MANUFACTURERS SET FOR BUDGET BOOST

The Federal Government's 2016 Defence White Paper released on 25 February reveals that around $195bn will be invested in defence capability and equipment over the next decade. With spending increases expected in areas such as anti-submarine warfare, air combat and amphibious warfare development, Australian manufacturers across the defence and aerospace sectors are seizing the opportunity for export success. By Carole Goldsmith.

Sue Smith is the Executive Officer at the Australian Industry & Defence Network (AIDN)'s national and Victorian office. Smith hopes that the proposed defence spending will also provide increased business opportunities for AIDN's 700-plus members. These are located Australia-wide, comprising mainly defence and security SMEs, plus Primes such as Boeing and Thales.

"The largest chapter is AIDN-Vic with 240 members," says Smith. "We disseminate information to our chapters Australia-wide and run networking functions."

This February, Smith, sponsored by AIDN-Vic. and 10 AIDN SME members, joined Team Defence Australia (TDA)'s exhibition and delegation at the Singapore Air show. A number of potential opportunities were identified by AIDN-Vic members during the air show.

Smith explains: "TDA is an integral part of the Department of Defence, and it helps promote export of Australian industry products and services to international markets. TDA hires the exhibition space at international air shows and Australian defence SMEs can exhibit free of charge."

Sue Smith, Executive Officer, the Australian Industry & Defence Network (AIDN).

AIDN is also an integral part of the Defence Engineering Internment Program, a Department of Defence initiative. This program provides placement opportunities for third and fourth year engineering undergraduates to gain experience at defence SMEs. These placements are managed by AITEC, an educational project management organisation and AIDN, which does most of the student site visits. Aviation/Aerospace Australia (A/AA)'s 70 corporate and 200 individual members, mainly represent the commercial aviation industry. It has a Memorandum of Collaboration (MoC) with organisations in Singapore, Poland, China, Vietnam and Indonesia, as well as the Air Transport Action Group (ATAG) Geneva.

Aviation/ Aerospace Australia (A/AA) Programs Director Tamara Bell.

A/AA Programs Director Tamara Bell says the organisation is planning an international summit at which representatives of its MoC partners will be invited to attend. This will be held during the Australian International Aerospace and Defence Exposition at Avalon, Geelong, from 28 February to 5 March 2017. Bell highlighted two of its members – Swinburne University and Cablex – both of which have directors on A/AA's Board.

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Professor Geoff Brooks, Pro Vice-Chancellor, Future Manufacturing.

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Swinburne – Inside the Factory of the Future

A new facility within Swinburne University's Faculty of Science, Engineering and Technology situated on its Hawthorn campus in Melbourne's east, the Factory of the Future (FotF) is fast establishing itself as an emerging hub for aerospace-related research. Professor Geoff Brooks, Pro Vice-Chancellor, Future Manufacturing, explains that the FotF has excellent facilities for rapid design and prototyping.

"We have been designing a small helicopter in virtual space for an industry partner," says Brooks. "Once we design it, we can then use 3D printing to produce components and prototypes in plastic and metal. Then we can test the component's quality using our non-destructive testing equipment such as laser ultrasound gear." Professor Bronwyn Fox, Director of the FotF, adds: "There's a broad range of aerospace activities at Swinburne. Among these, Dr Matt Ebbatson from the Department of Aviation has conducted research to analyse the role of the human-machine interface in aircraft to improve safety."

This project for Air New Zealand was part of a 737 cockpit aviation control study. In another industry project, Swinburne researcher Dr Suresh Palanisamy has conducted research into machining aircraft composite components with high-precision cutting tools for Boeing. "We have been translating our experience from working with mass production in the automotive industry to aerospace industry applications," says Fox. "The recent adoption of carbon-fibre composites in electrical vehicles such as the BMW i3 has led to new innovative production processes.

Professor Bronwyn Fox, Director of Swinburne University's Factory of the Future

"Swinburne is working with local and multinational partners to demonstrate these principles in the FotF. I was delighted to see how relevant and well received Swinburne's activities were during my recent trip to the JEC (composites) exhibition in Europe and at meetings with the world leaders in this field."

Cablex – A leader in diversity

Heidi Krebs is a co-owner of Cablex and its Director of Business Development. She also serves as an AA/A board member and an SME Ambassador for the Australian Advanced Manufacturing Council (AAMC). Krebs is extremely proud of the company's progress and its 200 employees, all of whom have contributed towards its success.

High voltage and insulation testing.

"We plan to employ an extra 50 people and expand our factory in the next 12 months, to manage the new and existing contracts' supply," she remarks.

As Australia's leading globally recognised advanced manufacturer of custom cables and harness assemblies, Cablex services the defence, aerospace, transportation, telecommunication and electronic industries. Based in East Bentleigh, in Melbourne's south-east suburbs, the company has long-term partnering agreements with leading Australian and global aerospace/defence suppliers for manufacturing services and major contract joint bids. Key programs include supplying harnesses and avionics bays for the MRH 90 multi-role helicopters and the Tiger military helicopter for Airbus, as well as electrical harnesses for the MRTT (Multi-Role Transport Tanker) Program for Airbus Military.

Krebs explains the company's history: "Michael Zimmer started the business in 1985. It was based in a Ferntree Gully garage. He moved into a small factory and employed around three people in 1988, when I started."

In 1990 the business was incorporated and, anticipating the company's potential future growth, Krebs became a 50% shareholder. Zimmer remains a co-owner and the company's managing director.

Copper braiding for EMI and RFI noise interference

"From a small idea, we have grown so much larger," Zimmer says proudly. "We now make all the wiring and avionic bays that complete the electrical system for the Tiger and MRH90 helicopters."

With the help of the Federal Government's procurement process, Cablex secured the Airbus (then called Eurocopter) tender to manufacture helicopter harnesses. The global aircraft manufacturer was so impressed with Cablex's precision advanced manufacturing capabilities, quality and delivery performance that it engaged Cablex to supply Airbus France and Europe with all the cable harnesses for the Tiger and MRH90.

Krebs gives AMT a tour of the Cablex factory, warmly introduces several employees, many of whom have been with the business for more than 20 years. On the production floor, an operator named Heather is building the intricate cable assembly designed from the Airbus helicopter computerised files and programs.

"These design files inform our operators which pins they need to place on the end of each wire," Krebs explains. "It also shows the pinouts and which tools are required to build the configuration. The pins are individually hand-crimped and inserted into connectors, then sent to a routing table. The workplace is set up for Lean manufacturing to ensure competiveness and efficiency. This line alone makes 2,500 different configurations of complex assemblies. All cables are bar-coded and tested for safety to ensure traceability and customer compliance."

Another operator, Ramesh, demonstrates braiding, which puts a copper or Nomex braid onto the cable. He explains that this protects the cable and stops radio frequency and electronic magnetic noise interference in helicopters and defence vehicles.

"The braiding is a very important part of our differentiator advanced manufacturing," Krebs adds. "In defence land vehicles, noise interferes with the RFI (Radio Frequency Interference) or EMI (Electro

Magnetic Interference), so our six machines are an essential solution on how to reduce the noise." Cablex has been working with Thales Australia for the past 12 months to build electrical harnesses for the Hawkei land vehicle. Krebs says: "We are currently its preferred supplier for electrical cable assemblies and harnesses."

Cablex is supporting Thales to refine and enhance the vehicle's harness design. This will help identify savings and maximise performance advantages for the production of a superior, innovative vehicle for the Australian Defence Force and potential global markets.

A leader in diversity, Cablex was awarded employer of the year at the 2015 Women in Industry awards. More than 60% of all its staff members are female, almost three times the Australian engineering/ equipment manufacturing average. Its diverse workforce consists of people from 26 different cultures. International food days have been a regular activity at this family-friendly company.

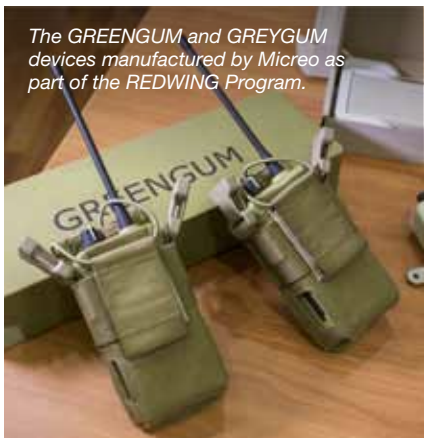
Cablex prides itself on staff training and skill development, as well as keeping employees informed on projects and business operations. Krebs points to the large TV screens placed around the company to keep employees updated on quality improvements and recent new projects. The company is also an active participant in the Defence Engineering Internment Program.

Krebs says: "The key to our success are our people, many of whom are long-term staff who have stayed with us on our journey."

Micreo – Award-winning innovation

Micreo's Managing Director Tim Shaw received a Defence Science & Technology (DST) Group Achievement award last December in Canberra. The award recognises Micreo's role as a manufacturer in partnership with the DST Group, the Australian Military Sales Office (AMSO) and the Counter IED Task Force, who are responsible for the development, manufacture and deployment of specialised force protection systems for coalition partner security forces within extremely tight timeframes.

This is a great achievement for the Brisbane-based defence manufacturing and design engineering company that Shaw founded just 14 years ago. Currently employing 72 people, Micreo's core business is the design and manufacture of products to transmit and receive signals in the microwave region of the electromagnetic spectrum. These are known as Radio Frequency and Microwave Integrated Circuits, or RFMICs. Micreo's products are currently installed in several of the world's front-line military aircraft and ships.



The GREENGUM and GREYGUM devices manufactured by Micreo as part of the REDWING Program.


Micreo staff during the manufacture of REDWING C-IED devices.

Micreo's Business Development Manager Mark Pezaro, an electronics engineer, explains how RF MICS transmit and receive signals in the microwave region of the electromagnetic spectrum: "The majority of our RFMICs are used for frequency conversion. Ideally, a frequency downconverter covers a full input frequency range of interest, translating these signals down to a range that can be digitized by a high-speed analogue-to-digital converter (ADC) for communications and analysis purposes."

Micreo's RFMICs are usually installed on an aircraft as close as possible to receiving antennas that cover all points of the compass, to intercept all incoming radar signals.

"These signals feed into a system computer that analyses them, so that the pilot can obtain full situational awareness of the RF signals around him," says Pezaro. "The antennas are typically mounted in the outermost parts of the aircraft like the wingtips, so the RFMICs therefore need to withstand high levels of shock and vibration and extremes of temperature."

Micreo has also developed a range of photonic products that allow for the transmission of broadband (up to 40GHz) RF signals across fibre-optic cable. They are used in world-leading military aircraft and ships.

Pezaro describes the company's in-house product environmental testing processes: "Due to the extreme environments our products are required to work in, we have the capability to do some of the environmental tests in-house to ensure that the design will work under high shock and vibration levels, temperature and humidity extremes. Once the design is qualified through extensive environmental testing, then the manufactured units are each submitted to testing to try to uncover any failures that may occur early in their lifetime."

Micreo works closely with local universities to attract engineering talent.

"We sponsor engineering scholarships at the University of Queensland (UoQ) and our Chief Technology Officer is an Adjunct Professor at the UoQ," says Pezaro.

Australian industry partners including Micreo Limited have collaborated under the Defence Department's REDWING program to provide the systems for protection against remotely controlled improvised explosive devices (IEDs). Two systems have been produced: GREENGUM, to equip dismounted forces; and GREYGUM, for fitting to light vehicles; along with a test device to support these two variants.

According to Pezaro, Micreo needed to employ additional staff to cope with the volume of work created by the contract for the manufacture of GREENGUM and GREYGUM. The rate of production required two shifts per day, so the company employed trainees and used its own fulltime staff to supervise as needed.

Micreo exports 85% of all its products, mainly to the US (its largest market), Israel, Spain, the UK and Germany. It usually sells its products to the Prime contractors and system integrators, not directly to governments.

On the company's future plans, Shaw says: "Micreo has grown at an average annual rate of almost 20% since starting in 2002. Based on our current work for existing customers and our prospects, we believe that level of growth is sustainable and will probably increase.

"The 2016 Defence White Paper reveals that Australian defence spending is increasing. With the purchase of larger platforms such as frigates and submarines and new F-35 fighter aircraft, there is an increased need for industry collaboration amongst local companies, as well as with foreign suppliers. We hope to position Micreo as a viable partner for this new work in Australia and to use that as a springboard into the supply chains of the larger international Prime contractors."

www.defence.gov.au
www.aidn.org.au
www.swinburne.edu.au
www.cablex.com.au
www.micreo.com