enabling technologies such as artificial intelligence, machine learning, quantum technologies, power and energy, RICO uses specialist personnel with Army's total workforce model to advance knowledge in artificial intelligence, quantum technologies, robotics and autonomy.





Application









Quantum Technologies







Operational simulation and geophysical modelling

Cryptography

and logistics



Security and cryptography

Network synchronisation

sensors and computers



Currer		Lines of Effort	Objectives
nr state	Thesis	Collaborate. Growth of an Army Chapter of a Defence Quantum Innovation Community.	Establish a quantum innovation ecosystem focused on land domain.
High potential Complex	The most disruptive &	Explore. Implementation of a rapid quantum application discovery and testing cycle via regular Quantum Technology Challenges.	Identify the most advantageous applications the land domain.
Diverse Low TRL National strength	advantageous applications are yet to be	Exploit. Development of select quantum technologies, applications and associated operating concepts and force designs.	Develop the related technology, operating concepts and modified forc
	discovered	Refine. Curation of Army's quantum technology understanding, landscaping, assessment and strategy.	Support Defence's quantum technology strates













Power & Energy





CONTEMPORARY VEH PROPULSION DOMINATED BY ELEC AND HYBRID-ELEC TECHNOLOGY

BENEFITS OF ELECTRIC PROPULSION





PMV Hybrid Electric Drive Conversion (ePMV)







- 2 Hybrid Electric Drives
 - 140kw
 - 480 Nm (Continuous Torque)
- Silent
- Optimised Power Management Sys
 - Est. 200- 300km
 - Est. 24-36hr Silent Watch
- Diesel Range Extender
 - Est.400kw continuous power
- Exportable Power





Robotic & Autonomous Systems



الله Army	
Robotic & Autonomous Systems Strategy	
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The purpose of the RAS Strategy is to set the path to realising a RAS enabled future Army that can rapidly deploy, concentrate at a point of effort and disperse to survive – through a robust and resilient network, leveraging superior decisionmaking to win in future conflict.

5 Benefits

- Efficiency
- Maximising Soldier Performance
- Improving Decision Making
- Force Protection
- Generating Mass & Scalable Effects





Optionally Crewed Combat Vehicle

OCCVs:

- Demonstrate 2 platforms (Ph 1)
- Demonstrate 4 platforms (Ph 2)
- 20 platforms for 2 years of experimentation with 1 Bde (Ph 3)
- Potential for spiral development
- TAS-DCRC TAGVIEW



Outcomes:

- Exploration of the value of the ability to optionally crew
- Roles for OCCV
- Gaining user insight
- Growing AIC/ Experience (JLU(V))
- Safety case
- Sustainment workforce and parts
- User interface/ ratios





OCCV - Demo





L121 40M

- 2 veh Convoy
- 5 Veh Convoy
- User exploration



Outcomes:

- Efficiency
 - Rate limiting Factor
 - Exploration of the value of the ability to optionally crew
- Gaining user insight
- Safety case Autonomy
- Road Regulation
- Edge v Network
- Possible Roles for L-F
 - Long Range Fires (LRF)
 - Logistics



Combat RAS Enabled





Lift – 30 x 20'ISO

Logistics RAS Enabled



Personnel 12 Lift 30 x 20' ISO Ratio 1:4 but US 1:9



Al delivers autonomy, improves decisions, and supports human cognition

Decision Advantage

Decision-Driven Data

- Enabling mission success by quantifying risk
- Helping commanders 'see' their commands

Partner Collaboration

- Coalition nations, academia and Industry engagement
- Collaborate, explore and exploit

Brain Interface

- Robot control (BRI)
- System interaction (BCI)

Process Improvement

- Transcribe and understand the battle
- Increase situational awareness of the 'now'

Cognitive

Augmentation

• Enable staff to be analytical, not transactional

Swarming

Collaborative Robotics

- Building teams of cognitive agents
 (biological and artificial)
- Developing transparency and trust between humans and robotsCollaboration for the mission

Battlespace Immersion

- Mixed Reality for fighting
 elements and headquarters
- Increase operational tempo by being 'part of the battle'





- Reality v Expectation of Technology
- Trust & Tolerance of Autonomy
- Culture
- Sovereign IP
- Sovereign Algorithm ownership
- Platform endurance
- Moral, Ethical & Legal aspects
- Force Design v Technology v Concepts
- Workforce Impacts
- Countering Adversary RAS





Discussion

https://researchcentre.army.gov.au/rico





