

Defence Science & Technology Organisation

# Connections

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**A new EW  
development  
paradigm**

- **Heads-up on OCEANS '10**
- **Examining alloy corrosion**

## Support to Operations – continuing priority for DSTO

The highest priority tasking for DSTO and the ADF is Support to Operations. DSTO responds by deploying staff, conducting urgent technical investigations, developing new systems and supporting the evaluation of equipment in theatre. These activities serve to save lives and ensure the ADF has the most appropriate equipment and procedures for the conditions in theatre.



### Long history

Support to Operations dates back to the Vietnam War when analysts deployed into theatre as part of the Field Operation Research Service. A hiatus of almost 30 years occurred before East Timor in 1999.

As the ADF led the UN Force into East Timor, DSTO was developing the Theatre Broadcast System – satellite-based, broadcast communications that was highly cost effective and light weight. The system was used to broadcast broadband intelligence, so providing timely, high quality information to commanders. Two DSTO staff deployed in support of the equipment. Since that time DSTO has fielded another 98 staff, recently reaching the milestone of deploying 100 staff.

DSTO also supports operations through an air accident investigation capability to Defence and provision of expert advice to the Incident Response Regiment.

### Well trained, well prepared staff

Over the past decade DSTO People Strategies has forged policy for the deployment of Defence civilians. Each deployee is a volunteer. Staff need

to be able to meet medical, psychological, training and preparatory requirements.

DSTO operates two training courses for deployees. The Joint Pre-Deployment Operations Analyst Course is a four week course held once a year. It trains DSTO staff in operations analysis techniques that will be useful in supporting commanders in theatre. The Fly Away Team Course is one week in length and informs technical specialists of the conditions of work in theatre. The Fly Away Team Course is held twice a year.

Health and safety are always of concern but never greater than when DSTO staff members are deployed. An in-depth analysis of the threat environment is conducted, risks identified and mitigating strategies put in place to ensure the safety of our volunteers.

### Employee lapel pins

A new deployee lapel pin has been designed and produced to enable those who have deployed on operations an opportunity to display this achievement on a daily basis. This initiative of CDS will allow easy identification of those who have deployed and hence raise awareness of past and current operations.

### Record of achievement

Commanders task DSTO using Operational Science and Technology Support Requests. DSTO's Operations Support Centre actively manages the requests to ensure a timely and relevant response.

Acknowledged achievements are quite diverse.

- Countermeasures to passive infrared improvised explosive devices attacks have played a role in avoiding casualties.
- Greater protection for the Bushmaster vehicle has saved many lives and reduced injuries.
- Disruptive pattern uniforms have been developed in a very short period of time for conditions in Afghanistan.
- Radio frequency interference has been controlled to ensure communications and countermeasures could run concurrently, so maximising the protection of convoys.

"Reachback" is an important part of Support to Operations. DSTO staff in theatre, whether analysts or technologists, can reach back into DSTO to access advice, the latest information and facilities from colleagues here in Australia.

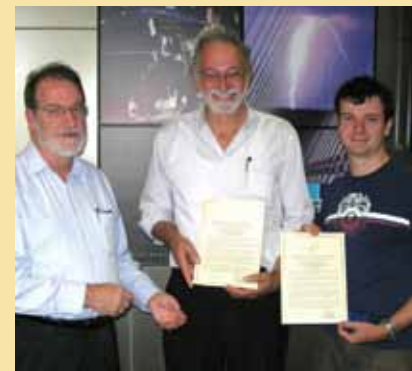
Operational Data Exploitation also plays a key role. You may have noticed recently the launch of the Support to Operations database – a tool that is made available to DSTO and ADF staff with a need to know. Data exploitation is critical in providing accurate records and supporting analysts' activities.

### Corporate Enabling Research Program (CERP)

The DSTO CERP has a focus on Support to Operations. Force Protection, Intelligence Surveillance and Reconnaissance, Countering the Improvised Explosive Device and Network Security are all included in the CERP. These elements are able to combine cutting edge research with rapid utility assessments to ensure the innovations they provide deliver military value to the warfighter.

DSTO is only able to support operations as it does because of the in-depth defence and scientific knowledge of its staff which has been developed over many years. It also relies on volunteers who are prepared to spend many weeks away from family and friends in order to ensure the ADF has the best equipment and procedures possible.

To all those who have made that sacrifice, thank you, it is truly appreciated. **C**



Above (L-R): CWSD Bruce Ward presents the commendation received from JTF633 to DSTO's 100th deployee Norbert Burman, and 99th deployee Kris Allpress (both WSD). (Phil Radoslovich on the back page of this issue was DSTO's 93rd deployee.)

Cover: Jayasanka Piyaratna, developing a new EWRD development paradigm.



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# Good things come in small, plug-and-play packages

**Tired of the long and expensive development cycles of custom-made hardware, with the associated maintenance costs and obsolescence challenges, Jayasanka (Sanka) Piyaratna (EWRD) is proposing an exciting new way of developing electronic warfare (EW) systems.**

“In the EW domain, and the wider signal processing domain, most of our solutions currently use custom made hardware,” says Sanka. He likens the situation to having a separate computer to run word-processing, database, spreadsheet and other software applications. “Using this analogy, it would be the equivalent of building a new computer to run each new application. What we are aiming to achieve is the equivalent of a PC, where each new application is just a matter of loading software.”

Sanka, in consultation with EWRD colleagues Mike Bell and Brian Reid, is developing a generic computing framework in tandem with reconfigurable electronic circuits (called field programmable gate arrays or FPGAs) that promise to provide a flexible, inexpensive and rapid way to “plug in” and develop high-end EW applications.

## Hidden COTS will save on cost

Sanka wants to minimize the total cost of ownership of EW devices. “A key concept is that the framework should be based on commercial (COTS) hardware – we want to utilise the manufacturer’s hardware knowledge rather than reinventing the wheel.” This will also give a defined and affordable upgrade path.

Sanka says he’s on track to address issues and develop a generic EW core (GEWC) with a well-defined user interface. “Some of our ideas are ahead of the available technology, but in five years when the technology is mature we’ll be ready and waiting for it.”

If a GEWC gains wide acceptance, then scientists could concentrate efforts on developing applications for it, rather than the current situation where the majority of resources are used on the maintenance contracts for multiple legacy systems.

Sanka is working with a team to develop the GEWC idea using “Future EW” New Policy Proposal (NPP) funding. A working group that includes EWRD colleagues Peter Juett, Mike Bell, Brian Reid, Pev Hall, Marek Dziadosz-Findlay and Jarrad Shiosaki meets regularly to map out an exciting, reconfigurable EW future.

## Morphing prospects

The flexibility of field programmable gate arrays would allow, if deployed in a UAV for instance, a radar surveillance platform to “morph” into one of several possible jammers upon detecting a target. This might be remotely-controlled by a human EW expert, or the reprogramming could be automatic, based on a set of rules.

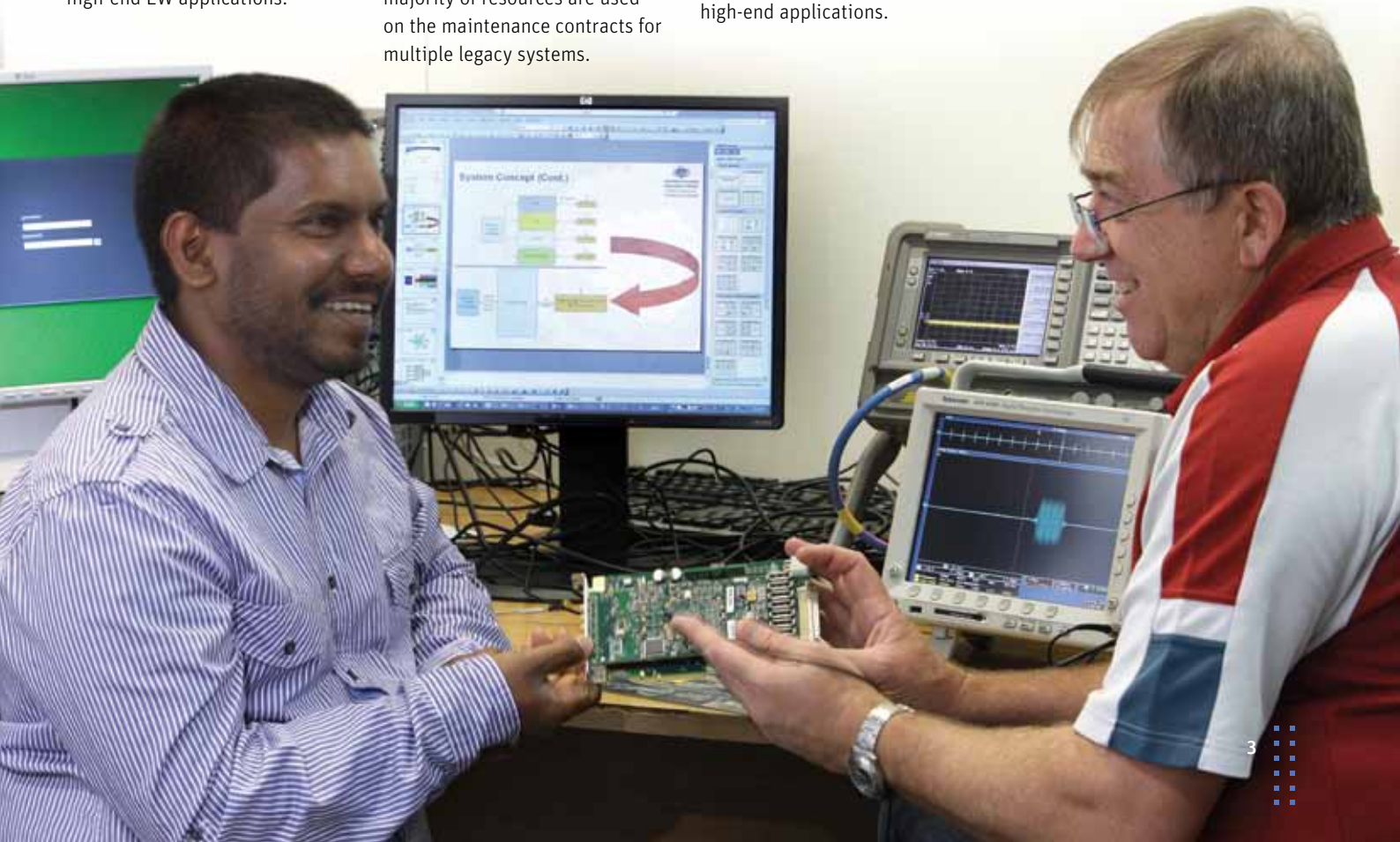
Sanka says that EW applications developed for a generic EW core would be easier to procure and maintain. A contractor might simply be given a software algorithm to implement. With a well-defined interface any outdated GEWC hardware infrastructure could be upgraded without the need to recode the high-end applications.

“We’ve started putting together the COTS computing and FPGA components, and defining the interfaces. The first step will be to demonstrate a generic framework and give a proof of concept.” Sanka hopes to demonstrate a reconfigurable radar in 2010. The system will then be expanded to include electronic counter measures (ECM) and electronic support measures (ESM).

“Our GEWC proposal is perfectly suited to a research organisation like DSTO. With many different trials taking place we would only have to maintain and support a single hardware framework.”

“The key thing is the open architecture based on COTS hardware. That will allow us to seamlessly upgrade. I’m not in complete la-la land,” Sanka chuckles. “We want to demonstrate that we will be able to do this.” **C**

Sanka and Peter Juett (EWRD) examining a COTS card that could facilitate an affordable, maintainable EW development revolution.



# Marine scientists ready to set sail and tell all

**DSTO scientists are gearing up to take part in OCEANS '10 in Sydney in May. Over 450 abstracts have been received, including 23 from DSTO.**

The theme of the conference is 'Showcasing advances in marine science and engineering', and organisers from DSTO Sydney say the conference will emphasise the value of innovation in the development of new techniques and technologies.

Phil Chapple (MOD) says the conference website ([www.oceans10ieeesydney.org](http://www.oceans10ieeesydney.org)) has some informative Ezines, and tutorial information including details of the HF Surface Wave Radar tutorial that Stuart Anderson (ISRD) will present.

The authors of two papers that have been accepted for OCEANS '10 gave *Connections* a taste of what will be presented.

## Marine surveying where lasers fear to tread

Julian Vrbancich (MOD) will present an update on work that first began with his RAN science scholarship in 1997. He will present preliminary results of a bathymetric mapping technique that employs an electromagnet slung under a helicopter above the ocean surface. The innovative device (SeaTEM), developed under the CTD program, measures changes in magnetic fields to estimate the depth of water and sediment.

For initial testing, the team created a unique cradle to hold SeaTEM in a stable position

above the ocean by tying it to masts above a floating tuna farm ring off the coast of Port Lincoln (SA). In April last year a survey was flown with a helicopter over Broken Bay (NSW). Julian says the location, which includes two drowned river valleys side by side, has "nice undulating sediment thickness" which made it easier to correlate what they were detecting.

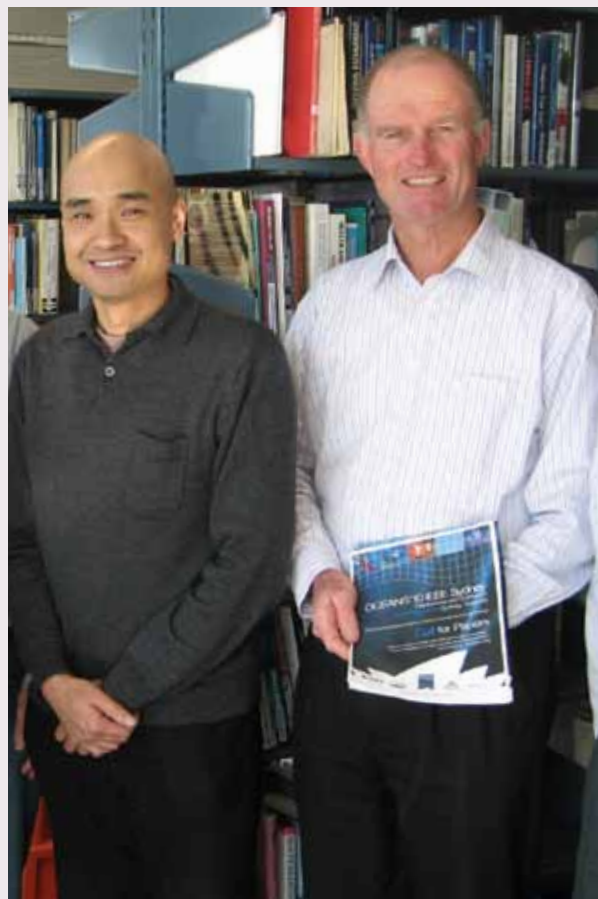
Julian will present results to confirm that SeaTEM is accurate when compared to a traditional marine seismic survey conducted over the same area.

He says an added benefit is that the seismic survey data can now be used for future DSTO research, for instance to test improvements in the SeaTEM system. "The SeaTEM mapping technique is not as accurate as laser depth sounding (LIDAR), but it can be used in surf, turbid water and areas with muddy sediment, where laser depth sounding is not possible."

## Gliding into exciting new territory

Brian Ferguson (MOD), Kam Lo (MOD) and Joshua Rodgers (MPD) will present the results of a trial using a single hydrophone attached to DSTO's Slocum glider in Jervis Bay.

Brian says gliders like Slocum can be deployed for up to five



months, and from a military aspect Defence is interested in whether the glider could go to a remote location and monitor human activities.

Post-processing of the data revealed that the Slocum could detect airborne acoustic sources such as turbo-props and helicopters, as well as surface vessels and active sonar. Slocum could tell the Navy what helicopter was hovering above it.

Brian says the beauty of Slocum, which uses buoyancy changes to saw-tooth through the water, is that the recorded data has no platform noise. "There is no engine or propeller noise at all."

The project brings together colleagues from DSTO Edinburgh, Melbourne and Sydney and continues to reveal exciting possibilities. "The other thing that we've just found in the data is all the dolphins. We're actually counting the dolphins," says Brian.

With the RAN striving to be environmentally friendly, Brian says the Slocum hydrophone configuration provides great opportunities to work with Navy to measure the effect of active sonar on mammals. US dolphins have been found to double the frequency and strength of transmission in noisy undersea environs. Basically they have to shout.

"Do our dolphins change their frequency or noise level?" asks Brian. "It'll be interesting to see what we can find out." **C**

Above (L-R): Kam Lo (MOD) and Brian Ferguson (MOD), part of a cross-site, cross-divisional team extending the potential of the Slocum glider.

Left (L-R): Julian Vrbancich (MOD) and Joshua Rodgers (MPD).





# Examining hidden corrosion with x-rays



**A DSTO team led by Tony Trueman (MPD) has completed its first research program using x-ray tomography to investigate the extent of hidden corrosion on aluminium alloys. The results were presented recently at the Australian Corrosion and Prevention conference.**

The team consisting of Maria Salagaras (MPD), Steven Knight (DMTC) and Alison Wythe undertook the study to develop better prevention and management practices for aircraft.

Wrought aluminium alloys of the 2xxx and 7xxx series used on aircraft are known to have grain structures that are highly directional. Corrosion can propagate along the grain boundaries beneath the surface (this is known as ‘intergranular’ corrosion). Intergranular corrosion is difficult to identify and quantify, and can have a major effect on the fatigue life of aircraft structures. It is of particular concern to ADF aircraft fleet operators.

“This approach required time-consuming destructive analysis of the sample, and even then, the results obtained didn’t fully describe the extent of the attack, being limited to what can be seen by dissection.”

Greatly improving on this situation, X-ray micro-computed tomography can now be used to non-destructively measure and visualise intergranular corrosion.

The three-dimensional digital images of the corrosion, each taking over eleven hours to produce as the samples were slowly rotated, precisely portray the extent of corrosion.

## The experimental process

Maria says the team designed the test samples as 2 mm diameter cylindrical pins which were sufficiently thin for x-ray transmission. The end grain surface of the pin was selected as providing the most susceptible path for sub-surface corrosion.

“The biggest challenge was to manipulate the data into a form we could use for quantitative analysis. We needed to run the data through a noise reduction filter so we could accurately measure the volume of corrosion using the image processing software. The next step is to automate this process.”

## Future looks bright

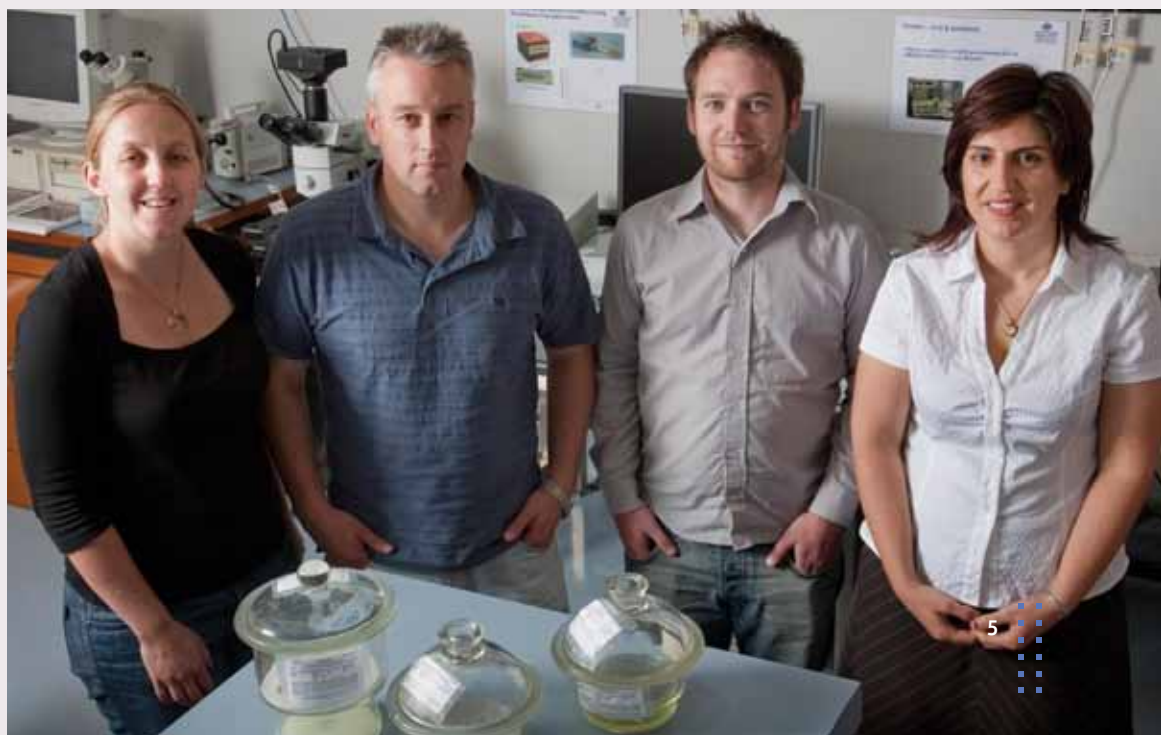
Members of the team along with international collaborators will be continuing the research this year using an advanced photon source at the Argonne National Laboratory synchrotron in Chicago (USA). “We will potentially be probing the specimens in only 10-20 minutes compared to the current 11 hours, and with better resolution,” says Maria.

“With the synchrotron’s much faster imaging time we could potentially take several images of a single specimen *in situ* and watch the corrosion develop, which would be very valuable.”

The x-ray beam line that the team need for this at the Australian synchrotron (Melbourne) is still undergoing development.

Maria says that access to the Australian synchrotron will provide the opportunity for new, exciting and innovative experimentation in the field of materials engineering. **C**

Above: Maria Salagaras sets up one of the corroded alloy pins before commencing the x-ray tomography process and (below) the X-Ray Tomography Group (L-R): Alison Wythe, Tony Trueman, Steven Knight and Maria Salagaras.



# Awardees share secrets of their success

During Australia Day ceremonies last month, eight DSTO staff members were recognised for their valuable contributions to government service. *Connections* asked each for a tip on success at work and life in general.

## Maureen Barker (SIER)

"Horatio Nelson said, 'I could not tread these perilous paths in safety if I did not keep a saving sense of humour', and William James said, 'Common sense and a sense of humour are the same thing, moving at different speeds. A sense of humour is just common sense, dancing.' Much better said than anything I can come up with!"

## Peter Bates (AVD)

"Get the most you can out of each day; treat each day as though it is your last."

## Paul Dixon (MPD)

"Be a good listener, respect other people's opinions, and work collectively to solve problems."

## Ulric Heinzle (SES)

"Remaining open minded and looking at a problem from a different angle can be useful. Lifetime experience is often undervalued - everyone goes along in life picking up skills and knowledge which can be usefully applied to solving problems.

"By the time you get to 70 you should have plenty of previous experience to draw on, provided the Alzheimer Syndrome hasn't set in. Hmm... now what did that nice man give me that medal for on Australia Day?"

Happy 70th birthday, Ulric!

## Geoff Knight (EWRD)

"Your leaders are just as confused as you."

## John Love (ISRD)

"Being one of nine children my late father always impressed upon the family that it was never about yourself but all about the family unit working together. It is something that I have attempted to carry out throughout my life in general.


"So it's about the team, not yourself. This has worked very well for me as I have worked with a great team of people and I will always look upon the award as one for the team."

## Bob Selway (WSD)

"In life, including your working life, remember to treat others like you would like to be treated and that we are individuals who sometimes need special consideration of our feelings. If you work for DSTO, remember that we all work for the same organisation and not ourselves or just our division.

"If you consider these things in your dealings with those that surround you, you will help others to be happier and relaxed, and it can be catchy."

## Andrew Smith (WSD)

"Never believe everything you read." (*Good advice, Andrew. Apologies for printing your name incorrectly in the last issue.*) 



Above (L-R): Peter Bates (AVD), Paul Dixon (MPD) and DCDS Ian Sare.

Left (Back row, L-R): DCDS Warren Harch, John Love (ISRD), Maureen Barker (SIER), Geoff Knight (EWRD), (Front row, L-R): Ulric Heinzle (SES), Bob Selway (WSD), Andrew Smith (WSD).





# Award-winning paper provokes discussion

David Holmes (AVD) says Air Vehicles Division has not usually been associated with operations research. And last year was the first time that he and colleagues Rodney MacDonald (AVD) and Andrew Goodwin (MPD) had attended the Defence Operations Research Symposium (DORS). But they brought home the Gus Schaeffer OR Hub Best Paper Award.

"In recent times we've been doing a lot of work with Air Operations Division (AOD), and were invited by a range of AOD personnel (especially Simon Goss, David Cox and CAOD David Graham) to submit a paper." The links between AVD and AOD have been increasing, reflects David, who has a feeling that their success was partly due to being "flavour of the month."

"Also, we're brilliant," jokes Rodney.

## Serious questions asked

The threesome's paper, "The Cost of Capability Ramifications

of Defence White Paper 2009", presents predictions that have provoked plenty of discussion. "The basis of the paper is a bunch of work the three of us have been doing for about the last five years. The ideas really crystallised while we were preparing material for AFHQ (Air Force Headquarters) for the White Paper," says David.

The paper draws on DSTO experience to present an extrapolation of the Defence plans expounded in the White Paper. "The White Paper proposes expanding a range of capabilities but doesn't



specifically allocate budgets." With ever expanding support and maintenance overheads, the paper asks "Can we do this?"

Apart from pointing out the White Paper's "elephant in the room", the three colleagues from Weapon Systems Sustainment Group (formerly known as Cost of Ownership) also describe some ways that DSTO can help solve the problem. Off-the-record feedback from Defence sources indicates they are on the money with their postulations.

Andrew says his group is working on problems like this all the time, with different flavours. "But we're usually not talking

in generalities as we did in this paper – so there have not been many opportunities to present papers."

The paper can be accessed on the intranet via the DORS Archive on the OR Hub page: <http://community.dsto.defence.gov.au/hubs/or/DORSArchive/DORS2009/> **C**

Above (L-R): Rodney Macdonald (AVD), David Holmes (AVD) and Andrew Goodwin (MPD) - winners of a Best Paper award for their discussion of the cost of capability ramifications of the 2009 Defence White Paper.

# Happy faces after successful biometrics trial

Rebecca Heyer (LOD) and Dragana Calic (LOD) say the second phase of the biometrics trial went extremely smoothly, thanks to the enthusiastic participation of their colleagues. In total, 129 DSTO staff members returned from the first stage of the trial (from February 2009) to participate in one of four sessions.

The trial gathered data on the accuracy of human operators at an identity checkpoint. "Volunteers were given an ID card, which they were not allowed to see, and then did a loop past 32 operators," says Dragana. The operators, including trained members of four government departments and an untrained group, were

required to note whether or not they thought the ID was valid and how confident they were with their decision.

The ID card may have been "fake", so volunteers passed the ID card in an envelope and were only able to see it afterwards just in case their behaviour changed. There were a few laughs when they eventually saw their photo.

"The information is still being assessed," says Dragana. She adds that there was a performance difference between the operator groups from the government agencies, and these groups all performed better than the untrained operators. "We are assessing the individual differences from tests that the operators completed, so that we can tap into perceptual and/or cognitive abilities of the operators."

(Biometrics research was discussed in *Connections* October 2009). **C**

## Recognise that face?

Interested in finding out how well you can perform face recognition tasks? In March, the team will be on the lookout for volunteers for a new study. Participants will perform six computer-based tasks where they will compare a target image to a gallery of images and be asked to make a series of identification decisions.

In addition, participants will complete a series of psychological tests investigating factors that are thought to correlate with face recognition ability. If you are based in Edinburgh, keep an eye out for email invitations to participate or contact Rebecca Heyer for further information on 08 8259 4236. **C**

DSTO volunteers with identity cards wait in "cubicles" before presenting themselves to operators as part of the facial biometrics trial.



### S&T focus outlined at ADM2010

DCDS Warren Harch shone the spotlight on DSTO while addressing an assembly of senior Defence personnel and industry representatives at the ADM2010 conference in Canberra last month.

Speaking on the subject of innovation, he updated conference delegates on the key areas of focus for DSTO's science and technology program for 2010 and beyond:

- Operations support
- Support to the force-in-being
- Acquisitions support
- Enabling research

Warren also spoke about DSTO's Corporate Enabling Research Program and the need for DSTO, industry and research institutions to adjust their thinking about ways to collaborate into the future. **C**



### CARTMAN's new home trucked in

DSTO Melbourne staff witnessed engineering ballet recently as a huge crane and truck moved a sixteen ton stainless steel barrel into position. The Environmental Test Facility (ETF) was built in Geelong, transported to Fishermans Bend and installed in one piece.



As the new home for HPPD's CARTMAN mannequin it will allow scientists to test individual protective equipment (IPE) ensembles and other items under a wide range of environmental conditions.

Complete system level testing of this type is a major step forward for DSTO, says Karl Pavey (HPPD), and will significantly enhance HPPD's capability. It is expected that DSTO will have full use of the facility by September 2010. **C**

Up, down and away – the ETF is eased into position.

### Force Development Group to be reckoned with

The Force Development Group (FDG) Technology Week took place in February, culminating in an Industry Seminar with the broad concept of examining selected AOF (Army Objective Force) combat support capability bricks against a series of tactical vignettes. This generated a series of discussions examining the ideas and capabilities required in the future combat system.

During the week FDG engaged with DSTO to gain insights and information, to improve the understanding of Science and Technology (S&T) devoted to

Army's capability development and modernisation effort, and to tour through some of the labs at DSTO Melbourne. **C**



Bin Lee (HPPD) describing research into camouflage and signature management to members of the Force Development Group.

### Long service recognised in WSD



Congratulations to several long-standing WSD staff who recently received their 20 and 30 year awards from CWSD Bruce Ward. Picture shows (L-R): Themie Gouthas (20 years), Tony Ferschl (30 years), Zia Ahmed (20 years), Bruce Ward, Doug Kewley (30 years), David Bassett (30 years) and Phil White (30 years).

### Watching darkness for Earth Hour, 27 March 2010



At 8.30pm on Saturday, March 27 iconic landmarks around the world will switch off their lights for Earth Hour 2010, joining hundreds of millions of people showing their commitment to the environment.

In Australia, Melbourne's Luna Park, Rialto Tower, Arts Centre and Crown Casino; Brisbane's Story Bridge; Adelaide's Town Hall and Rundle Mall Lantern (pictured); The National Library and Australian War Memorial in Canberra and the Sydney Opera House, Sydney Tower, Harbour Bridge and Luna Park will join

this growing list. Do your bit for Earth Hour. [www.earthhour.org.au](http://www.earthhour.org.au)



## Introducing Group Instructions and DSTOGRAMS

**DSTO is introducing a new framework for policies and procedures to align with the portfolio-wide System of Defence Instructions.**

The new framework will improve the coherence of the system of policy, procedure and information documents and result in more concise policy documents.

The framework separates practices and procedures from high-level policy, allowing the former to be readily updated without waiting for clearance from CDSAC. Under this model, business process sponsors are responsible and accountable for the quality and currency of

their business processes and associated documentation.

### New model for Group Instructions

The new model replaces the CDS Instructions (CDSIs) with a new series of DSTO Group Instructions (DSTO-GI). Each CDSI remains in effect during transition but will be cancelled once its content is absorbed into the new framework.

### DSTOGRAM

The framework also provides for

the DSTOGRAM, a Group-level equivalent of the DEFGRAM. DSTOGRAMS are intended for the formal promulgation of information across DSTO, including interim policy/procedures if required as a stop-gap. DSTOGRAMS may be issued by SES Band 1 equivalents and above, and have a limited life.

### Implementation

Changes are being implemented within the TechWeb to ensure policies and procedures can be readily found on the intranet. All DSTO policies and procedures will be gradually migrated to the new system.

In future, new DSTO policies will be announced through DSTOGRAMS which will be published on the TechWeb and notified through DSTO Daily News.

These revised governance arrangements are being managed by the Chief Operating Officer Division.

For further information contact Mark Heinrich (02 6128 6366) or Amir Masoumi (02 6128 6325).

Please refer to the TechWeb for full details. **C**

## Farewell to Paul Gaertner and welcome Brian Hanlon to CONDS (Washington)

**The CONDSW Office farewelled Paul Gaertner, Sally Copley and their children, from the CONDSA position which Paul has occupied for the last three and a half years.**

The CONDSW office says Paul has been an outstanding representative of Australian Defence Science and Technology, particularly engaging with the

JCTD community to establish links and open opportunities for Australia to participate in these advanced S&T developments.

Paul was congratulated on the impact of his posting and thanked for his efforts. The CONDSW office also noted the fantastic support he received from Sally in his representational role, and extended thanks to her. Paul returns to LOD where he

will take up work in the area of military utility evaluation.

CONDSW Office welcomes Brian and Vanitha Hanlon and their children to the CONDSA position. Brian takes up this position from his home Division in JOD. **C**

## DSTO Scottsdale goes for 2 and 5 at Festivale

**Costumes and cuisine had a field day.**

DSTO Scottsdale's staff members Tracey McLaughlin (pictured), Guillermo Fernandez and vacation student Megan Tennant have been busy promoting 'Go for 2 and 5' for Eat Well Tasmania at this year's Festivale, a food festival in Launceston. Eat Well Tasmania was encouraging kids to eat two pieces of fruit and five serves of vegetables each day.

Tracey dressed up as a strawberry, Guillermo as a celery stick and Megan was handing out stickers to the kids. Volunteering involved talking to the children and their parents

about healthy eating.

Guillermo was also lucky enough to be asked to assist Hobart chef, Paul Foreman, to cook his famous local wasabi 'scramble', confit abalone, cured ocean trout and preserved lemon beurre blanc. **C**



## Good lookers no match for Thumpers on Oz Day

**Cricket continued to be a popular fixture for the third year running.**

'The Running, Fielding, Thumping & Wicket-taking Party', a mix of staff from EWRD and WSD, took out the 2010 DCDS Edinburgh Backyard Cricket Cup by 2 runs in a nail-biting sudden death play-off against 'The WSX Team for Ridiculously, Ridiculously Good Looking People'.

The drama was high, the appeals impassioned and the stalker managed to clear the bails! Victory, the Cup, bragging rights and a carton of beer went to the winners. DCDS Warren Harch said the DSTO values of team work, courage and initiative were all displayed in the match. **C**



The winners: Back row: Manik Attygalle, Michael Parker, Andrew Bailey, Marcus Varcoe. Front row: Andrew Hart, Christine Pienaar, Robert Baker and Richard Woodland.

## Ten years on... Executive Leadership Development still evolving to meet needs

### Believe it or not, it is now over a decade since DSTO started running its Executive Leadership Development Program (ELDP).

The program was created to strengthen DSTO's senior leadership capability and to deepen the pool of capable leaders from which to select our future Chiefs. While this was the original driver, the key part of ELDP is really about improving individual self-awareness, enhancing relationships, leading people and supporting a constructive leadership culture across DSTO.

A number of DSTO Chiefs have completed the ELDP: CJOD Jennie Clothier, CAVD Ken Anderson, CAOD David Graham, CHPPD Simon Oldfield, CISRD Tony Lindsay and CPRD Jim Smith, while over 80% of the target group of senior S&T Level 7-8 staff have completed the ELDP as at June 2009.

That's the quantitative side. For the qualitative side, we can see that ELDP has had an impact on DSTO through our culture and leadership over the last 10 years, shaping the way the organisation works and exposing participants to different leadership styles. At an individual level, evaluations tell us that the program has an impact on people and a positive influence on their leadership behaviour.

#### How ELDP improves performance

According to participants, the ELDP helped them with

- Greater interpersonal understanding
- Effective communication
- Breaking down barriers, particularly geographical ones
- The development of networks and contacts
- Increased understanding of DSTO
- Quality of their work relationships

"Ten years on" ELDP refresher workshops are now being offered. The objective of the two-day workshop is to:

1. Get together, re-connect and reflect on their DSTO leadership journey.
2. Explore new skills and behaviours that will boost their team's performance and that of DSTO.
3. Explore means of influencing the DSTO Senior Leadership Team and the Executive, focusing on an identified organisational issue or need.

4. Reflect on what legacy they might want to leave, how their current performance reflects that possible legacy and develop a *personalised legacy plan*.

The first refresher was run in November 2009 for participants of the inaugural 1999 ELDP. Pierre Urlings (LOD) gave the following positive feedback:

"The recent ELDP 1999 Workshop reconfirmed that personal and leadership development is a continuous learning process. The workshop provided not only an excellent opportunity to catch up with colleagues and friends of ELDP 1999, but also an excellent moment in time to compare and to learn from each other's experiences over the past

ten years. Like the ELDP course itself, it was a very motivating and rewarding event. Thanks to Teena and her professional team in providing this opportunity and to Bruce Fairlie for initiating the idea of the workshop."

A Refresher Workshop for ELDP 2000 participants is planned for April 2010.

ELDP continues to evolve to meet DSTO's needs. ELDP 2010 will get underway in March/April 2010 and is likely to be opened up to experienced S&T6s to enhance leadership capability in those roles.

For further information on ELDP, see: <http://web-vic.dsto.defence.gov.au/workareas/PS/activities/lead/eldp.shtml> **C**



The Class of 1999: Back: David Saunders, Michael Flaherty, and Douglas Kewley. Middle: Peter Gray, Simon Henbest, Bruce Fairlie, David Heilbronn, and Colin Coleman. Front: Lakshmi Narasimhan, Pierre Urlings, Dean Bowley, and Jason Scholz.

## 2010 DSTO seasonal flu vaccination program

### The annual seasonal flu vaccination program is again being offered to DSTO staff.

Vaccines are expected to be delivered toward the end of March, so sessions on the major sites will be scheduled around end March, early April. Smaller sites will have local arrangements co-ordinated as per previous years. Appointments will be taken through an online booking process.

This year the flu vaccination will contain the H1N1 as well as other selected strains.

The viruses are: A/California/7/2009 (H1N1)-like strain, A/Perth/16/2009 (H3N2)-like strain and B/Brisbane/60/2008-like strain.

More information on dates and times will be advertised in your local Daily News as dates are confirmed.



For further information contact the Occupational Health Coordinator for your site. Louise Earl (08 8259 6238) for DSTO Edinburgh, Sydney and Stirling

or Robyn Laurie (03 9626 7441) for DSTO Scottsdale, Brisbane and Canberra. **C**



## The Fair Work Act 2009 and Flexible Work Options – what does this mean for you?

### National Employment Standards (NES)

The National Employment Standards (NES) that came into effect on 1 January 2010 include a right for employees with specific carer responsibilities for children to be able to request flexible working arrangements. These provisions support and strengthen provisions already available through the DECA.

### What are the provisions?

Employees may request a change in working arrangements to assist with the care of a child if:

- they have completed at least 12 months continuous service; and
- are parents of, or have the responsibility for the care of, a child who is:
  - under school age; or
  - is under 18 and has a disability.

### What are changes in working arrangements?

A request must be in writing to their supervisor, setting out the details of the change being sought and the reasons for the change. This request may include:

- Changes in hours of work, such as reduction in hours worked or changes to start and/or finish times.
- Changes to the pattern of work, such as job sharing.
- Changes in location of work, such as working from home or another location.
- How long the proposed arrangement is expected to last.

### What are reasonable business grounds?

Defence must give the employee a written response to the request within 21 days stating

whether the request is granted or refused (on reasonable business grounds). Relevant factors in refusing a request may include:

- The effect the request would have on the workplace and business, e.g. impacts on finances, efficiency, productivity and customer service, and the practicality of accommodating the employee's request.
- The inability to reorganise work among existing employees, or recruit a replacement/job sharing employee.

An application for a change in working arrangements should be considered favourably subject to operational requirements. However, in some circumstances Defence may not be able to agree to the hours, pattern of work or work location specified by the employee and alternative

arrangements may need to be considered.

### Other minor changes

The NES introduces other minimum standards which underpin DECA provisions for redundancy pay, unpaid parental leave, absence for eligible community service activities and unpaid pre-adoption leave.

### Want more information?

Refer to Defence Workplace Relations Newsletter 20/2009 Flexible Work Options and the Fair Work Act 2009 (22 December 2009) available online at the DEFWEB (<http://intranet.defence.gov.au>). **C**

## Did you know?

### Transitioning to the new DECA 2009 performance cycle

• DECA 2009 introduces a new annual performance cycle which commences on 1 September each year and concludes on 31 August the following year, with a mid-term exchange taking place during February. As DECA 2009 came into effect in November 2009, after DSTO staff and managers had entered their 2009-2010 performance agreements in WebDIS, there are some

transitional arrangements that will take place to accommodate the changes in WebDIS.

- In early February all current performance agreements recorded in WebDIS will be updated to reflect the performance cycle end date of 31 August 2010 (they currently reflect a 31 July 2010 end date). This will be a mass update so employees will not be required to manually amend the dates. You should, however, be aware of the update as you

may need to review your Key Expected Results (KERs) in light of the extended timeframe.

- New agreements created in WebDIS from early February will reflect the new performance cycle timeframes.

### Enhanced functionality in PMKEYS Self Service (PSS)

- Enhancements have been implemented in PMKeyS Self Service (PSS) that improve functionality for the processing of:

- Annual Leave - Usage
- Annual Leave – Purchase of additional leave credits
- Personal Leave – Caring in an unexpected emergency
- Personal Leave – Credits exhausted
- Duty statement updates
- Position 'Reports To' changes

Detailed information about these changes is set out in DEFGRAM 798/2009 available on the DEFWEB (<http://intranet.defence.gov.au>). **C**



### Solutions to Dmitri's dilemmas (page 15)

**A3:** Flick the first switch to "on", flick the second switch to "on", then after some time flick it back to "off". The light bulb that is "on" corresponds to the first switch, the light bulb that is warm corresponds to the second switch; the last light bulb corresponds to the third switch. **C**

**A2:** Each trailing zero corresponds to a factor of 10. Each factor of 10 is composed of 2 and a 5. There are many more factors of 2 than factors of 5, thus it is sufficient to count the number of factors of 5. Every fifth number in the product contributes a factor of 5, while every 25th number contributes a second factor of 5. Thus the total number of trailing zeroes is  $100/5 + 100/25 = 24$ .

**A1:** Cook the first two meatballs on one side. Remove one meatball from the pan and add the third meatball. Cook for 5 minutes. You now have one fully cooked meatball and 2 half-cooked meatballs. Cook the remaining two meatballs for a total time of 15 minutes.

# Bravo Zulu for Pacific 2010 participation

**'Bravo Zulu' was the reaction from CDS and other divisional chiefs over DSTO's participation last January in the Pacific 2010 International Maritime Exposition in Sydney.**

The 'well done' was for both the first 'DSTO Maritime Defence Technology Symposium' organised at Pacific 2010 and for DSTO's exhibition stand at the event.

The three-day DSTO symposium featured a host of overseas and Australian experts in maritime technology presenting to a solid audience of delegates.

Minister for Defence Personnel, Materiel and Science Greg Combet delivered the opening address to a full house, telling his audience that DSTO was uniquely placed to host the symposium and the role it is playing in the Future Submarine project.

"The Organisation has an esteemed record in providing scientific support to all facets of Australia's maritime security," Mr Combet said.

## Overseas speakers

The theme for the DSTO symposium was 'undersea and above water sensor integration', a theme supported in their presentations by the various speakers, in particular eminent overseas maritime technology experts such as Garry Heard (Defence R&D Canada), Nickolas Guertin (US Navy), Martin Jordan (Space & Naval Warfare Systems Command, US Navy), John Binford (US Naval Research Laboratory), Greg Walker (Defence R&D Canada) and Jon Hisock (Dstl, UK). The overseas speakers, who participated in the symposium at DSTO's invitation, later visited Edinburgh for further discussions.

David Liebing (MOD), Chris Norwood (MPD), Mark Krieg (MOD) and Warren Marwood (EWRD) chaired the various sessions. Anthony Schellhase (EWRD), Roger Neil (MPD) and Darren Sutton (MOD) also

assisted with the symposium. They worked closely with DSC staff, principally Steve Butler and Julie Bebbington, who were responsible for organising the DSTO exhibit and assisting with the symposium.

## DSTO papers

DSTO scientists contributed several papers across the Pacific 2010 event, including Bernard Kachoyan (MOD, pictured) keynote speaker at the Maritime and Port Security Symposium.



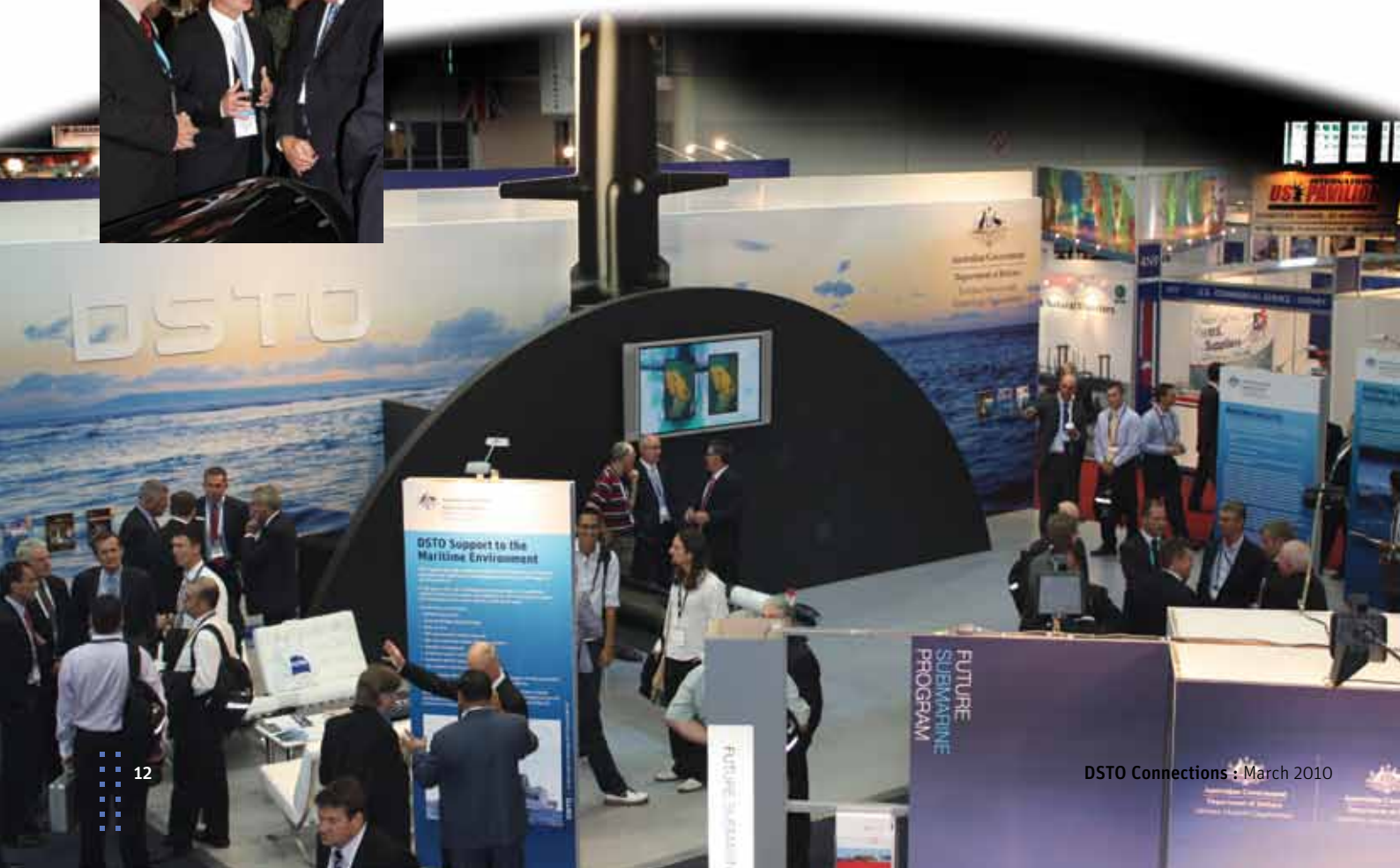
Bernard's paper discussed the interrelationship between the technology and the human components of port and harbour security systems. "It's really necessary to exercise the people and the technology components of the system together, to determine whether the people know how to use the technology properly, and whether the technology works as part of the wider system," he said.

MPD's presentation by Leo De Yong and Michael Buckland on the reconstruction of the HMAS Sydney II incident was very well received and resulted in many enquiries for the DSTO report to the HMAS Sydney Commission of Inquiry.

## The display stand

DSTO's Pacific 2010 exhibition display stand featured an eye-catching front end view of a stylised submarine in keeping with the symposium theme as well as a high fidelity model of MPD's Murula off board system and some visual displays. A feature of the DSTO stand was a floor projection depicting an underwater scene with a submarine sailing beneath the feet of visitors to the stand and fish scattering in the water. **C**

DSTO stand at Pacific 2010 and (inset) Roger Neil (MPD) and CDS explaining the workings of Murula to Defence Minister Faulkner.







### Aliya Valiyff

**My job (and location):** Flight Systems Engineer, AVD, DSTO Melbourne.

**Favourite book, movie, painting or music (and why?):** Book: *The Life of Pi* – it's well written and the topic (on the surface about being shipwrecked with the remnants of a zoo, but with deeper themes) is something different.

**Current or past obsessions:** Science fiction movies. In particular I like Spock (the Leonard Nimoy version).

**Most exciting experience:** My university honours project – we built an unmanned air vehicle (UAV). It flew, and the footage is on YouTube.

**My worst fear:** Working in Building 11 (DSTO Melbourne) with no air-conditioning forever.

**My scariest moment:** The acrobatic flights we experienced as part of our undergraduate aeronautical engineering studies at the University of Adelaide.

**If I could be a famous character from history, I would be:** [Irish author] James Joyce because he had a quirky/different way of thinking and spent a lot of time in Irish pubs.

**Best compliment you've received:** "Oh, you've put on weight!" Whenever my extended family see me, they love to see that I've put on weight.

**What would you tell a new starter joining DSTO?** Come to morning tea. **C**



### Paul Chircop

**My job (and location):** Maritime Security Analyst, MOD (DSTO Sydney).

**Favourite book, movie, painting or music (and why?):** *Thirteen Days* (movie) – inspiring stuff!

**Current or past obsessions:** Playing touch football, oz-tag and soccer.

**Most exciting experience:** Reading the superlatively seminal *Debris Spread from a Mid-air Aircraft Break-up* (DSTO-TR-1709), by Marc West, with Preface written by Richie Benaud. This report is truly one of the greatest accomplishments in the history of Operations Research.

**Best compliment I've ever received:** "You're a good kid!" - *Bernard Kachoyan*.

**My greatest regret:** I deeply regret spending an exorbitant \$10 to see the film *Bright Star* at the movies. Words cannot express the degree to which this cinematic soap-opera sucked. All I can say is that this featureless film made me physically sick and psychologically traumatised - in a way which Freud could never have envisaged.

**Who would you most like to invite for dinner, and why?** Winston Churchill – just to get a few pointers on how to make great one-liners.

**If I could be a famous character from history, I would be:** Me.

**What would you tell a new starter joining DSTO?** Get acquainted with the sagacious writings of the philosopher Matthew Verdich (DSTO Sydney). His insight into the human condition betrays the depth of not only his knowledge, but his personality. **C**



### Graham Duggan

**My job (and location):** Policy Officer, Science International Relations (DSTO Canberra).

**Current or past obsessions:** Absolutely love making, talking about and especially drinking good coffee. Life is too short to drink bad coffee!!! Also love dogs especially my little one Tui Two toes, trail running, safari and travelling of any kind.

**Most exciting experience:** One minute fishing for giant piranha in the Amazon using red meat bait, then moving only 30 metres away and swimming with them - only received a couple of bites.

**My worst fear:** Being run over by a bus and receiving the standard one line write up in the local rag!

**Best compliment I've ever received:** That is the best flat white I have had in a long time! 10 out of 10!

**My scariest moment:** Being in an open top truck at night looking for lions and finding them! They walked within 2 metres and then roared! The sound goes straight to the soul! Lucky they weren't too hungry!

**My greatest regret:** Not going on a day trip up to the Pyramids when I had the opportunity.

**If I could change anything I would change:** The harsh terms of the Treaty of Versailles. Had the terms been more reasonable perhaps no Depression, no Hitler, WWII, holocaust, and communism.

**Who would you most like to invite for dinner, and why?** Nelson Mandela. He has been one of the most influential leaders of modern times. He is the perfect role model for a politician, modest, honest, and inspiring.

**If I could be a famous character from history, I would be:** Woodrow Wilson. Great international relations politician and influence behind Wilsonianism.

**What would you tell a new starter joining DSTO?** Working as a 'policy officer' is not as 'boring' as it sounds. Interesting colleagues, exciting challenges and great work-life balance.

**Dreams/goals are:** Make the perfect coffee!

**Favourite book, movie, painting or music (and why?):** Movie: *Shawshank Redemption*, Books: *Magician* by Raymond E. Feist and the Sharp series by Bernard Cornwell.

**What's been your 15 minutes of fame?** Entrant on a TV game show. I won a ladder!

**What puzzle would you most like to solve?** The theory of everything. Working on it in my spare time. **C**



# Washington Winter Wonderland 2009-10

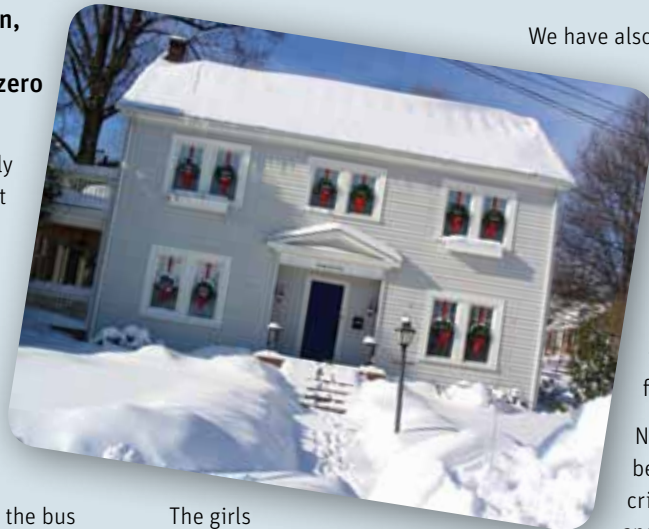
Chris Lewis (EWRD), on attachment in Washington, sent *Connections* this report on the 'fairy tale' Christmas he experienced during the recent sub-zero conditions in the USA.

Wow, what a treat, a wonderful white Christmas in Washington.

It really has been a terrific experience to have a fairytale Christmas. Many of the houses in the street were decorated with lights, garlands and wreaths which looked impressive against the white snow. No need for fake snow on the store windows. It is also tradition in Virginia to put a single candle in each of the front windows of the house to welcome family and friends to your home.

We have had record snow falls this winter in the Washington area - between 56 and 75 inches,

depending on exactly where you live. Most side streets were down to a single lane with mounds of snow in streets and car parks. The sidewalks resembled trenches cut out of the piles of snow and ice. Standing at the bus stop on top of the snow mound, dressed in my black overcoat with hands in pockets trying to stay warm, I must have looked like a penguin in the Antarctic to drivers passing by.



The girls have loved tobogganing down the street in front of the house on their own luge track. The neighbourhood kids have taught them a few ways to have fun in the snow like making snow caves and eating fresh snow.

We have also learnt the various techniques for snow shovelling from our neighbours. A little WD40 or car wax on the snow shovel will stop the snow sticking, which becomes important after the first ton of snow.

Next Christmas it will be back to backyard cricket, the Weber BBQ and watermelon, which won't be quite the same as a Christmas in the snow. **C**

## Going green - recycling in our cafeterias

With Clean Up Australia Day (7 March this year) continuing to be a popular initiative in the environment calendar, DSTO staff at Edinburgh and Melbourne sites are embracing recycling in the cafeteria.



In Melbourne, the recycling bins are located between the serving counter and the dining area. In Edinburgh, there are two recycling bin locations; at the 205 Labs exit where separate bins are provided for

paper and plastic recycling, and in the centre of the cafeteria underneath the tray returns area. Contractors collect, sort and recycle those items placed in the recycle bins. Anything placed in the general rubbish bin goes straight to landfill.

**Careful with your scraps, please!**

Despite the increasing uptake of recycling by staff, the greatest deterrent to the increased recycling volumes remains the cross-contamination of waste. Contamination occurs when staff place non-recyclable objects into the recycle bin, resulting in the entire contents heading to landfill.

Jenny Fairnington, DSTO Environment Officer, says, "The biggest culprit in cross-contamination is food scraps. As long as containers are empty and generally free of food contaminants they are acceptable, but one unfinished meal thoughtlessly discarded into a recycle bin can destroy everyone else's hard work."

Figures detailing how much waste has been recycled are available on the History and Environment webpage, <http://web-vic.dsto.defence.gov.au/workareas/ENV/activities.shtml>

**What can be recycled?**

- Empty drink containers such as milk cartons, soft drink containers, fruit juice containers and water bottles without lids
- Paper bags that are provided with sandwiches and hot food
- Triangular-shaped plastic sleeves used to package takeaway sandwiches
- Newspapers
- Empty salt, sugar and pepper sachets

**What can't be recycled?**

- Food scraps
- Any plastic that does not hold its shape such as plastic wrap and cellophane from prepacked sandwiches, pies, pasties and cakes
- Aluminium foil containers that are used for take away food and their lids
- Waxed takeaway coffee paper cups. **C**



# What the $\pi@#\phi$ ? Quirky snippets from the world of science

## Army parachutes to be super-sized



For the first time in more than 50 years, the US Army is upgrading soldiers' parachutes. Over 50,000 T-10 parachute systems will be replaced over five years with T-11 systems. The T-11 has been in the design process since the 1990s, and can support 400 pounds compared to the current model's 360 pound limit.

The developer says it has a steadier canopy that in test jumps has reduced injury rates by 70 percent. A spokesman for Airborne Systems said that jumpers are a lot bigger today than they were in the 1950s when the T-10 was introduced. The older parachutes are not capable of handling the additional weight.

Between 1960 and 2002, the mean weight of US adults increased by almost 11 kg. (US Center for Disease Control). In Australia, between 1990 and 2005 the average weight of men increased 6.2 kg and women 5.1 kg.

[www.nationaldefensemagazine.org](http://www.nationaldefensemagazine.org)

## Silence of the latex



Say goodbye to noisy neighbours and thumping bass. Researchers in tightly-packed Hong Kong have developed cheap and effective soundproofing in the shape of novel tiles made from latex and a few plastic buttons.

Low-frequency sounds, especially, seem to seep through most domestic walls. That's because of their long wavelength, says Zhiyu Yang from the Kowloon University of Science and Technology.

The noise-cancelling panels consist of a latex rubber membrane stretched over a 3-millimetre-thick rigid plastic grid of 1-centimetre-wide squares. In the middle of each square is a small, weighted, plastic button.

## Sounds cancelled

When sound waves hit the panel, the membrane and weighted buttons resonate at difference frequencies. "The inner part of the membrane vibrates in opposite phase to the outer region," says Yang. That means the sound waves cancel each other out and no sound gets through.

By stacking five membranes, each tuned to a specific band, you can create a soundproof panel. With these panels you can soundproof homes, says Yang. And the panel's weight is equivalent to ceramic bathroom tiles "although it's slightly thicker at 15 millimetres," he adds.

[www.newscientist.com](http://www.newscientist.com)

## Dmitri's Dilemmas

Dmitri Kamenetsky (C3ID) has more dilemmas to solve.

**Q1:** A meatball must be cooked for 5 minutes on each side. You have a pan that can fit exactly 2 meatballs. What is the least amount of time to cook 3 meatballs?

**Q2:** : How many zeroes are at the end of 100 factorial? (100 factorial =  $1 \times 2 \times \dots \times 99 \times 100$ )

**Q3:** You are in a room with 3 light switches. These switches control 3 light bulbs. These light bulbs are located in a second room; they are "off" and you cannot see them. Once you have entered the second room you cannot go back to the first room. How can you determine which switch corresponds to each light bulb? **C**

### Answers on page 11

*Note: In the last issue we printed an incorrect answer. Manholes are round because the manhole cover cannot be accidentally dropped through the hole. The circle is one of the few geometric shapes with this property.*

## Caption contest – Win a USB drive

The most interesting or funny caption for the picture below will win a USB drive. Winner of the March caption contest will be announced in the May edition of *Connections*.

Send entries by 20 April to [connections.editor@dsto.defence.gov.au](mailto:connections.editor@dsto.defence.gov.au).



## December contest winner

Congratulations to **Derek Weber (C3ID)** for his winning entry:

*"Let's see how far he gets before realising I've put a sleeping possum under his helmet..."*

Other clever entries included:

*"When you're this cool, nobody needs to say a thing."* Pev Hall (EWRD)

*"... for the few Australians who choose not to ride kangaroos to work."* (This might confuse American visitors who keep asking where all the kangaroos are.) Patrick Garnaut (C3ID) **C**





# Phil Radoslovich - First tour, lasting impressions

**Phil Radoslovich recently spent four months in East Timor, following a career change from DSTO's Business Office to Operational Support in Joint Operations Division (JOD).**

"On arrival I was struck by how mountainous the country is," said Phil. "It is quite dry in the interior and there are lots of eucalypt trees. It is reminiscent of the rugged range areas in Australia. East Timor has a lot of potential as a tourist destination, though only the hardest tourists venture there at this stage."

Based in Dili at the International Stabilisation Force (ISF) Camp Phoenix, Phil says East Timor has left lasting impressions of a nation with troubles at present but a bright future. "The Timorese people are very friendly but very poor. Outside of Dili subsistence farming is the dominant form of work."

With communications infrastructure limited, DSTO's OA team had to go off the beaten track in order to carry out key tasks.

### It's a jungle out there

Phil says the journeys that criss-crossed the country also proved valuable to their ADF escorts, who experienced life outside of Dili. "Out there it is mainly families working on their own plots of land – in many ways

more stable than Dili. We stayed in a range of accommodation - camping out under tin sheds, in a basketball stadium, and in local government buildings."

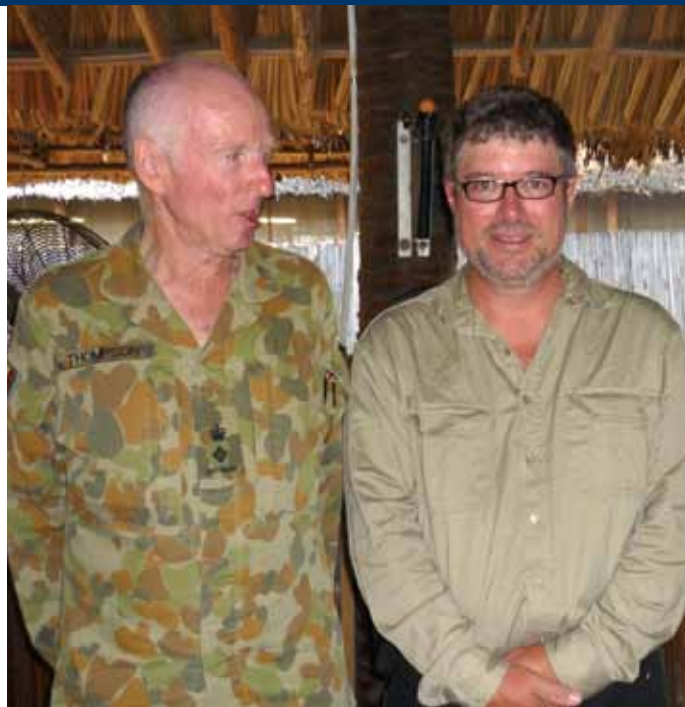
"The locals didn't speak a lot of English, but through interpreters they were happy to talk to us."



### Young nation on the brink

"One of the things that strike you is the number of kids – they're everywhere. The proportion of kids under twenty in East Timor is one of the largest of any country."

Phil's other overwhelming impression is the scale of the destruction across the country. The original presidential palace remains a burnt-out reminder of a turbulent era. "Dili is full of buildings like that. Around 70%



of infrastructure was destroyed in the last decade – the maintenance and rebuilding is a massive job."

"In a word? East Timor is fascinating. It is a place of potential; though there are some challenging problems at present."

Further information on DSTO Support to Operations and deployments is available at the following DSTO intranet site:

<http://web-sa.dsto.defence.gov.au/DSTO/research/OpsSpt/index.shtml> or contact LTCOL Jack Gregg (Manager S&T Deployments) on 8259 4216 or 0400 462 466. **C**

Above: LTCOL Trevor Thompson and Operations Analyst, Phil Radoslovich on ANZAC Day 2009 at Camp Phoenix, Dili, East Timor. Centre: Taibesse market, Dili. Main picture: Surveying locals outside of Dili meant going above and beyond, or in this case, trusting the locals on a bridge that was never intended to carry the weight of fully-laden Australian Defence personnel.

