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Have manned submarines had their day?

Tom Muir

While the pros and cons of this country's proposed Future Submarine fleet and its type, number, cost, and whether we will ever be able to find crews for them, is debated exhaustively on *The Strategist*, other blogs and in the media generally, local websites don't have much to say about their unmanned successors.

With the extraordinary advances in miniaturisation, communications, battery life and so on it seems inevitable that future generations of highly capable autonomous underwater vehicles, already being used for mine reconnaissance, mine hunting and hydrographic survey operations, will take over more of the missions performed by RAN submarines such as **Intelligence, Surveillance and Reconnaissance** (ISR). Perhaps our future submarine program could be split between fewer manned submarines and a number of underwater vehicles, similar to the proposed split between manned and unmanned airborne surveillance systems under **Air 7000**.

The RAN has been interested in **unmanned maritime vehicles (UMVs)** since their appearance in the 1980s and 1990s, and has sponsored **DSTO** research into the area for over a decade. In recent years, the size and cost of commercial 'autonomous' UMVs has decreased significantly, enabling increasing numbers of such vehicles to enter service with Coalition navies and commercial underwater survey outfits.

In particular, **autonomous underwater vehicles** (AUVs), have attracted special attention and DSTO has expanded and refocused its work program, undertaking research on new vehicles and technologies in areas of operations where commercial providers or international partners are not adequately addressing Australia's unique requirements.

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DSTO's work includes the exploration of multiple-vehicle cooperatives, long-range covert delivery of payloads, and investigation of concepts for the deployment of UMV payloads from submarines. The widespread introduction of high-accuracy, GPS-aided inertial navigation systems in all but the smallest and least expensive AUVs has meant that navigation – once a critical limitation of AUVs in shallow waters – is no longer problematic. A **Slocum Glider** fitted with a hydrophone has been evaluated for use by Defence in a sonar surveillance capability. The glider type of autonomous underwater craft was developed initially to gather data on ocean currents, temperature and salinity, providing a more efficient and effective means of data collection than arrays of ocean floats or shipboard surveys.

This is due to the fact that a glider can sample water conditions for both horizontal and vertical dimensions, and can continue to do so over distances of many thousands of kilometres in missions lasting up to several months.

In the UK, plans for the military's maritime drones are set out in documents published by the MoD's defence, science and technology laboratory. It has told defence manufacturers it wants their help to develop drones "to provide greater support to maritime operations such as mine countermeasures, anti-submarine warfare and missile defence".

"Innovation in maritime technology, including unmanned systems, will make it possible for UK armed forces to continue to use the sea with security and persistence," the report says. "Unmanned systems are being considered as a potential option to aid in the delivery of a range of different maritime tasks given the range of potential threats and increasing demands on the smaller number of highly capable manned platforms in which much of the UK capability is currently focused."

The tasks set out are anti-submarine warfare, mine countermeasures, anti-ship missile defence, counter-piracy operations and support to future submarine operations. The document makes clear the drones could be used to attack potential enemies.

Across the Atlantic, the **Office of Naval Research** (ONR) has awarded **General Atomics** a potential $US20 million contract to develop energy section technology for the US Navy's **Large Displacement Unmanned Underwater Vehicle Innovative Naval Prototype (LDUUV INP)** program, which seeks to develop a large unmanned submarine able to operate in the open ocean and in coastal waters and harbours on missions lasting more than 70 days to gather intelligence, surveillance, and reconnaissance (ISR) information. The LDUUV INP program is in place to develop UUV autonomy and long-endurance propulsion systems for large UUVs.

General Atomics – best known for the company's work on unmanned aerial vehicles (UAVs) – will help develop technology leading to an energy-dense air-independent rechargeable or refuelable energy system for a future large unmanned submarine.

Transfield preferred for LMM contract

Tom Muir

Defence is negotiating with preferred tenderer Transfield Services (Australia) regarding the new Land Materiel Maintenance Service (LMMS) contract, a landmark agreement that Defence says will underpin efficiency reforms in the ADF's logistics system. The LMMS contract is for the provision of maintenance for land-based assets, such as military vehicles and general equipment and while the negotiations to finalise the contract progress, Defence has entered into an early services agreement with Transfield Services to enable initial transition activities to begin in the lead up to the new contract taking effect from July 1, 2013.

The LMMS contract arrangements will replace three existing Defence contracts for maintenance services which are due to expire on June 30, 2013. The new contract, worth hundreds of million dollars over six years, and reportedly covering 12 military bases, will replace three existing contracts for maintenance services that are due to expire on June 30. One of them is for Bandiana, where **BAE Systems Australia** took over from Tenix in 2008. A separate BAE Systems Australia contract to operate the massive warehouses at Bandiana also runs out on June 30. It will also be replaced by a nationwide contract, yet to be announced.

Other contenders for the LMMS contract are believed to have included **UGL**, **Serco** and presumably the incumbent, BAE Systems Australia would have put up its hand. If Defence cannot reach a contractual arrangement with Transfield Services, Defence reserves the right to suspend or terminate negotiations with the preferred tenderer and revert to one or more of the other competing tenderers. The word in the trenches is that UGL was told to hang around, just in case...

In June last year requests for tender for LMMS (closing October 22) were released to prospective tenderers who had satisfied Defences registration requirements. LMMS contract contenders found a very different approach to service delivery—moving from contractor-led to Defence-led with contractor staff embedded into the business as Defence requires. At the unit level, contractor staff will report to the Commanding Officer.

Prospective LMMS tenderers were invited to propose an approach to innovate and continously improve the Defence logistics system with the aim of maintaining or improving levels of service with total cost lowered over time. This was in recognition that input from commercial logistics experience and knowledge into the logistics network would be a key driver of the innovation sought. Proposed solutions from tenderers would be evaluated to see how this might be achieved and there are indications that Defence may share benefits from improvements with contractors.

Scope of LMMS

Equipment to be maintained may include armoured and protected mobility vehicles, (such as **M1A1, ASLAV, M113AS4, Bushranger PMV**) and light, medium and heavy general transport and firefighting vehicles. Also included are weapons, including direct

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and indirect fire weapons and small arms, and ground based air defence equipment. Also within the LMMS scope is the maintenance of engineering plant and equipment, aerial delivery equipment, electronic instrument and radio, and test equipment and a limited range of marine equipment such as Army watercraft. Because a portion of the Australian Defence inventory is US sourced and under the control of **International Traffic in Arms Regulations (ITAR)** W&D and LMMS contractors, who are third parties for ITAR purposes, must be ITAR compliant and have obtained US authorisation.

Unrelated to the service contracts being replaced by the LMMS requirements, but reflecting perhaps the complexities involved in sourcing maintenance for the Army's armoured vehicles, it was announced in mid-2011 that **General Dynamics Land Systems Australia (GDLSA)**, the OEM for both the ASLAV and the M1A1 Abrams tank, and had been responsible for their support under previous arrangements, would provide spares and engineering support for the ADF's fleet of **Abrams Tanks, Light Armoured Vehicles** and **Hercules Recovery Vehicles** for at least the next five years.

Workforce implications

BAE Systems Australia says its contract for the Land Materiel Maintenance Services will not be renewed after an unsuccessful tender bid, affecting about 450 staff employed at the Bandiana Army Base, near Albury/Wodonga, in a range of maintenance roles.

A BAE spokeswoman said the company would be working alongside Transfield with the aim to employ the workers hit with redundancies, because they had the skill set to do the job.

GCV strife!

The Congressional Budget Office, in a new report on alternatives to the Army's Ground Combat Vehicle (GCV) program, concludes that every option open to the service - buying off-the-shelf vehicles from foreign allies, upgrading Bradley infantry carriers and killing the GCV altogether - is less risky and more affordable than the Army's current path.

The authors of the report also write that a new, notional GCV would not offer a quantum leap in soldier protection. In fact, all three alternatives to a new GCV - the Israeli-made **Namer**, the German-made **Puma**, and an upgraded **Bradley Infantry Fighting Vehicle** - offer the same, if not more soldier protection, according to the report.

Naturally, officials from **BAE Systems** and **General Dynamics Land Systems**, the two competing contractors involved in developing the GCV, came out swinging! With the **DMO**'s proper preference for OTS solutions we don't think Land 400 stakeholders need worry!

Bargain price Hercules sale

Australia has offered to sell Indonesia five Lockheed Martin C130 Hercules aircraft at a "bargain" price after discussions between defence ministers.

Foreign Minister **Bob Carr** and Defence Minister **Stephen Smith** held talks in Jakarta with their Indonesian counterparts.

With Indonesia embarking on a big military modernisation and expansion, buying fighter jets, missiles and building its own attack ships, Indonesian Defence Minister **Purnomo Yusgiantoro** says Indonesia wants to buy the aircraft.

Last year Australia gave Indonesia four C-130 Hercules ex-airforce aircraft, worth an estimated $30 million, to be used in maritime emergencies and disaster relief.

An Australian Space Policy

Tom Muir

Australia's Satellite Utilisation Policy was released by the government this week providing certainty and strategic direction for Australian users of satellite technology. The policy will be directed from a new Space Coordination Office in the Industry Department, where space matters languished many years ago to the criticism of space users such as EOS.

On-going, cost effective access to satellite capabilities is essential to Australia's future and good space policy is expected to pay economic dividends for Australia. Satellite imagery, including for defence purposes, was estimated to contribute about $3.3 billion per year to GDP. Positioning technologies, such as GPS, were estimated in 2008 to have added $1 billion per year to GDP, and this is forecast to grow to between $6 and $12 billion by 2030.

Key aspects of Australia's Satellite Utilisation Policy include:

- Giving priority to earth observations from space; satellite communications; and position, navigation and timing;
- Contributing to international 'rules of the road' for space through Australian space situational awareness infrastructure and diplomatic efforts;
- Building and retaining high quality Australian space expertise; and
- Developing a plan to meet projected growth in Australia's satellite information needs by modernising and consolidating Australia's ground infrastructure.

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The launch event at Mt Stromlo showcased 14 Australian Space Research projects funded by a $40 million government investment to support space-related research, education and innovation activities.

They included:

- trialling hypersonic combustion ramjets - scramjets - capable of travelling at 8600 km per hour (Queensland University) automated tracking of space debris, to prevent damaging collisions between satellites and man- made junk in orbit (**EOS Space Systems** Pty Ltd) Australia's first two years Masters' program in satellite systems engineering;
- The development of Antarctic broadband, to provide broadband data and voice communications systems for the frozen continent (Aerospace Research Pty Ltd).

Energy-efficient space propulsion systems which can be used for interplanetary travel, to de-orbit satellites and to keep satellites in orbit for longer are highly sought after. The Australian **Plasma Thruster** project will develop a spaceflight-ready plasma thruster engine capable of meeting this demand. The engine will be based on the Helicon Double Layer Thruster (HDLT) technology invented and developed at the Australian National University (ANU).

Synthetic aperture radar (SAR) satellites are unaffected by factors that hamper other earth observation satellites such as smoke, dust or volcanic ash. The deployment of multiple small satellites in formations promises significant advances in environmental monitoring and for use in time-critical bushfires, floods, storms, volcanic eruptions and earthquakes (University of NSW).

Helicopter rescue system put to the test

A West Australian company has begun trials of its new airbags designed for defence force helicopters in case they crash into water.

A lightweight, detachable emergency floating device that will enable a helicopter to remain afloat after ditching in the sea was demonstrated at **HMAS Stirling**.

The **Pegasus Aircraft Buoyancy System** was developed by **L-3 Oceania** and **One Atmosphere** under the **Capability and Technology Demonstrator** (CTD) Program managed by DSTO. The system can lift an aircraft weighing 10 tonnes to the surface from a depth of up to 10 metres. It then keeps the aircraft afloat for four hours, increasing the opportunity for crew to escape safely.

The Pegasus flotation device weighs less than 30 kilograms, has no wired connection to the aircraft, and can operate automatically or under pilot control.

Duncan Watson, deputy director of the CTD Program Office, has recognised the project as a significant development in aircraft buoyancy innovation.

"Pegasus addresses Defence's desire for Army helicopters to have the ability to stay afloat should they ditch into the water whilst undertaking maritime operations and when operating from Navy ships," Watson said.

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While many medium to large helicopters are fitted with permanent emergency flotation systems, these are heavy and can affect aircraft performance. Pegasus has the potential to reduce the weight burden for existing aircraft, plus increase the safety for smaller helicopters conducting training and operations over water. Such a capability will become essential as Army will be using rotary wing aircraft from the new **Landing Helicopter Dock** ships in the future. The demonstration of the Pegasus system included a life-size airframe that replicated the buoyancy and centre of gravity of a medium size helicopter, such as the Army's **ARH Tiger**.

The CTD Program funds Australian industry to demonstrate new technologies that enhance Defence capability. Since the program began in 1997 Defence has invested $250 million in 104 projects. Ninety-four of these projects have been completed. Of these, 86 have been successfully demonstrated and 15 are now in use.

Movement at the station

New appointments have been made at Rheinmetall MAN Military Vehicles and FireEye.

Peter Hardisty has become the new project director for Land 121 3B at **Rheinmetall MAN Military Vehicles** in Australia.

Under Phase 3B the fleet is to include protected and non-protected vehicles and is intended to heighten operational effectiveness and survivability as well as creating logistical and training synergies through uniformity.

Hardisty will be based at Rheinmetall MAN Military Vehicles Australia's headquarters in Canberra.

He looks back on a long career in Her Majesty's Armed Forces, which he joined in 1982 serving in the UK and Germany during which he completed operational tours in Northern Ireland, the first Gulf War and with the UN in Cyprus.

After leaving the military, Peter Hardisty worked as operations manager for HW Fisher & Co Chartered Accountants from 1999 until 2002. In 2002 he joined the UK MOD Defence Procurement Agency/Defence Logistic Organisation, serving as General Support Vehicles integrated project team leader until 2006 where he was in charge of the tri-service acquisition and through-life management of the UK MOD's logistic vehicles.

Hardisty then joined Marshall Vehicle Engineering as general manager and then managing director in 2007, a UK-based company supplying military vehicle bodies and equipment to logistic vehicle manufacturers.

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FireEye has begun a rapid expansion in Australia and NZ. The company, which pioneered a method of detecting cybersecurity threats through its proprietary signature-less technology, has appointed **Phil Vasic** regional director for Australia and NZ.

Vasic most recently joined FireEye from Clearswift, where he served as vice president, Asia Pacific and Japan and was responsible for leading sales, support and services across the region. He brings 15 years of enterprise sales and sales management experience to FireEye, including terms at Websense and Hewlett Packard.

In recent months, FireEye has attracted significant global attention on a number of fronts by being named the fourth fastest growing technology company

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in North America by Deloitte and the "hottest" cybersecurity startup by Forbes. In November, David DeWalt, the former head of McAfee and the chairman of the board of Mandiant, became FireEye's chief executive officer.

RPC are finalists

RPC have been selected as a finalist in the 2013 Manufacturers' Monthly Endeavour Awards in the following three categories:

- Australian Industrial Product of the Year Award
- Enterprise Connect Award
- Technology Application of the Year Award

The Australian Industrial Product of the Year and the Technology Application of the Year Awards are for the development of the new innovative FRAS Carbon Fibre Mine Vent Duct and the Enterprise Connect Award is for the introduction of LEAN into RPC Broadmeadow facility.

ADM Online: Weekly Summary

A summary of the latest news and views in the defence industry, locally and overseas. Check out our webpage for daily news updates on the *ADM* home page and make sure you bookmark/RSS this for a regular visit.

This week, the Australian Defence Force signed a $107 million five-year contract with **BAE Systems Australia** to provide Aviation Technical Training services.

CAE was awarded a contract to develop an MH-60R avionics maintenance trainer and weapons load trainer (AMT/WLT) for the Royal Australian Navy (RAN) under the US foreign military sale (FMS) program.

Also, Boeing handed over the seventh production **P-8A Poseidon** to the US Navy on schedule March 29, marking the first delivery from the second low-rate initial production contract awarded in November 2011.

International

RAF pilots earn wings from their desks

The UK Royal Air Force (RAF) has passed out its first set of specialist unmanned aerial vehicle (UAV) pilots during a ceremony at Creech Air Force Base (AFB) in Nevada, it announced on 1 April.

The ceremony saw four pilots awarded their Remotely Piloted Air System (RPAS) 'wings', so becoming the first non-aircrew personnel to receive the brevet.

The four airmen, who are the first to be trained specifically for the role, will now have the ability to bomb sites and carry out intelligence missions by remotely flying the 11-metre long Reaper MQ-9 aircraft from their desks.

The RAF has created a specialist flying branch for those in charge of Remotely Piloted Air Systems, training the first cohort in the United States because the machines cannot be flown in the UK under current aviation laws.

All the pilots had undergone basic training for 'real' aircrafts before specialising in drone flights. RPAS pilots get a dedicated wings badge which has blue laurel leaves rather than brown to show their specialisation.

Advances in hunting quiet subs

DARPA's Distributed Agile Submarine Hunting (DASH) program has tested two complementary prototype systems as part of its Phase 2 development effort.

The prototypes demonstrated functional sonar, communications and mobility at deep depths. The successful tests have furthered DASH's goals to apply advances in deep-ocean distributed sonar to help find and track quiet submarines.

The first prototype is the **Transformational Reliable Acoustic Path System (TRAPS)**, developed by a team led by **Science Applications International Corporation (SAIC)**. TRAPS is a fixed passive sonar node designed to achieve large-area coverage by exploiting advantages of operating from the deep seafloor. This expendable, low-size, weight and power (SWaP) node communicated to a stationary surface node via wireless acoustic modems, with further secure RF reach back to the performer's facilities via

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satellite. The second prototype is the **Submarine Hold at RisK** (SHARK), an unmanned underwater vehicle (UUV) developed by a team led by Applied Physical Systems (APS). SHARK intends to provide a mobile active sonar platform to track submarines after initial detections are made. APS team member **Bluefin Robotics** recently deployed the prototype to depth in February 2013.

TRAPS and SHARK are scheduled to demonstrate their core sonar functionality together. Subsequent efforts may follow to realise multiple sonar nodes as well as the integration of the SHARK UUV with its sonar.

GD awarded $US40 million for Abrams Tank production

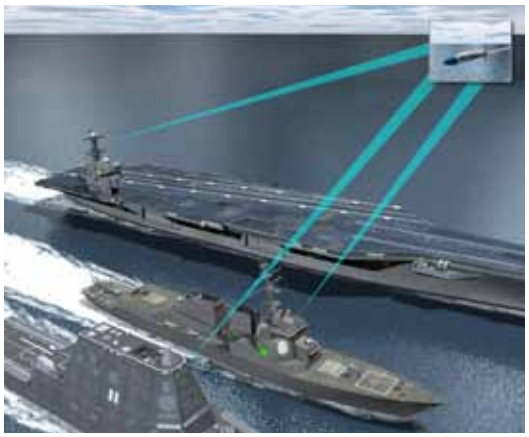
General Dynamics Land Systems has been awarded an additional $US40 million for the procurement and production of Saudi M1A2 (M1A2S) Abrams tanks for the Kingdom of Saudi Arabia.

This modification is part of an existing contract to upgrade the Kingdom of Saudi Arabia's fleet of tanks.

The **Foreign Military Sales** contract was awarded by the US Army TACOM Life Cycle Management Command on behalf of the Royal Saudi Land Forces.

This contract extends work started in 2008 to update M1A1 and M1A2 tanks to the M1A2S configuration for the Kingdom of Saudi Arabia. The M1A2S conversion increases the efficiency and capability of the tank.

The work will be performed by current employees at the **Joint Systems Manufacturing Centre** in Lima, Ohio, with an estimated completion date of July 31, 2014.



US Navy awards LM $US57 million to upgrade EW ship defence system

The US Navy has awarded Lockheed Martin a $US57 million contract to upgrade the fleet's electronic warfare defences against anti-ship missile threats.

Under this low-rate production contract for **Block 2** of the Navy's Surface Electronic Warfare Improvement Program (SEWIP), Lockheed Martin will upgrade the **AN/SLQ-32(V)2 system** found on all US aircraft carriers, cruisers, destroyers and other warships

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with key capabilities to determine if the electronic sensors of potential foes are stalking the ship.

"The SEWIP Block 2 upgrade will ensure the AN/SLQ-32 system continues to outpace the threat and establishes a framework to easily install future upgrades," **Joe Ottaviano**, SEWIP program director for Lockheed Martin Mission Systems and Training, said.

"The system is the first sensor to be fully compliant with the Navy's Product Line Architecture strategy, which facilitates the rapid introduction of new technology into the fleet. By using commercial-off-the-shelf components, we provide additional cost savings and ease of maintenance for sailors."

Block 2 is the latest in an evolutionary succession of improvement "blocks" the Navy is pursuing for its shipboard electronic warfare system, which will incrementally add new defensive technologies and functional capabilities. The Navy competitively awarded Lockheed Martin a contract in 2009 to develop SEWIP Block 2 and the company recently completed successful integration and test activities for two engineering development models.

Further 76 Foxhound vehicles order for Ricardo

Ricardo has received an order from prime contractor General Dynamics Land Systems-Force Protection Europe (GDLS-FPE), for the assembly of 76 additional vehicles, bringing the total Foxhound fleet size ordered to date by the UK Ministry of Defence to 376.

All Foxhounds vehicles are assembled by Ricardo at the purpose-designed production line commissioned in 2011.

MBDA and Thales extend their cooperation on CAMM

The core Team Complex Weapons (Team CW) air defence missile development program – the Common Anti-air Modular Missile (CAMM) for the Future Local Anti-Air Defence System (FLAADS) – has been the catalyst for the creation of a new business relationship between MBDA and Thales UK's Belfast site.

Over the last year, as part of on-going activity to develop the UK CW supply chain

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and to realise the complementary skills of Thales, the two companies have been exploring opportunities to work together on CAMM, drawing on the missile design and manufacture capabilities in Northern Ireland.

Work placed with Thales Belfast on this important development project now exceeds £1 million and has also opened up opportunities for a further £8 million of manufacturing work in the next phase of the project. Thales is involved in a number of aspects of the CAMM Demonstration project with work now covering the assessment and modelling of the thermal management within the missile, structural analysis work, and the use of precision manufacturing capabilities to make a number of the missile components.

The companies are now exploring a number of areas of likely cooperation across other projects and throughout the product lifecycle. In the area of In-Service Support (ISS), for example, the companies are working together to see what additional value can be delivered to the UK customer by exploiting the opportunity created by the British Army re-basing decision to bring all of its current air defence assets together at Thorney Island.

In addition, MBDA and Thales UK's Basingstoke site have also taken significant steps forward over the last six months using two pilot projects, focused on missile safety and arming units and intelligent fuzes, to transform the traditional transactional customer-supplier relationship into one where both parties are actively working together. In January 2012, MBDA selected Thales Basingstoke to supply the CAMM laser proximity fuze under an £11 million contract.

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FORTHCOMING EVENTS

For a full list of defence and industry events, head to *ADM's* online events page at www.australiandefence.com.au

International Maritime Security Conference

DATE: **14-16 May 2013, Changi, Signapore**
ENQUIRIES: **IMDEX Asia Web: http://www.imdexasia.com/index.aspx**
IMSC 2013 will bring together Navy Chiefs, Coast Guard Directors-General and academia around the world to discuss threats to maritime security and safety, as well as develop frameworks and solutions to deal with the security challenges that threaten and disrupt sea lines of communication.

2013 Hunter Defence Conference

DATE: **22-23 May 2013, Fort Scratchley**
ENQUIRIES: **Web: www.stickytickets.com.au/10869**
The 2013 Hunter Defence Conference, supported by NSW Trade & Investment, HunterNet and Hunter Business Chamber, is an excellent opportunity for SMEs to hear about current Defence opportunities, diversification, innovation and skilling in supporting Defence.

ADM Cyber Security Conference

DATE: **12-13 June, 2013, Hotel Realm, Canberra**
ENQUIRIES: **ADM Events - Jamie Burrage, Ph: 02 9080 4321;**
Email: Jamie.burrage@informa.com.au Web: www.admevents.com.au
ADM's 3rd Cyber Security Summit will see stakeholders from Australia's Defence and National Security agencies address the current and emerging cyber threats to Australia's security. More details to be released closer to the date.

DSEI

DATE: **10-13 September, 2013, ExCel, London**
ENQUIRIES: **Web: www.dsei.co.uk**
DSEI is the largest fully integrated defence and security show in the world, feautring Air, Naval, Land and Security show content. Based in ExCeL, London every two years, the event provides unrivalled access to key markets across the globe.

SimTecT

DATE: **16 Sep - 19 Sep, 2013, Brisbane Convention and Exhibition Centre, Queensland**
ENQUIRIES: **Web: www.simtect.com.au**
SimTecT is the annual Simulation Technology and Training Conference held by Simulation Australia. Since its inception in 1996, SimTecT has grown to become Australasia's premier simulation conference for industry, government and academia.