Technology Challenges for the Australian Army

Dr Roger Lough
Chief Defence Scientist

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Standard Form 298 (Rev. 8-98)  
Prescribed by ANSI Std Z39-18
DSTO at a Glance

- Budget (06-07) – 442 M
- 12 Research divisions
- 2300 staff
- 8 sites across Australia
Mission

DSTO is the Australian Government’s lead agency charged with applying science and technology to protect and defend Australia and its national interests. It delivers expert, impartial advice and innovative solutions for Defence and other elements of national security.

Vision

To be a world leader in defence science and technology – indispensable in transforming the Australian Defence Force and Australia’s national security.
DSTO’s Role

> Support to Policy.
> Minimise technology surprises.
> Smart buyer and user advice.
> Niche developer.
> Assist industry to assist Defence and National Security.
> Strengthen technology base.
Australian Army

> Responsible for land and special operations.
> 25,000 strong permanent force.
> Budget: AU$5.9 billion.
> Busiest since Vietnam War.
> Currently 2900 ADF personnel on deployments – Iraq, Afghanistan, East Timor, Solomon Islands, etc.
> Two extra battalions by 2008.
FORCE 2020

> Seamless force integrated internally and externally with providers and community.

> Continued multiple roles (peace-keeping, humanitarian, law enforcement, etc.).

> Punching above its weight.
Hardened & Networked Army (HNA)

- Combat weight and size.
- Flexibility through networking.
- Complex environments.
Technology Drivers

- War on terror.
- Expeditionary operations.
- Joint warfighting.
- Reducing cost of operations.
- Systems integration.
- Force transformation.
Challenges

> Interoperability
> Operational Tempo/Turnaround
> Systems Thinking
> Force Protection
> Automation
Onboard jamming and towed decoy capability.

Deployed radar: US Army C4ISR On the Move Trial with DSTO.

Interoperability
Interoperability
Operations Support
Electronic Warfare Self Protection
Operations Support

Desert uniform
Hardened and Networked Army – a Complex Adaptive System

HNA S&T Requirements

Understanding the System
(Complex Adaptive Systems)

Developing the System
(Emerging Technologies)
(Systems Integration)

Employing the System
(Operations Analysis)
(Human Factors)
Complex Adaptive Systems – from science to applications

Source disciplines
- organisational sciences
- biological sciences
- cognitive sciences
- information sciences
- physical sciences
- math & computing
- evolutionary economics
- social sciences

Fundamental Theory
- Understand Fundamental Processes in Complex Systems
- Causality and Influenceability in Complex Systems

Engineering
- Design and Management Principles for Complex Systems
- Methodologies, Guidelines, Tools and Techniques

Applications
- Complex Systems Engineering
- SoS Integration
- Human Integration
- Complex Systems Management
- Complex Operations
- designing systems and operations for robustness
- engendering more adaptivity
- joint, coalition and interagency ops
- decision support in complex situations
- influencing behaviour of others' systems
- empowering human adaptivity
Force Protection

> IED countermeasures
> Vehicle survivability enhancements
> Reduce exposure of dismounted soldiers
Counter IED Capability
Counter IED Capability
Vehicle Survivability
Thermal Signature Management

Baseline ASLAV

![Optical Image](image1.png)  ![Long wave IR Image](image2.png)

Mobile camouflage system

![Optical Image](image3.png)  ![Long wave IR Image](image4.png)
Off Axis Viewing Device

Camouflage
Automation - Challenges

> Human systems integration – who does what.

> Information overload (many assets controlled by few people).

> Technology trust and reliability.
C4ISR On the Move

Mobile Ground Control
Real (US) Troops
Real Targets/Clutter
Real C2 System
SEAMS/FBCB2

UAVs
Scan Eagle
Aerosonde
Buster
C4ISR On the Move
Capability & Technology Demonstrators

- Annual budget $26 M.
- $160 M invested since 1998.
- Industry proposals increasing since last 2 years.
Capability & Technology Demonstrators

- Rapid landmine detection and neutralisation.
- Advanced Individual Combat Weapon.
- Haptically Operated Counter-explosives robot.
- Personnel Location Device using GPS and smart card.
- Wearable energy pack.
- Light-weight ceramic, composites armour.
Capability & Technology Demonstrators
Collaboration with US Army

Current collaboration mechanisms:

- The Technical Cooperation Program
- Deutch-Ayers Agreement (PA-10 excellent example)
- Missile Defence MOU
- CBR MOU
- Land Forces Modernisation Agreement
- ABCA Army Standardisation Program
- Data Exchange Agreements
Summary

Australian Army transforming

Network centric
Hardened but ‘light’

DSTO support
Emerging threats
Systems design
Operations analysis