RAEME

CRAFTSMAN

The Corps of Royal Australian Electrical and Mechanical Engineers

Issue No. 69 2018

Army trains its sights on technology

Next to its primary role as a Defence force, the Army has always relished its role in skills training.

By its very nature, the Army has a continual influx of new recruits, and many of them are trained to play a role in the essential support aspects of the service.

As the cornerstone of support, RAEME trains raw recruits into skilled operatives who service and maintain everything from a pump or motor to a tank or helicopter.

In order to achieve the necessary level of excellence, the military requires first-class machines, machinery, and ancillary equipment.

The Asia-Pacific regional office of the 600 Group, Sydney-based 600 Machine Tools, has been a trusted partner of RAEME for several decades, and has supplied a range of machines that are found in the Army's workshops at home and abroad.

These include such world-famous brands as Colchester and Harrison lathes. Colchester and Harrison lathes have become a byword in the training sphere throughout the world. The Harrison Alpha manual/CNC combination lathe range boasts the simplest flat-bed CNC lathe on the market.

The full range comprises the 2-axis XS range, with models covering swing-over bed lengths from 330mm up to 760mm and bed lengths of up to 6-metres.

The company's conventional lathes start with the geared head, 330mm swing over bed Student centre lathe, and continue through to the variable speed Master, Triumph, Mascot, Mastiff, and Magnum centre lathes.

Purpose-designed and engineered, all Harrison and Colchester lathes are built to exacting standards of precision, reliability, and durability.

Army drill

Another member of the 600 Group, Clausing of Kalamazoo in Michigan, is making waves with its range of powerful drills, mills and saws.

Speaking of waves, it is said there is at least one Clausing machine on every major ship in the U.S. Navy.

Boot-up the simulator

The exclusive distributor for Fanuc CNC in Australia, 600 Machine Tools, is now able to offer the CNC Simulator, which has been described by engineers and workshop managers around the world as "the most significant breakthrough in training for machine tools ever to be launched."

"It helps workshop personnel of all ages and levels of skill to learning CNC operation. Trainees use a CNC display, MDI key, manual pulse-generator used in machining tools, in addition to learning programming and checking the created machining-program."

The CNC Simulator is based on the Fanuc Series 0i – Model F platform, and can be operated in either milling or turning configurations. Students can program the simulator as a 3-axis mill or a 2-axis/1-spindle turning system.

These world-class simulators are portable, and require only a standard electric outlet.

Lost and found

Every technician curses Murphy's Law when an urgently-needed hand-tool or spare-part is missing.

The 600 Group Company Tykma-Electrox has the answer – laser marking systems.

The Anglo-American company manufactures an extensive range of fully-integrated systems that enable technicians to instantly identify the origin, correct part number, and nearest or best source of supply.

Worldwide, the military is increasingly using a code called UID. This is a form of a datamatrix code that uniquely identifies military assets, and is globally unique and unambiguous.

More information: 600 Machine Tools, 27 Foundry Road, Seven Hills, Sydney, NSW 2147. Tel: (02) 9674 4738, Fax: (02) 9674 7641. Website: www.600machinery.com.au

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RAEME
CRAFTSMAN
The Corps of Royal Australian Electrical and Mechanical Engineers

Issue No. 69 2018

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Head of Corps

BRIG Andrew Freeman – COMD 17 CSS Bde

It has been another amazing year for the Australian Army and our Corps. It has been a year that has seen the appointment of a new Chief of Army, Lieutenant General Rick Burr, the deployment of many RAEME officers and soldiers overseas, the constant Force Generation Cycle preparing our soldiers for war, and the continual introduction of new equipment. This operational/work tempo has now become the new normal and we in RAEME have embraced it.

I have been fortunate throughout the year to visit many units across Army and I have witnessed the great work we as a Corps are doing. Our significant contribution to the Australian Army is recognised and frequently acknowledged by the senior leadership and our reputation as professional technicians grows in strength.

This year I had the opportunity to visit our Colonel in Chief, His Royal Highness, Prince Philip, The Duke of Edinburgh. Although the Duke of Edinburgh is 97, I found him to be most engaging and still very interested in what our Corps is up to. The main reason for my visit was to thank His Royal Highness for his commitment to remain associated with our Corps.

The HOC and LTCOL Evans meet the Colonel in Chief, HRH, Prince Philip, Duke of Edinburgh.

His Royal Highness retired from all official duties last year and it is my understanding that he held over 700 patron-like appointments, with 32 of these appointments linked to the military which included Captain General of the Royal Marines since 1953, Honorary Air Commodore-in-Chief of the Royal Air Force and Colonel of the Grenadier Guards.

Upon retirement he transferred his representational responsibilities to other royal family members with the exception of three appointments; they being the Colonel in Chief of the Intelligence Corps, of the Royal Electrical and Mechanical Engineers and of our Royal Australian Electrical and Mechanical Engineers. He was very

BRIG Creagh addresses the RAEME Corps Dinner.

The HOC presenting the outgoing Deputy Heads of Corps with recognition of their service to RAEME.

The HOC presenting the retiring Representative Colonel Commandant, BRIG McGahey, CSC, for his service to the Corps.

appreciative that we valued his commitment to RAEME. We also spoke about our Corps Banner – The Prince Philip Banner, which he recalled presenting it to us in 1986, and of our 75th Anniversary – I thanked him for the letter he sent which I read aloud at the Corps Dining-in-Night that was held at the National War Memorial.

I would like to make mention of our Corps Conference which was held in October at Sydney. The Corps Conference, like the Army, must be self-correcting and continuously change and evolve in order to remain relevant and effective. This year the conference was very structured and I would like to acknowledge the work done by our seven Topic Leads who wrote and led the discussion papers in the months leading up to the conference, as well as presenting their findings and recommendations.

We as a Corps made some significant decisions during this conference, which include the establishment of Master Artificers for each of our trades. It is my intent to conduct next year's conference in the same format, so I ask that you engage early with the topic leads and be a part of the discussion that will inform our Corps and drive necessary changes.

The role of our Colonel Commandants and the Representative Colonel Commandant is important and their contribution to our Corps is significant. At our recent Corps Dinner Brigadier Dave McGahey was farewelled and his contribution to the Corps, fulfilling many key appointments over many years, cannot be understated.

I would like to acknowledge and thank the Regional Colonel Commandants who are retiring from their appointments, namely Colonels Tony Borg and David Cocker. I would also like to welcome our new Representative Colonel Commandant Brigadier David Creagh, who was a previous Head of Corps, and the new Regional Colonel Commandants: Colonels Steve Evans (Qld), Martin Griffiths (Vic and NT), Andrew Herbert (Tas and SA), Mark Sweetman (WA) and Andy Adams (NSW and ACT).

Finally, I would like to acknowledge the great work our two Deputy Heads of Corps have done over their two year tenure. Both Lieutenant Colonels Brett Nelson and John Bouloukos have worked tirelessly for our Corps while having demanding Commanding Officer appointments. They have both significantly contributed to the stewardship of RAEME and have ensure that we remain contemporary, relevant and forward looking. Gentlemen, on behalf of the Corps thank you for commitment as Deputy Heads of Corps.

I look forward to working with the Corps, building upon our achievements, and being able to visit many RAEME elements during my travels in 2019.

Deputy Head of Corps (Ground)

LTCOL John Bouloukos, CSM – CO/CI ASEME

It is bittersweet to be writing my second and last DHOC-Ground article for the Craftsman magazine. It has been an absolute privilege to command the Corps ground school and be part of a fantastic team who have trained the future military-technicians for the ADF, as well as develop the future leaders of RAEME.

ASEME and the Corps have achieved a significant amount of modernisation, changes which have only just started, but will ensure our role of providing Army's maintenance effects will continue well into our 100th year as a Corps. Our modernisation efforts have only just started, but we have set the conditions and methods to collectively move forward. I would like to commence by highlighting some of our efforts:

- Army Technical Trade Training Contract Retender. Key staff at ASEME have worked tirelessly to conduct this significant retender activity. The drafting of the Statement of Work was supported by resources provided by BRIG McGahey, as DG Plan Centaur, and we thank him for his support. The contract was awarded to Wodonga Institute of TAFE and is presently half way through the transition process. Under this contract we will see all of the learning and assessment being delivered through a Moodle online learning package, followed by the capture of OJT progress through an electronic tool – skill-tracker. The contract is designed to ensure the learning materials provided are contemporary, contextualised to meet our capability needs, and can be readily updated as we modernise our trades into the future.

- Mapping Maintenance Capability to Skills and Training. Employment Category and Training Design Group at the Army Logistic Training Centre have commenced a body of work to map the Corps capabilities from the Manual of Army Employment into actual skills and then link these skills to a Unit of Competency (UoC) or other training requirement, with a simple rationale statement to justify these links. This body of work will ensure at ASEME we train the right skills and UoC for Army capability; but it also provides a good start state as we move into the Maintenance Employment Category Review in 2019-2020.

- RAEME Officer Basic Course Ground (ROBC-G). A key topic of discussion over a number of years has been role clarity between our Officers and Artificers. The Corps Conference topic on Workshop Command and Control has given us a clear way forward; however, concerns remained in how the Corps trained our junior officers. The ROBC-G was designed to up-skill the technical knowledge and understanding of the role an officer must play to deliver the maintenance effects to a Commander. At the time of writing this article, the first course was in the final week. Initial feedback is very positive and it will be refined over the next few years. Of note, this career course is being run at ASEME, and as such we can clearly state that we are the Corps ground school preparing our craftsman and officers for their roles in delivering Army's maintenance capabilities.

- Revised Corps Conference Format. The 2018 Corps Conference started in February 2018 with the release of the topics and dedicated topic leads to research, develop proposals and present the outcomes to the Corps Conference. This new format has enabled the HOC Cell to harness the intellectual capability of the Corps, to derive a unified outcome, and offer Army solutions to evolve how we deliver the Maintenance effect essential to supporting emerging capabilities. In 2018 the Conference was a success with the positions reached for the seven topics. In 2019 we will work to further enhance how we engage the Corps to develop the topics for the Army Maintenance Capability Conference.

As a Corps, the ground trades are about to undertake one of the most significant trade reviews in a generation. The work undertaken in 2018 will provide the basis for the Terms of Reference for the Army Maintenance Employment Category Review, likely to commence in 2019. As a Corps we must support this review, as the outcomes will inform what our future trades will be and what training we will require.

My time as DHOC-Ground is ending and our Corps successes have all been achieved as a collective. I would like to make specific acknowledgement to:

- MAJ Perri Hobbs for his efforts in generating renewed focus on Corps membership, merchandise and the staff effort to coordinate the HOC Cell, the Corps Conference and other activities behind the scenes.

- LTCOL Brett Nelson for his support as DHOC-Air and working with the entire HOC team to build a more integrated approach between our two Corps streams.

- The two Corps RSMs WO1 Turnbull and WO1 Colefax, for your advice and support in ensuring our Tradespeople have a champion at the senior levels of the Corps and Army.

- The Representative COL COMDT and COL COMDT for their sage advice and support to ensure the history and future direction of Corps is aligned. Their support in a largely voluntary capacity is appreciated and shows that our esprit de corps extends beyond our active service in Army.

- The two HOC, BRIG Kohl and BRIG Freeman for their efforts in guiding the HOC cell and setting the conditions for us to be able achieve the successes to date.

- Lastly I want to thank all the members of Corps for your efforts in maintaining the spanner clubs, supporting the Corps Conference discussions and every day doing great things that enhance the positive image of the Royal Corps.

I would like to close by wishing the new Corps appointment holders all the best for their tenures in 2019 and beyond. It has been an honour to be a part of the HOC Cell and command our Corps school (ground).

Arte et Marte

Deputy Head of Corps (Aero)

LTCOL Brett Nelson, CSM – CO/CI RAMS

It has been another busy yet successful year for Army Aviation and a fitting year for our colleagues to celebrate the 50th Anniversary of the establishment of the Australian Army Aviation Corps. Early 2018 saw 16 Aviation Brigade intimately supporting DACC/HADR activities within Australia and our near region.

This was followed by a very successful major exercise period. Army's new platforms are achieving marked increases in rate of effort, improved reliability and reducing maintenance burden (although more work is required in this area for the MRH-90 Taipan). Confidence in Army Aviation and our sophisticated, digitised and lethal helicopter fleet is on the up.

Two major activities for Army Aviation that will continue into 2019 are the integration onto the Canberra-class Landing Helicopter Dock (LHD) and the introduction of the MRH-90 Taipan into 6 Aviation Regiment (replacing S-70A-9 Black Hawk as part of Plan PALISADE). Through 2018 we saw MRH-90 Taipan, CH-47F Chinook and ARH Tiger embarked on the LHD for major exercises and/or dedicated flight trials.

The aspiration for 2019 is to see all three platforms embarked as part of the Amphibious Ready Group. Plan PALISADE is the main effort for 16 Aviation Brigade in 2019, with detailed planning and focussed execution required to ensure continuity of Special Operations Rotary Wing support. Airbus Asia Pacific (AAP) will establish the initial maintenance workforce at 6 Aviation Regiment and will be supplemented by experienced Army MRH-90 maintainers from 5 Aviation Regiment.

Outside of 16 Aviation Brigade, the proliferation of Unmanned Aerial Systems (UAS) is impacting all of Army. 20 STA Regiment is trialling the Schiebel S-100 Camcopter concurrent with continued operation of Shadow 200. The Wasp AE and Black Hornets are being rolled out to Combat Brigades, while every Army Unit has received a Multi-Rotor UAS in order to develop 'drone literacy' amongst soldiers.

From an integrated investment plan perspective, there are three major projects concurrently ramping up – Light Utility Helicopter for Special Operations (L2097-4), ARH Tiger Replacement (L4503) and Shadow 200 Tactical UAV Replacement (L129-3). There is a virtual 'Matterhorn' of investment that needs to be scaled by our colleagues in AHQ and CASG in the next few years.

In the training space, the Rotary Wing Aircraft Maintenance School (RAMS) is winding up S-70A-9 Black Hawk technician training while introducing a new CH-47F training system. RAMS has been in the business of Black Hawk technician training since 1990 and the final initial employment training (IET) graduates will depart RAMS at the end of 2018. This is the end of an era and my thanks go to the Army and Boeing Defence Australia (BDA) team who contributed to this capability over the years.

The new CH-47F technician training system at RAMS was officially opened by Chief of Army on 18 October 2018 and represents the benchmark for future technical training given the seamless integration of instructor-led learning, simulation and practical on-job training.

A major activity for 2018 was the conduct of the Army Aviation Capability Establishment Review (CER). The CER provided an opportunity to 'right-size' our technical workforce with clear alignment between maintenance capacity, rate of effort and preparedness directives. The CER has also locked-in a key tenet of Plan PELICAN, being the integrated Army/contractor model for our maintenance workforce.

A significant body of work continues as part of Employment Category Reviews (ECR). The RAEME Aeroskills Other Ranks ECR tackled trade sustainability issues for ECN 411/412 and provided target structures for the ECR. Furthermore, it recommended the transition of ECNs 153/154 to RAAF in line with Houston Review recommendations (although implementation timeframe remains TBC). A key outcome of the ECR was the endorsement of the Aeroskills Technician Specialist (ATS) program.

The goal of this program is to create a cadre of CPL (ECN 411/412) with deep systems knowledge, holding additional authorisations (previously held by SGT) and remunerated accordingly. In order to develop their technical mastery, ATS candidates will participate in an Industry Placement Program that will provide exposure to deeper maintenance venues and component overhaul facilities (expected to commence Jan 20).

EME Aviation Officer (EMEAO) will progress to ECR in 2019, where we will refine our career model in order to retain EMEAO through critical CAPT ranks and prepare them for both CLM and technical roles at O4/O5.

Finally, I would like to thank the Head of Corps team for their collective efforts in advancing the interests of RAEME and improving communication across the Corps. Last year's RAEME 75th Parade was a particular highlight for me and those who participated from RAMS and RAAF STT.

The 2018 RAEME Corps Conference was vey successful and has mapped out a number of activities that will benefit both the Corps and Army in future years. I am grateful to have had the opportunity to be Deputy Head of Corps (Aero) and will be passing the baton onto incoming CO/CI RAMS, LTCOL Miles Irving.

Arte et Marte

Corps RSM

WO1 Rick Colefax – RSM ASEME

It is with pleasure that I write to you for the first time as Corps RSM and I welcome our new members to the Corps. This year has been busy as normal and it has been satisfying to see our soldiers and officers achieving and representing the Corps in events such as AASAM.

As a Corps, we have seen and supported the introduction of new platforms and equipment that are based on new technologies and the integration of systems that we have not experienced before. The phases of Land 121 vehicles, the introduction of new types of UAVs and the announcements of BOXER and HAWKEI have shown that our trades may need to change in the future to accommodate how the 'systems within systems' work together. The main concern with this is how we get ahead of the bell curve by training for these systems now so we have SGTs and WOs that have the knowledge and skills when they are introduced.

For a first step, HOC and ASEME are negotiating with Civilian Industry to implement a placement program for soldiers and officers in the ground space similar to the program initiated by our Air brethren. In line with this, Plan Centaur has evolved into looking at what our trades may look like in 2030 and will feed into the Army Maintenance Employment Category Review planned for 2019/20.

Throughout the year, I have had been able to speak to a fair few soldiers as they come through ALTC to complete their SUBJ Two or Four. It was good to be able to hear what was going on in their units and to find out their concerns and thoughts on where the Corps is heading.

The main discussion I had with them is what they deem as their role as CPLs or what they think their CPLs should be doing. An overwhelming majority related that leading, mentoring and guidance of the Crafty on the floor is the prime function and due to time spent behind the computer, this was not being done well.

Unfortunately, one of the other functions of the CPL is to conduct the administration side of our trades and is a necessary activity, but I encourage the CPLs of the Corps to try and spend some time on the floor so our Craftsmen/woman can ask those questions they definitely have when conducting their jobs.

One of the items that has been a privilege in this role is to recognise our soldiers for their service to RAEME. This would not have been able to be achieved without the notification from OCs and ASMs of the Corps and I hope that this continues next year.

I would like to acknowledge MAJ Perri Hobbs and the members of the HOC Cell for their work contributing to the esprit de corps and maintaining the health of the Corps Funds. They are the ones that put together the Corps awards and certificates that our soldiers deserve for the efforts.

Finally, I wish all the members of the Corps a safe Christmas and hope you have a chance to have a well-earned break. I look forward to catching up with you when I travel with the HOC.

Arte et Marte

RAEME Corps SUBSCRIPTION FORM

Life Membership Contributions:

CFN - SGT: $260. SGT - CAPT: $390. MAJ+: $520.

1. Lump Sum Payment, or
2. Instalments: #(number of payments) x $(Amount per Period) = $Life Membership. A Period is fortnightly, or yearly.
3. Direct Debit to: Defence Bank, **BSB: 833-205**, **Acct # 20509705**, **Acct Name: RAEME Corps Fund**, or Cheque to RAEME Corps Fund.
4. Each contributor to the Corps Fund will receive a bronze St Elligius Membership Medallion.
5. Personnel contributing the full Life Membership amount will receive a silver St Elligius Life Membership Medallion and a framed copy of the RAEME Corps painting "AFV Repair in the Light Green".
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Address ..... Town/Suburb.....

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Email: RAEME.HOCCell@defence.gov.au, Ph: (02) 605 54325/54329/52274

SO2 Corps

MAJ Perri Hobbs

As you may or may not have heard, my position, SO2 Corps RAEME, will not be filled next year. Or the next. This is the new future of the Head of Corps Cell and affects all Corps with ARA personnel in these positions. Whilst it is disappointing for the Corps, the work that we do in the Cell will carry on.

First, there are the other members of the Head of Corps Cell – the HOC, the Deputies, the Corps RSM, and WO1 Dekrell that will continue the good works. Secondly, the duties I perform will be allocated amongst them and other personnel within ASEME and RAMS. Thirdly, if approved by the Chief of Army, the Corps will institute the Trade Advice Cell with the Master Artificers coordinating the provision of technical trade advice – this will go some way towards improving the Head of Corps' ability to provide the Chief of Army with advice on maintenance capability.

Discharging soldiers will still receive Recognition of Service certificates recognising their service to the Corps and Army, the Craftsman magazine will still be published, Corps Conferences will still be run, and the RAEME Corps Fund will continue to support Spanner Clubs and RAEME Birthdays across the country. There just won't be an SO2 Corps to help manage it all.

If the last year, 2017, was about 75 years as a young Corps constantly evolving, this year has involved a long hard look at some of our possible futures. The Corps Conference started in February and allocated topics for development to selected personnel around Australia. The results of these were presented at the two-day gathering in Randwick Barracks from the 23rd to the 24th of October. The final papers and the Corps talking points are published here in the magazine.

The Corps Conference covered topics as diverse as Battle Damage Assessment, the career progression of our regimentally inclined soldiers, how we review our trades, and the relationship between the Workshop Commander and the Workshop's Senior Tradesman. The papers are not the right, wrong or final answer, but the Corps positions as briefed to the Chief of Army are the official RAEME positions on the topics (pending his approval). The work done this year will be built on in 2019 with the Maintenance Effects Conference and the 2020 Corps Conference.

The Corps Instructions have been updated, with the Head of Corps signing them on the 14th of October. Included in these are a change to the way we recognise the service of our officers and soldiers – all Corps personnel discharging after completing their minimum service are entitled to a certificate signed by the Head of Corps recognising their service to the Corps and Army. Unfortunately, we rely on the unit informing the HOC Cell of the details of soldiers discharging.

Due to the volume of certificates that we issue, we appreciate at least 6 to 8 weeks of notice prior to the intended presentation. If you do have unit RAEME personnel discharging, just send us their details and we will return the signed certificates in a RAEME presentation folder to your unit address.

The HOC Cell has restocked the Corps Shop with items such as ties, cummerbunds, bow ties, scarves, cufflinks and coffee mugs. In the near future we are considering supplying Corps branded thermos flasks, upmarket cuff links, polo shirts, and stable belts (although these will not be an item in accordance with the Dress Manual).

The membership subscriptions and trading profits support Corps activities such as the Corps awards, the Craftsman, the presentation coins to new officers and soldiers, the Artificer's Coin, as well as funding disbursements to the Regions. Whilst we did not fund activities to the same amount this year as we did in the 75th (as we did not make a profit last year), we still gave out over $3500 in financial support to RAEME personnel in support of RAEME Birthday events in 2018. Your support in buying the merchandise and purchasing membership are key to our financial support of Corps events.

I would like to thank the members of the HOC Cell— thank you for your advice to me and your contribution to our Corps. The 75th Anniversary Parade and Dinner, and the Corps Conference have been a real contribution to our Corps now and into the future. I would particularly like to thank WO1 Dekrell for his work in the Cell. He organises the Certificates of Recognition, the delivery of the merchandise to the purchaser, the delivery of the Corps Awards and the Craftsman, as well as a myriad of other jobs. Without him, the HOC Cell would not be able to carry out our mission. Despite being RAAMC, he has contributed more to our Corps than most.

Finally, I would also like to thank all of the contributors to the magazine. While Dave Clarke and I spend a couple of weeks at the end of the year reading and editing articles, it is you, the reader, who send us all the interesting stories of your year in the Corps – Thank You.

From the Editor

WO1 Dave Clarke

With the manning shortage in the RAEME Head of Corps (HOC) Cell continuing and getting worse next year with the HOC Cell losing the SO2 position as of 2019. I've been drafted back in again to assist with compiling the 2018 RAEME Craftsman. This year's edition has been very well supported by members of The Corps writing articles and we have been overwhelmed by Unit Jottings, which is great to see.

As usual, I really enjoy reading the articles and finding out what is happening in workshops, on exercises and on operations. It's great to see that no matter what challenges are put to our tradespeople we continue to overcome them. This includes relearning old skills; such as 7 RAR have had to do with maintaining the M113AS4 FOV, having gone to PMV briefly.

LTCOL Brendan Robinson has included an article he wrote for Australian Army's professional military education portal, 'The Cove', on the challenges facing RAEME in the future. This is a thought provoking article that should get you thinking about what we should be doing to meet the challenges of the future. Along this line, ASEME has introduced the Regimental Officer Basic Course – Ground (ROBCG) to set new RAEME officers up for success in their new careers and there is an article about the first course run by ASEME this year.

It appears that the Lean is taking over in our Workshops and the way we do business as there are four different articles on that subject. It appears Victorian father of the year, LTCOL Jadhav from DTR-A is the Army's 'Guru' of Lean and has been spreading the word across the Army. From reading the articles provided it looks like he has converted many of our members into lean practitioners.

There is also a lot of good work being done to integrate both RAEME Air and Ground trades in the amphibious theatre, with both having to learn how to overcome the challenges this environment provides as well learning to work on Navy platforms. This is an exciting and long overdue development in Army's capability.

There's also a couple of articles from members deployed on Op Accordian and Op Okra. The members deployed all seem to be working hard and meeting all the challenges put to them working on the diverse amount of deployed equipment. Again, it's always pleasing to read comments that state the RAEME tradies are the pick of the maintainers on operations, as they are always willing to turn their hands to whatever it takes to achieve the mission.

The Corps now has its own Protected Mobility General Maintenance Vehicle (PMGMV) to support PMV and there are two articles on this vehicle and it gets a number of mentions in the Unit Jottings. This looks like a great bit of kit!

There is also an article on how 1st Signal Regiment supported the Deployable Joint Force Headquarters during Ex Hamel 2018. The statistics provided on work done and equipment used is mind blowing!

On the technology front, there is an interesting article on how simulation is being incorporated into the training at RAMS. There is also two articles on drone racing, detailing how it is now a recognised Army sport and how RAEME was represented at the Military International Drone Racing Tournament in Sydney in October.

As 2018 is the centenary of end of World War One, I thought it appropriate to include an article on my visit to the Battle of Hamel Centenary Service on 4 Jul 2018. How does this relate to RAEME you ask? Maybe it could be that of the five Mark V tanks that were knocked out during the battle, three were able to be repaired and brought back into action; or maybe it could just be because the CA Lt Gen Burr noticed I was wearing my Corps tie and came over to talk to me. Either way I think it's important to remember the event and the Centenary of Armistice. It's just a pity it wasn't the War to end all Wars!

Due to privacy laws we are no longer able to get lists of members that have retired from DOCM or SCMA, so if you would like your service recognised please let us know by sending an email to the Corps RSM WO1 Rick Colefax. On behalf of the Corps I thank you for your service. I would also like to wish Major Scott Babington the best for the future when he discharges in early 2019.

There are two moving tributes written by The Corps ASM WO1 Laurie Wallace on two serving members that passed away this year; MAJ Lloyd Millican and WO2 Mick Kenny. We have received a number of emails regarding members that have passed away. Unfortunately, the detail in a lot of these emails is very light on. Therefore, I've kept the rest of the vale notices to the members name and date they passed. If you're sending this information please provide enough information so that we can do the member's memory justice.

I hope you enjoy the 2018 edition of the RAEME Craftsman Magazine as much as I have enjoyed putting it together.

Arte et Marte

With Skill and Fighting: An Article About Future Maintenance in the Australian Army

LTCOL Brendan Robinson

Like many combat enablers, the effect that maintenance brings to capability is often poorly appreciated. Maintenance is, however, an essential input to capability that comes with a price: too little means no capability; too much can consume a capability. Last year Defence was in the public spotlight for both problems.[1]

The new Landing Helicopter Dock (LHD) fleet spent a considerable amount of time alongside undergoing unforeseen repairs, and the ballooning costs of sustaining the Multi-Role Helicopter (MRH-90) fleet drew the attention of the Australian National Audit Office (ANAO). As Army introduces ever-more complex fleets of equipment, such as the recently announced Combat Reconnaissance Vehicle, the threat of unplanned growth in maintenance costs is a real possibility that must be considered now.

According to a recent ANAO report, Defence spends almost as much on sustainment of its materiel as it does on acquiring it. In 2015-16, this equated to around $6.5 billion on acquisition and $6.3 billion on sustainment, each about 20% of the Defence budget. Of concern, the ANAO also found that Defence is not reliable in forecasting Whole of Life sustainment costs, nor willing to present these costs as prominently as acquisition costs.[2]

The introduction into service of Army's Multi Role Helicopter (MRH-90) fleet is instructive. In 2004, the forecast annual sustainment cost per aircraft was $2.13M, by 2009-10 it was $5.66M and by 2012 it was up to $7.70M per aircraft. In this time the fleet grew from 15 aircraft to 47 and the sustainment costs grew a whopping 350% per aircraft. In a rather significant understatement, the ANAO identified that the "sustainment cost has been identified as a 'key risk' for the MRH90 ..."[3]

Notwithstanding that many improvements have been made to this platform, such cost blowouts will have consequences for Army's sustainment budget and other capabilities. Directly addressing these cost implications in a 2016 speech to Defence Industry, Head Land Capability, Major General Kath Toohey, asked:

"How [can we] reduce our cost of ownership?... How do we better position logistics to support the modernised Land Combat System? Is there a way we can challenge / change / or drive our Force Generation model to optimise maintenance, sustainment and resource usage?"

As this article will highlight, solutions to these answers are already being generated, but in the face of an antiquated maintenance philosophy. Like our United States allies at the end of the Cold War, many maintenance functions were outsourced by Defence in the 1990s on the unproven premise that cost-savings could be made.[4]

Much later it was recognised that this efficiency drive occurred to the detriment of organic capability.[5]

For both the Australian and United States armies, it is probably too late to reverse these structural changes, so what can we do?

For a start, we need to appreciate the inherent value of our remaining maintenance system in terms of its cost and contribution to capability. As the ANAO noted from the 2015 First Principles Review, "...Defence treats staff as a 'free good' across the Department" yet the labour bill for Capability Acquisition and Sustainment Group (CASG) employees in 2015-16 was $490.4M.[6]

This also rings true at the Brigade level; a senior Combat Brigade logistics planner recently advised that if he could get the Brigade Royal Australian Electrical and Mechanical Engineers (RAEME) workforce to work an hour longer each week, he would not require the contracted maintenance support provided to achieve his Brigade's equipment readiness requirements.

That the value of CASG project staff should always be costed against capability is clear, but less clear is whether the same argument applies to uniformed tradespeople. On the one hand, Army's investment into technical trades is significant.

The new technical trade training contract adopted for the Army School of Electrical and Mechanical Engineering (ASEME) is one of Army's most expensive training contracts and RAEME tradespeople are amongst the better paid soldiers in the conventional Army. Therefore, Army could expect a similar return on investment in the form of productivity in workshops. However, the 2008 Pappas Review assumes no productivity savings from combat and combat-related military staff advising that "... the number of combat and combat-related military staff has a direct relationship with capability"[7] implying that the deployability, not the productivity, of these staff is paramount.

To be clear, the aim of ASEME has always been to generate soldiers first and qualified tradespeople second. Equally, the RAEME Corps' Latin motto, Arte et Marte (with skill and fighting), reminds us that the Corps' real purpose is to serve on the battlefield where the economic concept of productivity takes a backseat to maintaining equipment for the warfighter. Most warfighters will appreciate the truth of this dichotomy.

On exercise or deployment they will know their supporting tradespeople work through the night to ensure broken kit is fixed if its availability is imperative to the mission. In barracks, these same warfighters as commanders may struggle to achieve unit equipment readiness requirements as their personnel are frequently absent from the unit workshop for leave, courses, physical or military training, medical appointments or corporate governance. Somewhere a balance exists.

This is not the main issue though because this RAEME workforce makes a definite contribution to both maintaining the capability and deploying it. I think the real issue is how we match this incredibly valuable but finite workforce to the right areas. The Singapore Armed Forces (SAF) offers an interesting solution. The SAF has a similar sized professional army to the Australian Army yet their operating

and geographic context is certainly different to Australia. To this end they have recognised that their own finite uniformed maintenance workforce is critical to their ability to deploy.

One outcome of this is that scant maintenance is conducted by SAF tradesmen on general purpose vehicles and equipment whose repairs are readily outsourced. Instead, the efforts of SAF tradesmen are focussed on mission critical equipment such that they conduct the majority of maintenance on their Terrex armoured fighting vehicle (AFV) fleet. Whilst further investigation will be warranted should the Australian Army consider this approach for its incoming fleet of AFVs, there are three related factors that could influence this to ensure our maintenance personnel are treated as a valuable resource:

- Mission critical equipment fleets are increasingly the most expensive and technically demanding on the battlefield, demanding readily available, experienced and highly qualified maintainers.
- Army's recruitment offer for Science, Technology, Engineering and Mathematics (STEM) qualified potential maintainers must be competitive.
- The advanced technology that Army introduces over the next decade will appeal to this competitive market since it is not freely available elsewhere.

A closer look at the maintenance system could also drive down costs by considering how we plan and forecast our maintenance requirements, and how much maintenance we need to do. On the former, Army has recognised the deficiencies of the existing maintenance system.

Since 2016 a team working under the banner of Plan CENTAUR have identified numerous deficiencies using the LEAN methodology to improve workshop practices and update Army's maintenance strategy. On the latter, direction was released in late 2017 for Army's AFV fleet maintenance recognising the new paradigm that Army's Plan BEERSHEBA ushered in. Using legacy AFVs (ASLAVs and M113A4s), its successor, Plan KEOGH, laid the groundwork within Army for the incoming Land 400 fleet of AFVs in terms of structures and training.

Using similar structures across Forces Command, Plan KEOGH demands that commanders and exercise planners align to the force generation cycle of 'readying, ready and reset'. Enforcement of this cycle is intended to set limits on equipment usage during training, particularly when a combat brigade is in the reset phase of the cycle. Supporting documents also define revised regionally-based contractual maintenance arrangements. These are good steps towards realising Head Land Capability's goal to reduce the cost of ownership.

Caution is necessary though. The introduction of a next generation fleet of AFVs through Land 400 should encourage those in charge of this program to pause; not just in consideration of the previously dismounted infantry units now operating AFVs but also for Army's armoured regiments. Why? Just ask the US Army what happened following the introduction of the M1 Abrams in the 1980s. Chris Demchak's case study[8] of how the US Army introduced a complex machine into service concludes that even with careful planning, unexpected problems frequently arose that challenged the organisation's ability to develop enterprise solutions when bespoke and localised fixes were more readily achieved.

So called 'buffering',[9] introduced to manage this complexity quickly escalated fleet cost of ownership through growth in specialist maintainers, contractors and test and evaluation. Further, she advised that whilst this may be workable in a garrison environment it is hardly recommended for the complexity of conflict.[10]

Regardless, this is one of the premises justifying the modernisation of Army's AFVs through Land 400. Besides improving a capability, it supposedly drives down the cost of ownership.[11]

As Dave Beaumont observes (with reference to Demchak) this is often not the case for militaries as the ANAO's critique of the MRH's sustainment costs demonstrates, and a 2016 Army discussion paper advocating the use of tanks acknowledges.

So what can be done to reduce cost and the buffering Demchak identifies? The authors of the Army tank discussion paper identify a range of potential solutions for sustainment costs, but it is hard to go past their main point; to simply reduce the tank fleets' rate of effort through greater investment in simulation systems that replicate crew procedures, vehicle operation, and gunnery. The Land 400 program will deliver on this in later phases but such an outcome should also be considered now as part of Army's maintenance strategy.

Solutions to partially address Demchak's buffering concern may also be available through further investment in Army's highly-qualified RAEME workforce and the forecasting tools it relies upon. One of

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Demchak's key concerns is that on introduction to service, complex systems impose a huge burden of unknown and often unforeseen faults. Significant investments during design and testing can go some way to resolving these issues, but would likely render such a system unaffordable.

An alternative to investing during design is to invest in the human capital responsible for maintaining the fleets. Much like the Ryan Review's goal to improve decision-making superiority in the Army through investment in professional military education and professional discussion portals like The Cove, Army should consider a similar investment in the technical and intellectual superiority of its tradespeople.

Much is already done through ASEME trade courses and Plan CENTAUR activities but more could occur through virtual reality based training, conferences, distributed learning and existing networks. Not all problems can be solved this way but undoubtedly having a trusted and highly skilled workforce on hand to develop solutions is more desirable than not.

The improvement of maintenance forecasting tools and their predictive ability would complement this investment. Already at our disposal is a large and mostly unmined set of data within our maintenance systems that could inform and improve our equipment maintenance forecasting. Chris Jackson proved this in 2009 when as an Army Captain he mined Land Rover servicing data. His analysis of this data showed that a recently serviced vehicle was "1000 times less reliable than one that had been serviced 10 000 km ago"[12] and led to mandatory servicing intervals being doubled.[13]

Close to the end of its life, planned maintenance costs for this fleet were sharply reduced. Such is the power of data analysis. As an organisation, Army should exploit this lesson for our new equipment fleets wherever possible.

To close, Army is embarking on a transformative modernisation journey that will outfit its field forces with an unprecedented level and scale of complex technology. No one is assuming this will be easy, and amongst the many challenges associated with this journey is keeping sustainment costs under control. Examples of the stalled LHD fleet and expanding MRH90 and tank sustainment budgets offer a sobering guide on what to expect.

Yet there are signs that the Australian Army is aware of these challenges and is looking for solutions on either side of the maintenance balance sheet. On the productivity side we could use our workforce more effectively and in so doing change the way we recruit, utilise and invest in our technical workforce to overcome constant staffing shortages, competition for skills and the ever-present complexity inherent in introducing new systems.

On the other side of the balance sheet, organisational changes to reduce actual equipment usage, and efforts to better forecast our maintenance liability offer other means to drive down the cost of ownership. Army's intended investment into simulation, coupled with efforts to exploit our maintenance data would complement these outcomes.

Finally, Army's yet-to-be-endorsed maintenance strategy may offer the roadmap to aid its modernisation journey. It is vital that is does – Army's $20 billion investment into new AFVs should provide the Government with the capability it needs and the protection that the Australian public expects for its troops. It should not therefore be undermined by rising and unforecasted maintenance and sustainment costs that bring into question the affordability and value of that capability.

About the author

Brendan Robinson is a graduate of the UK Command and Staff College and the Royal Military College Duntroon. Trained as a mechanical engineer at the Australian Defence Force Academy, he joined RAEME in 2001 commencing his first post at B Squadron 3rd/4th Cavalry Regiment in 2002. He now coordinates infrastructure projects from the plans branch at Headquarters Forces Command and maintains a healthy interest in world affairs and Army modernisation.

This article was originally posted in the Australian Army's professional military education portal, 'The Cove', on 10 August 2018.

[1] R. Callinan, 'Call navy trial off, we've got that sinking feeling', *The Australian*, 9 August 2017, page 6. Callinan drew attention to the unforeseen maintenance costs associated with the Navy's LHD and Army's Tiger Armed Reconnaissance Helicopter fleet.

[2] Australian National Audit Office (ANAO), *Defence's Management of Materiel Sustainment*, 39, para 3.37.

[3] ANAO, 37, para 3.24.

[4] D. Warren, *Defense Maintenance: Sustaining Readiness Support Capabilities Requires a Comprehensive Plan*, Testimony Before the Subcommittee on Military Readiness, Committee on Armed Services, House of Representatives, (Washington DC: United States General Accounting Office, 2001). Warren testified that cheaper sustainment costs were never realised following the downsizing of the US Department of Defense's maintenance system at the end of the Cold War.

[5] J. McCarthy, *Logistics in War*, 'Tyranny of the Easy Button: Finding a Balance between Contract & Organic Logistics', (blog), 17 July 2017, accessed 29 November 2017, https://logisticsinwar.com/2017/07/17/tyranny-of-the-easy-button-finding-balance-between-contract-organic-logistics/.

[6] ANAO, 42, para 3.45.

[7] Department of Defence, *2008 Audit of the Defence Budget*, (Canberra: Department of Defence). In discussing labour productivity gains in the Defence workforce, the Pappas Review assumes no productivity savings are realised from combat and combat-related military staff observing that "...the number of combat and combat-related military staff has a direct relationship with capability." Defence, 2008 Audit of the Defence Budget (Pappas Review), page 25 [Accessed 7 Oct 2017]

[8] Chris Demchak, 1991, *Military Organizations, Complex Machines – Modernization in the U.S. Armed Services*, Cornell University Press, New York

[9] Demchak, 32.

[10] Demchak, 38.

[11] Army cites this very point in describing Project Land 400 and the rationale for replacing its "ASLAV fleet with a CRV due to obsolescence factors that constrain tactical employment and increase the cost of ownership." Australian Army, Project Land 400, https://www.army.gov.au/our-future/modernisation-projects/project-land-400 [Accessed 5 Dec 2017]

[12] Chris Jackson, 'Do we service materiel too often?', *Maintenance News* Issue No 120, Land Systems Division Defence Materiel Organisation, (Melbourne: Jun 2009), 1,2.

[13] Land Systems Division, 'Extended servicing interval for Land Rover 110', *Maintenance News* Issue No 121, Defence Materiel Organisation, (Melbourne: Sep 2009), 12.

Maintenance Process Improvement Using LEAN Six Sigma Methodology

LTCOL Sandeep (Sunny) Jadhav

Lean Six Sigma (LSS) is a fact- based methodology consisting of technical statistical tools that solve numerous business problems. 'Lean' focuses on the wastages within any process whereas 'Six Sigma' focusses on the variations in the results from those processes. The coupling of these internationally-recognised methodologies has effectively been proven in commercial businesses, other armies and industries across the globe.

The essence of LSS is to build a faster, better, simpler and more productive processes through simplification, streamlining and optimisation of process elements. Its goal is to achieve excellence and organisational skills which in turn will improve organisational profitability (cost effectiveness) and productivity through waste elimination. It is a strategy to spot the low hanging 'invisible' fruits and identify anomalies or deviations within an organisation or system.

LSS is the foundation upon which organisational 'best-in-class' performance and a culture striving for continuous improvement and innovation can be established. The end state of the LSS methodology is to improve systems, processes, organisational performance and change people's mindset; subsequently enhancing Army's Capability.

In 2018, the Land Maintenance System unit within DTR-A conducted multiple LSS process improvement activities across the Army and wider Defence Force. The unit employed LSS as a tool, technique and most importantly as a guide on how to improve an innovative mindset. This produced highly positive results, including:

- Improved maintenance processes within units through reductions in process delays and removal of non-value adding process steps.
- Cutting of approximately 3 hours from the average 14 hours spent per work order, thereby improving the delay vs activity time ratio.
- Considerable reduction in time required for governance-related activities.
- Cost savings of approximately $300,000 pa through reduction in maintenance planning process cycle time from 285 to 200 days
- Elimination of over 53 hours of non-value adding work from the Condition Assessment Process within Navy's LHD Technical Integrity Management System.
- Highly improved efficiencies in repair management through optimal placement of maintenance staff to their required work, tools and support mechanism, thereby reducing the distances they had to travel to complete designated tasks.
- Cost savings of approximately $500,000 per year was realised within an organisation by improving the lead time by 30% of the Board Of Studies process.

A key finding from these improvement activities was that LSS sought to influence outputs through understanding the individual processes, sub-processes and controlling their inputs. It was found that three 'big leaks' exist in any process regardless of its size, complexity and context. The organisation leaks profitability (money) or productivity (effort). Sources of such leaks are commonly but erroneously attributed to employees of their actions however LSS has proven a more common root cause to be complications, inefficiencies or delays within processes.

Fixing processes before aligning staff behaviours will fix productivity.

Examples of process leaks include:

- **Delays.** The delays between the process steps cost time and money that reduce productivity and profitability.
- **Defects.** The mistakes and errors in outputs that have to be fixed or scrapped.
- **Deviations.** The small to large differences or inconsistencies from piece to piece, day to day, month to month, time to time of the products and services.

Delays and Defects can be addressed using Lean. Six Sigma will rectify deviations.

Getting started in LSS

Developing an understanding of LSS methods and tools requires no special background in mathematics, nor does it require exotic computer software. It does however require a desire to consider a process in detail through use of simple tools such as post-it notes and flip charts with a view to finding an optimal process flow.

Training will include instruction on the LSS methodology and is conducted at following levels:

1. Six Sigma Awareness and LEAN Champion (Yellow Belt) – 1.5 days.

2. Six Sigma and LEAN practitioner (Green Belt) – 2 days

3. LEAN Master and Six Sigma (Black Belt) – 2.5 days.

The 'belt' ratings noted above provides an international recognition of proficiency within the LSS field.

Training, mentoring and certification as a LSS practitioner is facilitated by DTR-A (AHQ) through the SO1 or SO2 Land Maintenance Systems.

LTCOL Sandeep (Sunny) Jadhav
SO1 Land Maintenance System DTR-A (AHQ)

Leaning 9 FSB – 9th Force Support Battalion LEAN Training

CPL Simon Cannon and MAJ Dean Kachab

At a chance meeting at Robertson Barracks, Darwin, in mid-2017 seeded the roots of a training journey of international recognition for a number of personnel within the 9th Force Support Battalion (9 FSB).

9 FSB personnel recently embarked upon a journey to become part of a Lean Six Sigma Society of Professionals, LSSSP. With full support from the CO 9FSB, LTCOL A Harrison-Wyatt, the opportunity to undertake this training began with engagement from OC 9 LSC, MAJ Dean Kachab, with AHQ and CASG representatives, LTCOL Jadhav and Mr. Basu Banka, respectively.

Since the last quarter of 2017, LTCOL Jadhav, and support staff, visited 9 FSB, RAAF Amberley and RAAF Richmond (176 AD SQN) to deliver the training that would see the LEAN Six Sigma principles taught are almost immediately implement into areas of perceived inefficiency and capability shortcomings.

LTCOL Jadhav and Mr. Basu Banka instructed a swathe of personnel from the unit's Workshop and Logistics elements on the tools, methods and principles required to achieve the yellow belt qualification within the LSSSP framework. This training enabled members to be equipped with the necessary know-how to develop problem statements, outlining issues and defining the so what or implications. These areas were Defined, Measured, Analysed, Improved and Controlled (DMAIC). This is a core tool in the LSS space and is a cycle aimed at continuous improvement.

9 FSB Workshop staff Lean Training.

LEAN Six Sigma is a methodology evolved from LEAN and Six Sigma combining the two theorems into one and is focused on customer's needs. Using an acronym SIPOC (Supplier – Input – Process – Output – Customer), members are able to map out problems and identify exactly any issues. In this map, the detail of Value Adding, and Non Value shows where waste can be reduced. To achieve reduction of waste, or Muda which is Japanese for waste, we must assess it by utilising TIM WOODS (Transportation Inventory Motion Waiting Over-processing Over-production Defects Skills). If waste is identified to fall within any of these areas, we must look at ways to reduce or eliminate the effect it has in order to produce a product for a customer more efficiently and with less variability.

One example of understanding TIM WOODS has led us to also tie in with the 5S model (Sort Set Shine Standardise Sustain). Through combining these two principles we have been able to change the layout of our Workshop in order to eliminate unnecessary movement

LTCOL Jadhav conducting training.

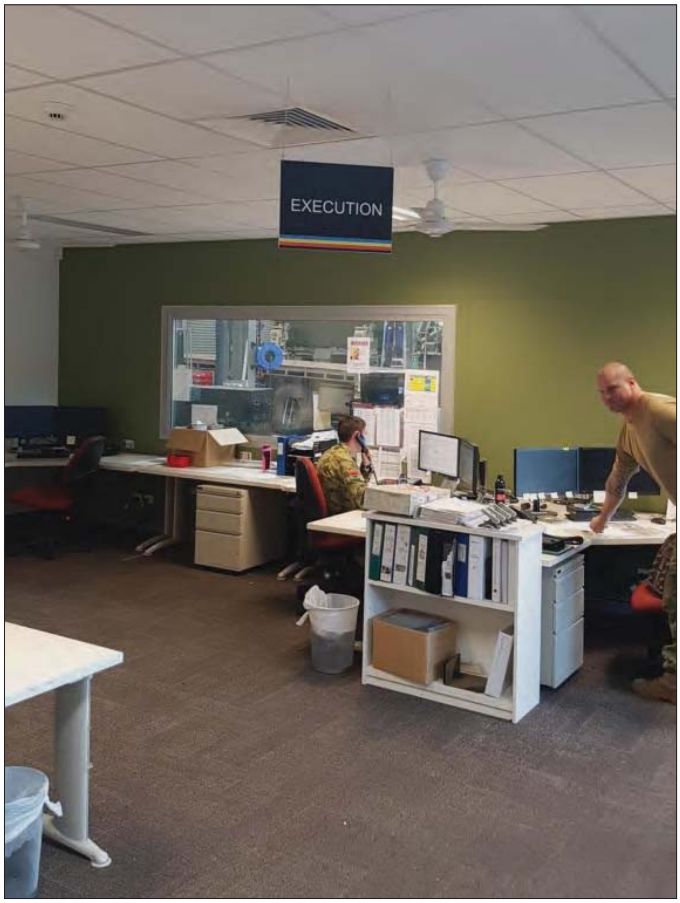
of tradesmen between the shop-floor and the tool store. We were able to achieve this through the local purchase of rolling trolleys, with tailored layout of high-use tools and always co-located on the workshop floor. Another benefit of 5S is to also use colour groups for managing equipment; we have used this on our 'croc line' by detailing what each group means for the equipment parked there.

Through EMEOPS, we have been able to standardise practices and sustain them at the desired tempo level through simply adding flowcharts and checklist templates on work stations and desks. The 5S model is such a simple and effective tool to use in any area of your workplace and like most things within LEAN Six Sigma, it is a cycle so it will have continuous relevance.

Visual aids are also a huge factor in practicing LEAN Six Sigma. Ishikawa, or fishbone diagrams, portray Cause and Effect and are perfect in visually laying all items along a path to a perceived defect. This aids to identify the focal areas for process improvement. Slightly more mathematical, Box and Whisker Diagrams, help to identify the median – an area that indicates the process variability. Variability is not ideal for a customer so this is an area where further areas can be enhanced and changed. Value Stream Mapping is another way in which we can begin our initial assessment of a process defect.

Over the course of 6 months, these LEAN Six Sigma workshops has seen a massive change in thinking for all those that attended and those who will continue on this training journey. A select number of members of the battalion were then encouraged by AHQ and

9 FSB Workshop mapping activity.



9 FSB EMEOPS Layout.

CASG to progress to the Green Belt Qualification through attending more training in greater detail. LT COL Jadhav and Mr. Basu Banka revisited RAAF Amberley to deliver this new tranche of training. This of course required the students to write and submit an assignment and sit an exam. We revisited our initial ideas to further improve on them and to also present the information to our CO so we could gain his approval to implement the recommendations made through the reports to the wider parts of the unit.

Going into more depth and being given access to more tools to aid in effecting our desire for higher customer satisfaction allowed for further improvements to be seen.

I strongly encourage other personnel from RAEME, or any CSS or Combat Corps, to undertake training within The LSSSP certification process – it is an ideal way to ensure your workforce is continuously improving business processes and maximising capability.

A LEAN Approach to EMEOPS Introduction

SGT Andrew Gorine

The 9th Force Support Battalion (9 FSB) recently conducted a review of its workshop. As a result of the review activities, it implemented a new Electrical Mechanical Engineering Operations (EMEOPS) structure and adapted its workplace operating processes. This change has resulted in a decrease in work order administrative downtime of approximately 50% over a rolling 12 month period, measured utilising VULCAN and other evidence from the Reliability, Availability, Maintainability Engineering (RAME) section. The aim of this paper is to explain the new processes followed at 9 FSB EMEOPS so that other units can assess whether they wish to implement this as best practice within their maintenance facilities.

Background

The author posted into 9 FSB at RAAF Amberley and within the first few months identified a number of deficiencies. The identification of these issues, amplified by the evolution of PLAN CENTAUR, encouraged the author and the

Technical Support Platoon (TSP) Platoon Commander to think of a new approach to workshop operations.

The initial plan was to establish a Production Control Section (PCS)[1] based on the "Six Maintenance Planning Principles"[2]. The plan has since evolved, with the facility now using ten principles. It should also be mentioned that this is not just a system based on principles: it is a culture that must be instilled within the workplace to achieve excellence.

There is a growing consensus within the Royal Australian Electrical and Mechanical Engineers (RAEME) Corps between Artificer Sergeants Major (ASMs) that you cannot have everything ready for the Commanding Officer all the time. Instead, it is important to work with the Operations cell to forecast activity demand[3]. It is the personal opinion of the author that, despite the fact that nothing can be available 100% of the time, the efficiency of the system described in this paper results in a level of equipment availability that comes close to achieving 'complete' readiness. As a result, this system assures the Commanding Officer that, within reason, they have all of their capability available and at their disposal as and when required.

The Structure

9 FSB EMEOPS currently operates using the following 10 principles:

1. keep planning as a separate department
2. focus on future work
3. component level files
4. estimate the job based on planner expertise
5. recognise the skills of the craft
6. measure performance with work sampling
7. internal key performance indicator (KPI)
8. visual management systems
9. command and control (C2)/transparency
10. strict routine

Keep planning as a separate department. The PCS sits completely separate from the members conducting day-to-day business. Desks have been arranged (within network cable limitations) in such a way that encourages face-to-face communication between the members of the PCS, in order to enhance future planning and knowledge transfer. The PCS is the first section you see when you walk into the office, preventing customers from walking too far and distracting other personnel who are working. The PCS does not get involved with the work that is currently on the floor.

Focus on future work. The PCS looks at future work and future work only. Nothing that happens in the current work fortnight goes to the PCS, as this is the responsibility of the Execution Team. Exception to this only occurs if work has to cease and be parked up for long term issues (or generated from XX – DO NOT USE Technical Inspections). In this case the PCS takes over responsibility for Date Equipment Required (DER) negotiation, additional parts planning, etc.

Component level files. Ellipse is the Computerised Maintenance Management System (CMMS) that currently keeps component level files on our equipment. The essential element in this case is to maintain data integrity with as much detail provided as possible. There is a set naming format for all work order headers, making it easy for all personnel to organise their work. Having a uniform naming convention that is known by all planners and executors allows easy visual differentiation of the current work schedule. 9 FSB utilise a formal naming convention in MILIS (Military Integrated Logistics Information System) for all work order headers which enables simpler organisation: OWNER/EQUIPMENT/ARN/TYPE OF JOB.

Estimate the job based on planner expertise. The PCS consists of experienced members and, if required, draws on experienced Senior Non-Commissioned Officers to provide methods of how to conduct work in the most efficient manner. Emphasis is placed on the PCS being educated in the ADF supply chain (with the minimum requirement being the Campus ADF Supply Chain course) to reduce the tendency to dump everything on the Repair Parts Section for rectification. The PCS are the ones held accountable for parts not arriving as they should be the ones chasing up parts as required.

9 FSB EMEOPS is separated into two detachments (see Image 1 for visual representation):

Planning. The planning detachment currently consists of a multi-trade group of personnel with a Corporal Vehicle Mechanic, and a part-time Craftsman Fitter Armament who is in training, spending two days a week in the planning department offering his expertise. There is a Sergeant Vehicle Mechanic in the location that currently conducts platoon administration; however, is able to provide expertise when required.

Scheduling. The scheduler is currently a Corporal Technical Electrical System who sits in the same area. He is available to offer expertise to planners on electrical matters when required. There is now also a Production (call in and out) Clerk that is a Lance Corporal Vehicle Mechanic, having just taken over from a civilian contractor.

The Production Clerk works together with the scheduler, who drives the flow of work in to the workshop. The workshop schedules using two week blocks, i.e. two weeks' worth of work are called in while the next two weeks are planned due to known turbulence within Army workshops. At any time, the leading hands in the work execution area can advise the scheduler to either slow down or speed up the schedule if work is being conducted quicker than expected.

Recognise the skills of the craft. The individual skill of the technician must be considered by the planner when estimating a

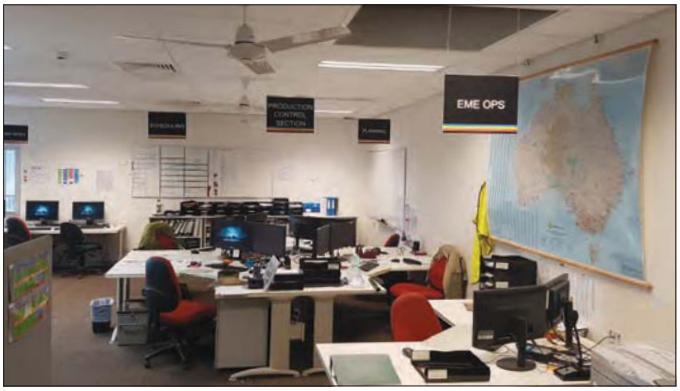


Image 1: Production Control Section.

job. The planner uses their expertise to plan the general conduct of a job, respecting the individual proficiency of the technician against the specific information and the way the work will actually be conducted.

Measure performance with work sampling. This is conducted in a number of ways at 9 FSB EMEOPS. The first theory behind this is that complex reports which have been introduced with 'chase the green' style KPI are not required for the day-to-day running of the maintenance facility. The only report used for production management at 9 FSB is the DDAPC1 (Maintenance Management Overview) Report, as it provides an overview on the back page of all the relevant KPI as per the Electronic Supply Chain Manual (ESCM) and gives a backlog figure. Local Site Administrators are able to set this up to run cyclically and be delivered automatically into an individual's Infoview (a fact that still seems to be some sort of secret around the RAEME world).

Furthermore, the work order audit list on the second tab allows sorting of the current work into a simple table that is easy to follow. An alternative to using the DDAPC1 report is to open all current work in Mincom WorkPlanner and export to Excel. It is mandatory that all the data fields are completed as per the template with no variations. Furthermore, VULCAN is used on a weekly basis in order to gauge equipment downtime (time between call in and equipment returned).

Internal KPI. 9 FSB has set the following internal KPI:

- All Maintenance Requests (MR) (unless pending further information from the requesting customer) are to be in the relevant workgroup in under 24 hours during the working week (note: 1200h Friday – 1200h Monday = 24 hours).
- All MR are to be converted to a work order within 24 hours of being in a workgroup.
- Parts are to be ordered and the job planned within 24 hours of the work order conversion.
- The time difference between all call in and out periods is 24 hours (unless the owner notifies EMEOPS that they cannot deliver or pick up equipment). This is where significant time savings are achieved, allowing early indication of potential friction points and unavailability of equipment for work.

Visual management systems (VMS). The first VMS at 9 FSB starts with the 'croc' line. There is a four colour system denoting the current status of the particular work order. When call ins and outs are conducted, customers are directed to the particular colour they are to park their vehicle at, or at which delivery point they are to drop off their equipment. There are a number of posters around the office for technicians IOT ensure they also park vehicles in the correct colour.

Templates have been created denoting the workflow of work orders through the CMMS.

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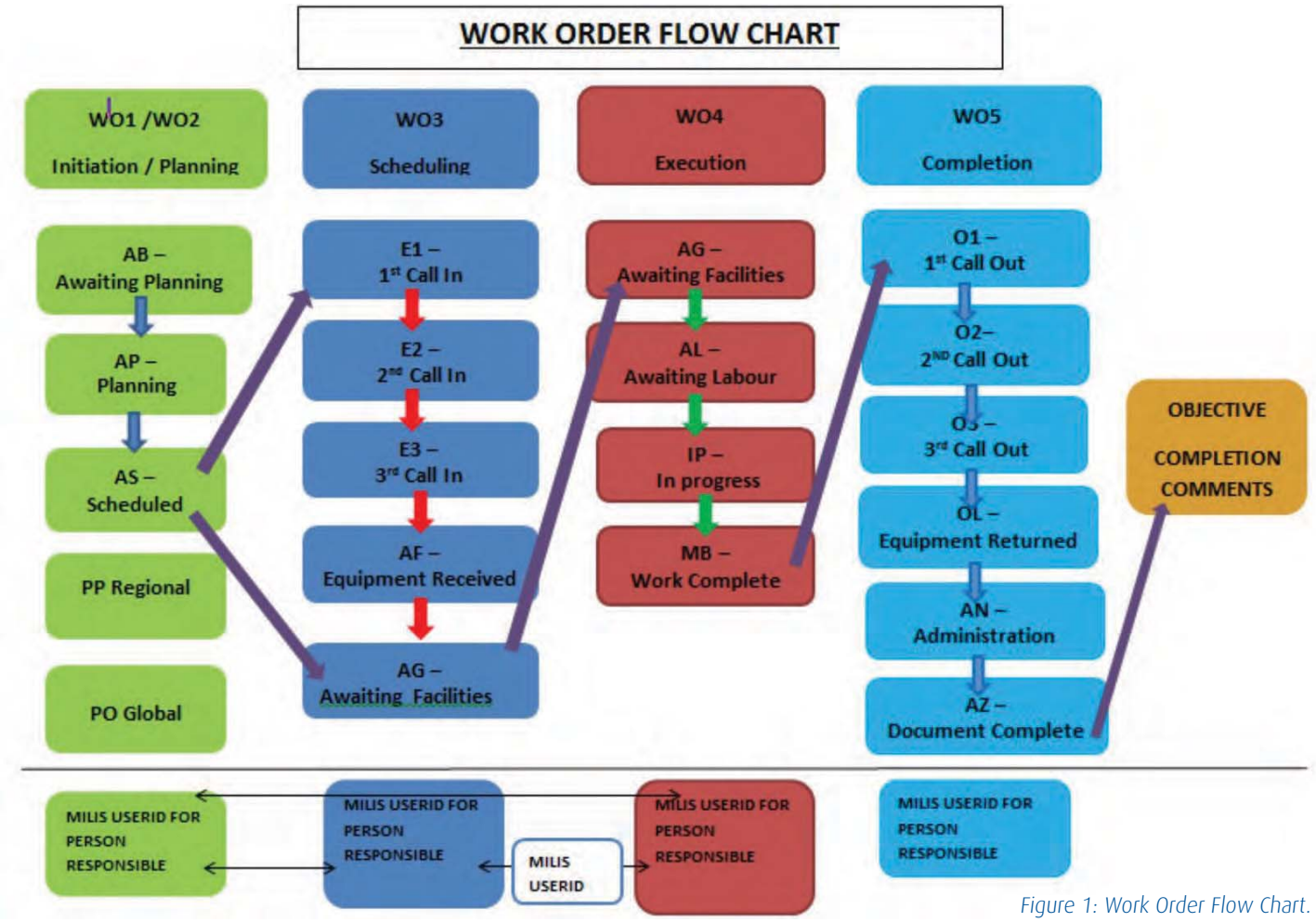

Figure 1: Work Order Flow Chart.

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C2/transparency. This is the most important aspect of the 10 principles. It starts with C2, by the EMEOPS having a group email box on the network. It may sound minimal; however, nothing is permitted to be sent to customers and external agencies from personal e-mail addresses. It must be sent on behalf of the group email, and must also carbon copy the group email box.

The theory behind this particular aspect is based upon the author's experience with personnel being in and out due to various Army commitments, which often leads to an information gap about certain jobs. This is the first part of ensuring that anyone (all Lance Corporal and above in the workshop have access to the box) can answer a query by searching through the various folders in order to provide information to a customer. Not only does this aid in keeping the EMEOPS transparent (nothing is deleted) and all informed, it keeps the customer honest and allows the EMEOPS to produce evidence of technical advice provided or evidence of multiple call in and out attempts when necessary.

Written communication is the only type permitted for contact with customers; phone calls are not used. A running commentary is maintained in the extended text at the work order header level that must be completed as the work order progresses through the execution process. This is another enabler for planners as anyone can see the status of any work order at any time if there is a request for information. This commentary is also copied into the completion comments during closure for maintenance traceability.

The practice of having a section commander run a workgroup on Ellipse is no longer used at 9 FSB. Instead, work orders are managed by user status and are assigned to individuals. This is visually represented in Figure 1 and laid out in Figure 2. The explanation of the process is below:

MSEWO1 & 2 (Initiation & Planning) screens are only to be used by the planners. The planners look in multiple workgroups for MR which require conversion. Once converted, the planner assigns the job to their USERID and uses AB (awaiting planning), AP (planning), PP (parts regional), PO (parts global), A5 (await technical data) user status whilst planning the work order. Upon completion of the planning process (when the parts are ordered), the work order is assigned to the USERID of the scheduler and changed to user status AS (scheduled).

MSEWO3 (Scheduling) screen is used by the scheduler to schedule the work. The current guidance is to plan in two week blocks of work (the author has accepted the turbulent nature of barracks routine). The flow of work is completely controlled by the scheduler. The personnel in the execution section advise the scheduler whether the flow needs to increase or decrease. Once the equipment arrives in location, it is up to the floor corporals to determine in what order they want to complete the work. The trigger for schedulers to call in work is when 70-90% of the class nine stores have been received (depending on the work order type). The scheduler uses the user statuses E1 (1st call in), E2 (2nd call in), E3 (3rd call in), AU (owner task), AF (equipment received), AW (awaiting item at trade) and AG (awaiting facilities). Once the equipment is received, the scheduler reassigns the work order to the relevant USERID of a floor corporal (based on their current workload).

MSEWO4 (Execution) screen is used by the corporals running the jobs on the floor. The only thing they have to worry about is the jobs in location at the workshop. They use the user statuses AL (awaiting labour), IP (in progress), MB (work complete), PP and PO (if growth work is found). Once the job is completed (i.e. all the physical work and electronic transactions including technical inspection has been done) they reassign the work order back to a USERID of a member in the PCS.

MSEWO5 (Completion) is used currently by the prod clerk. They conduct staff checks on the work and finalise any outstanding transactions. They then use user statuses O1 (1st call out), O2 (2nd call out), O3 (3rd call), OL (equipment returned), AN (administration) and AZ (document complete). The PCS closes the work order and scans it in to the DRMS (which also has a highly organised structure).

The advantage of the below workflow is that managers only need to be concerned about the work orders that are assigned to them. For example, a floor corporal may have 10 work orders assigned to him, knowing that he should not have any issues with parts or customers, as the equipment has already been delivered to him. The planner only worries about planning. The production clerk only concerns himself with the call in and out process. This alleviates the current practice of running a workgroup with 50 jobs jumping between different stages.

Strict routine. This is a must. The current practice is not to allow personnel to go home until labour hours have been submitted and user statuses have been updated. This may seem extreme; however, the relentless pursuit of excellence has to be taken seriously. The strictly enforced standardisation enables the creation of a 'culture' that ensures everything is completed correctly.

Other considerations. There are a number of other enablers to the new structure. The platoon commander is instrumental in this plan as they are one of the key inputs into production. The lieutenant will utilise their peer group in the unit, as well as the OPS conference, in order to gather 'business intelligence' on upcoming activities. This intelligence is fed to the workshop ASM, who injects the work

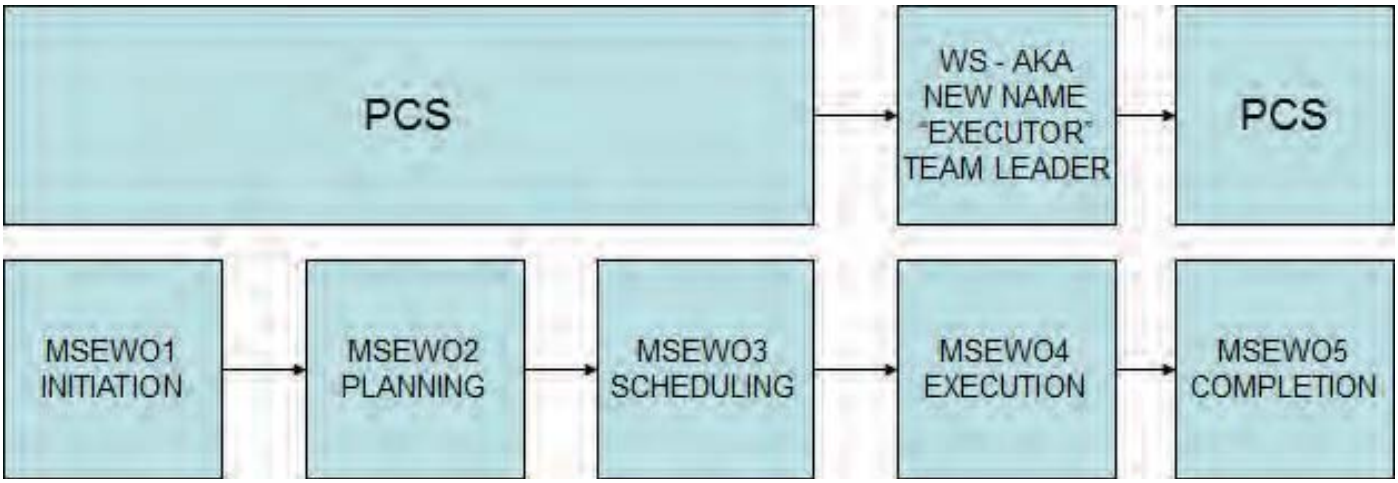

Figure 2: CMMS Workflow.

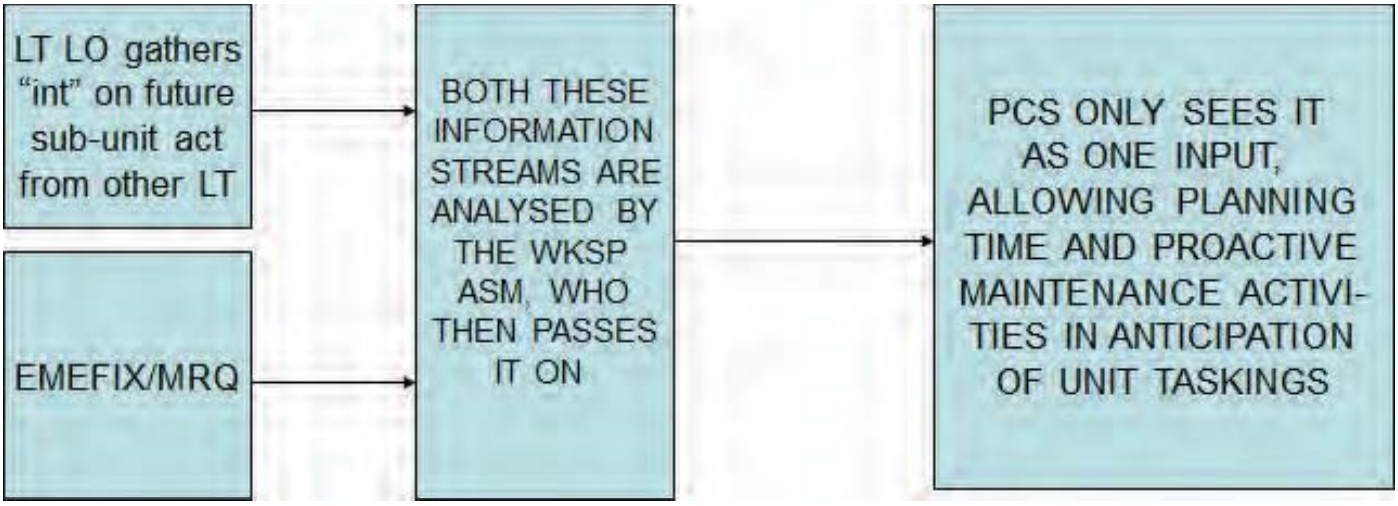

Figure 3: Business workflow.

into EMEOPS, resulting in PCS receiving only one input of work. This allows for greater planning and understanding of upcoming training activities and priorities (represented in Figure 3),

Although this structure currently applies to MILIS, it can easily be transferrable to our future ERP (enterprise resource planning) solution (SAP). SAP still generates work in a similar fashion and has a linear workflow, meaning that personnel can be assigned specific roles in the end to end process. Furthermore, as SAP is highly configurable, a system such as this (or similar) can be used during initial configuration, thereby making the process in the ERP 100% templated/standardised for all.

Much importance must also be placed on the initial MR vetting (triage) process. One must vet every single DER to confirm whether it is a real, or user perceived priority. Once the MR has been converted, the workshop has committed to the DER. The best time to renegotiate is during the MR phase. This may involve sending craftsman (or the planners themselves) out to the yard in order to ascertain the validity of the user request. An example of this is looking at windscreen chips to confirm whether they can be done at the workshop or will be outsourced via the Joint Logistics Unit. This is an important step in the process, as it allows early intervention and identification of potential future points of friction.

Growth work over 10% is referred back to the PCS by the Execution Team in order to ascertain whether the work can still be completed in a reasonable time, or will have to be rescheduled.

All members of the PCS must have, as a minimum, a MMMPLAN (planner) profile.

Conclusion

9 FSB has recently implemented an EMEOPS structure that is reaping significant rewards for the unit. The method used is essentially a LEAN approach to the CMMS and the planning world. It is recommended that any reader of this paper considers implementing a similar system as best practice in their respective unit.

About the author

Sergeant Andrew Gorine is a Vehicle Mechanic by trade. He is currently posted to 9th Force Support Battalion as a workshop supervisor.

[1] LWD 4-2 Maintenance Support 2009

[2] The Planning and Scheduling Handbook – Richard D. Palmer

[3] FORCOMD Maintenance Support Directive 2017 of 13 Dec 17

13 CSSB – 113 Workshop Coy

WO1 Grant Stinson and CPL Terry Sullivan

2018 has been a year of positive change for all of the workshop staff at 113 Workshop Company 13 CSSB in how we support the units in 13th Brigade including Infantry, Engineers, Artillery and Tenth Light Horse.

Whilst some members have been deployed on Transit Security Element (TSE) rotations this year on the home front there has been a shift of focus to increase the amount of maintenance being performed by Army Reserve staff.

This was brought about as a result of reduced ARA staff and the ceasing of civilian trade support. The key to achieving this has been through two main levers:

1. Lean Maintenance Activities, and
2. Dedicated Maintenance Weekends.

Fortunately amongst the Full time and Part time staff we have members with direct industry experience as Business Improvement Specialists and use of Toyota Production Systems.

To assist embed a Continuous Improvement culture in the workshop everyone was introduced to 5S Workplace Organisation, Lean Maintenance Principles, Types of Waste (DOWNTIME) and Process thinking. With this new knowledge at hand the current state of the Workshop facilities were reviewed and it was surprising how many things had become the' norm'. The team mapped the process for vehicle servicing and End to End POL management. The spaghetti map highlighted how inefficient our process was. The way things were set up there was also additional work (over-processing) being done for spill management.

There was great engagement within the Workshop as everyone contributed to the changes to Workshop bay designs. The Vehicle Platoons Bay Plan is simple and visual on a large whiteboard which allows ready reference by workshop members and briefings of progress.

Workshop Design Brief.

In between swinging spanners on subsequent maintenance weekend's each section worked on their bays to continually improve the layouts, the locations of equipment and tooling juggled around for safer and more efficient maintenance.

I have had great feedback from the team. For the first time in a long time they understand why changes are happening, have been able to provide ideas to how bays are laid out and then enabled to make changes that is making their work better.

Whilst we still have plenty to do I am very proud of all our tradies who have taken up the challenge with Lean Maintenance and parading more often to swing spanners on dedicated Maintenance weekends. Special thanks to CPL Terence Sullivan our in-house Toyota specialist who has taken a lead role in the Lean Maintenance Deployment and shares some of our Lean Journey below.

Set up Vehicle Bays.

Maintenance Weekend.

Lean to me: CPL Sullivan

I was posted in Jan 2017 as a VM CPL and am currently in EMEOPS. Due to reduced workshop manning, all maintenance needs to be carried out in the most efficient and productive way.

Vehicle platoon lost two Full time CPL's and one crafty at the end of 2017, this reduction in manning has made production in vehicle platoon heavily reliant on Reservists, with the odd job going to JLUW.

This required lean maintenance principles to be introduced based along the same lines as KAIZEN; the Japanese word for improvement, I used this when I worked for Toyota in CIVI street to keep productivity as efficient as possible; working smarter, not harder.

To implement lean maintenance at 113 Workshop Coy, 13 CSSB the following actions were carried out in vehicle platoon:

- The amalgamation of two facilities into one, setting out specific bays for specific vehicles,
- The acquisition of an FLSP, set up for PMV servicing; to stop the requirement of pulling the pack every service to only pulling the pack for 40,000km/1000hr services,
- Relocation of waste oil/coolant recovery points to minimise downtime.
- Auditing of specialist tooling and tool boxes replacing deficiencies.
- Labelling specialist tools and having them catalogued in folders with photos for ease of identification.
- Setting up of parts collection point/distribution point and the eradication of partial parts issue on Req's unless requested.

HQ FORCOMD – Technical Management Section Update – Maintenance Reform

CAPT Tom Hegarty

Maintenance culture within Army has been an evolving beast over the past 24 months. A number of positive changes have been implemented within the Forces Command maintenance space, many of which have been driven by Technical Management Section (TMS) of G4 Branch, HQ FORCOMD. At the end of 2017, the Forces Command Maintenance Support Directive 2017 was released which set the tone for maintenance in 2018 and beyond. On commencement of the year, a number of manning changes within TMS took place. LTCOL Alex Palmer took the reins from LTCOL Paul Nelson as SO1 Technical Management and MAJ Shandelle Welbourn posted out leaving the SO2 Technical Management position vacant. CAPT John Peterson stepped up as SO2 while CAPT Tom Hegarty remained deployed on operations until July. Upon Tom's return, John tagged out for his turn on ops and Tom stepped into the SO2 role. WO1 Dave McBean, WO1 Tim Costin and Ms Jeanne Arifin have continued to do all the actual work as usual.

For the past 12 months, the main effort for TMS has been maintenance reform. TMS has been focused on investigating solutions that remove undue technical and non-technical (operator) maintenance liability whilst still ensuring equipment is safe and fit for purpose. This focus has encompassed a number of different areas; however, the stand out effort has been in the Non-Technical Inspection (NTI) space. NTI are used to identify equipment faults, missing components, system failures and up-coming maintenance; consequently ensuring that equipment is safe and fit for purpose when required. The transition to a modernised force has seen incremental technological advances, a bias toward repair-by-replacement or Original Equipment Manufacturer (OEM) repair maintenance methodology, low replacement costs and an unbalanced use of specialist items. Despite these advances, administrative processes governing the conduct of NTI had remained unchanged.

A Test & Evaluation (T&E) activity within FORCOMD commenced to assess the effect of suspending mandated NTI had on the technical integrity across a range of different equipment fleets. To ensure suitable equipment types were included in the T&E, the equipment had to meet one or more of a number of possible conditions. For example, the equipment had other checks in place to identify potential maintenance issues (ie. first or last parades) or it was simple in nature, meaning that it would either work or would not. Alternatively, the type of equipment and quantity within the system was such that failure did not present risk to personnel or availability. Control and test groups were utilised and the suspension of NTI was enacted across 80 equipment groups within FORCOMD from 31 March 2017.

The T&E concluded in May 2018 with the results giving comprehensive indication that the suspending of mandated NTI has no detrimental effect on the technical integrity of land materiel. In a number of cases, the test group (no mandated NTI conducted) actually had less maintenance liability than historical norms. It was conservatively calculated that the suspension of mandated NTI across the 51,318 items within the test group resulted in a reduction of 5095 work days of NTI and administrative tasking, noting the equipment husbandry operator maintenance remains extant. As a result of this T&E, the cessation of mandated NTI within FORCOMD for relevant equipment fleets has been approved. This approval is documented in the AE425 (Maintenance Variation) available on the TMS SharePoint site.

The suspension or removal of mandated NTI does not remove the requirement to keep our equipment safe and fit for purpose. It empowers commanders to make maintenance decisions for their own equipment and maintain their capability. NTI forms for equipment remain available via Webforms. Commanders at all levels still have the ability to direct NTI within FORCOMD, they are just not mandated to do it for everything all the time. Operators must continue to be responsible and utilise equipment correctly and report suspected faults.

So what else has TMS been doing for the past 12 months? Continuing on with the theme of NTIs, TRF staff within FORCOMD Formations and Training Centres have been working with TMS to identify and remove the mandated NTI requirement for all non-MILIS tracked items (NTEHR). Further, the mandated NTI schedule for PMV Fleet of Vehicle (FOV) has been reduced from 30 to 90 days. TMS is also supporting AHQ and CASG in changing the required 12 month servicing schedule on GWagon FOV to every 24 months. On top of this, TMS has been actively supporting Plan Centaur's Maintenance Task Analysis (MTA) of the M1A1 tank through engagement at a number of workshops across the country.

The delamination of Transparent Armour (TA) on PMV FOV has been a recent significant issue for all units with PMV. TMS has taken a pragmatic approach to this problem and applied some common sense thinking to enable the continued use of PMV so long as the windscreen delamination does not extend into the area that the windscreen wipers would clear. If on exercise or operations, the vehicle's windscreen could be affected by mud and dirt causing poor visibility. In this scenario, the driver would clear the windscreen with the wipers and continue operating the vehicle. If the delaminated area is caked in mud anyway, the delamination becomes somewhat irrelevant. With this in mind, alternate Command Endorsed TA inspection criteria has been released to ease the impact this issue is having on units (AE425 available on TMS SharePoint site). This simple approach has allowed approximately $600,000 worth of TA to remain safely in use with the supply chain now able to address critical TA capability shortfalls where they are needed. More in the 'TA space' will develop over the next 6-12 months.

Another area TMS is currently working on relates to containers. Currently, there is no RU classification available for containers. TMS is investigating the benefits and associated risk of introducing an RU classification with no expiry. This classification would be for those containers where a commander has identified that it is no longer required to be used for transport on public roads and is effectively a unit storage shed. Amongst other stipulations (such as how the equipment is lifted etc), this classification would state that the container 'must not be transported on public roads'. Reclassification to FF IOT utilise the equipment on public roads would require the full TI with any required maintenance performed first. An AE425 is in progress.

It has been a busy 12 months since the last Craftsman, we don't expect it to change. HQ FORCOMD is seeking further input from all units on wider maintenance reform. TMS are looking at maintenance (technical and non-technical) reform holistically and are keen to get your input and ideas to further progress in this area. Further information on the T&E and other areas mentioned can be found on the TMS SharePoint site below. TMS are keen to hear your maintenance issues (there is every chance they are echoed by your ASM) – We can't fix what we don't know.

TMS SharePoint: http://legacy/TeamWe2b2010/ARMY/forcomd/hqforcomd/g4branch/TechnicalManagement/

About the author – CAPT Tom Hegarty is SO2 Technical Management in HQ FORCOMD.

Simulation & Spanners: Contemporary Aviation Technical Training

CAPT Michael Fairbanks-Smith

Since the 1970s the Rotary Wing Aircraft Maintenance School (RAMS) has provided technical training to aircraft technicians, engineering officers, aircrew and civilian partners. The school has taught fixed and rotary wing aircraft systems of greatly varying technical complexity, which is today observable by comparing the in-service Kiowa and its contemporary replacement, the Armed Reconnaissance Helicopter (ARH).

When comparing these platforms it is easy to recognise the technological advances that have occurred within a relatively short period. Composite airframes replacing aluminium, fly-by-wire replacing mechanical flight-controls and glass cockpits replacing analogue gauges have become a staple of military aviation. As the complexity of aircraft increases, so too does the training requirements and challenges in terms of trainee ability to assimilate information, but also the ability of schools to deliver efficient, effective and high-quality training.

This article presents contemporary technical training methods utilised by RAMS to meet these challenges both now and into the future.

The days of trainees being issued an echelon bag filled with manuals and overhead projector delivered lessons are behind us. Whilst once appropriate, it is now intuitive that we teach trainees using a similar environment to that in which they live, surrounded by technology.

Blended learning is a technology based flexible approach to the design, development and delivery of learning and teaching. It is a hybrid of online computer based and traditional face-to-face learning enhancing one-another[1].

For our purpose simulation may be considered as a component of blended learning. RAMS utilises Blended Learning and Simulation (BLS) training for the MRH90, ARH and CH47F. Not solely, but in ever increasing proportions, BLS is finding a preferred place having proved itself as an effective tool for meeting the challenges of a contemporary, highly complex technical training environments.

At this point it is important to note that BLS does not completely remove the requirement to train hands-on skills through traditional on-the-job (OJT) methods, being the swinging of spanners so to speak. For some therein lies a controversy whilst for others it poses a key question. What is the correct balance of OJT to BLS?

Figure 1: MRH90 AST trainee workstation performing a simulated component R&I whilst interacting with the Interactive Electronic Technical Publication.

The frustratingly non-committal answer to this question is, it depends. It depends on trainee ability, on prior experience, on the required graduation standard and it depends on generational requirements. Whilst trainee ability, experience and graduation standards are readily accepted, it is generational differences which are proving increasingly important. Younger trainees not only accept, but thrive within tech heavy learning environments. It would be folly to ignore this as a method of achieving learning outcomes.

As a result, 3D animations, simulated component R&I utilising a mouse and screen combined with the use of simulation devices has become the interface between the classroom, OJT and ultimately the workplace. It has reduced previous reliance on OJT and resultant access to costly aircraft and components whilst increasing trainee throughput, reducing gaining unit training liability and producing skilled and capable personnel. The once clear demarcation between the classroom and OJT is becoming increasingly less defined for the right reasons.

During 2018 RAMS is introducing several BLS training initiatives to include the following.

MRH90 3D System Animations

The RAMS developed MRH90 3D Systems Animations largely removes the reliance on physical training aids through providing animated system models which are highly portable and effective regardless of trainee numbers. The MRH90 gas turbine engine animation below displays component rotation, gas flow and start sequence information to the trainee. RAMS is currently developing time-synced narratives for these animations.

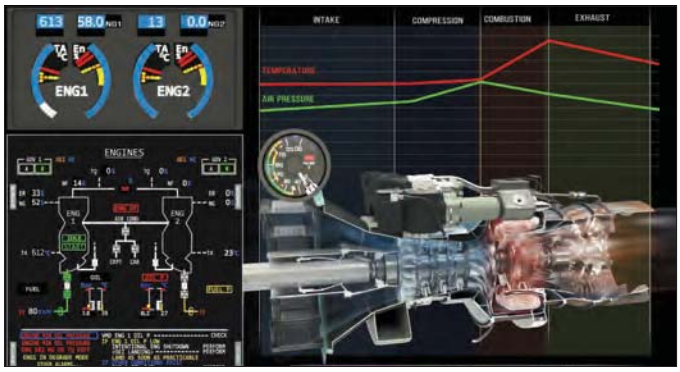

Figure 2: MRH90 3D Engine animation detailing internal rotation, gas flow paths and start sequences.

MRH90 Aircraft Systems Trainer (MRH90 AST)

The MRH90 AST comprises of 13 trainee workstations (Fig 1), two instructor stations and a functional simulated cockpit (Fig 3) allowing for system operation and checks, fault diagnosis and general familiarity with a very high level of fidelity. This realism allows for the conduct of tasks which previously required a running MRH90, reducing cost, scheduling conflicts and trainee bottle-necks whilst significantly improving trainee access, task repeatability and opportunity for exceptionally detailed instructional interactions.

CH47F Avionics Trainer (CAT)

The CAT system offers hands-on task training through the simulation of avionics systems within a fully integrated CH47F environment. It replicates the aircraft with simulated line replaceable units supporting avionics training such as fault finding, R&I, operational checks and assessment.

Figure 3 & 4: MRH90 AST cockpit and systems display screen.

CH47F Maintenance Blended Reconfigurable Aviation Trainer (MBRAT)

The MBRAT is a virtual maintenance environment trainer which uses a blend of simulation-based modelling and replicated physical controls for stand-alone or instructor led training and assessments. The MBRAT is able to collect data allowing the instructor to identify areas for improvement enhancing learning outcomes.

Figure 5: The CAT is a full-scaled avionics simulator.

Summary

BLS affords RAMS the ability to efficiently deliver quality training of complex systems in an accepted and easily assimilated manner for trainees whilst reducing reliance on costly components and aircraft. As traditional OJT training will likely remain, it stands to reason that an appropriate balance of OJT to BLS must be maintained in order to achieve graduation standards, leading us to the position of *in with the new, and in with the old* at least for the foreseeable future.

About the author – CAPT Michael Fairbanks-Smith is a senior instructor for MRH at RAMS.

Figure 6: CH47F Maintenance Blended Reconfigurable Aviation Trainer virtual environment.

[1] 1 UNSW Blended and online learning https://teaching.unsw.edu.au/blended-learning

Maintenance First, Duty Second

LT Jack Gilfedder

2018 has been a year of transition at 7 RAR, which has shone a bright light on the importance of skilled and reliable tradesman at all levels of the organisation. It is easy for a workshop to succeed when it is fully manned, resourced and receiving superior information on its vehicle fleet. However, for the majority of 2018 this was not the case at 7 RAR. As such, all craftsmen should be commended on delivering a functional AS4 fleet in the face of adversity.

There has been a great deal of lessons learned with many being learned the hard way. This is a good opportunity to highlight what we have learnt during this period and to document the exemplary performance of individuals in the organisation. This article will look to provide a scope on maintenance operations within a mechanising infantry battalion with a focus on three key areas of the maintenance system, being maintenance planning, operator and equipment management and workgroup planners.

This article is by no means conclusive but simply looks to highlight areas for growth and understanding by all three stakeholders within the maintenance system; maintainer, equipment manager and operator.

Planning, planning, planning

Generally, maintenance is not designed to be a reactionary activity; work is forecast, planned, tasked and conducted based on time or condition variables, which trigger maintenance events. These are known to maintainers and maintenance planners as a result of known or accumulated data on the LogIS or component failure rates. These have been developed through appropriate testing and over historical usage by the OEM or within the military, allowing for the creation of the maintenance scheduled tasks allocated to each platform. This allows the prediction of a maintenance liability in first and second line support units. In spite of these scheduled tasks there are numerous variables and complications in first line units that affect their conduct to the required standard or within the set timeframes.

The deconfliction of superior commander's intent from 1 BDE down to OC Admin Company can create conflicting schedules and support requirements that cannot always be met. In spite of all of these variables within the work environment, a workshop must be able to adapt and overcome, to ensure that the maintenance effort is aligned to the unit effort.

The fallacy has emerged that it is the role of the workshop to ensure 100% equipment availability at all times during the FORGEN Cycle. Re-alignment of expectations at the command levels can enable the workshop to conduct the required training while keeping its parent unit at the appropriate level of readiness.

While negotiating the difficulties of a first line workshop the importance of planning reactionary maintenance began to be become more apparent. The correct analysis of outstanding tasks, available work hours and the flow of parts through the RPS reduced an overwhelming, time poor situation to a manageable weekly schedule, while enabling additional training to be undertaken. Looking at the outstanding work within the 7 RAR workgroups, there are 2900 items that require attention on the UEHR and the workgroups contain greater than 500 hours of work.

To external assessment this would look like the workshop is far behind and unable to surmount that task. Once analysed and broken down the workshop does not have enough available work to fill the week let alone an unachievable task. If the workshop is purely reactionary then the entire day is consumed in an ever evolving decision cycle that is disrupted by the shifts in priorities of effort from the various authorities.

Love your vehicle

Vehicle husbandry harks back to the cavalryman looking after his horse through developing an intimate bond with the animal and having an in depth understanding how to maximise its performance. In the modern context it is focused on the operator conducting maintenance tasks, requesting the correct stores and being aware of likely faults and flaws in his vehicle.

In a resource constrained environment the careful management and conservation of all resources is critical to producing a capability. Specifically, for the infantryman, the innate knowledge that the vehicle is your lifeline, your support network, your communications node and your main weapon system, is not a sentiment instinctively felt by an infantry battalion. This is an understanding forged over sustained immersion within mechanised operations, which has led to the infantryman being able to better comprehend their equipment and diagnose a maintenance issue to the same extent as a junior craftsman. This is a skill that has been lost at 7 RAR but something that the organisation is working hard to revive.

Such a culture needs to be embraced across all personnel within the Battalion and requires an adult approach to the passage of both skills and knowledge from the tradesman to the infantryman and the cross pollination of concepts at the command level. The emphasis moving forward has to be on education and the dispersion of knowledge throughout all ranks and roles in a mechanised battalion, without which the organisation cannot grow a culture focused on capability generation.

The importance of having an integrated A1 Echelon embedded within the rifle companies allows for a familiarity between Mech Corporals, Crewys, Drivers and the Craftsman. This organisational structure has historically been the backbone of more equipment heavy units enabling the flow of information to be comfortable and constant.

However, the withdrawal of CSS personnel from first-line to second-line under CSS CONOPS has reduce the flexibility of the Admin/ Log Coy to provide such effects, instead reliance on an increase in maintenance effect rearwards seems to be the new MO, one which is contrary to long-standing mantra of repair forward. This limits the ability of vehicles to be repaired while on the battlefield and can lengthen the lines of communication rearward further exposing the Battalion to becoming isolated in the advance. This was seen on exercise Predators Run where 18 maintenance and logistic requests were not filled as C Coy advanced down the escarpment.

The FRT was required to accept greater liabilities and conduct controlled parts exchanges when there were parts in the region. Vehicles were close to being grounded through simple parts shortages and stores requirements. This lengthy line of support places greater responsibility with the second line units in predicting the requirement of the units it supports. Therefore, the sharing of both extrinsic and intrinsic knowledge needs to go both ways to ensure knowledge gaps are reduced.

With A1's pushing further up into the battle space, the RAEME

craftsman must now be a highly competent Mechanised Crew Commander and be able to participate in assaults and effectively engage the enemy. This tactical acumen is best learned through integration and practice both within the training establishment and tactical training up to ALT5 and under the command and tutelage of the mechanised infantry CSMs.

Empowerment of NCO's

The integration of A1's shines a spotlight on the importance of competent and confident JNCOs in RAEME. While they may not command a large number of individuals, the decision of the FRT commander may enable or disable an entire Mechanised Company. 7 RAR WKSP learned the importance of empowering our FRT Commanders on Ex Predators Run 18 where minor issues caused major delays due to the FRT lacking a clear understanding of the maintenance effect.

Technical responsibility will always lie with the ASM however he does not possess the ability to be omnipotent and advise on all technical decisions occurring in the field. Through experiencing various technical problems and their solutions, the workshop and its JNCO's can begin to understand what they are capable of achieving and what they can make a decision on. The ASM needs to be able to trust that his JNCO's will make decisions in line with his intent and conform to his technical guidelines.

Whilst in the barracks environment, this empowerment becomes tantamount to the smooth functioning of a workshop and the release of the ASM to conduct higher level tasks. If the ASM is constrained in the management of work groups, managing individual duties, assisting EMEOPs and managing daily administration, then his wealth of experience becomes negated by such tasks.

Through empowerment, of the CPLs to think outside the box and understand how their practices influence the organisational tempo, the ASM can be released to petition changes at the BHQ level and influence strategic decisions across the force. This in turn creates a better working environment for all ranks with a more defined rank structure and clearer goals at the individual, group and organisational level.

Ongoing analysis of shortfalls in the maintenance cycle by the JNCO's can further lighten the workload on the craftsmen. This is exemplified by the implementation of oil sampling replacing the 3 month servicing task that was spearheaded by ASM 7 RAR through advice and recommendations from the VM CPL's.

Conclusion

This has been an intense year for the workshop at 7 RAR and has prompted immense growth and development at all ranks. The first conduct of exercises with mounted companies since the de-mechanisation of the unit has provided some very unique challenges and some excellent learning opportunities for the unit as a whole. The new CSS CONOPS further complicates a fluid maintenance situation and provides additional difficulties that would be similar at all units.

In order to push forward and develop further the 7 RAR Workshop needs to actively implement the lessons learned from this year as the Battalion moves forward to certify as the RBG. A1 Echelons need to be cemented as an active tactical element of the companies and the familiarity that will facilitate the required knowledge growth will shortly follow.

The Workshop leadership team needs to take a more active role in the education of all individuals both up and down the chain of command. The intent is to formalise maintenance and fault finding lessons in a "Mechanise Maintenance Handbook" to be distributed in every vehicle. Lastly, the development of JNCO's needs to continue.

Further emphasis on the allocation of time to professional development of our junior leaders to produce not only a good tradesman but a tactical manoeuvre commander who understands the commander's intent and can achieve the task within the technical intent of the ASM.

There is still a long way to go for 7 RAR to become a truly mechanised fighting force however it has been a successful year and all tradesman must be commended on their performance and application to the task.

About the Author

LT Jack Gilfedder is employed and the Technical Support Platoon Commander within Admin Coy, 7 RAR. This paper is a reflection piece on the observations from a maintenance perspective through the journey of mechanising an Infantry Battalion throughout 2018.

Maintaining the Modern Deployable Joint Force Headquarters (DJFHQ) 1st SIG REGT Forward Repair Group (FRG)

Ex HAMEL 2018 saw the 100th Logistics Support Squadron (100 LSS) deploy to Tiger Hill in Shoalwater Bay Training Area for the period 28 May – 05 July in support of DJFHQ and coalition partners. 100 LSS deployed as part of the 1st Signal Regiment, whose role is to provide Computer Information Systems (CIS) and Combat Service Support (CSS) to the HQ. At its peak, over 600 personnel from across Army, as well as DFAT, Navy, RAAF and US Armed Forces personnel resided on Tiger Hill.

Amenities were provided by a contract solution and consisted of a 14 stall shower block with hot, pressurised water, 30 flushable toilets and a series of bucket showers (absolute luxury). Water was resupplied to the HQ by the 2nd Force Support Team, part of the Combined Force Support Group for the exercise, and consisted of 30,000L deliveries by Bulk Liquid Water Tanker (BLWT) to refill the nine 10,000L tanks in location. Water usage was approximately 22,500L per day for the amenities and another 5,000L of potable water for drinking and use by the kitchen.

Technical Support Troop deployed a Forward Repair Group (FRG) consisting of, on average, 24 personnel (1/23). The FRG had the primary role of establishing and maintaining a Field Power Distribution System (FPDS) to supply:

- 80x accommodation tents
- 38x Base-X 305 tents containing DJFHQ working areas
- 49x 18 kW Environmental Control Units (air-conditioners)
- 309x 15A, four socket 240V, distribution boards
- >270x fluorescent lights
- A field kitchen including two brand new kitchen containers
- 101st Signals Squadron
- A Role 1 Medical Facility in a weather haven expandable shelter

To power the dependency five 60kVA generators were deployed in-conjunction with six 120kVA generators. At any one time four of the 120kVA generators would be running and two of the 60kVAs, the others were held in reserve and used to cope with surges during peak demand periods such as the afternoon heat.

- 43,200L of diesel was consumed by the generators
- 18 generator services were conducted using a total of 360L of engine oil
- Over 10km of heavy duty cable was rolled out, weighing up to 1kg per meter. This doesn't include the large quantities of extension cords run throughout the HQ and accommodation.

The FRG fulfilled its enduring role of providing integral repair and recovery support to 1 Sig Regt, DJFHQ and assigned force elements. Essential support was provided to the deployed element by the Rear Echelon, consisting of 14 personnel, expediting repair parts and conducting liaison with JLU. The FRG conducted over 2200 hours of trade tasking broken down into the following areas:

- Electrical: >2000 hours in establishment, maintenance, collapse and testing of the FPDS
- General Engineering: 65 hours of repair and light fabrication work + numerous additional services of tradesmen in estate and facilities infrastructure maintenance roles
- Electronic and Instrument Repair: 5 hours ISO Commander's Tactical Party (four PMVs)
- Vehicle Repair: 75 hours
- Recovery: 8 hours + manning a Recovery Post from 02-04 Jul 18.
- RPS: >60 hours, both deployed and in barracks
- Volleyball: Daily, 1630-1730h. An International Competition was conducted with the US 76 IBCT in the later weeks, the overall result being an agreeable draw.

Whilst the explanations above are excellent for quantifying the FRG's contribution to the exercise, it shouldn't detract from the quality of the services provided by the dedicated Craftsmen and JNCOs of the Troop, often in the conduct of General Duties roles and ad-hoc tasks required to maintain the Tiger Hill establishment and those passing through. The qualitative aspect of their performance was most notable in the sheer variety of dependencies supported often for tasks outside the scope of their trades; applying sheer RAEME ingenuity to prevail.

The FRG's location at Tiger Hill enabled it to support (at least in some capacity) numerous Units and Formation HQ throughout the exercise including; 3 CSSB (3 CSST), 6 ESR, 16 ALR, 7 CSR, 7 Bde HQ, 2 GHB, 1 Avn, 20 STA, US 76 IBCT, 1 MP Bn, 6 CS Bde, 1 Int Bn, 10 FSB (2 FST) and BG Waratah. The FRG was also ideally placed to provide SME advice on a variety of topics to inform the following agencies:

- CASG – to inform L8120, L8140 and L8190
- G4 – to inform L8120 MHE
- QinetiQ and DSTO – to inform L8140 and Power and Energy requirements in general
- 17 Bde HQ, Force Modernisation – to inform catering capability and acquisition of more ARKS Army wide
- School of Artillery – to inform gun line (Battery level) power requirements and methods of supply and reticulation
- Divisional HQ J2 Cell – to inform Level 5 SCIF container construction and design finalisation

As usual, the RAEME underground made things happen and was the most effective means of communication around the battlefield, Tiger Hill acting as one of the main hubs.

The exercise saw a relatively small number of technical repair tasks completed and a large effort towards miscellaneous base maintenance, this is attributed to the both static nature of the DJFHQ establishment and the inherently substantial peripheral infrastructure.

Overall, Ex HAMEL 2018 was an excellent platform to progress Power and Energy related modernisation efforts and the 1 Sig Regt FRG made the most of any opportunity to influence future systems.

RAEME Officer Basic Course – Ground (ROBC-G) Technical Command and Control

Since the inception of the Corps, RAEME has always had to deal with the provision of technical advice to Commanders and managing the practical aspects of providing the maintenance effect to empower the combat punch, of the Army. This has always required a positive symbiotic relationship between the Officers and our Artificers – across all the ranks and trades.

To build such relationships requires clear roles and responsibilities, and most importantly a solid foundation established through training at each requisite rank level. In 2017, an opportunity was identified and supported by Army Senior Leadership that RAEME junior Officer training should be enhanced to provide them additional technical knowledge and skills to assist them in their roles as Workshop Commanders. A new course was devised, the RAEME Officer Basic Course - Ground (ROBC-G).

The course design was a collaborative effort between ASEME and ECTD Group, ALTC. It is through the key efforts of MAJ Tim Hajenko, who designed the technical foundation module; CAPT Jonathon Lawson who designed the command module; supported by MAJ Mick Fry, MAJ Alexander MacDonald who inserted cotemporary workshop experience; and MAJ Ed Stokes who lead the final assessment for the command module. The course would not have been successful without the assistance of a number of visiting lecturers from 1 Bde, CASG, 17 CSS Bde and AHQ.

Aim and Course Overview

The course began with a three week technical foundation module. After an introduction to the ideas underpinning maintenance theory and the mathematical tools used in maintenance analysis; the students received presentations from visiting lectures from DTRA, DLOG-A and LEA's RAM Section.

These presentations gave them an introduction to the entire maintenance process and their role as workshop commanders within it. It introduced the equipment lifecycle, provided an insight into how maintenance regimes are developed through the RCM process and the regulatory framework Army uses to govern its maintenance processes. The final week focused on how to apply Army's risk analysis process to an equipment maintenance problem through a Technical Exercise Without Tools. Students learnt how to combine technical advice with their analysis of the commanders plan to develop risk based maintenance COAs which they briefed to the CO.

The foundation module was rounded out with a site visit to Land Systems Division where they were introduced to the various areas where they could reach back to receive deeper level support and advice in their roles.

Feedback from students:

The students were a mix of newly graduated General Service Officers (engineers and non-engineers) and Direct Entry Officers. Some had spent a few months in the Units and some were on back-to-back courses and were yet to march into their Units. This blend of experience was excellent from a mutual learning and experience-sharing perspective, which immensely benefited the course.

Overall, the eighteen ROBC-G graduated officers unanimously expressed that they were now better equipped with job relevant skills, knowledge and technical support network after attending this course as compared to when they graduated from LOBC.

Next steps

The trial course has been successful in preparing the graduated officers for commencing their careers within the Land Materiel maintenance management domain. Some aspects of the course will be adjusted further based on the feedback from students and instructors. The next course schedule and resource awaits the outcome of the trial course Learning Review that will be established in the coming months; but the ROBC-Ground will remain as a new course to build the technical skills required of a RAEME Officer.

Back Row (L-R): LT B. Burton, LT H. Fairbairn, LT D. Gray, LT F. Banks, LT I. Uys, LT K. Wang, LT L. Woodford.
Middle Row (L-R): LT P. Mueller, LT M. Payne, LT J. MacKenzie, LT K. Lee, LT M. Bechler, LT E. Cox, LT N. Hood, LT C. Worsley, LT A. Tomlin.
Front Row: LT D. Lloyd, CAPT A. Babu (CM), MAJ T. Hajenko (Instructor), LTCOL J. Bouloukos (CO), CAPT J. Lawson (PM), CAPT D. Garton-Dodd, LT R. Plackett.

Centenary of the Battle of Le Hamel

David Clarke

Australian Corps Memorial Le Hamel 4 Jul 2018.

There would not be many Australian Army members that have not heard the word Hamel. Be it as an old and bold such as myself, who worked on and taught the Gun, 105mm, Field L118-F1 & L119-F1 'Hamel'. Younger members would associate Hamel with the largest exercise Army conducts each year, in order to test the Readying Brigade, before it takes over as the Ready Brigade. However, how many people know the story of why the Australian Military chooses to remember the name Hamel?

As a trade instructor here at ASEME back when I was a WO2, I thought I'd add a bit of historical interest to the Hamel maintenance courses I was conducting by doing a short lesson on the Battle of Le Hamel as an arousal. This initial investigation opened my eyes to what an important and historic battle this was to Australia and how it was a turning point for the Allies in World War One.

I read somewhere recently, that once you start doing historical research it's like peeling an onion, once you get past the first layer you continue to find more to draw you in. This is what I found when I started looking into Hamel. It lead me to start reading about John Monash and his inspirational life, which should be compulsory reading for any military member with leadership aspirations. His combined arms tactics are the basis of how Armies plan and fight battles today. Field Marshal Bernard Montgomery, the World War II British army commander, described Monash as the best World War I general on the Western Front.

For those that are not aware of the battle, I have copied a very brief synopsis from The Army website on Exercise Hamel below:

> *The Battle of Hamel (or The Battle of Le Hamel, 4 July 1918) was a successful attack launched by the Australian Imperial Force and several American units against German positions in and around the town of Hamel in Northern France. The battle was commanded by Lieutenant General John Monash who employed the new tactics of combined arms tactics to successfully complete the battle in 93 minutes (previous battles using conventional tactics lasted for weeks or months with high casualty rates). The battle of Hamel paved the way for the allied victory in the First World War.*

https://www.army.gov.au/our-work/operations-and-exercises/major-exercises/exercise-hamel-2016/what-is-exercise-hamel-0

The above synopsis of the battle does not do the significance of this battle justice and is only the tip of the iceberg. This was Monash's first battle as The Commander of the Australian Corps, he was adamant that the infantry should not be sacrificed in an unprotected advance, hence his care to ensure that they were well covered. This was the reason he was loved and admired by his troops. Once he reached the level of Corps Commander, Monash finally got the opportunity to use his highly developed skill for meticulous planning and organisation, and to innovate in the area of technology and tactics. There were also two Australian VCs and a Medal of Honour awarded for actions during the battle. Peter FitzSimons wrote 'Monash's Masterpiece' about the battle in time for the centenary; which is very interesting.

Ultimately, my fascination with the Battle of Hamel and John Monash lead to me and my family spending three days doing battlefield tours of Polygon Wood, Villers Bretonneux, Pozieres, Mouquet Farm and Le Hamel; culminating in attending the centenary commemorative service at the Australian Corps Memorial at Le Hamel. Taking our seats on that quiet and calm morning around the memorial, I couldn't help but think back 100 years to that very day. We would have been standing atop Wolfsberg; the final objective for the battle and it would have been raining artillery shells; death and misery would have been visible as far as the eye could see. The Australians and their US Allies would have been continuing the fight by holding the ground taken from the Germans, whilst consolidating themselves in their trenches.

Assembling at the Australian Corps Memorial.

I found the service very moving; especially when the local school children planted flags around the remnants of the trenches with the occasional symbolic poppy; also when the flags of the countries involved were raised above the memorial; and when the French representative read French Prime Minister Georges Clemenceau's speech to the Australian troops after the Battle of Hamel:

> *"When the Australians came to France, the French people expected a great deal of you....We knew you would fight a real fight, but we did not know that from the very beginning you would astonish the Continent with your valour. I have come here for the simple purpose of seeing the Australians and telling them this. I shall go back tomorrow and say to my countrymen: I have seen the Australians; I have looked into their eyes. I know that they, men who have fought great battles in the cause of freedom, will fight alongside us, till the freedom for which we are all fighting is guaranteed for us and our children."*

Georges Clemenceau's speech on Australian Corps Memorial.

Flags around trenches with poppies.

Australian Corps Memorial service with flags raised.

David Clarke and CA LT Gen Rick Burr, Battle of Le Hamel Centenary Service.

I highly recommend that if you find yourself in Europe, that you take the time to do battlefield tours with a guide and pay your respects to those that served before us and made the ultimate sacrifice; it is a very sombre and sobering experience. It is one thing to read about these battles, it is a totally different thing to walk the ground the battles were fought on.

Finally, I'd like to thank my wife and daughter; Rebecca and Keely, for indulging me by spending part of their European holiday walking around these battlefields. It made the experience all the more special sharing it with them.

David, Keely and Rebecca Clarke at the Hamel Centenary Service.

Introduction to Service, Protected Mobility-General Maintenance Vehicle (PMGMV) WO1 Steven Doehnert

The Initial Issue and Familiarisation training of the new Protected Mobility General Maintenance Vehicle (PMGMV), has been completed with 1, 3, 7 Brigade Units receiving the PMGMV. 16 ALR, 7SIG REGT and ASEME having also received the PMGMV.

Under LAND 121 Phase 3B, the Army provided 37 Assault Pioneer Variants and 12 Troop Variant PMV's to be re-rolled as the new Protected Mobility General Maintenance Vehicle (PMGMV) variant. The PMGMV was delivered under the auspice of the Protected Mobility Vehicle (PMV) and the Bushmaster original equipment manufacturer (OEM) Thales.

The PMGMV is Army's ballistic and mine blast protected general maintenance vehicle enabling a RAEME forward repair team (FRT) to conduct maintenance support including light and medium grade repair tasks, across the battlefield. The PMGMV has been modified to meet current deployable standards, accept required mission fits and includes the following ancillary equipment in the designs baseline:

a. modified and enhanced hull;
b. a working at heights platform;
c. a light weight crane;
d. a reconfigurable internal stowage;
e. revamped external stowage;
f. a fixed external work bench;
g. a canvass annex with removable sides; and
h. a sustained towing capability (with a matched trailer).

The vehicles have already been put to work with a number of Units taking the new vehicles on recent Exercises. I would have to say no feedback is good feedback, with no major issues being reported. Throughout the training a number of minor issues were identified and these have been passed onto Thales for rectification. Thanks to an old WO1 VM (Ron Van Der Doorn) being the Thales Project Manager for the PMGMV and keeping in tradition of the RAEME Craftsman, a couple of Tri Colours were placed on the vehicle just to let people know who the vehicle belongs to.

Now with the vehicles delivered, the Project is concentrating on finalising the matched trailer solution. The trailer will be delivered to Units progressively from early 2019 and is required to supplement the FRT's load carrying requirements primarily when the PMGMV is fitted with the deployed mission fits. When the mission kit is fitted to the vehicle, a measured proportion of the vehicle's load is required to be transferred to the trailer to ensure the vehicle axles remain within required load limits. The trailer will be modified to:

a. allow PMGMV crew to safely ingress and egress from the vehicle with the trailer connected, and

b. provide a 1500-1900 kg carrying capacity, with an aggregate trailer mass of less than 4000kg and will include provision for the safe carriage of workshop gasses.

Workbench set up and Work shelter set up.

WO1 Steven Doehnert
Senior Technical Advisor PMV-M Program

Protected Mobility General Maintenance Vehicle (PMGMV)

CFN Ashton Walsh

It's been a long time in the making and every tradie wants them; the Protected Mobility General Maintenance Vehicle (PMGMV) is finally here. The Land Rover GMV is on its last legs, with water leaks in the cabin and a serious lack of air-conditioning; understandably the Crafties in Townsville are happy to see them replaced.

Some of the key features of the PMV variant include bins for spare parts, an external workbench awning and a fridge for "Loctite". One of the most notable additions to the PMGMV is an inbuilt crane, even with it's limited Safe Working Load at max extension; in the field environment this addition will greatly assist with conducting maintenance.

For employment in the tactical environment, compared to the GMV the PMGMV is better equipped, notably with differential locks for off road driving and a reduced sound signature; making Forward Repair Teams smoother and more time efficient in the field environment.

The new PMGMV also includes its own tool box; as a result tradies will not have to load a personal tool box on each field exercise and will only need to carry a personal tool bag at most. This will help reduce the likelihood of personal tools going missing during field exercises, causing headaches for both the owner and the Q-store.

Over all the GMV replacement is going to improve the efficiency of workshop elements in the field environment as well as raise morale due to its significant enhancements.

It's Official – Drone Racing is a Sport

MAJ Charles Phillips

Did you know: Drone racing is a sport in Army!

Since its humble beginnings a little over 12 months ago, the Australian Army Drone Racing Team (AUADRT) has led the way to challenge the notion of traditional sports in Army and now ranks itself as the newest Army Approved Sport. This new endeavour is best described by the Commander Forces Command:

'You will have seen me promoting the Army Drone Racing Team on social media. The Army Drone Racing Association now has the governance in place to develop from its genesis as an AHQ initiative to become a regular part of FORCOMD/Brigade rhythm as a Brigade Sport. The Association has been approved by DCA (endorsed by myself and the Association Patron, HLC), operates under an airworthiness instrument and has association members in each garrison location.

This is an exciting development for Army. I see it as a representation of the evolving sporting landscape that keeps up with the changing interests of our soldiers and young officers. Traditional sports such as AFL, Rugby, Netball and Touch Football have a specific place in the development of teamwork, fitness and resilience but I see a place for emerging sports like drone racing and perhaps in the future on-line gaming.

I highly encourage you and your Brigade Sports Officers to include this sport in a regular fixture of formation sports. I look forward to your feedback about how we balance the traditional sports with their known benefits to our culture and cohesion with these emerging sports.'

Did you know: The AUADRT members regularly travel across Australia to compete in local, national and international drone racing events!

In the last year alone, members have competed at the FAI World Cup in Adelaide, Australian 2017 Drone Nationals, Mission Food Australian Nationals North Queensland and will very soon cap of a very successful year at the Military International Drone Racing Tournament MIDRT at Victoria Barracks Sydney where they will be facing off the best racers from over 20 other military drone racing teams.

Australian ARMY Drone Racing Team

MIDRT2018 MILITARY INTERNATIONAL DRONE RACING TOURNAMENT SYDNEY AUSTRALIA

Did you know: The AUADRT members enjoy some very generous deals with its corporate sponsors!

Like any good sporting association the AUARDT has lined up partnerships with quality companies who are willing to support its members. Currently the list of sponsors includes well-known brands such as Liftoff, Rising Sun FPV, Impulse RC, Tiny FPV and Fatshark.

Whether you are an old pro or brand new to this sport; everyone has their eye on the next piece of kit which will give you the competitive edge. If you are looking for whoops, goggles, frames or just a ready to fly beginner kits; one of our sponsors has a seriously good deal for you.

LIFTOFF

TINYFPV .com.au

FAT SHARK RC VISION SYSTEMS

ImpulseRC

RISINGSUNFPV

Did you know: The AUARDT members are regularly called upon to represent this sport at high profile events!

As a new and captivating sport, the drive to see drone racing at significant events has exploded over the last year with representation at events such as Land Forces Conference Adelaide, Canberra Generals Day, UNSW Canberra @ ADFA Open Day, World Of Drones Conference Brisbane, CIVSEC and the Australian Youth Aerospace Association amongst others. Plans are also well underway for additional representation at events like the 2019 Avalon Airshow Melbourne where we are expecting our largest caged flying area to date.

Did you know: That over 80% of the AUARDT membership is RAEME!

As it turns out; in a sport that involves a lot of crashing, it also involves a lot of fixing. This has made drone racing a very appealing sport for members of the RAEME brethren. So weather you are a VM, a gun plumber a sparky or a black hander, this sport is one of very few that allows you to design, build and create your own competitive equipment, it also allows you to put all of your trade skills to work to stake your own competitive advantage.

If any of this sounds appealing for a Thursday afternoon sporties or a new hobby and recreational interest, then head on over to the AUARDT Facebook page and track down a representative in your area.

Happy flying! Arte et Marte

Military International Drone Racing Tournament

The Australian Army is the first military in the world to host the Military International Drone Racing Tournament; which was competed in support of the Invictus Games over the period 18 to 20 Oct 2018. The tournament was conducted in order to showcase of the sort of technology, opportunities and Science, Technology, Engineering and Mathematics (STEM) skills that exist in modern defence forces.

This exciting, adaptive, contemporary motorsport saw teams from Australian Army, UK Ministry of Defence, New Zealand Defence Force, Royal Australian Air Force, Defence Science and Technology Group, Australian Army Cadets, US Army, Royal Thai Army, UAE Defence Force and Malaysian Defence Force compete at Victoria Barracks Sydney.

GG – Australia with Australian Army Drone Racing Team.

Two of the five members of the Australian Army Drone Racing Team (AuADRT) racers are RAEME! LCPL Cam Webster (pilot name 'Cam'), VM from 3CSSB and LT Mark Sheppeard (pilot name 'Shep'), maint engineer from 5CSSB. The Army team clean swept the team events - Overall, ANZAC, Ashes and Inter-Service. Shep placed 8th overall.

The Governor-General of Australia the Honourable Sir Peter Cosgrove AK MC (Retd) was at the event to meet the teams and try his hand at operating a drone with assistance from Shep.

GG – Australia trying his hand at flying a drone under LT Sheppeard's tutelage.

Tug of war used to be the Spanner sport (along with the spanner toss and billy carts). However, Drone Racing is custom made as the sport of choice for the contemporary technician!

GG – Australia with Military International Drone Racing Tournament competitors.

The RAEME Corps Conference – 2018

The Corps conducted the 2018 Corps Conference at Randwick Barracks from 23 to 24 October. However, to make the best use of attendees' time, the Corps Conference topics were released in February. The appointed topic leaders, with assistance from volunteers within the Corps, then used the intervening six months to develop their topics, presenting the results at the Conference.

The Conference consisted of a scene-setting activity, with addresses from the Chief of Army, Director General Land Manoeuvre Systems, Director General Army Aviation Systems' representative, and the career management agencies, followed by the Head of Corps, the Deputies and the Corps Regimental Sergeant Major. The topic presentations followed the scene setting activity with each topic leader presenting their topic and the accumulated six months of work, followed by a discussion involving all attendees. The Head of Corps then summarised the resultant discussion, with the results forming the basis of the Head of Corps' Conference Brief to the Chief of Army. The brief is summarised here in the following talking points by topic along with the finalised Conference papers.

Corps Talking Points: Topic 1

How can the Corps improve the current methodology for reviewing employment categories in a rapidly evolving technological environment?

1. **Conference Outcomes.** The outcomes of this Corps Conference Topic were:
    a. That RAEME ground trades were expected to proceed to ECR in 2020 following outputs of the Land Force Maintenance Strategy 2030 (develop 2019).
    b. The essential and desirable characteristics for the RAEME SO2 Employment Category and Training Development (SO2 EC&TD), HQ ALTC. Intent is that a high performing individual in this role can influence modernisation of ECNs on a day-to-day basis (i.e. without relying on ECR to affect change).
    c. That RAEME ground trade (maintenance) ECRs require a dedicated ECR team as the staff work will exceed the capacity of the SO2 EC&TD. Identification of resources and individuals will need to occur ICW CM-A throughout 2019.
    d. The RAEME HOC cell will provide advice throughout any maintenance ECR process and supporting communication to members of the Corps. This will be enabled via a HOC Directive inclusive of a RACI matrix.
    e. That RAEME HOC requires a broader network of advisors in order to provide timely advice to an ECR (see Topic 5 – RAEME Master Artificer / Trade Sponsors).
2. **Background.** This topic was designed to investigate options for ensuring RAEME employment categories remain relevant and aligned with the modernisation of Army's land material. It was noted that the Army Employment Category Management process was undergoing significant change that would set conditions for more frequent and shorter-duration ECRs. While ECRs remain essential to achieve large-scale changes, it is equally important the employment category managers affect routine smaller-scale improvements to EC.
3. Firstly, this topic served to improve the general awareness of the ECR process amongst RAEME's senior leadership attending the Corps conference. Secondly, it was noted that RAEME's ground trades were due for ECR, but this should not occur until finalisation of the Land Force Maintenance Strategy 2030. It was also noted that RAEME's aviation trades had progressed through ECR in 2017 and the aviation engineer officer is scheduled for ECR in 2019.
4. It was agreed that RAEME needs to prioritise the role of SO2 EC&TD and provided CM-A with a set of essential and desirable characteristics for consideration. While the SO2 EC&TD will set the conditions for commencement of an ECR, based on experience with RAEME aviation and the current health ECR, a dedicated team will be required for conduct of any maintenance ECR.
5. Finally, it was agreed that RAEME HOC provides a critical supporting effort to an ECR by informing various steps of the review and communicating progress/outcomes to members of the Corps. To that end, RAEME HOC requires an enhanced network of advisors within the Corps, which will be achieved via establishment of Master Artificers and Trade Sponsors.

Corps Talking Points: Topic 2

How will the Army maintain the rapidly proliferating system of systems?

1. **Conference Outcomes.** The outcomes of this Corps Conference Topic were:

   a. The Corps agreed to the development of a Maintenance Effects Campaign Plan to be presented at the 2019 Army Maintenance Capability Seminar.

2. **Background.** This topic was designed to start a discussion amongst the Corps and to consider what skills the future workforce will likely require to provide Army its maintenance effects; in light of the ever increasing levels of integration within and between our new equipment. As the research and paper developed, it was soon realised this was a complex problem, with threads interwoven with many of the other conference topics and work already in progress across Army.

3. Considering that Army will only continue to acquire new capabilities that will be fully integrated systems (systems of systems), it was decided that the Corps should develop an Army maintenance effects campaign plan. This campaign plan will be designed to connect all of the efforts across Army as we refine our maintenance effects to support joint land combat.

4. The campaign plan will consist of five Lines of Effort (LOE) to draw together the work across Army to ensure our future maintenance support concepts are nested in doctrine, training and the TTPs to support the generation of Army capability.

   a. **Campaign plan – problem statement.** How does RAEME provide the maintenance effect required to support Army in Motion and accelerated warfare by 2030.

   b. **LOE 1 – Review of Defence's Land Maintenance Philosophy.** This LOE will leverage off work by Plan Centaur, the Land Forces Maintenance Strategy, and extend it to develop a comprehensive philosophical position articulated in doctrine, which should consider other non-RAEME maintenance capabilities. This will include the updated Corps position on Battle Damage Assessment and Repair.

   c. **LOE 2 – Review of Employment Categories.** Preliminary actions have commenced to shape the formal employment category review process. This LOE will run consistently across the life of the campaign plan, ensuring an iterative approach is maintained as new trades, skills and capabilities are developed to support emerging materiel fleets with ever increasing advanced system integration requirements.

   d. **LOE 3 – Establishing Maintenance Partnerships.** The increasing complexity of technology integration will require RAEME to cooperate with our Navy, Air Force, international military partners, industry (OEM), academia and technical training institutes to ensure our skills, knowledge and attitudes remain agile. This will ensure we are future ready to support joint land combat, across all spectrums of war.

   e. **LOE 4 – Building an Integrated Training Continuum.** The present maintenance training continuum is structured around Based Trade Training (ITT/IET) and Advanced Trade Training. Advanced Trade Training consists of specialist equipment courses and career progression courses once ITT is complete. Across the Corps, there are divergent opinions on the optimised way to deliver training to ensure Army has the right maintenance workforce, including the joint and contracted workforces. This LOE will deliver a unified, evidenced based position on what the future continuum needs to be based on the skills/competencies required to maintain advances integrated system capabilities.

   f. **LOE 5 – Information Operations.** As the campaign plan develops and outcomes are reached, we will need to ensure this is effectively communicated across Army and our maintenance partners. This will ensure that Army's future maintenance support concepts/effects are nested into our operational concepts.

Corps Talking Points: Topic 3

How will Army conduct battle damage assessment with an ever-increasing use of contractors and OEM for maintenance?

1. **Conference Outcomes.** The outcomes of this Corps Conference Topic were:
   a. That Army's Battle Damage Assessment and Repair (BDAR) capability is deficient in terms of doctrine, policy and training.
   b. BDAR is a core function of RAEME and, therefore, HOC should drive improvements in consultation with TC COMDTs and HQ FORCOMD.
   c. A set of BDAR definitions were agreed to in order to guide further development of BDAR doctrine and policy.
   d. RAEME HOC will request COMDT ALTC to update RAEME doctrine to include BDAR concepts and techniques. It is intended that this will then feed Army and Joint level BDAR policies.
   e. RAEME HOC will request COMDT ALTC to incorporate BDAR training into RAEME (ground) subject 4 courses.
   f. AAvnTC is already incorporating Battle Damage Assessment into subject 4 courses and engineer officer training following DG AVN direction of 10 Feb 17.
   g. HOC should request HQ FORCOMD G7 to include BDAR serials within collective training activities.
   h. RAEME industry placement initiatives (currently in development) will enhance technical mastery and, therefore, better enable BDAR in the future.
2. **Background.** This topic sought to understand the current level of Battle Damage Assessment capability resident within RAEME. It was identified by the topic leader and agreed by conference attendees that 'The current capability of the Australian Army to conduct Battle Damage Assessment and Repair (BDAR) on operations, up to and including high intensity warfare is deficient.' As BDAR is a core function of RAEME, the conference identified a number of options to improve our BDAR capability.
3. Firstly, it was agreed that updates to BDAR doctrine and policy (Army and Joint) was required. To inform this work, a set of updated definitions were developed for Battle Damage, Battle Damage Assessment and Battle Damage Repair. The key element of BDAR definitions was the role of RAEME to provide technical advice (with or without associated repair action) to inform a risk based decision by the tactical or operational commander.
4. It was agreed that BDAR training needs to be incorporated into individual training via the RAEME subject 4 suite of courses. It was noted that AAvnTC have commence inclusion of Battle Damage Assessment into subject 4 course and engineering officer training as directed by DG AVN on 10 Feb 17. Finally, BDAR serials should be inserted into unit-level professional development programs and FORCOMD collective training activities.

Corps Talking Points: Topic 4

How can the education and training of junior officers and artificers be developed to enhance the relationship between the workshop commander, artificier and supported element?

1. **Conference Outcomes.** The outcomes of this Corps Conference Topic were:
   a. There is a need to provide role clarity between the Workshop Commander and Artificer
   b. Proposed duty statements were developed for the Workshop Commander and Artificer. They should be included in doctrine, as learning outcomes on promotion courses and retained in a standardised RAEME format
   c. Officer postings as workshop commander and leading an EMEOPS team are critical development milestones for all RAEME officers
   d. CO's have a role to support the Corps efforts to establish the role clarity necessary within Army's maintenance sub-units, through proposed guidance from COMD FORCOMD
   e. Duty statements will be developed further along with other workshop positions during 2019 to build standardisation across Army's maintenance effects and inform future projects, such as ERP.
   f. A RAEME ADELE portal should be developed to support the professional development within the Corps, modelled off the ASEME Mastery Toolbox.
2. **Background.** The role of the junior officer within the ground RAEME stream has been contentious and lacking clarity for sometime. COMD FORCOMD has supported the introduction of the RAEME Officer Basic Course – Ground to build a technical knowledge base to rectify this deficiency. As a Corps, it was determined that role clarity could be enhanced to build a more effective Command relationship in Army workshops.
3. **Duty Statements.** Annex A provides the agreed duty statements for the workshop commander and Artificer. The HOC will release these across the Corps for immediate use within Army workshops. Further, we will request COMD FORCOMD write to Commanders seeking their support to implement the Duty Statements and the importance of RAEME officers building their core skills within their command appointments.
4. **Corps professional development.** To support, through technology enabled learning, the professional development across the Corps, it was agreed that a RAEME professional development ADELE portal will be established. This will be used to support career courses and allow workshops to deliver standardised information to enhance the command and control of the technical workforce.

Corps Talking Points: Topic 5

How can the Corps provide sound technical advice for each trade?

1. **Conference Outcomes.** The outcomes of this Corps Conference Topic were:
    a. The Corps will seek to have the Chief of Army appoint each position Extra-regimental appointments for an O-6 Trade Sponsor and a Master Artificer for the eight RAEME trade groups should be established to provide HOC, and Army, with a considered report on the status and future requirements for each trade.
    b. The Corps will seek to have the Chief of Army appoint each position.
2. **Background.** Across a number of areas of Army different silos of information relating to aspects of our trades is collated and used to inform a range of decisions. Often this information is not synthesised together to provide a holistic report on the state of a trade including; workforce health and sustainability, training concerns, future requirements of the trade to support emerging capabilities, and opinions of the trade from across the Commands and Ranks of Defence. Establishing a trade advice structure, as part of an extended HOC cell, will enable RAEME to provide accurate, timely and agreed data on each trade to support decision making processes with a single source of consolidated trade data.
3. **O-6 Trade Sponsor.** The Trade Sponsor will be an extra-regimental appointment selected by the HOC. Their primary task will be to provide strategic guidance and general support to their aligned Master Artificer. The key responsibilities are:
    a. ensure alignment of trade advice with Army's strategic environment
    b. communicate trade advice to key strategic decision makers across Defence
    c. support the extended HOC cell through strategic engagements to further enhance Army's maintenance effects
    d. support the Master Artificer in development of the annual state of the trade report.
4. **Master Artificer.** The Master Artificer will be an extra –regimental appointment selected by HOC, the Trade Sponsor and the appropriate DHOC. They will predominantly be at the rank of WO1, but for smaller trades may be drawn from the rank of WO2. The appointment will be by the Chief of Army. Their primary task will be to network across Defence to build an informed picture on the current status of their trade and offer potential insights into the future needs. The key responsibilities are:
    a. provide an annual 'State of the Trade Report' to the HOC
    b. maintain awareness of potential modernisation and other influences that may impact the trade
    c. develop a trade network across to provide views from all levels of the trade
    d. propose options to modernise the trade
    e. attend the quarterly Work Group (teleconference) to provide regular updates to the wider HOC cell on trade related matters
    f. provide communications through a range of means and publications.
5. **DHOC.** Each DHOC will provide the Master Artificer effect for their respective officer streams (aviation and ground).
6. **Tenure.** There is no minimum or maximum tenure for a person to hold any of the positions. Selection is on merit and will continue based on performance and willingness to perform the duties.

Corps Talking Points: Topic 6

What is the career development progression for soldiers pursuing the regimental pathway?

1. **Conference Outcomes.** The outcomes of this Corps Conference Topic were:
   a. HOC will promulgate a directive or Corps Instruction on the importance of, and the pathway for, progression to SM or RSM positions
   b. Information on career guidance be nested the in RAEME MAEs
   c. A briefing pack be compiled by the Corps RSM, in conjunction with DSCM-A, to inform those that show an interest in the Regimental Pathway.
2. **Background.** This topic was an analysis of the requirements and SKA to better inform and guide the Corps to ensure a healthy structure to produce future SMs and RSMs for the Corps. As an offshoot, this topic also analysed the benefit for representational and out of trade positions.
3. RAEME does not currently have a framework for identifying and mentoring prospective soldiers that have displayed the attributes and skills, or communicated their desire to become RSMs, SMs or represent RAEME to the wider Army. We need to grow theses soldiers to ensure the position of Corps RSM can be maintained and to promote the professionalism and resourcefulness of the Corps to the wider Army.
4. The Any Corps MAE details the career guidance and potential postings for soldiers to progress through the ranks to the position of SM or RSM. This information is not readily known or locatable by our soldiers and without the mentorship by our WOs, often are not able to make an informed decision whether to pursue a Regimental career.
5. As a Corps, RAEME must enable the building and promotion of an enduring structure to identify, mentor and encourage soldiers to pursue a Regimental Pathway to ensure positions within major workshops as SM are filled with our personnel. This will also strengthen the regimental progression in RAEME to fill corps coded RSM positions and provide representation in Tier B and C RSM positions in the future to provide advice on Corps related matters.

Corps Talking Points: Topic 7

What measures can the Corps implement to increase the diversity of personnel in the Corps?

1. **Conference Outcomes.** The outcomes of this Corps Conference Topic were:

a. RAEME is diverse in a number of areas, but lacks gender diversity.

b. RAEME should seek 'untapped' opportunities to improve female representation and, in doing so, improve overall gender diversity for Army (i.e. RAEME will not seek to increase female numbers at the expense of other Corps).

c. RAEME HOC will engage DRR to identify opportunities to improve female recruitment / retention outcomes for RAEME and to discuss whether a RAEME 'trade assistant' concept would be viable under the ADF Gap Year program.

d. The establishment of a network of Master Artificers / Trade Sponsors (Topic Five) will enable HOC to better understand and influence diversity within the Corps.

e. DOCM-A should pursue the concept of Corps-enlistment for engineering officer cadets (ADFA) and qualified engineers (RMC).

2. **Background.** This topic sought to understand the level of diversity within RAEME. The Corps has a strong degree of diversity in terms of demographics, employment categories, methods of entry, education levels and mixed technical/non-technical workforce. The major exception is gender diversity. Females represent only 3.9% of the RAEME workforce, which is significantly lower than other Logistic Corps (RAAOC/RACT), similar technical Corps (RAE) and maintenance trades in RAN or RAAF.
3. It is assessed that RAEME's low female representation is due to: lack of corps-enlistment for officers and perceptions about the nature of work for RAEME technicians/engineers. Furthermore, we lack 'critical mass' of female members, such that there are limited role-models in senior appointments to inspire females to join / remain in RAEME.
4. It was agreed that RAEME needs to work with DRR to improve female recruiting and retention outcomes and that RAEME will not seek to increase female representation at the expense of other Corps. One initiative that bears consideration is creation of a 'trade assistant' method of entry that will allow RAEME to access ADF Gap Year applicants (which has previously not been an option due to length of RAEME IET).
5. Finally, it was agreed that DOCM-A should pursue the concept of Corps-enlistment for engineering officer cadets (ADFA) and qualified engineers (RMC). Note that this addresses the broader issue of insufficient engineers within RAEME, but also has potential to improve female recruitment.

How can RAEME improve the current methodology for reviewing employment categories in a rapidly evolving technological environment?

MAJ Troy Hollis

Introduction

1. Army Employment Category Management ensures Employment Categories (EC) for officers and other ranks that are required to support Army's capability are aligned with modernisation initiatives, are managed effectively and are contemporary, deployable, sustainable and affordable.

2. Early and enduring engagement with the stakeholder group during Employment Category Review (ECR) is fundamental to the process. In order to maximise its effect as a stakeholder, for Army's effects, RAEME requires a united, deliberate approach to bring to bear its influence on the ECR process.

3. RAEME as a Corp is decentralised in terms of its members who carry influence across the Army. From our most junior soldiers undergoing Initial Trade Training through to senior officers in positions across the command, control and staff functions.

4. Maximum impact from the input of RAEME to the ECR requires a united voice from the Corps in the myriad of forums within which members have the ability to influence the evolution of Army's maintenance effects through the different EC.

5. **Scope.** This discussion paper will focus on the role of RAEME as a stakeholder and its input to the ECR process. This paper will not analyse the ECR process itself, it will explain the process only as much as required to identify those areas where the Corps can engage as a stakeholder. Whilst the outcomes discussed in this paper will impact all RAEME EC, RAEME aviation trades are captured under Aviation ECRs, as such this paper predominantly addresses ground EC. Industrial Relations (IR) considerations such as remuneration also fall outside the scope of this paper. The task to produce actionable outcomes has been the main driver behind development of this topic.

Aim

6. This paper aims to:

   a. **Provide** a basic understanding of the ECR process to Corps Conference attendees ITO enable informed discussion.

   b. **Propose** points for discussion at the Corps Conference regarding the role of RAEME in the ECR process.

   c. **Propose** actionable items for refinement leading up to and during the Corps Conference.

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7. The key discussion points proposed for this topic are:

   a. Discussion as to appropriateness of proposed skills, experience and responsibilities of SO2 Employment Category Management (ECM) (attachment 1).

   b. Does the consultation diagram represent the best flows of consultation that need to occur (attachment 2)?

   c. Is the allocation of responsibility for monitoring the environment and propose the initiation of an ECR to DHOCs appropriate?

8. The recommended future actions for this topic are currently:

   i. HOC remain engaged with COMDT ALTC to monitor commencement of ECR.

   ii. HOC request that SO2 ECM's job description be updated by ALTC IOT include identified requirements.

   iii. Drafted Corps Instruction be endorsed for final development and release.

The ECR process – why it is important

9. An introductory understanding of the ECR process is critical in enabling input to discussion on the Corps role within the process. The ECR supports the Army Modernisation Plan, ensuring that Army's workforce is reviewed and managed on a cyclic basis so Employment Categories are contemporary, deployable, sustainable and affordable, as well as being equitable across other EC within the ADF. The ECR is the mechanism through which the Corps must operate IOT ensure the best possible maintenance capability is provided to Army.

10. **So What?** The ECR is the process that decides what capability our workshops will have. If RAEME gets this right it has the ability to provide a flexible framework within which the Corps can provide maintenance support to current as well as new and emerging capabilities. If the Corps gets this wrong it could generate trade structures that are un sustainable and unable to provide deployable capability.

The ECR process

11. ECR are conducted over four phases with a Prelim Phase:

    a. **Prelim Phase** – Establishing the ECR requirement. Establishes the requirement for the conduct of an ECR with consideration given to new capabilities and major reforms. ECR nominations are submitted for consideration by the Army Employment Category Management Stakeholder Steering Group (ASSG) for inclusion in the ECR schedule:

       i. DCAP PLANS-A for capability based nominations

       ii. Employment Category Sponsor (ECS) for environmentally based nominations

       iii. any stakeholder can submit a nomination.

    b. Noting that major organisational reform and projects are given priority when consideration is given to inclusion on an ECR, it is recommended that any nomination by the Corps should be partnered by actions to elicit support from DCAP PLANS-A.

    c. The key output of the Prelim Phase is the production of a Terms Of Reference (TOR) to focus the conduct of the review. This is a key document which addresses the **what** of Army's changing capability requirements.

    d. **Phase One – Analyse Phase.** The ECS conducts an EC analysis including a FIC analysis. An analysis of workforce requirements leads to the development of outline courses

of action (COAs). These COAs are presented to the ASSG for approval. The chair of ASSG will issue formal guidance to the ECS on which COA are to be progressed

e. The key output of Phase One is formal guidance to the ECS on the COA to be progressed.

f. **Phase Two – Capability Design and Approval.** It should be noted that at the AHQ level, progress to the Design and Approval Phase marks the handover of responsibility from DGMOD-A to DGPERS-A. This phase involves the development of a detailed capability proposition, set timelines for development of Learning Management Plans (LMP), issue of Capability Endorsement Advice from DGMOD-A.

g. The key output of Phase Two is the capability proposition; this document addresses **how** the EC will meet Amy's changing capability requirements.

h. Other outputs of Phase Two are

i. the Learning and development strategy

ii. a draft employment specification

iii. a draft capability implementation plan

iv. requests to modify EC selection criteria if required

v. funding and resourcing identification

vi. issue of Capability Endorsement Advice from DGMOD-A confirming that the capability to be developed meets Army's needs.

i. **Phase Three – Capability Development.** Completion of all capability based documentation and approval by DGMOD-A and DGPERS-A, completion of learning packages, conduct of pilot courses, gap and sustainment courses planned, FIC arrangements put in place, and the issue of Employment Specifications, Capability Implementation Plans and Communications Plans.

j. **Phase Four – Capability Implementation.** Implementation of ECR outcomes and transition of all personnel to accord with new Employment Specifications (ES).

Outputs of topic analysis

12. The first paper on this topic, available on the topic SharePoint, discusses the initial direction for the research and development of this topic. Below is discussion on how the analysis of the topic has led to the production of outputs, discussion points and proposed actionable items.

13. **Initiating an ECR.** Topic scoping has led to the assessment that RAEME must have a deliberate methodology for considering whether to request the raising of EC for review. Per volume 1 of the Army Manual of Employment, if an EC is not raised by a stakeholder for review, it is not until a period of 10 years has passed that the EC is reviewed as part of the periodic review. During a 10 year period technology can rapidly evolve. In the previous 10 years Army has seen the following changes (amongst many others):

a. a near complete replacement of the GS light medium and cargo fleet

b. replacement of communications platforms from tactical level up

c. replacement of artillery gun platforms and targeting systems

d. a number of new aviation platforms

14. Within the next 10 years, the Boxer CRV will be in service across all ACRs (target 2026).

15. RAEME has a number of members in influential positions who can shape Army's appetite to review our EC. It is imperative that the voices of these members, and all members across the Corps are united. Consideration needs to be given to what indicators the corps should use as triggers to request a review, and who should be responsible for monitoring these indicators.

16. Is is noted that RAEME ground trades have been raised for ECR consideration, with the preliminary phase occur in 2019:

a. that they nominate RAEME Soldier trades for review as part of the next ECR cycle, or

b. that they commit to supporting a request from HOC RAEME that RAEME Soldier trades be reviewed at the next ECR.

17. An output of the analysis by RAEME SQ was a recommendation that in the future, DHOCs be responsible to the Corps for identifying the requirement for their relevant trades to undergo an ECR.

18. **Engagement with the ECR.** RAEME input to the ECR needs to be coordinated and the process needs to be recorded. IOT ensure that the RAEME voice has maximum effect during the ECR. IOT harness knowledge from members posted across all functional commands and the Army Joint Staff, the Corps must be systematic in its approach and have clear responsibilities and reporting chains for input to the ECR. The primary interface for the Corps in the ECR process is the ECS.

19. Through workgroup and analysis it is assessed that the Corps should focus on how it provides input to the cycle and how it conducts messaging to the corps. Key points in the ECR where the Corps should ensure it provides well coordinated input are assessed to be:

a. Development of the TOR which contains detailed capability statement which provides the ECS with a clear understanding of what the EC is being designed to support.

b. Development of the capability proposition.

20. Other items which the corps should coordinate effort for input are:

a. EC analysis which includes a FIC assessment

b. development of the Corps communication plan

c. drafting of the Capability Implementation Plan

d. development of LMP

e. modification of ES.

21. Proposed ECR roles and responsibilities within the Corps have been drafted in the attached RACI (attachment 3). Input prior to Corps conference regarding this RACI is welcome. It is intended that the accompanying Consultation Diagram, underpinned by the RACI, be discussed at the Corps Conference. It is suggested that the Consultation Diagram serve as the basis for the drafting of a Corps instruction on Consultation and inputs of the Corps to ECR. It should be noted that the final diagram will be heavily reliant on the outcome of topic *"How can the Corps provide sound technical advice for each trade?"* It is proposed that the outcomes from this topic provide the backbone for the Corps ECR consultation.

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22. It should be noted that the Consultation Diagram should also be interpreted for how the Corps messages. It is proposed that once positions are agreed to after consultation, or once HOC/HOCs representative makes a decision based on consultation conducted that messaging be promulgated through the Corps, via a HOC Order of the Day ensuring alignment to the Corps position. This aims to achieve a common drive to a capability outcome, rather than adhoc regional engagement based on personal opinion.

23. The RACI identified that the position of SO2 Employment Category Management and Training Design is critical in the conduct of RAEME ground ECRs. The outputs of the RACI provide a basis for the proposed experience, and responsibilities of SO2 attached to this brief. Key skills, knowledge and attitude bases identified are:

    a. experience with higher HQ staff processes
    b. broad profile including:
        i. experience in a regimental environment
        ii. project management experience desirable
    c. ability to engage with a broad range of stakeholders.

Proposed actionable outcomes

24. It will be proposed at the Corps Conference that the following items be carried forward for action:

    a. HOC remain engaged with COMDT ALTC to monitor commencement of ECR.
    b. Generation of agreed appropriate skills and experience for the member posted as SO2 ECM, with output messaged to Corps IOT enable a united Corps front for DOCM-A engagement.
    c. HOC write to COMDT ALTC IOT request that reviewed roles and responsibilities be added to the job description of SO2.
    d. Draft Corps Instruction, providing direction on how the Corps will consult across the Corps and provide input to the ECR be endorsed.

Conclusion

25. RAEME is a large, diverse Corps, in large defined by the complexity of the capability it is tasked to support. A coordinated approach, supported by deliberate messaging within the Corps is required IOT ensure that the EC are reviewed in a manner that ensures RAEME remains relevant in a rapidly evolving technological environment.

Attachments

1. Proposed experience roles and responsibilities of SO2 ECM
2. Consultation Diagram
3. RACI

Proposed experience roles and responsibilities of SO2 ECM

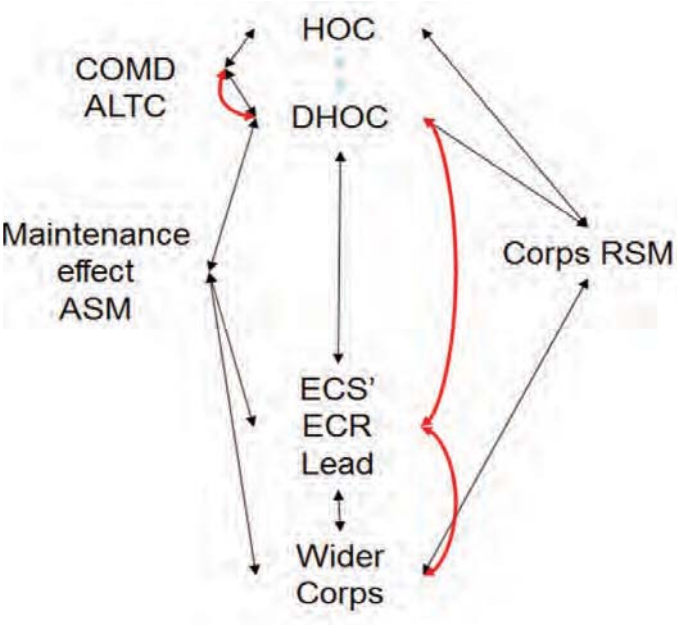
1. The proposed background and experience of a member posted as SO2 ECM are:

    a. Experience in a higher HQ staff role (Bde or higher, preferably functional command or higher). It is assessed that this will provide a selected member with the consultation skills required to not only consult across the corps but also to fuse the information collected into capability outcomes.
    b. In second or third position as a Major. Recommending that this position become a PSC position to attract a member with the required profile and motivation was discussed, however it is recommended that a member in their first or second posting as a Major will have the drive and contacts to succeed in this position. It was recommended that this person has completed sub-unit command in their first or second Major posting.
    c. Junior officer postings that include:
    i. a regimental role at the rank of Captain such as sub-unit 2IC or sub-unit OPSO IOT provide contemporary experience of workforce stressors.
    ii. a posting as an instructor as desirable. An understanding of Training Design is an inherent requirement of the position.
    d. Project management experience was assessed as desirable, however it was noted that experience base should be broad in terms of previous postings and a member with little experience external to CASG would not be desirable.
    e. Not required to be an ex-tradesman. Whether or not the SO2 ECM requires trade experience was discussed. It is the recommendation of RAEME SQ that the member will be adequately supported by members with trade experience and does not require trade experience themselves.

2. The proposed responsibilities of the SO2 ECM are:

    a. Responsible IAW the RAEME Corps Instruction on ECR for:
        i. Staffing the nomination of RAEME ECs through COMDT ALTC when notified of requirement by relevant RAEME DHOC.
        ii. Synergise RAEME input into the:
            (1) draft TOR for the conduct of RAEME ECRs
            (2) development of outline courses of action as required for any RAEME ECR
            (3) design of the capability proposition for RAEME ECR
            (4) EC analysis including FIC analysis of EC
            (5) setting of timelines for the development of RAEM LMPs
            (6) completion of RAEME ECR capability based documentation
        iii. Completion of RAEME LMPs.
    b. Provide input through consultation on:
        i. review of pilot courses.
        ii. dissemination of ECR Communication Plans
        iii. the implementation of ECR outcomes.

Consultation Diagram



RACI – Responsible, Accountable, Consulted, Informed

	HOC	Corps 1 Stars	COMDT ALTC	COL Trade Sponsors	DHOCs	RRR	Master Artificer	Bde ASM	Unit COs
PRELIM									
Determine the requirement	A	C	C	C	R	C	C	C	C
Nominate through the Workforce Review Steering group	I	C	A	C	C	C	C	C	C
Produce Terms Of Reference	C	C	A	C	C	C	C	C	C
PHASE 1									
Analyse workforce requirements	A	C	I	C	R	C	C	C	C
Develop Outline Courses of Action	I	C	A	C	C	C	C	C	C
Provide Formal Guidance	A	C	I	C	R	C	C	C	C
PHASE 2									
Design a Capability Proposition	C	C	A	C	C	C	C	C	C
EC analysis including FIC Assessment of EC	C	C	A	C	C	C	C	C	C
Set timeline for development of Learning Management Plans	I	C	A	C	C	C	C	C	C
Issue Capability Endorsement Advice	A,R	C		C	I				
PHASE 3									
Complete Capability Based Documentation	I	C	A	C	C	C	C	C	C
Approval of Capabiltiy Base documentation	A, R	C		C					
Complete LMP	C	C	A	C	C	C	C	C	C
Review of Pilot Courses	I	C	A	C	R,C				
Issue of Employment Specs	I	C		C					
Communications Plans	A	C	I	C	R	C	C	C	C
PHASE 4									
Implement ECR outcomes	A	C	R	C	C	C	C	C	C
Transistion Members to new ES	I	C	I	C	I	I	I	I	I

System of Systems (SoS)

CAPT Eamon McGinniss

The adoption and rapid proliferation of systems of systems within Army presents a complex problem to RAEME as their effective maintenance may not be achievable with our present training, trade structures and philosophy. This paper provides an introduction to the maintenance challenges posed by systems of systems and proposes that the Corp develops a campaign plan to ensure that we continue to provide the maintenance effect Army requires on its new equipment fleets.

Our society, and our Army as a part of it, are going through a period of rapid technological change. This can be seen in both the systems we use in our day to day lives as well as the new fleets of equipment Army is procuring. Potential adversaries are also adopting these technologies which force us to accelerate our fielding in order to maintain success whether in competition or in conflict.

Periods of rapid technological change are not new, a similar period of rapid advances occurred at the beginning of the last century. During that time technologies such as the internal combustion engine changed our society and the way wars were fought, through its employment in vehicles and aircraft. This proliferation of machines across the battlespace created an enduring role for people who maintained them, resulting in the birth of our Corps.

That significant advance of that technological revolution was in the advance of machines which enabled the human operator to achieve tasks that were up unto that point, only possible with large numbers of people. The recent advances in electronics, computing and information management have meant that we are able to link different types of systems together in ways that were previously not possible. These groupings of systems are often referred to as Systems of Systems (SoS).

The advances in the types of tasks SoS are able to achieve is significant. They are able to do many tasks that were previously only possible with a human operator and in some cases, they can perform tasks that were not possible at all. This utility has led to a rapid adoption of SoS by our Army and the adversaries we potentially face. As a Corp RAEME is now faced with the question "How will the Australian Army maintain the rapidly proliferating SoS?"

To start to answer this question, we need to understand how SoS differ from previous systems and how this may challenge the way maintenance is conducted on the battlefield. An example of a SoS that illustrates these differences is an air defence system. A modern air defence system consists of several different systems (often principle items) which are linked together in a way that allows them to achieve their higher-level task. A typical air defence SoS will include: one or more radars to detect incoming threats, several missile and gun systems to defeat detected threats, a command node where the operators determine which detected threats are to be engaged and how, a network to enable the information to flow between the systems, generators to power the system, vehicles to move the system to the required location and the software that provides the interoperability between the constituent system elements.

A key difference between a SoS and a traditional system is the coordination of the constituent systems (each potentially principle item) to achieve a higher-level function. This is achieved through a local network that allows information about the constituent system elements, their environment and control instructions to be transmitted across the SoS. The heart of the SoS is the software and processing that coordinates the actions of the constituent systems to achieve the desired purpose. It is the "glue" that holds the system together.

Maintaining a SoS brings a new set of complexities. Because a SoS is able to combine multiple different functions or capabilities this often means that their constituent systems are produced by different manufacturers, often to different standards and are likely to have different maintenance regimes. It is also very likely that these constituent systems were not designed to operate together or even for the purpose that they are being used for within the SoS. By using existing maintenance analysis processes we can develop effective regimes for the constituent systems which can be carried out with existing trade groups.

The larger challenge is maintaining the interoperability of the constituent systems. Because the constituent systems will often be designed and built by different manufacturers, each may have a different software with different update requirements and timeframes which creates the risk of disrupting the interoperability of them.

RAEME has traditionally focused on the mechanical aspects of maintenance and has not developed either a conceptual approach to software maintenance nor the technicians with the necessary skills. This is in part due to software maintenance being a more recent requirement and different from the maintenance traditionally performed by RAEME. Army maintenance is designed to restore equipment from a degraded state to a predetermined condition from which it can perform its required function(s). Software maintenance is different in that it updates the configuration of software to continue to provide the same or enhanced functionality.

The majority of the requirement to update software's configuration come from three main sources. The first is the requirement to remove errors "bugs" from the original code. The size of the software programs required to control modern systems is large often running into millions of lines of code. This code cannot be completely tested prior to deployment and as faults are discovered, fixes are rolled out through software updates to remove them. The second driver is that software is subject to continuous analysis for vulnerabilities, often referred to as cyber vulnerabilities. As these are discovered, patches are rolled out to reduce the systems susceptibility to cyber-attack.

The third driver of ongoing software maintenance is capability updates. The functionality of systems can be easily changed through changing the software that controls them. This provides an opportunity to upgrade a systems military utility without the costs associated with a physical upgrade or replacement.

The increasing adoption of SoS by Army significantly enhances our capabilities, but their characteristics challenge two assumptions which have underpinned RAEMEs maintenance philosophy and nested concepts of maintenance support; systems are relatively simple and system configuration is relatively static.

Systems at the time of the formation of RAEME were relatively simple with most using a group of similar technologies to produce their function. This enabled a technician trained in a single trade to maintain it. A current example of this type of system is the in-service rifle, it uses several mechanical systems which can be maintained by a single trade, in this case an armourer.

The technology groupings of different systems provided a logical basis for a similar grouping of the skills to maintain these systems and formed the basis of trades. As the logic of these groupings is fundamentally technology based, as opposed to platform based, the trades required by the military to maintain their system were aligned to civilian trades. This similarity provides Army with the opportunity to leverage off civilian skills and training advances.

The assumption of simple systems requiring a single trade to maintain has already been challenged with the incremental advances in technology during the second half of the 20th century. In the Army, this can be seen in armoured fighting vehicles where in addition to a vehicle mechanic to maintain the mobility elements of the system, they also required armourers to maintain the gun systems and electrically trained technicians to maintain the communications systems. While the overall system contains multiple technology types, as subsystems they remained distinctly separated. This allows the commonly accepted trade groupings to be retained with each focusing on their isolated sub-systems. While the trade categories are maintained, it increases the maintenance management burden by complicating the coordination of labour.

The growing complexity of systems has encouraged a more modular approach to the design of subsystem elements. By effectively modularising subsystem elements the system designer can focus different teams on different subsystems or even outsource the design and manufacturer of subsystems to companies that specialise in them. This modularity has been advantageous in systems maintenance as these subsystem elements can be easily replaced in a significantly shorter period of time than if a technician had to identify and replace the failed component in a more integrated system.

The 'part out, part in' approach is particularly attractive in a battlefield maintenance scenario as it gets a system 'back into the fight' more rapidly and increases the output of each technician. It also has operational drawbacks in that the subsystems are generally larger, heavier and more expensive than the components they replace. This significantly increases the volume of repair parts that must be held close to the front line and moved every time the support element moves in an operational scenario. It also requires a larger financial investment in inventory to ensure continued availability of equipment and creates a burden in the ongoing maintenance of the spare subsystems.

The modularisation of subsystems also creates an opportunity to approach the trade structures used to provide battlefield maintenance. Where systems have a design that allows 'part out, part in', a technician with significantly less depth of knowledge of a particular trade (but still trained in appropriate repair techniques) could be used across all of a platforms subsystem to effect repairs. This approach simplifies the coordination of the maintenance by reducing the number of trades required to restore a system back to one. It is already in use in armies around the world, including most notably the US Army who we share many equipment types with.

The idea of trading depth of knowledge of a trade and broad experience for a wider knowledge of, and possibly more experience on, a single platform is a complex question with considerations that range from the divergence from the civilian trade and training model through to human resource questions such as career models and posting. These are beyond the scope of this paper. This model of a parts replacement technician or platform maintainer relies on the systems that they work on retaining the distinct subsystem function separation and modularity.

While modularity is likely to continue due to the many engineering and economic advantages it offers, the assumption of function separation is challenged by the SoS. In previous generations of systems, the subsystems were separated as they needed to be controlled by the human operator. This meant that failures that needed corrective maintenance were able to be isolated to that system during the fault diagnosis process. SoS integrate their subsystems through their onboard network and this introduces significant complexity. In a SoS a condition of one subsystem may present as a fault in another part of the system. The condition may not even be a failure, it can arise from something as simple as a software control instruction mismatch between the different subsystem manufacturers. A technician who is trained widely across an entire platform but does not have in depth knowledge of subsystems operation and failure modes, may not be able to confirm the cause of the fault and simply replace the indicated subsystem. In addition to not resolving the fault, this will needlessly divert repair parts from other platforms, place a larger burden on the logistic system and incur an unnecessary cost from the refurbisher when no fault is found.

The second assumption that underpins RAEMEs overall maintenance approach that SoS challenge is that systems are relatively static. The capability provided by equipment has in the past been directly linked to its physical configuration. The costs associated with changing configuration across fleets of equipment are large which reduced their frequency. This relatively slow cycle allowed for detailed training on each system.

The software at the heart of a SoS is able, and must be updated on a much more regular basis to address bugs, remove cyber vulnerabilities and maintain battlefield superiority through capability updates expected in line with the Chief of Army's accelerated warfare philosophy. While these updates will not change the physical configuration, they will change the way the physical elements of the system interact and the faults within the system will be different. While historically the introduction of software changes has been a very deliberate process, the increasing rate of change in adversaries experienced in recent conflicts suggest that updates are likely to be more frequent with less testing of the impact on the SoS. In these scenarios it is expected that a large percentage of the faults created by these updates will be discovered and need to be managed by the maintainers in the field.

In addition to the software elements of the system, suppliers of repair parts will update the components within their subsystems as the components become obsolete. The interaction of these changes with the rest of the SoS is expected to be another source of issues that will need to be resolved in the field by deployed technicians.

This continuously changing configuration of the SoS is likely to increase the overall training burden associated with an equipment specific skills-based training approach. While there will be physical system knowledge that will be able to be built on, every time there is change in the configuration that changes maintenance procedures including fault finding and diagnosis, a new training package will need to be delivered.

While the current training approach produces technicians with a significant depth of knowledge of the underlying mechanical systems, to be more effective as maintainers of a SoS, there is still a significant gap in the existing trade structures of technicians trained on the software and the software-hardware interfaces that underpin the SoS.

In addition to the direct maintenance challenges posed by SoS, and in some cases in response to them, there are trends in the design of the end to end maintenance systems which support new material that impact the way RAEME maintains the Army's equipment. These trends include a significantly greater involvement of the OEM and other contractors and the movement of systems through the supply chain to a more rearward point of maintenance. In some cases, this

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is in response to the complexity of the systems being assessed as too great to be effectively maintained expediently in the field. This changing of the repair philosophy on a project by project ad hoc basis is leading to a significant divergence between the way we train our technicians and the way that we are able to employ them.

RAEME's traditional approach to providing Army's maintenance effect has been to deploy tradesmen with breadth and significant depth in their training. This provides Army with a very flexible maintenance capability with the ability to increase the type of tasks performed in theatre should the logistic supply chain become strained. This approach has been proven on the battlefield and is encapsulated in RAEME's forward repair philosophy.

Given the advantages and enhanced capability that SoS provides to Army, it is expected that their proliferation will increase. As this paper has shown, the maintenance characteristics of SoS requires RAEME to re-evaluate how it maintains the battlefield capabilities that commanders require. To do this it is proposed that the Corps develops an Army maintenance effect campaign plan, for presentation at the 2019 Maintenance Capability Conference.

To define the future state of RAEME, and Army's maintenance effect, the proposed problem statement for the campaign plan is, 'How does RAEME provide the maintenance effect required to support Army in Motion and accelerated warfare by 2030.' This aligns the future to the Chief of Army's, Army in Motion and Accelerated Warfare concepts. The campaign plan would be collated by the HOC cell resourcing a lead and tasking members of the Corps to focus on four Lines of Effort (LOE).

LOE 1 - Review of Defence's Land Maintenance Philosophy. This LOE will leverage off work by Plan Centaur, the Land Forces Maintenance Strategy, and extend it to develop a comprehensive philosophical position articulated in doctrine, which should consider other non-RAEME maintenance capabilities. This will include the updated Corps position on Battle Damage Assessment and Repair.

LOE 2 – Review of Employment Categories. Preliminary actions have commenced to shape the formal employment category review process. This LOE will run consistently across the life of the campaign plan, ensuring an iterative approach is maintained as new trades, skills and capabilities are developed to support emerging materiel fleets with ever increasing advanced system integration requirements.

LOE 3 – Establishing Maintenance Partnerships. The increasing complexity of technology integration will require RAEME to cooperate with our Navy, Air Force, international military partners, industry (OEM), academia and technical training institutes to ensure our skills, knowledge and attitudes remain agile. This will ensure we are future ready to support joint land combat, across all spectrums of war.

LOE 4 – Building an Integrated Training Continuum. The present maintenance training continuum is structured around Based Trade Training (ITT/IET) and Advanced Trade Training. Advanced Trade Training consists of specialist equipment courses and career progression courses once ITT is complete. Across the Corps, there are divergent opinions on the optimised way to deliver training to ensure Army has the right maintenance workforce, including the joint and contracted workforces. This LOE will deliver a unified, evidenced based position on what the future continuum needs to be based on the skills/competencies required to maintain advances integrated system capabilities.

LOE 5 – Information Operations. As the campaign plan develops and outcomes are reached, we will need to ensure this is effectively communicated across Army and our maintenance partners. This will ensure that Army's future maintenance support concepts/effects are nested into our operational concepts.

This paper has set the context around the evolution of maintaining the next evolution in technologically advanced material. It has demonstrated that as a Corps, we need to holistic reconsider how we provide the maintenance effect for Army, centred on the SoS integration. To achieve this it is proposed that RAEME develop a campaign plan to establish a framework for the Corps to develop agile maintenance effects by 2030.

Developing the Australian Army's Battle Assessment and Repair Capability

MAJ Chris Dent

Abstract

The current capability of the Australian Army to conduct Battle Damage Assessment and Repair in operational circumstances, up to and including conventional high intensity warfare, is deficient. The Corps of Royal Australian Electrical and Mechanical Engineers currently lacks the policy, doctrine, training and resources to maintain an effective BDAR capability to service the spectrum of Army's potential future tasks. This paper aims to detail the current deficiencies in BDAR capability, propose a viable framework from which to base future BDAR capability, and list the likely inputs to capability that will be required to achieve this. Ultimately, the chance for RAEME to redefine and renew its BDAR capability is an opportunity for the Corps to maintain its relevance and value within Army, in an environment of constrictive governance, over-reliance on OEM and loss of focus on tactical maintenance.

INTRODUCTION

The Corps of Royal Australian Electrical and Mechanical Engineers (RAEME) does not currently possess a capability to affect battle damage assessment and repair (BDAR) that adequately balances support to operational commanders whilst maintaining the best practicable standards of technical integrity. The following assertions form the basis of this opinion:

> *The Corps has no commonly accepted definition of Battle Damage, Battle Damage Assessment or Battle Damage Repair.*
>
> *Current BDAR procedures are limited to the specifics of supporting current and past operations and are unlikely to support operations in a high tempo, conventional, peer threat operation.*
>
> *RAEME tradesmen and officers have limited skills, policy guidance or authority to conduct BDAR at a level or in a manner that supports tactical action. This can be rectified by integrating BDAR capability into the existing lines of maintenance support and technical training continuum.*
>
> *Integration of BDAR between the ground and aviation streams of the Corps has not been achieved, but can be done so at a doctrinal and policy level.*
>
> *Detailed technical assessment of battle damage conducted above the level of the JTF, or repairs that are conducted to return a piece of equipment to an authorised configuration do not represent BDAR, they are elements of end to end maintenance and capability management.*

AIM

This paper aims to address four key themes: The current state of Army's BDAR capability; broad foundational concepts of BDAR and how they are applied in other nations; an aspirational model for the future of BDAR in Army; and a detailed assessment of the Fundamental Inputs to Capability required to achieve such a capability.

PART 1 – LITERATURE AND THEORY RESEARCH

FUTURE AND CURRENT OPERATING ENVIRONMENTS

This paper will not conduct a detailed assessment of Army's current and future threat environments, however a basic discussion of these is necessary to contextualise the assertions made regarding development of BDAR capability. The maintenance and repair of equipment in past and current operations has been shaped by a number of factors. Specifically, forces deployed in Iraq and Afghanistan were not involved in a high intensity conventional conflict, meaning that although equipment damage from IED and other kinetic means degraded combat power, the tempo of operations did not create an imperative for non-standard maintenance.

Secondly, the combination of a low political appetite for Australian casualties and a heavy emphasis on force protection measures meant that organisational effort focused on detailed technical assessment of battle damage, with OEM and NSB action to develop 'rapid' capability improvements, rather than the conduct of BDR in theatre.

Third, the existence of a Vehicle Theatre Pool of PMV, with further attrition stocks in the NSB, allowed a relatively responsive repair-by-replacement policy, further removing any requirement to conduct significant BDR in theatre. As will be shown in the assessment of current BDAR policy, this has shaped current attitudes and policies, particularly regarding the levels of technical oversight applied to BDA, and the perception of BDAR as a high level engineering and capability management activity, rather than an expedient tactical action.

In terms of future operating environments and their impact on materiel, an overview of the DATE construct highlights the range of battle damage vectors that may be encountered in future operations (Australian Army 2018 (b, c)). Across the spectrum, both high intensity conflict against a peer enemy and the actions of insurgents and irregular forces are likely to cause types of battle damage that cannot be repaired to an approved condition without the input of specialist agencies, and where the tempo and intensity of battle is such that equipment must be either rapidly repaired to support tactical action, or removed from the battle.

From a logistics perspective, it is also conceivable that a future theatre may also combine extensive equipment loss and/or damage with congested APOD/SPOD, global shortages of replacement parts, systems and tools, and an inability to maintain a sufficient theatre pool of replacement equipment. Even in insurgency type conflicts, it is likely that logistics lines of communication will be contested and may limit an ability to move replacement assets, parts or technical personnel forward to affect detailed BDAR.

We can infer from this analysis that the nexus of BDAR capability must rest with the deployed maintenance force and the manoeuvre commander, and must be applicable to a high end conventional warfighting situation against a peer adversary, in a logistics constrained environment. Maintainers and EME decision makers at the lowest tactical level need to possess the skills to conduct such assessments, articulate the maintenance risks and implications for commanders, and conduct exigent repairs within the constraints of the tactical and logistics environment.

ADF DOCTRINE

As a first action, a review of the existing ADF and Army policy on BDAR was conducted to determine the current levels of policy guidance, latitude afforded to Army's maintainers and policy gaps with regard to BDAR policy. The overarching conclusion from this review is that current doctrine acknowledges the concept and

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requirement for BDAR, but does not provide sufficient guidance to tangibly implement or maintain BDAR capability.

ADDP 4.5 Maintenance and Engineering

ADDP 4.5 (ADF (a)) provides a number of guiding principles that support the concept of tactical level BDAR, but does not provide sufficient detail to support the implementation or acceptance of a useful BDAR framework. In terms of support for BDAR, the document makes statements such as:

> *"Major equipment availability during a campaign is likely to fall steadily, due partly to losses from enemy action, but also from failure of the regeneration loop to match the failure rate. It is the rate of this decline that is important and the objective of maintenance support is to keep the rate as low as possible", and*
>
> *"An operational commander for reasons of operational necessity and, after the application of appropriate risk management, may be obliged to adopt a course of action that conflicts with standards and operational or technical directives".*

Unfortunately, the document does not then go on to detail that our "highly trained and motivated" maintenance workforce, operating "well removed from strategic support facilities", will be required to conduct any form of BDA or BDR at the tactical level. Similarly, there is no explicit mention of BDA, and the only mention of BDR is as an Engineer Service Supporting Operations, that resides at Brigade or Task Force level.

If an effective BDAR framework is to be implemented, this document would require revision to include more explicit policy guidance to support BDAR at tactical levels, including accepted definitions of BDA and BDR from a Land Materiel perspective.

DEFLOGMAN

DEFLOGMAN Part 2 Volume 10 Chapter 17 (ADF (b) provides the overarching guidance for the conduct of contingency maintenance (CMAINT), and contains three concepts salient to this discussion. Firstly, it states that "BDR is intended for the rapid restoration of technical equipment to a mission worthy state" and that because it does not provide the same technical assurance as standard maintenance, "equipment subject to BDR should be returned to normal operating standards as soon as circumstances allow".

Secondly, although the document details the need to articulate risks and issues surrounding CMAINT, it does not detail any specific actions or responsibilities for the conduct of BDA as a precursor to any BDR activity. Finally, the document details that operational TRA must devise a "streamlined system...for the delegation of technical authority during a contingency to ensure that personal safety and risks to ADF technical equipment are balanced against operational availabilities". Despite this, it is also stated that authority to accept the use of CMAINT or BDR rests with operational or component commanders, and may only be delegated down as far as unit commanders.

These observations highlight that as with the ADDP, there is broad policy support for the conduct of BDR as a subset of CMAINT, but that there is scope to refine the document to specify that BDA is an essential activity to enable articulation of maintenance risk prior to BDR occurring, and to clearly state that the command authority to conduct CMAINT may rest far lower than unit level in a given operational scenario.

TRAMML

The TRAMML (Army 2018 (a), Section 3 Chapter 8) provides CMAINT direction to maintainers IAW the stipulations of the DEFLOGMAN. This document provides broad support for the conduct of CMAINT, but again provides little in the way of specific guidance for the regulation of general or operationally specific BDAR procedures.

RAEME Commander's Handbook – LWP 4.2.2

As with the doctrine above, the LWP 4.2.2 (Army 2015) does not provide any specific guidance on the conduct of BDAR activities, save for a brief definition of BDR in the CMAINT context. The intent of this document (defining maintenance planning, roles, execution) and its applicability across both ground and aviation maintenance suggests it as an ideal location to provide detailed guidance and procedures to tactical maintainers in the conduct of BDAR.

JOC SOP

The JOC OPS 2 SOP Battle Damage Assessment (ADF (3)) is the only current operational BDAR policy for land materiel. This document covers the BDAR of vehicles in the MER, specifically PMV, and has evolved in response to operational circumstances prevalent in the past 15 years of operations in Iraq and Afghanistan, as discussed earlier. There are two notable features of this SOP. Firstly the levels of technical authority assigned to specific repairs on PMV illustrate a centralisation of technical authority that would not withstand the tempo of a conventional warfighting operation.

For example, JOC MAA authority is required just to replace or repair damage to lockers, doors or hinges on battle damaged PMV using authorised techniques and parts. The maintainer and EME commander at task group level or below have little to no authority to conduct any BDR or CMAINT. Secondly, the descriptions of Operator BDA and Technical BDA highlight a considerable gap in the BDA process. Operator BDA is described as a basic tactical assessment of the vehicle's ability to be moved from an immediate threat environment to a secure location, and Technical BDA is described as a complete technical investigation of the equipment. Neither of these are a battlefield assessment by a maintainer and commander.

The gap between these two assessments is the conduct of any rapid assessment by a maintainer and EME commander during or immediately after tactical action, that provides an operational commander with a technical assessment of the damage, a 'triaged' list of issues, and a series of maintenance options and risks. Similarly, there is no authorisation for deployed maintainers to then conduct any BDR or CMAINT.

The deduction gained from this document is that there is currently considerable confusion with regard to accepted definitions of BDAR within Army. The lesson learnt is not that the SOP is inadequate or inappropriate, because it has been designed to accommodate the relevant threats and maintenance considerations for past and current operations. Rather, we need to understand that this document should not be the template on which we base our understanding and application of BDAR and we should not be trapped into assuming that the conduct of BDAR is a function reserved for engineers, OEMs or NSB level maintainers. Rather, operational procedures should be defined by the mission type, Command risk thresholds, and the constraints upon the maintenance and supply systems. For example, in a high intensity conflict, it would be inappropriate to mandate that any BDA must take the form of a complete technical investigation, nor to hold the authority for CMAINT and BDR at the HQ JTF, JOC and CASG level.

ADF Aviation BDAR manuals and policy

Australian Air Publication 7002.011 Aircraft Battle Damage Repair Manual (ADF (d)) provides insight into the current BDAR procedures used within the RAAF and the Army Aviation community. Due to the technical nature of this document, and its ownership by the RAAF, this document should be incorporated into the proposed BDAR framework rather than amended. However, the document does provide an excellent example of the format of a service-level technical direction on the conduct and management of BDAR. The developing Land Materiel Maintenance (LMM) SOPs within DTR-A,

would offer an ideal location for a similar document governing the BDAR of ground equipment, with the two streams of RAEME maintenance and BDAR being linked at the higher level through the DEFLOGMAN and ADDP.

The other aspect of aviation maintenance that informs understanding of BDAR processes is the recently revised Defence Aviation Safety Framework, specifically the approved methods of BDA and BDR that occurs when damage is sustained to an aircraft. These methods progressively accept risk in order of tactical imperative and can be summarised as follows:

Method 1. The aircraft may have an approved Minimum Equipment List (systems that have to work) or Configuration Deviation List (items that do not have to be fitted). If faults or damage are within these bounds, operation can continue.

Method 2. If no MEL/CDL exists, or damage is outside those bounds, a technical assessment is conducted to determine if the defect/damage in question endangers flight safety. Eg. Primary structure damage, failure of an emergency system, electrical arcing.

If the answer is no, or no once mitigation is applied (ie isolated an damaged component) then operation can continue, with the delegate deciding how long operation can continue, what mitigations or temp repair is in place, if and how frequently to inspect the defect, how further degradation is mitigated, and what limitations on employment of the aircraft need endorsement from the aircrew.

Method 3. If the damage/defect does endanger flight safety or maintainers are unsure, contact the SPO and:

a. Get more data to enable return to Method 2.

b. Get an approved repair.

Method 4 – Deliberate Command Clearance. If Methods 1-3 are not viable, commanders, informed with a technical assessment, can elect to retain the risk to their judgement of SFARP.

Method 5 – Immediate Command Clearance. Worst case scenario, the aircraft captain makes their own immediate risk assessment when confronted with a worse tactical consequence.

The primary deductions from this policy area are that the understanding and treatment of BDAR within the Army Aviation maintenance community is not aligned with that of the ground maintenance community, and secondly, that the cascading model of BDA assessment used within the aviation stream offers a viable framework for a consolidated Corps model of BDA.

SURVEY / STAKEHOLDER ENGAGEMENT AND PME

Following the review of policy and doctrine, a two phase survey was conducted to develop a picture of how BDAR is currently viewed within and outside the corps.

Phase 1. A questionnaire (attached at appendix 1) was sent to a sample of 65 personnel from the RAEME ground and aviation streams, as well as members of Combat and Combat Support Corps.

Phase 2. Concurrently to the survey, a discussion session was held by RAEME personnel from 1 Bde (Darwin) and other NT units to discuss a suitable framework for BDAR at the tactical level.

The survey responses and the discussion group highlighted three main points:

Firstly, maintainers and EME decision makers at a tactical (up to formation) level define BDA and BDR as tactical actions required to support a mission and enable the decision making of an operational commander at the lowest level. Examples of responses include:

BDA is:

> *"One or more qualified technicians determining the extent of damage from a known baseline configuration, with OEM templates/specs/build states used as the datum" (Cbt Bde unit ASM)*
>
> *"Assess equipment to determine decision to repair/recover/destroy in place" (Cbt Bde unit TST Comd)*
>
> *"The initial inspection to determine the level of repair necessary to return the equipment to the battle or enable it to carry out or complete the mission safely" (Reserve Bde EMEWO and former UK Army BDAR instructor)*

BDR is:

> *"Returning equipment to a level which is acceptable (may be heightened risk) to an operational commander to achieve a battlefield capability" (Cbt Bde unit ASM)*
>
> *"The method of repairing the equipment in the shortest timeframe in order to enable it to return to the battle for an undefined period of time without conducting OEM approved repairs" (Reserve Bde EMEWO and former UK Army BDAR instructor)*

Secondly, maintainers feel that the Corps possesses an innate desire and capacity to conduct CMAINT, but that this has predominantly been conducted in an ad hoc manner, usually on exercise and without the acceptance of technical risk by operational commanders. Furthermore, tradesmen feel that although their basic trade training gives them the ability to assess faults and implement temporary or exigent solutions, they do not receive specific skills, resources, authority, or training opportunities to develop BDAR skill sets as part of their core competency.

Third, personnel believe that BDAR actions effectively cease at Bde level, as any assessment or repair conducted past the CSSB (BSG), or maybe the FSG, will be too far removed in both distance and time, from the tactical situation to be considered as BDAR. Specifically, any action taken by OEM, CASG or NSB personnel is simply a form of standard maintenance or capability management, albeit fixing damage that has occurred in battle.

These responses confirm that the views of BDAR within the tactical maintenance community differs significantly from the views of the engineering community. The Corps' maintainers and tactical level EME decision makers believe that they should, but do not currently have the skills, resources or training foundation to conduct the BDAR that would be required in a conventional, peer to peer warfighting situation. Moreover, they feel that for this to occur, a greater emphasis on risk based BDAR thresholds and authorities needs to be built into policy in order to enable a BDAR capability that is flexible regardless of mission.

EXTERNAL-TO-ADF POLICY AND RESEARCH

Following research and engagement within the ADF, further research reviewed BDAR doctrine and research from other nations to seek alternate perspectives and identify useful potential inputs into a revised Australian BDAR capability.

US Military policy

There are two key US documents that govern the management and conduct of BDAR within the US Army and US Marine Corps, The joint Recovery and Battle Damage Assessment and Repair Field Manual (2006, FM 403, MCRP 4-11. - 4A), and the BDAR Smart Book (2012, GTA 01-14- 001). The Field Manual is the superior document, sitting under the Field Manual for Maintenance Operations and Procedures, and the Smart Book is a supplementary resource that provides greater detail on generic BDR techniques, procedures and stores. Subordinate to both of these documents are the BDAR manuals for specific pieces of land materiel.

Both documents are useful to any discussion of BDAR. From a

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conceptual sense, they define the aim of BDAR to be to "restore the minimum essential combat capabilities to support a specific combat mission or enable the equipment to self-recover" and provide a detailed list of the general principles of BDAR, including the correct methods of reconnecting BDR activities with the standard maintenance chain once the tactical mission has concluded. In terms of building and applying a BDAR capability the Field Manual offers direction on the different BDAR skill sets required of equipment operators, maintainers and commanders, as well as the essential elements of peacetime BDAR training programs. Finally, both manuals provide detailed directions on how to execute BDAR, in the form of BDA checklists, breakdowns of in-service BDR kits, and instructions on the correct recording and reporting procedures for BDAR actions.

These documents support two aspects of the development of Australian BDAR capability. From a practical perspective, they offer tangible information on the methods and resources required to conduct BDAR, including the criticality of peacetime BDAR training. From a conceptual perspective, they illustrate the efficacy of an overarching BDAR policy that sits between strategic maintenance guidance and equipment-specific technical information. In the Australian context, this could take the form of a General BDAR EMEI, an LMM SOP, or an addition to the LWPG.

UK Military policy

The primary British Army doctrine related to BDAR is contained in Expedient Repair doctrine (MoD 2015), which appears to sit between US BDAR policy, and current ADF CMAINT policies. The policy contains a greater emphasis on the requirement for expedient repairs to be accompanied with "engineering judgement from an Engineering Officer" to determine technical risk and constraints on use of equipment under BDR, but also details procedures for the routine use of BDR kits and standard BDR procedures by REME tradesmen. Another key element is the direction that maintainers should receive general expedient repair training throughout routine annual training, reinforced by dependency specific training during pre-deployment training.

The Expedient Repair policy also supports the development of Australian BDAR capability, complementing the US doctrine with regard to how and when BDAR training is conducted and the use of standardised BDR stores and procedures, but also outlining a model of engineering rigour that may be more palatable to Australian appetites for elimination of technical risk.

Engineering research

There is a range of literature that helps to conceptualise an Australian BDAR framework that emphasises tactical BDAR, whilst still recognising and integrating the work of CASG and OEM from a capability design, implementation and management level.

From an engineering and capability management standpoint, studies commissioned by Eurocopter (Bruner and Gresle 2009) and French military land materiel provider GIAT (Monin et al 2006) offer perspectives on the linkage between engineering and tactical maintenance.

Monin et al (2006) discuss the concept of regeneration engineering as the method of estimating a system's ability to "regain operational capabilities following damage and/or failure" (pg 3) and note that this is a key engineering activity that must occur during system design and as an ongoing process throughout the system's operational life. They also note that the process is not merely a systems engineering concept, but requires significant input from Logistics Support Analysis. The implications of this in relation to an Australian BDAR framework is that creation of a tactical level BDAR capability is only a partial solution. To create a sustainable and optimal BDAR capability, logistics system inputs such as BDAR training, procedures and resources need to be incorporated into the capability management cycle by OEMs and CASG. In essence, a FIC based approach to building BDAR capability. Whilst this may be impractical during the design phase, at the very least it should occur during the life of the equipment at key junctures such a life of type reviews. Just as the current RODUM process provides data on equipment faults, a process needs to be created to allow to testing and reporting of BDAR actions.

The study of BDR techniques for ballistic damage to the Eurocopter (Bruner and Gresle 2009) also supports the concept of BDAR integration within capability management. The study details an OEM led and endorsed trial of composite repair techniques to the Eurocopter fuselage for use in battle damage situations. The state aim of the trial was to provide an authorised BDAR process that meets the requirements of having "simple processes and tools", "low sensitivity to environmental conditions", and facilitating the "best repair in prevailing conditions with available resources, in the available time". This provides illustrates the types of support to BDAR capability that should be sought from the OEM of Australian Land Materiel in future projects as it illustrates a singularity of purpose within capability management to best support the operators and maintainers of equipment in adverse operational conditions.

Tactical research

From an operational perspective, two research streams from the US and Polish Armies outline how BDAR capability can be designed and enabled at the tactical level.

A study conducted by the US Army Research Laboratory (Roach 1994), provides a basic model to describe the occurrence of battle damage and subsequent levels of assessment and classification. This offers a perspective that fills the current gap in Australian BDAR policy and doctrine, being the specific actions required of equipment operators, tactical maintainers and operational commanders, and is depicted below:

	Description
State	**Level 1:** Initial Configuration (approved configuration, maintained IAW authorised procedures)
Action	Physics (threat action)
State	**Level 2:** Damage State (battle damage has occurred)
Action	Engineering (repair)
State	**Level 3:** Remaining Capabilities
Action	Operation of remaining capabilities
State	**Level 4:** Remaining Combat Utility

Table 1. Basic BDAR progression

This model articulates to both commanders and maintainers, a logical flow of information and actions that connects maintenance with combat functionality. For example, when applying this to a vehicle in an operational context, the following would occur:

	Description
State	**Level 1:** Initial Configuration (approved configuration, maintained IAW authorised procedures)
Action	Vehicle sustains battle damage and is no longer compliant with its initial configuration
State	**Level 2:** Damage State (battle damage has occurred, some capabilities are damaged)

	Description
Action	**Maintenance (BDA):** The crew and integral maintenance element conduct a functional assessment of the vehicle, and provide a BDA to the operational commander that details: · Capabilities still fully functional · Capabilities damaged · Capabilities that cannot be repaired integrally · Repairs possible within available time and resources · Residual capacity of repaired capabilities · Combat utility of the system (dependent on which capabilities are repaired)
State	**Command decision:** Commander decides on which repairs are to be conducted and in which order, based on the mission requirement for particular capabilities.
Action	**Maintenance (BDR):** Maintainer and crew execute BDR IAW Commander's direct, available resources and time.
State	**Level 3:** Remaining Capabilities (some or all capabilities repaired to varying levels of functionality)
Action	Operation of remaining capabilities
State	**Level 4:** Remaining Combat Utility (combat effect afforded by functionality of remaining and repaired capabilities).

Table 2. BDAR process flow applied to a Battle Damaged Vehicle

Furthermore, if the EME commander / decision maker had an intimate understanding of the tactical plan, they would have inherent knowledge of which Combat Utilities (Level 4) would be of greatest importance to the commander, and therefore could offer a triaged technical assessment that itemises possible repairs in order of tactical importance.

The study goes on to use the M1A1 Abrams as a case study, and describes a basic assessment tool that allows operators and maintainers to rapidly classify the state of the tank's key capabilities (mobility, crew, acquisition, ammunition, firepower, communications) on a scale from completely disabled through to completely functional. For example, the Mobility capability of the tank can be categorised according to four descriptors as shown in Table 4 below:

Classification code	Description
M0	No mobility damage
M1	Reduced speed (slight)
M2	Reduced speed (significant)
M3	Total immobilisation

Table 3. M1A1 Mobility BDA Classification System

This system of classification provides a simple mechanism that an equipment operator and integral maintainer could complete immediately post-battle, and use to form the foundation of the BDA that is provided to the operational commander. In our context, the development of platform specific BDA checklists and tools is an area that could be included in equipment specific EMEI or ILSI.

Another informative area of research is the recent assessment of BDAR capabilities in the Polish Army. An analysis of the possibilities and needs of expedient repairs (Smal and Furch 2011) concluded that by extending the capability of tactical repair organisations to conduct expedient repairs, there was a significant increase in the resultant capacity of fighting formations to retain combat power under operational conditions. The specific model used figures of 20% vehicle attrition rates per day, moderated with the repairability of vehicles and the capacity of repair units, and illustrated that retention of 70%+ of a unit's combat power could be extended from three days to ten days depending on optimisation of each factor.

A second Polish study from 2011 (Smal and Kowalski) assesses the current constraints of executing BDAR within a mechanised brigade, and offers direct parallels to the current Australian context, given that the Polish system of logistics and maintenance echelons at Brigade level is almost identical to ours. In assessing the existing Polish system of repair, the analysis noted the following:

> *Tactical maintenance units and mobile repair elements are constrained from conducting BDR due to a lack of "special repair equipment", "instructions for operating in combat operations" and "training programs for logistics specialists".*
>
> *Lack of a tactical BDAR capability "significantly reduced its (the battlefield maintenance system) repair capacities and elasticity and; thus, resulted in inabilities to recover and restore combat power of fighting units".*
>
> *"The system of BDR is also indispensable in case (sic) of conducting operation in the long distance from their own logistics support, and supply sources".*

The study then goes on to outline a proposed BDAR capability that is tiered from the equivalent of a Combat Team A1 echelon, through to the Maintenance Company of a CSSB, and Bde Battlefield Clearance Team. Table 5 below details the specifics of the model:

Level (organisation and personnel)	Functions	Inputs to capability
Level 1: Operator / Crew	-Immediate BDA diagnosis -Crew repair using a BDR kit that is CES to the equipment	-Crew level BDAR training -Equipment specific BDAR procedures (handbooks) -Basic BDR kit (small bag size)
Level 2: Company A1 Ech FRT (possibly as part of Bn BCT)	-Link between equipment/crew and Battalion Maintenance PL (A2 ech) -Affect BDR in loc within capacity or conduct recovery to A2 ech	-Enhanced BDR kit (trunk/s size, including armour repair) -More detailed BDAR training
Level 3: Dedicated section from Maintenance Coy or Bn supporting Bde or Div Maint Area	-Last line of BDAR in the AO -Affect enhanced BDAR eg. Composite material patching, elec sys repair	-Containerised, deployable BDR workshop -Comprehensive BDR kits -Technical expertise and authority to conduct extended BDR or make decision to backload out of AO.

Table 4. Polish BDAR Model for Mechanised Brigade

Whilst the above framework does not consider the role of an A2 echelon type organisation in the BDAR process, it provides an excellent example of the type of systems that are in use, or being considered by other military forces. Moreover, both Polish studies support the key premises of this paper in that they highlight the ability to impose an effective BDAR capability onto the existing lines of maintenance support, and the notion that BDAR effectively ceases when a piece of equipment cannot be assessed and repaired within an operational theatre.

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RESEARCH CONCLUSION

The assertions and deductions made from the above analysis lead to the conclusion that Army's current BDAR capability is not a suitable or sustainable capability for the future. In order to provide the foundation for a new BDAR framework, a list of key capability objectives is proposed below:

Command and Management

An improved policy framework that orchestrates BDAR considerations and authorities from DEFLOGMAN, ADDP, CSS LWP, LMM SOP, TRAMML and individual platform EMEI.

A BDAR process that is integrated into the existing lines of maintenance support from sub-unit to theatre level.

A defined BDA process that facilitates articulation of technical risk, repair priority and tactical outcomes of any BDR, allowing an operational commander to make the repair vs recover vs destroy decision.

A risk threshold and decision support tool for operational commanders down to the lowest level to make the above decision in any given operational context.

Organisation

Coherent organisation of Army's BDAR requirements with CASG and Land Materiel OEM to ensure that BDAR is a consideration throughout the capability life cycle.

Major Systems

Major systems are designed to facilitate the conduct of BDAR.

Feedback loops are in-built to allow passage of data from tactical BDAR into through-life systems engineering.

Support

Leverage personnel exchange programs, technology and communications to link OEM and CASG expertise with tactical level maintainers in barracks and on operations.

Personnel

Training of equipment operators in basic BDAR to reduce draw on maintenance personnel.

Increase the value added by RAEME GSO within combat units by making them a key enabler of BDAR.

Dedicated BDAR training for all personnel charged with BDAR responsibilities, both in the RAEME Subject 4 suite of courses and in unit technical training programs.

Collective Training

BDAR competencies are incorporated into combat unit and formation METL and collective training serials.

Threat and platform specific BDAR training is incorporated into MST/MRA

Facilities and Training Areas

Maintainers have access to training areas and training aids that facilitate the safe and realistic conduct of BDAR training within Australia.

Supplies

Appropriate tools and parts are provided to facilitate BDAR at each level.

PART 2

BUILDING AN EFFECTIVE AUSTRALIAN BDAR CAPABILITY

This section of the paper proposes a BDAR capability framework for Army that satisfies the foundational concepts of BDAR and the capability objectives listed above. This framework is comprised of four elements: common definitions of Battle Damage, BDA and BDR; a generic decision making tool for operational commanders to make the BDR/recover/destroy decision; a framework linking the maintenance and command actions of BDAR to existing lines of maintenance, and a FIC-based list of the enabling actions needed to implement the framework coherently.

DEFINITIONS

Battle Damage

Battle Damage is any damage sustained by a piece of equipment in an operational situation that reduces the equipment to a condition below its authorised configuration and capability.

Battle Damage Assessment

Provision of **tactical level technical advice** to the commander on further operational use of equipment.

Battle Damage Repair

Non-standard repair to return equipment to a level of functionality IOT achieve a specific purpose for a specific mission / timeframe.

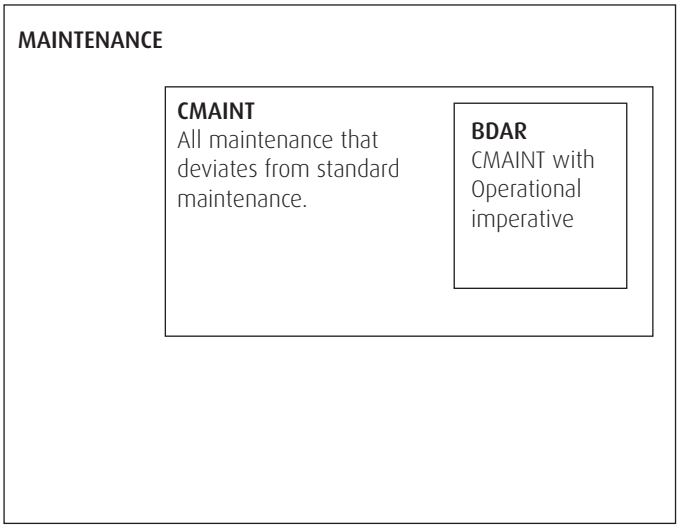

Table 5. Location of BDAR within the maintenance system

COMMAND AUTHORITY FOR BDAR

Critical to the BDAR framework is the authorisation for operational commanders to decide between BDR, recovery or destruction of equipment. Given that the specific levels of risk allowed to commanders will vary significantly based on operational threats and missions, the basic decision support matrix provided below outlines the decision flow of operational commanders from crew through to FSG level, with the numbers equating to the order of decisions to be taken:

Commander	BDR (assuming standard maint is not possible)	Recover	Destroy
Crew / Aircraft Captain	1. Repair to continue current mission 2. Repair to allow recovery	3. Initiate recovery by CT A1 Ech 4. (AVN only) fly to base in current condition	5. Equip cannot be repaired or recovered, imminent danger to crew life – destroy
Combat Team / AVN SQN	1. Repair to continue current mission 2. Repair to keep moving and allow repair later 3. Repair to allow recovery	4. Initiate recovery by BG A2 Ech/BG BCT/AVN BG	5. Equip cannot be repaired or recovered, imminent danger to crew life – destroy
Battlegroup (AVN BG)	1. Repair to continue current mission 2. Repair to keep moving and allow repair later 3. Repair to allow recovery	4. Initiate recovery by BSG /BDE BCT	5. Equip cannot be repaired or recovered, imminent danger to life or BG mission – destroy
BSG	1. Repair to optimal state for extended use with BDR applied 2. Repair to sub optimal state for use with BDR applied for short term operational objective	3. Cannot be repaired, not required in battle, backload to FSG	4. Equip beyond repair and burden on BSG, no recovery to FSG possible destroy
FSG	1. Repair using BDR only if repair by replacement is not possible or sufficient parts/tools/facilities do not exist to conduct standard repairs in theatre	2. Cannot be repaired, not required in battle, backload to NSB	3. Not authorised

Table 6. BDAR Decision matrix for operational commanders

A helpful comparison for the use of this tool is the Rules of Engagement construct, whereby personnel and commanders are issued specific ROE based on the operational environment, likely threats and mission parameters. In the case of BDAR, operational planners would allocate commanders a specific set of constraints and decision thresholds within the BDAR authority matrix, adding conditions such as mission constraints, repair time, equipment types / values, types of damage, and the capacity of the deployed logistics system to conduct standard repair and recovery.

EXECUTING BDAR

The following framework for BDAR within a combat formation (including Army Aviation) is proposed, and details the relevant maintenance and command functions that are to occur:

BDAR Level	Maintenance functions	Command functions
Level 1 (immediate) Crew / operator / pilot	Crew conduct functionality assessment post BD incident (alone or with maintenance FE) Conduct operator BDR IAW equipment specific procedures and basic BDR kit	Communicate BDA event information to CT and A1 ech Immediate decision on repair/recov/destroy
Level 2 (integral) Combat Team / sub unit	A1 ech debrief crew, conduct initial BDA at site, brief commander Conduct BDR IAW Comd direction and time thresholds, using tradesman's BDR kit, equip specific and general BDR procedures Classify and record BDR IAW CT Comd's direction	Communicate BDA event to BG and A2 ech (notify if likely to be a BSG level BDR) Subsequent decision to repair/recov/destroy based on CT mission
Level 3 (integral) Battlegroup / unit	A2 ech conduct BDA at CT ECP or in A2 loc Conduct BDR IAW Comd direction and time thresholds, using light grade BDR kit, equip specific and general BDR procedures (possibly assisted by BCT maintainers) Classify and record BDR IAW BG Comd's direction	Communicate BDA event to BSG or Bde BCT Subsequent decision to repair/recov/destroy based on BG mission
Level 4 (close) Brigade Support Group	CSSB Maint Coy conduct detailed BDA at Bde ECP or BMA Conduct BDR IAW Comd direction and time thresholds, using medium grade BDR kit and possibly locally made parts, equip specific and general BDR procedures (possibly with comms link to FSG / CASG / OEM) Classify and record BDR IAW BSG Comd's direction	Communicate BDA event to BDE HQ and FSG Potential decision to classify beyond repair and initiate repair by replacement and backload to NSB action

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BDAR Level	Maintenance functions	Command functions
Level 5 (general) Force / Theatre Support Group	FSG Maint Coy conduct detailed BDA at FMA, possibly with deployed OEM support Conduct BDR IAW Comd direction and time thresholds using BDR kit, possible locally sourced or manufactured parts, general BDR procedures, possibly with deployed OEM support or comms link Classify and record BDR IAW FSG Comd's direction	Summarise and communicate consolidated BDAR report to NSB Conduct logistic support assessment and determine if operational requirements and logistic deficiencies warrant extensive BDR. Initiate backload to NSB action ICW replacement demand. Operational level review and revision of BDAR authorities for subordinate commanders
Level 6 (mounting) National Support Base	Support in theatre BDAR via deployed OEM reps or remote comms Collate BDAR reporting to inform revision of BDAR procedures, resources and training Collate BDAR reporting to inform through life capability enhancements	Monitor and support operational level review and revision of BDAR authorities for subordinate commanders

Table 7. BDAR execution matrix

BUILDING THE FIC FOR BDAR

The implementation of the above BDAR framework will require orchestrated action from all levels of the Corps, across all FIC areas. These are listed below:

BDAR Level	Action required
Command and Management	**Development and alignment of Doctrine** **ADDP 4.5** -Addition of the concept of BDAR as an operational sub-set of CMAINT, subject to specific controls as stipulated in an operational TIMS **DEFLOGMAN – Contingency Maintenance** -Revision of this chapter to: -Explicitly define BD, BDA and BDR as they relate to Land Materiel -Link to the AAP and LMM SOP for detailed guidance on BDAR for ground and aviation **LMM SOP** -Creation of an LMM SOP for BDAR (or incorporation of BDAR guidance into any CMAINT SOP) -Consider the Aust. Air. Pub on BDAR as a model. **TRAMML** -Incorporate direction on the recording of BDR actions and the correct method of terminating BDR classification when standard or CMAINT re-commences. **LWP 4.2.2** -Amendment of this LWP to reflect: -The basic definitions, considerations and principles of BDAR -The conduct of BDAR within each line of maintenance -Addition of BDAR tasks to the roles and responsibilities of RAEME Commanders -BDAR inputs to maintenance and CSS planning/MAP -BDAR considerations for design of unit technical training programs **EMEI** -Creation of a general BDAR EMEI, similar in content to the US BDAR Field Manual, detailing: -Basic BDAR principles -A standardised tactical BDA procedure -Generic BDR procedures for tasks such as hose and pipe repair, armour patching, composite repair -Creation of platform specific BDAR EMEI for all major Land Materiel platforms, detailing: -OEM endorsed Minimum Equipment and Configuration Deviation Lists -Equipment specific BDA checklists/proformas -OEM approved BDR procedures -BDR stores/kits authorised for use on the platform

BDAR Level	Action required
	Deployed force procedures: -Incorporation of operation-specific BDAR authority matrices into deployed force TIMS, authorised by deployed and JOC TRA -Separation of non-BDAR CMAINT from deployed BDAR procedures. Eg. Vehicle accidents in a FOB are not treated as BDAR unless there becomes a tactical imperative for the use of that vehicle.
Organisation	**OEM integration** -Development of OEM placements for Army maintainers to gain increased knowledge of major platforms and build relationships between tactical and NSB level maintenance.
	DSTG support: -Continued use of DSTG to support in depth technical research into BDA and emerging BDR techniques to better inform tactical BDAR actions.
	Informal feedback loops: -Inclusion of BDAR objectives in Defence Entrepreneurs Forum and other 'good ideas' formats to allow tactical level feedback into BDAR continuous learning.
	International partners: -Seek inclusion in the BDAR activities of international partners that have mature BDAR processes. Eg. Link BDAR to IE outcomes for Ex Longlook and other activities. Seek participation in NATO reviews of BDAR doctrine.
Major Systems	**Development / IIS:** -Inclusion of tactical level maintainers and decision makers in BDAR process mapping and design serials for major systems.
	Provisioning / BOI: -Allocation of BDAR training aid versions of major systems to unit or regional locations to facilitate beneficial and safe BDAR training in Australia.
	Through life support: -Land Materiel MSA to specify and build dedicated communication channels between OEM and deployed maintainers specifically to support BDAR actions with expertise and technical advice. -Incorporation of BDAR process reviews as part of mid-life reviews.
Support	**Joint effort:** -Seek participation or joint ownership of BDAR training and doctrine development. Most applicable to aviation and RAAF. Eg. Revitalisation of RAAF BDAR training courses through joint funding and manning.
Personnel	**MAE:** -Incorporation of BDAR responsibilities into employment specifications.
	Organisational BDAR stewards / champions: -Creation of technical and non-technical positions with ownership of BDAR capability development and management.
	Individual training: **RAEME ROBC** -Introduction of BDAR theory. -Explanation of the CFN-WO BDAR training continuum to facilitate understanding of the skills of their personnel. -Detailed theory of BDAR – using material from Module 1 of the proposed TRF-SO course. -BDAR assessment based on providing a back-brief to a BG COMD on a BD event. -Design a unit technical training program, incorporating BDAR. **LOIC – Staff Planning Activity** -BDAR factors as part of CSS analysis during MAP. -Design of a Cbt Bde BDAR appendix to the CSS SPTORD. **TRF-SO** -Detailed BDAR theory – as per current proposal. -Operational theatre Battle Damage vector assessment and creation of operational commander's BDAR Authority matrix. **Initial Trade Training** -Introduction to BDA concepts – role of an A1 echelon CFN in supporting the FRT commander. -Introduction to BDAR technical publications – BDAR general EMEI, BDAR EMEI for L121, PMV, other general systems. -Introduction to BDR – general BDR procedures and use of vehicle and FRT level BDR kits.

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BDAR Level	Action required
	Equipment maintenance courses: -Use of platform specific BDAR EMEI, BDR Kits. -Platform specific BDA processes and integration with operators. **Sub 4 CPL:** -Support to BDAR at CT A1 echelon level – conduct a BDA and back-brief a CT Comd on a BD event. -Tactical level recording and reporting of BDAR. -Greater trade-specific instruction on technical BDAR considerations. **Sub 4 SGT:** -Support to BDAR at BG A2 echelon or CSSB level – conduct a BDA in support of a BG ASM and EME Officer. **Sub 4 WO:** -Support to BDAR at BG, BSG or FSG level – conduct a BDA. -Detailed BDAR considerations and processes – possibly as per the revised Module 1 to TRF SO. -Developing BDAR within unit technical training programs.
	Aviation: -Work currently underway at AAvnTC to revise and build Aircraft BDA capability and training progression for aviation maintainers.
	Professional Development: -Mandated PD for GSO and Engineering Officers IAW current work being done with UNSW ref. Masters of Systems Engineering or Asset Management
Collective Training	**Unit internal training:** -Development of resources and policy to guide unit technical training programs with BDAR objectives.
	FORGEN / RTS: -Incorporation of BDAR objectives in the METL for CSS sub-units, CSSB and FSB, linked to their respective roles in the lines of BDAR. -Use of BDAR serials during simulation activities to better test command authorities and decision making under conventional warfighting scenarios without compromising limited physical training time.
	MST / MRA: -Incorporation of BDAR training serials on pre-deployment training to add currency to competence in BDAR, and provide operationally specific guidance on the likely BD vectors, approved BDR techniques, command authorities.
Training Areas and Facilities	**Training facilities:** -Use of portable training aids and stores could be accommodated within existing training areas and facilities. -Long-term infrastructure development could include BDAR simulation centres in the same style as the casualty simulation centre at Army School of Health.
Supplies	**BDR kits:** -Equipment specific BDR kits issued as CES to vehicles – either all vehicles or only to pre-deployment training and operational fleets. -Generic BDR kits (with increasing capacity) for issue at CT A1, BG A2, BSG and FSG level for repairs such as: -Hose, pipe and hydraulic line repair -Electrical cable and loom repair -Metal patching, armour repair -Composite structure repair
	BDA kits: -BDA kits for issue at BG, BSG and FSG level to allow field based conduct of tasks such as: -Non-destructive testing
	Training aids: -Vehicles that have sustained battle damage and been RTA, or vehicles that have been disposed of.

Table 8. FIC requirements for proposed BDAR framework.

CONCLUSION

This paper has attempted to provide a compelling argument as to the deficiency of the Australian Army's current BDAR system, and the need to design a BDAR capability that meets the requirements of future threats, addresses current capability gaps and accommodates the best examples of BDAR theory and practice from other sources. The framework provided in part two of the paper is designed to provide a useable set of definitions and concepts for BDAR in the future, along with an assessment of the enabling actions that will need to occur to allow a fully integrated BDAR capability across Army and its supporting agencies.

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APPENDIX 1 – CORPS BDAR SURVEY

The questionnaire contained five questions, as detailed below in Table 1:

Question	Primary	Sub questions
1	How do you define BDA and BDR?	
2	What role do different stakeholders play in the BDAR process?	a. A1/A2 echelon tradesmen b. Combat unit EME officer and ASM c. Manoeuvre unit commander and equipment user d. CSSB EME officer and ASM e. Deployed contractor / FSR f. Formation HQ g. JOC h. CASG
3	At what point/time/level of repair does an action cease being BDAR and become a part of existing end to end maintenance or capability management process?	
4	What current BDA / BDA definitions and processes exist in Army / JOC / CASG?	Include strengths and weaknesses
5	What BDAR / BDR definitions exist outside of the ADF, and what aspects of these may have utility to us?	

Table 1. BDAR Initial Survey

How can the education and training of junior officers and artificers be developed to enhance the technical C2 between the workshop commander, artificer and supported elements?

CAPT Andrew Barker

Introduction

1. The employment of the junior RAEME (ground) officer has been a contentious point of discussion for many years. Workshops (WKSP) platoon commanders have traditionally tendered towards administrative functions or 'pool' officers, while the ASM has been relied upon to answer maintenance RFIs and provide feedback to Commanding Officers and Executive Authorities. It has been suggested that the key causes of this are as follows:
   a. a lack of technical training, education and knowledge
   b. the ASM being unwilling to give up 'control' of a workshop to a perceived unqualified officer
   c. a lack of delineation between the roles and responsibilities of each position.
2. During the development of this discussion paper the Corps has been engaged to clarify the problem and identify possible solutions. It should be noted that this problem is perceived to be related to ground RAEME only, due to the difference in training and education of RAEME Aviation. Further, whilst the outcomes will have impact and potential benefit for WKSP and ASMs at all levels, greatest focus has been on the junior WKSP Commander (i.e. Lieutenant).

Aim

3. The aim of this paper is to summarise the research into the above topic and to outline the proposed recommendations that can be implemented to develop solutions to mitigate the problem statement.

Conduct

4. The topic response was developed through a combination of formal surveys and informal discussions.
5. **Surveys.** Two surveys were developed and personnel were invited from a variety of rank and organisation to provide responses. The participants varied in rank from SGT-COL and included appointments from Combat Brigades, SOCOMD, HQ JOC, AHQ, HQ FORCOMD, ALTC, CASG and Plan Centaur.
6. **Survey 1.** Survey 1 sought to identify the Corps opinion of the problem statement, and identify proposed mitigation strategies. Over 150 individuals were invited to respond, with only 29 individuals responding. This sample size causes concerns with validity and reliability of the data; however, the responses were considered to provide valuable feedback, from a motivated few.
7. The survey 1 questions were as follows:

   Problem Statement: Junior RAEME Officers in workshops tend to be employed as administrative assistants rather than commanders of their workshops.

   Question One. On a scale of 1-5 (1=strongly disagree, 5=strongly agree), to what extent do you agree with the problem statement?

   Question Two. What is the cause of this problem?

   Question Three. What can be done to address this problem?
8. **Question One.** The following results were received from Question One:

   Strongly disagree: Two respondents

   Disagree: Four respondents Neutral: Six respondents Agree: 12 respondents

   Strongly agree: Five respondents
9. Although some respondents did identify they disagreed or strongly disagreed with the problem statement, the majority of respondents (60%) either agreed or strongly agreed.
10. Question Two. Of those who agreed or strongly agreed with the problem statement, the identified causes were able to be grouped into the following criteria:
    a. A lack of technical training through the Officer training continuum
    b. Attitudes (both junior WKSP COMD and ASM) not consistent with continual development of the junior officer
    c. A confusion or lack of understanding of the roles and responsibilities of the WKSP COMD compared with the ASM
    d. Excessive administration/paperwork
    e. A lack of 'relevance' of the RAEME officer.
11. The 'lack of relevance of the RAEME officer' in most cases referred to the fact that the RAEME officer was often the first logistics officer moved within a unit to fill a manning shortfall, as they were not considered to have as much value as some of the other officers.
12. **Question Three.** A number of solutions were proposed. Of those identified, weighting was placed on those raised by three or more survey respondents, and four were identified for mention in this paper:
    a. Further technical training of junior officers
    b. Implementation of standardised duty statements for WKSP COMD and ASM
    c. Employ additional administrative staff or restructure existing administrative staff allocations (to action this requires analysis of Army's Unit Entitlement views and beyond the scope of this topic)
    d. Further integration of officer and NCO courses.

Proposals

13. The proposals were corroborated throughout various discussions between the topic lead and RAEME personnel across Army. This was considered to be an important part of the process as it suggests broad Corps agreeance to the proposed solutions.
14. Army has already noted the need to provide foundational technical training to newly appointed RAEME LTs. A trial course is being conducted at ASEME and will further inform how best to upskill the officer workforce. As such, addressing this need is considered beyond the scope of this paper.
15. Two key proposals have been developed to enhance the Technical C2 of the WKSP:

    Proposal One. Development of duty statements for the WKSP COMD and ASM

    Proposal Two. Integration of Officer and NCO courses

16. Additionally, a third proposal was developed to inform the Subject Four suite of courses, and begin the development of duty statements beyond the WKSP Comd and ASM:

    Proposal Three. Development of Sergeant and Corporal duty statement

18. The duty statement development became the primary focus of this topic, particularly following the back brief to HOC RAEME. To ensure the success of this measure, consideration was given to the development of the duty statement as well as the appropriate implementation. Survey Two invited participants to provide feedback on how they view the roles and responsibilities of the WKSP COMD and ASM.

19. **Survey Two.** Over 150 individuals were invited to respond with 40 personnel providing responses. This lack of response further suggested apathy from the Corps in resolving the agreed upon view that RAEME lacks role clarity for our Officers and SNCOs.

20. The purpose of the second survey was two- fold. Firstly, it sought to refine the role of the WKSP COMD and ASM into an easy to understand format. Secondly, it sought to develop a list of doctrinal/generic tasks for each position. The survey two questions were as follows:

    What is/should be the role of the WKSP COMD?

    What are/should be the tasks of the WKSP COMD?

    What is/should be the role of the ASM?

    What are/should be the tasks of the Workshop ASM?

21. **Results from Survey Two.** Feedback from Survey Two was combined to develop the two duty statements that can be found at annex A (WKSP COMD) and annex B (ASM).

22. These two duty statements have been developed with three key considerations:

    a. One duty statement covering all WKSP COMD and ASM, as opposed to specific to WKSP size (i.e. Company or Troop) will allow implementation across all positions and ranks, embedding the change yet allowing inclusion of WKSP specific tasks.

    b. The focus on key maintenance tasks allows supplementation of existing 'all-Corps' and extra-regimental tasks

    c. The aim for progression should be to develop duty statements for each individual position (i.e. OC WKSP Coy) aligning with the format used by 16 Aviation Brigade Standing Instructions (Logistics) - Maintenance Series, ensuring standardisation across the Corps and implementing learning from best practice from all Army WKSP.

23. After analysing the survey, the findings were compared against doctrine (LWD 4-2 and LWP-CSS 4-2-2) and the MAE. The research suggested that in the majority of cases, the survey responses were consistent with the publications, indicating validation of the duty statements and negating the low responses. The key differences are as follows:

    a. LWD 4-2 outlines a responsibility of the ASM is 'leadership and human resource management of subordinates.' This is considered to be the responsibility of the Workshop Commander, with different responsibilities applied in the duty statements (Workshop Commander manages workforce; the ASM executes intent and manages with DSCM-A.)

    b. LWD 4-2 outlines a responsibility of the ASM is the 'provision of advice to the maintenance commander, CO of the FE and dependencies.' Advice to the CO of the FE and dependencies is considered to be a responsibility of the Workshop Commander.

Duty Statement Implementation

24. Identifying the roles and tasks of each position will certainly treat the issue outlined in survey one; however, without appropriate implementation, the desired effect will not be achieved. There is a requirement to appropriately promulgate the information to ensure that the duty statements will be implemented at the unit level. A number of considerations for the implementation have been outlined below.

25. **Inclusion in doctrine/policy.** The options considered for where the statements should reside were the MAE, LWD 4-2 and LWP-CSS 4-2-2.The role and tasks for the duty statements were designed to be generic to be applicable to any ASM, regardless of trade. For this reason the MAE is not considered to be a suitable location as the Artificer specifications are outlined by trade. In considering the two key doctrinal maintenance documents, Chapter 5 to LWD 4-2 – Command and Control is considered to be the most suitable option for the inclusion of the duty statements. This already contains information about the responsibilities of the Maintenance Commander and ASM. The duty statements will appropriately nest in this chapter as an annex, and the function of the duty statements is intended to provide additional Technical C2, as the topic title outlines.

26. **Promulgation to Commanders.** It is suggested that the 'lack of relevance' of the RAEME officer outlined in survey 1 is an issue which is manifest by command, either the sub-unit commander or unit commander. These positions are generally those who seek advice directly from the ASM and also re-role the RAEME officer when a vacancy needs to be filled with the perception the ASM can fulfil the role in their absence. For these reasons, the change in relationship needs to be promulgated to commanders who will be employing maintenance personnel; with the method being fundamental to implementing the required cultural change.

27. The issues pertaining to the relationship between the WKSP Comd and ASM have become embedded in Army culture, identified in the results from Survey 1. Any attempt to change this culture requires a clear and precise communication strategy, outlining how the change will increase capability. If the relevant commanders do not appreciate the benefit these measures will achieve, there is risk they will not be adopted. The focus of this message needs to be the increase in use of the WKSP Comd for briefing and planning, and a decrease in removing the WKSP Comd from their primary position to fulfil other roles.

28. Once the Corps has agreed upon the two duty statements, these duty statements need to be communicated to Army to outline the shift in employment of our key maintenance personnel. This should be initiated with a brief to the Chief of Army outlining the Corps view. Following this, a Chief of Army Directive will provide an appropriate messaging platform to outline that this is not only the view of RAEME, but also the senior leadership of the Army. This directive will enforce the employment of the duty statements, while providing an understanding of the research and reasons from which they were formed, and how they will be of benefit.

29. In addition, Plan Centaur currently has the lead on the development of two documents, through which the duty statements can be promulgated, with a brief explanation of the background. These documents are the 'Guide for maintenance commanders' and the 'Overview of effective maintenance practices for unit commanders.' Inclusion in these documents will ensure that the commanders within a unit, often the assessing officer and senior assessing officer, will know what is required of each position and will be able to employ those positions against those tasks, including as part of reporting.

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30. Finally, LOAC provides an opportunity to provide additional training to all Logistic Officers to understand how best to employ their maintenance personnel to support the operational plan. Providing some direction on what the desired intent is and how they can support it will provide an additional layer of implementation to enhance the likelihood of success.

31. **RAEME SUBJ 4 WO and LOBC/ROBC-G.** Currently, no alignment exists between the RAEME SUBJ 4 WO course and LOBC. Opportunity exists to conduct some instruction on the role and responsibility of the WKSP COMD and ASM with students from each course integrated. This will ensure that individuals who are about to become WKSP COMD and ASM, will have a clear understanding of what their roles and responsibilities are, and will be able to execute those accordingly. It will also enable a forum educating both the junior WKSP Comd and ASM on the importance on harnessing the ASMs experience (for the WKSP Comd) and how to mentor effectively (for the ASM). Additionally, this will provide an opportunity to deliver Corps messaging to the Junior WKSP Comd and ASM, who will be able to effectively disseminate and implement change.

Proposal Two – Integration of Courses

32. The current integration of LOIC and SUBJ 2 WO CSS focuses on planning an all- Corps environment, in particular the role of the CSS Officer and CSS Warrant Officer in the Military Appreciation Process. This allows both the CSS Officer and CSS Warrant Officer to understand their roles in planning, how this feeds into the MAP, and how this informs and develops the CSS plan. Importantly, the courses are not integrated for the entire duration of each course, as not all elements of instruction require integration. This methodology can be applied to the WKSP through integration of the ROBC-G and SUBJ 4 WO RAEME.

33. The roles and responsibilities of the WKSP Comd and ASM require an understanding of each position and what inputs and outputs are required from each position to enable the other. Understanding this will greatly benefit the relationship between the two, as each position will know the expectations of themselves and each other. The duty statements highlight tasks that are interrelated and outline the need to ensure appropriate training is provided to future WKSP Comd and ASM in how to effectively manage the relationship between these tasks. Repair prioritisation (identification of and application of), personnel management and management and execution of a technical training program are all areas that integration is considered to be beneficial.

Proposal Three – Further Key Task and Duty Statement Development

34. The next logical progression for duty statements is to continue development for SGT and CPL posted to a WKSP. One of the difficulties that has been identified is the difference in rank for some positions depending on the size of the WKSP. For example, some WKSP employ a number of personnel in EMEOPS, whereas some employ a single WO2 or SGT. The same can be said for work group supervisors, whereby some units employ SGT and some employ CPL in this role. This creates a dilemma of whether it will be more effective to raise generic duty statements for position or rank.

35. The development of key tasks and responsibilities for all SGT and all CPL will allow review of doctrine and the Subject Four training continuum to ensure our doctrine and training align with how maintenance personnel are being employed, and should be employed. The development of these key tasks are not planned to be implemented as duty statements, but inform training. This proposal is considered important in improving the Technical C2 within WKSP; however, should be explored in a detailed manner, similar to that of the WKSP Comd and ASM duty statements.

36. Further, development of duty statements for key WKSP positions will provide the same benefits to other positions that are expected from the implementation of the WKSP Comd and ASM duty statements. An understanding of the role and responsibility of each position within a WSKP will enable clearer employment of these positions by commanders and increased clarity for the individuals in the positions. It will also allow the Corps to outline and improve on best WKSP practices across Army.

37. A list of key responsibilities for SGT and CPL has been developed and can be found at annexes C (SGT) and D (CPL). This has been presented in the same format as the WKSP Comd and ASM duty statements.

Further research

38. Throughout the development of this topic, a number of ideas were identified as opportunities to either support the technical C2 between the WKSP COMD and ASM, or provide additional benefit to the Corps. These were not pursued as part of this topic for the following reasons:

    a. Time constraints

    b. Difficulties in obtaining feedback from Corps

    c. Risk in attempting to achieve too much too quickly.

39. Notwithstanding, the opportunities have been outlined briefly below for consideration and potential inclusion as part of the next Corps Conference

40. **Validation of RAEME SUBJ 4 WO.** Throughout the research for this topic, it has been suggested that RAEME SUBJ 4 WO is not adequately preparing WO2s for their first appointment as ASMs. References have been made to re-instate the pre-appointment course. Before this is considered, current ASM should be canvassed to determine whether or not they feel the training provided has adequately prepared them for the role. This could be incorporated as part of SUBJ 4 WO and include LOBC/ROBC-G where applicable.

41. **Review of LWD 4-2 and LWP-CSS 4-2-2.** Through the development of this topic, comment has regularly been made that the maintenance doctrine is out of date and in need of a re-write. This is more likely to be the case for the LWD 4-2 which has not seen a review since 2009 than the LWP-CSS 4-2-2 which was reviewed in 2015. Should a review of doctrine occur, it is strongly recommended that this is conducted holistically, with a review of the LWD 4-2, LWP-CSS 4-2-2 and MAE to occur concurrently, ensuring alignment across the three documents. One intent for the LWP-CSS 4-2-2 could be reducing the size to ensure it can be carried on the commander.

42. It was identified that one key area in which doctrine is outdated is providing guidance on the tools the WKSP COMD and ASM can exploit to inform their maintenance advice. For example, VULCAN has become a valuable addition to MILIS reports in informing decision making and advice. Benefit will arise from the compilation of key reports and tools within Vulcan that can be used to enhance maintenance practice and procedure.

43. **Corps Information**. A number of newsletters exist to update personnel on Corps matters. Information is released regarding maintenance practices and Plan Centaur; however, some detail is lacking on what is informing the decisions and changes in policy. An opportunity exists to create a RAEME portal in which information can be uploaded, including analysis, data etc. allowing the RAEME personnel to become subject matter experts on what is occurring within the Corps, as well as the reasons why. This could involve updates from major stakeholders

including Plan Centaur, AHQ, HQ FORCOMD, and HQ SOCOMD amongst others. If we want our junior leaders to be subject matter experts, there is a need to expose them to the Corps business in a more detailed, accessible manner.

44. The proposed method for this is the ASEME Mastery Toolbox currently being developed. This Toolbox is being developed by ASEME using ADELE to provide a method of informing the Corps and technical training using information gathered from a variety of sources. This will allow the selection of information to be managed by ASEME, direct implications to training, and enable the Deputy Head of Corps (Ground) to retain oversight of the promulgation of this information. Further, this method can be the location for other technical education and training initiatives.

Conclusion

45. The problem presented in this topic requires attention, as agreed upon by elements of the Corps through Survey One. One risk in developing a solution is attempting to achieve too much, too quickly and not achieving the desired intent. With that in mind, this topic has presented a solution assessed as able to be implemented immediately with the desired effect. By defining the roles and responsibilities to the WKSP COMD and ASM, their relationship will become much more effective and efficient. Further, by defining the roles and responsibilities to those who employ our WKSP COMDs and ASMs, they will be employed more appropriately and can be reported upon more accurately.

46. In addition to the implementation of these duty statements; the development of duty statements for the remainder of the WKSP, either by rank or generic position, the review of our keystone doctrine and development of professional development goals will ensure that the Corps continues to grow and enhance our procedures and people, providing a much greater maintenance effect.

Recommendations

47. As a result of the research and analysis conducted, it is recommended that:

    a. RAEME endorse the duty statements for the WKSP COMD and ASM

    b. CA is briefed on Proposal 1 and requested to release CA Directive for dissemination

    c. the endorsed duty statements are included in Chap 5 to LWD 4-2 Maintenance Support, Guide for Maintenance Commanders and Overview of effective maintenance practices for unit commanders

    d. a lesson is included on LOAC to inform future SUC of the effective employment of maintenance personnel

    e. an integrated package is delivered to LOBC/ROBC-G and RAEME SUB 4 WO confirming WKSP Comd and ASM duty statements

    f. integration between ROBC-G and SUBJ 4 WO RAEME is explored to enable enhanced workshop management

    g. RAEME endorse key responsibilities for SGT and CPL to inform training review

    h. HOC endorse development of position based duty statements for presentation at next Corps Conference

    i. a review process of the LWD 4-2 and LWP-CSS 4-2-2 is initiated to ensure alignment and currency

    j. ASEME Mastery Toolbox is adopted as the centralised portal to inform RAEME on Corps, maintenance and equipment management updates and information.

Outcomes

48. As a result of the Corps Conference discussion of the topic the following outcomes were agreed upon:

    a. It was agreed that there is a need to provide role clarity between the WKSP Comd and ASM

    b. The proposed duty statements for WKSP Comd and ASM endorsed; including their insertion into doctrine, as learning outcomes on promotion courses and retaining a standardised RAEME format

    c. It was agreed upon that officer postings as WKSP Comd and leading an EMEOPS team are critical development milestones for all RAEME officers

    d. COMD FORCOMD will be requested to write to Commanders seeking their support to implement the duty statements

    e. Duty statements to be developed further along with other workshop positions during 2019 to build standardisation across Army's maintenance effects and inform future projects, such as ERP

    f. Development ofRAEME ADELE portal endorsed to support the professional development within the Corps, modelled off the ASEME Mastery Toolbox.

A System of Technical Trade Advice for the Corps of RAEME

MAJ Perri Hobbs

Executive Summary

1. It is proposed that RAEME forms a Trade Advice Cell to provide future focused and strategically grounded trade advice to the Chief of Army through the Head of Corps (HOC). The proposed Cell is composed of a Master Artificer, a talented WO1, paired with a Colonel as a Trade Sponsor for each RAEME Employment Category (EC).
2. The role of the Master Artificer is to develop trade advice, with a focus on maintenance modernisation, to support the Head of Corps in providing Corps advice to the Chief of Army, Employment Category and Training Development (EC&TD), and the Army Aviation Training Centre in developing the RAEME Ground and Aviation Employment Categories and training, and other personnel requiring trade advice as required, and to provide leadership within their technical trade.
3. The role of the Trade Sponsor is to provide strategic guidance to the Master Artificer to ensure trade advice is strategically aligned with Army's priorities, and to engage senior Army leadership in trade related matters.
4. A selection panel composed of the HOC, the relevant Trade Sponsor and Deputy Head of Corps (DHOC) will select the Master Artificers based on their technical leadership, communication and networking skills, experiences and knowledge. Master Artificers must be future focused, providing advice on the modernisation of maintenance into the future, as well as advice on current maintenance capability.
5. In recognition of their service, technical mastery, and their efforts to modernise maintenance, the Master Artificer will be presented with a Parchment from the Chief of Army appointing them to the position, and empowering them to engage widely.

Introduction

6. Since the 1st of December 1942, RAEME is a Corps that has solved complicated technical maintenance problems every day. The one constant in the Corps is the periodic modernisation of equipment, technical skills, and management systems that are required to keep the Australian Army at the forefront of combat capability. The Corps of RAEME meets these challenges every day with a deep well of technical expertise embedded within our personnel and corporate memory. Too often, however, the road to smoother modernisation of our capability is made bumpier by inappropriate decisions and their supporting evidence, analysis and advice.
7. Across a number of areas of Army and the non-Army Group, different silos of information relating to aspects of RAEME trades is used to inform a range of decisions, particularly on acquisition and sustainment matters. Often this information is not synthesised together to provide a holistic report on the state of a trade and disseminated widely.
8. This Corps Topic suggests a solution that provides appropriate, considered and official trade advice to the HOC in order to better support Army's decisions in regard to capability, acquisition and sustainment.
9. This topic builds on work conducted previously, but not implemented, by others such as MAJ Scott Babington.

Aim

10. This paper proposes a system to provide trade advice to the Head of Corps, Army and Defence.
11. Advice on RAEME trade specific matters is currently provided in two ways:
    a. Informal advice from individuals or organisations
    b. Formal advice collated by EC&TD the Employment Category Review (ECR) process.
12. Trade advice provided by individuals is biased by the individual's experience, postings, and strategic awareness. A person's opinions on a subject may be correct, correct in another time or circumstance, or plain incorrect. There may also be multiple points of view on a technical trade topic, each with its own advantages and disadvantages. The advantage of seeking an individual's advice is that it is quick, easy and tailored to the recipient's needs, but there are inconsistencies that over multiple individuals and instances build into an incoherent and inappropriate system of maintenance.
13. Trade advice provided as a result of the ECR process is the collected opinion of the Corps, with the strategic guidance necessary to fit civilian trade competencies and military proficiencies into employment categories suitable for Army's maintenance system. The process involves the survey of a wide variety of personnel across the Corps, with EC&TD then distilling individual's replies into requirements for EC modification. This process delivers better quality advice, with much of the individual biases removed, but it is a long process (up to 10 months once reformed) and is not responsive to individual requirements.
14. To build a coherent maintenance system, one source of correct and timely trade advice is required. The proposed system of trade advice for RAEME will minimise incorrect advice while also providing a single source of official truth in regards to military maintenance and the supporting trades.

Other Corps Trade Advice

15. RAAOC and RACT have instituted technical governance and advice functions similar to that proposed in this paper. RAAOC and RACT both implement a system with a senior WO1 (Conductor for RAAOC, Subject Matter Advisor (SMA) for RACT) acting as the senior representative of their Employment Category within their Corps, assisted by an LTCOL or COL mentor (Mentor for RAAOC, Subject Trade Mentor for RACT). In both cases the WO1 and LTCOL work together to provide technical trade advice to the HOC; the WO1 providing the technical advice, with the LTCOL grounding the technical advice in strategic reality.
16. Both Corps use their advisor teams to contribute to Corps policy across a wide range of issues that affect those particular ECs. Their roles include the following generic responsibilities:
    a. Represent their EC to the HOC
    b. Improve trade governance, Army capability
    c. Mentor within trade
    d. Contribute to trade related Working Groups, incl. DFRT and EC Reviews
    e. Contribute to trade heritage and recruiting.

17. The RACT Corps SMA are tied to the Tier A positions within Army School of Transport's S7 Standards Cell. However, the SMA Road transport is the Chief Driving Instructor – Army – a WO2 position.

18. RAAOC's current selection of Conductors (at odds with their most current Regimental Instruction) preferences personnel on merit rather than position or experience. The selection process involves the SWOM Cell at DSCM-A providing the top five personnel from each feeder trade, preferencing those with demonstrated subject mastery, EC governance, and the ability to promote their EC. RAAOC selects their Conductors based on their mastery of their trade, and their ability to improve it.

19. However, a problem encountered with RAAOC's Conductor system is alternate sources of valid advice. An example was the Logistic Advisory Team (LAT) providing advice on stores and accounting. Previous Conductors have been posted to LAT positions, but this is not always the case. The LAT is often seen as the best source of stores and accounting advice due to their workload and subsequent visibility to RAAOC soldiers requiring guidance. This is much the same as the Maintenance Advisory Service (MAS) being seen as a good source of advice by those they audit. It should be noted however, that the LAT and the MAS are corporate governance organisations. The advice they provide is of adherence to corporate governance regulations, not modernisation of their trade. Trade advice provided by MAS and LAT uses advice on current skills and techniques in support of better corporate governance outcomes.

20. A RAEME system of trade advice would need well defined responsibilities and relations to other possible sources of technical EC/trade advice, particularly MAS. A strong focus on modernisation is essential, as a focus on current technical skill may see the Master Artificer competing with MAS and EC&TD to provide technical advice on current skills. Breaking the nexus of personnel seeking advice from those that they know will initially be difficult in an organisation, such as Army, that places a premium on the importance of human relationships to achieving a task.

Proposed Trade Advice Cell Structure

21. The proposed structure of the Trade Advice Cell, illustrated in Figure 1, is a Master Artificer for each of the Employment Categories, each partnered with an O6 level RAEME officer as a Sponsor:
    a. ECN 146 – Fitter Armourer
    b. ECN 226 – Recovery Mechanic
    c. ECN 229 – Vehicle Mechanic
    d. ECN 235 – Metalsmith
    e. ECN 418 – Technician Electrical
    f. ECN 421 – Technician Electronic

22. The exception to this is the RAEME Aeroskills trades due to the small size of two of their trades. There should be a Master Artificer and Trade Sponsor each for the following (a structure mirrored in DSCM-A):
    a. ECN 411 Technician Aircraft and ECN 153 Aircraft Structural Fitter
    b. ECN 412 Technician Avionics and ECN 154 Aircraft Life Support Fitter.

23. The Sponsor provides strategic guidance, while the Master Artificer provides a deep level of technical knowledge. The Master Artificers seek advice and guidance on the wider strategic realities from their Sponsor, but report directly to the HOC and Deputies. The Sponsor will also liaise with the HOC separately.

Positions

24. The position of Master Artificer is not tied to any particular Army position, with the exception of the Recovery Mechanic Master Artificer.

25. There are only two positions in Defence coded to an ECN226 – one in CASG, and one in ASEME. In this case, the Master Artificer ECN226 should be tied to the OIC Recovery position at ASEME (APN 454282). The OIC Recovery regularly provides advice to recovery mechanics in units, projects such as Land121, and is also involved in liaison visits to other country's recovery facilities and units.

26. Options for the Master Artificer for ECN 235 may be considered due to the small size of the EC. This may involve personnel from various SERCAT, multiple appointments for the Master Artificer Armament (the most like trade), the consideration of an WO2 instead of an WO1, or a combination of the previous options.

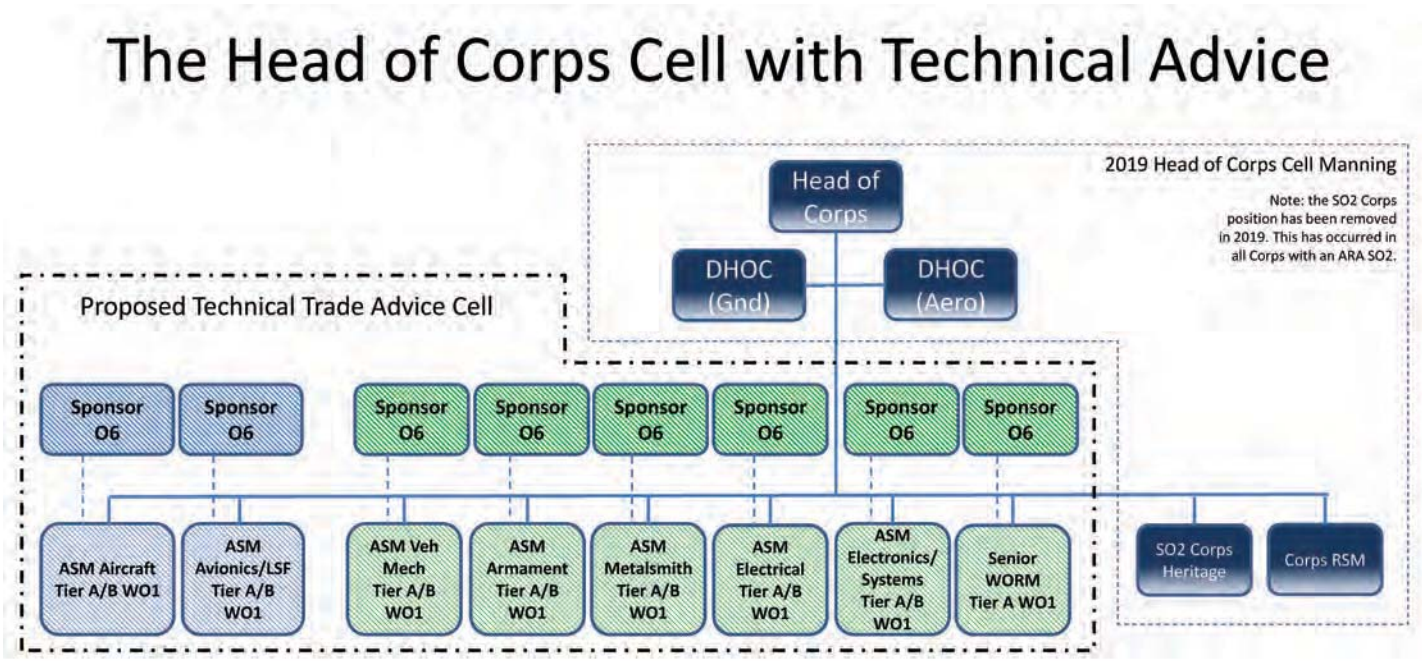

Figure 1: Proposed Trade Advice Cell

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Cell Tasks

27. The Trade Advice Cell is to:
    a. produce regular reports on their trade to the HOC as an outcome of a EC working group or conference
    b. provide input to the Employment Category Review (ECR) process
    c. provide leadership to their EC
    d. targeted messaging to selected personnel.
28. The major deliverable of the Trade Advice Cell, the "State of the Trade" report should include:
    a. workforce health and sustainability
    b. training concerns
    c. future requirements of the trade to support emerging capabilities
    d. opinions of the trade from across the Commands and ranks of Defence.

Personnel Roles

29. The Trade Sponsor provides strategic guidance and oversight of trade advice; they ensure that trade advice aligns with Army's strategic direction and maintenance environment. The Trade Sponsor provides strategic guidance and hierarchical connections that the Master Artificer may not have access to in their posted position.
30. The Sponsor has an additional responsibility to provide targeted, strategic formal and informal communication in support of EC and trade related matters. This targeted communication forms the other half of successful trade advice; having developed one source of trade truth for the Corps, the Corps must now communicate it to key decision makers within Army and the ADF.
31. The responsibilities of the Trade Sponsor include:
    a. ensuring the alignment of trade and EC advice with Army's strategic and maintenance environment
    b. communication and networking to ensure trade advice is communicated to key strategic decision makers
    c. supporting the HOC in strategic engagement of wider RAEME initiatives
    d. supporting the Master Artificer in development of trade and EC advice
    e. supporting the Master Artificer in regular communication with interested parties, including through Corps and allied publications.
32. The Master Artificer is the prime representative of their feeder EC and trade. They are to provide advice on their technical trade to HOC and the wider Army with a strong emphasis on improving Army's capability in respect to their trade. The Master Artificer is to be strongly focused on the potential future evolution and modernisation of their trade and how the Corps may prepare.
33. The position of Master Artificer is an extra-regimental duty for a SERCAT 7 WO1, but in exceptional circumstances may be a WO2 or not SERCAT 7. As with the HOC, the Master Artificer is to provide advice only. The Master Artificer works beyond the military Chain of Command to exert influence through technical leadership underpinned by subject mastery and their skills in communication and networking, including through the HOC (and therefore the CA), as opposed to exercising direct executive authority. While a very competent maintainer, the Master Artificer is first and foremost a networker, collating opinions on trade matters, distilling that into official Corps advice, and then working to promote trade matters and leading trade modernisation.
34. The responsibilities of the Master Artificer include:
    a. providing advice on their EC and trade to the HOC RAEME
    b. providing advice on Army governance and technical regulation with respect to their trade
    c. maintaining awareness of possible modernisation and modernising influences related to their trade
    d. developing options to modernise their EC and trade within Army's maintenance environment
    e. develop a trade network to provide input into Corps trade advice.
    f. convene an biennial EC Seminar or remote discussion to discuss their feeder trade and EC and provide the results in writing, through the Trade Sponsor, to the HOC
    g. providing technical guidance to, and improving the technical competence, trade and corporate governance knowledge of the members of their EC
    h. provide trade advice and guidance to DSCM-A and DRSCM-A as required
    i. promote their feeder trade and EC within Army by providing articles to the RAEME Craftsman, Army newspaper, articles in the Cove, and other publications from associated organisations promoting their EC, trade modernisation, and related issues.
    j. provide input into AHQ and CASG acquisition and sustainment processes related to their EC
    k. provide trade specific assistance to ALTC and EC&TD in EC Management Processes, including ECR.
35. The DHOC (Ground) and (Aeroskills) will perform the role of the Master Artificer for their respective officer Corps streams – ground and aviation.
36. There also exists the possibility of extending the Master Artificer concept to include a position to oversee the development of the EMEOPs functions.
37.

Personnel Selection

38. Selection of suitable RAEME Warrant Officers will be conducted by a Selection Committee consisting of the HOC, the relevant Trade Sponsor and DHOC.
39. The success of a Master Artificer will depend as much on the occupant's personality, communication and networking ability as it does on their trade skills and previous experiences. A Master Artificer should have excellent verbal communication and networking skills, and good written communication skills.
40. The selection of a Master Artificer occurs in five steps:
    a. **Step One – Performance Check.** The first step in identifying potential Master Artificers is to seek the top five performing Warrant Officers according to the SWOMS Cell in DSCM-A. The SWOMS Cell is to rank the WO1s, culling any that do not meet the following criteria:
        i) MEC J1X or J2X
        ii) At least three years in rank
        iii) Personnel that are consistently "Above Worn Rank/Highly Effective" for:
            (1)Leadership
            (2)Interpersonal Relations
            (3)Oral and Written Communication
            (4)Technical/Trade Skills
            (5)Strategic Perspective

b. Additionally, SWOMS is to list their postings at the SGT to WO1 rank level.

c. Step Two – Background Check. DHOC will request DOCM-A conduct an AIMS search to ensure that there are no adverse events that the candidate has been involved in, and as another source of evidence for outstanding performance. The result should be "Yes, the candidate is suitable", or "No, the candidate is not suitable"; therefore not breaching the candidates privacy.

d. Step Three – Invitations. The HOC will invite all candidates to submit written applications on why they should be selected as a Master Artificer. The candidates should be allowed an open ended response, but must also answer questions posed by the HOC Cell. The evaluation of written responses allows the Selection Committee to assess the candidates written communication, strategic insight, and engagement and attitude to modernisation. Questions put to the candidates should engage the candidate on the major challenges facing the trade, EC and Army; AHQ and CASG's development of new capability and how new maintenance processes and systems can be best designed; and personal examples of innovation implementation.

e. S**tep Four – Selection.** The Selection Committee will select the best candidate based on the following:

   i) Merit and performance as recorded by DSCM-A

   ii) An ongoing commitment to serve Army and RAEME within the ARA

   iii) Demonstrated capacity to innovate, implement reform and communicate to a wide audience

   iv) Demonstrated technical and governance mastery

   v) Seniority within rank

   vi) Wide base of experience within Army's, and Defence's, maintenance environment.

f. **Step Five – Notification**. The HOC will write to the successful applicant, inviting them to accept the position of Master Artificer. If the applicant subsequently declines, the HOC will approach the next highest ranked applicant. After all successful applicants have accepted the position, the HOC will write to all unsuccessful applicants informing them of the decision.

g. **Step Six – Appointment.** The CA will appoint the Master Artificer and issue them the Master Artificer's Appointment Parchment. The appointment of the Master Artificer by the CA will invest suitable gravitas to the appointment holder empowering them to engage widely on their trade; the appointment is not recognition of long serving experience, but an appointment to improve maintenance and drive its modernisation.

Recognition of Service

42. The Corps cannot offer remuneration as recognition, or create positions for the Master Artificers; all positions will be extra-Regimental as is the case with the current Head of Corps Cell, although exceptional circumstances may dictate the use of non-SERCAT 7 personnel.

43. The Corps should recognise the service of the Master Artificers with a Parchment signed by the Chief of Army appointing them to the position. The Appointment Parchment is much the same as the Corps RSM Parchment, appointing them to the position and laying out the required service.

Conclusion

44. This paper proposes a Cell of personnel to provide trade advice to the Head of Corps in support of his mission to provide Corps advice to the Chief of Army. The cell is a collection of advice teams, composed of a Master Artificer mentored and advised by an O6 level RAEME officer, with one team per feeder ECN. The Master Artificer produces trade advice relevant to Army's strategic environment, with both the Master Artificer and the Sponsor responsible for disseminating official Corps opinion to all concerned, but particularly targeted at senior decision makers within the Army and the wider ADF.

Recommendations

45. It is recommended that the Head of Corps seek Chief of Army's endorsement of:

   a. The creation of formal extra-regimental positions within the Head of Corps cell to provide trade advice – a Trade Advice Cell

   b. The Trade Advice Cell be established with a WO1 Master Artificer and an O6 RAEME officer for each RAEME OR ECN:

      i) ECN 146 – Fitter Armourer

      ii) ECN 226 – Recovery Mechanic

      iii) ECN 229 – Vehicle Mechanic

      iv) ECN 235 – Metalsmith

      v) ECN 411 Technician Aircraft and ECN 153 Aircraft Structural Fitter

      vi) ECN 412 Technician Avionics and ECN 154 Aircraft Life Support Fitter.

      vii) ECN 418 – Technician Electrical

      viii) ECN 421 – Technician Electronic.

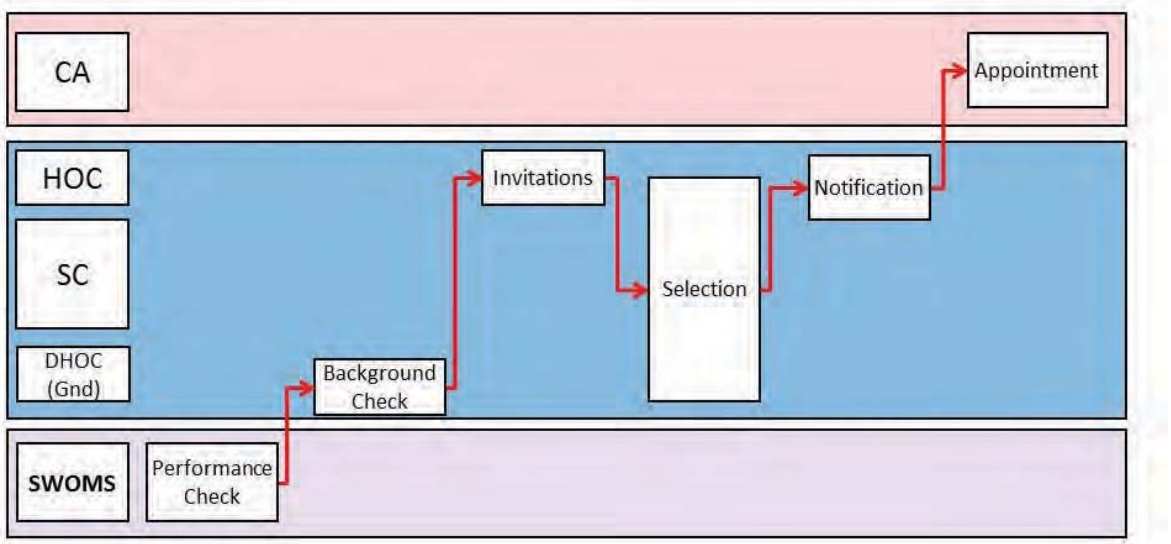

Figure 2: Master Artificer selection process

Career Progression for a RAEME Regimental Pathway

WO1 Richard Colefax

Introduction

1. With the policy change removing the regimental stream in approximately 2005, the focus shifted to trade progression and an unintended consequence has resulted in the requirement to maintain trade qualifications to enable to be promoted. Within RAEME, we find ourselves in a position where we are unable to maintain 'Regimental' positions within our own organisations (WKSP CSM and ASEME WSM) and in the greater 'Any Log Corps' and 'Any Corps' posting plot. The outcome is that as a Corps, we do not have the structures to enable a healthy progression through to RSM and, as a secondary effect, provide representation of the Corps across Army as advisors to commanders.

2. The All Corps Soldier Training Continuum (ACSTC) centres on the basic knowledge for the regimental soldier with the 'Arms Corps' enhancing this with their SUBJ 2 for SGT and WO2 courses which are focused on the regimental and operations warrant officer, and is detailed in their MAEs. Aligned with this is the requirement to be posted to instructor and operations positions, which maintains a pool of broadly experienced and qualified soldiers to fill SM or 'Any Corps' positions. RAEME, and other Logistic Corps, have a general logistic emphasis on their SUBJ 2 promotion courses which does not provide the skills to fill positions in training units or unit operational positions.

3. Currently RAEME does not have a formal process for identifying and mentoring prospective soldiers that have the attributes or skills to become RSMs, SMs or represent RAEME to the wider Army. The Corps needs to grow the soldiers to fill these positions so the position of Corps RSM can be maintained to provide the advice and information to Senior Leaders of the Army and the Corps. The Corps RSM is essential, separate to and nested with the proposed Trade Mentor structure being proposed at the Corps Conference.

4. This paper has been based on the 'Any Corps' and RAEME series of Manual of Army Employment (MAE) and comments and suggestions from members of the Corps.

Aim

5. The aim of this paper is to propose a framework to identify and mentor RAEME soldiers to ensure a healthy structure for filling Corps coded positions and promoting RAEME to the wider Army.

Regimental and Representational Pathway

6. **Creating a framework.** The first step in creating a framework for identifying soldiers for regimental and representational positions is to define the requirements for the framework. The framework must conform to the prerequisites of the Manual of Army Employment (MAE), both trade specific and 'Any Corps Soldier', in relation to required courses and Average Time in Rank (ATiR) and define preferred postings and decision points. This will enable the soldier to be promoted and gain experience that contributes to the development of the attributes required to provide advice to senior staff and command.

7. **Initial Identification.** All RAEME Warrant Officers have an obligation to the Corps to ensure that potential is recognised and developed in both Military and Trade skills across a broad range of areas to ensure the Corps can provide the maintenance capability/effect now and into the future.

8. RAEME Warrant Officers play a significant role in developing attitudes of the Craftsman early in their career and as a result require to have an unbiased approach towards trade or regimental career guidance based on their assessment to where a soldier may best contribute to the Corps into the future.

9. Initial identification of Privates and Corporals by SMs and ASMs to begin mentoring and liaising with Career Advisors to plan the posting requirements to provide a strong profile to be competitive in the PAC process. To provide the necessary experience and skills in both ECN and regimental aspects and enable the soldier to meet the requirements of the MAE, a ratio of one trade to two 'Any Corps' postings could be utilised. During these periods, the soldier can still be able to attend promotion and specialist courses.

10. **'Any Corps' MAE.** The 'Any Corps' MAE details the skills, knowledge and attributes required and directs the training, Career Profile and guidance for soldiers to progress from PTE (E) to RSM. For promotion to the next rank, the MAE states that 'Any Corps' soldiers are required to complete SUBJ 1 for the next rank and any Corps or Employment category specific promotion courses and attain the specified ATiR.

11. Initial postings for a CFN to a Forces Command unit is required to enhance their skills after completing ITT. After completing the required trade and promotion courses, they can be promoted to CPL based on merit in demonstrating a high level of technical, military and tactical proficiency as well as showing a potential for increased responsibility.

12. Potential postings for CPLs who have shown an interest in the regimental pathway are at the Federation Guard and DFR to provide a strategic outlook, and as a recruit instructor at 1 RTB to consolidate military attributes and enhance their instructional techniques. This can also be assisted by allocating lessons and tasks within their unit that build on their knowledge of military skills and processes. These postings and tasks will also confirm the interest and skills of the soldier for a regimental pathway or representational positions and ensure their career aspirations are not misplaced.

13. On promotion to Sergeant, selected postings as instructors at RMC-D, ADFA and LWC will provide grounding in doctrinal knowledge such as Military Law, discipline, dress and bearing and ceremonial. Postings to 1 RTB, ASEME and major workshops as platoon sergeants will confirm and enhance their knowledge of administration and policy for the successful management of soldiers. This will provide the foundation to fulfil the position of SM and be competitive for the 'Any Corps' positions as well.

14. It should be noted that the MAE directs that it is as this point, after completing two years as sergeant, the election to pursue the Regimental Pathway may be communicated to DSCM-A and if accepted, they will be not be presented to their trade PAC thereafter. This is to enable solidification of the skills, knowledge and attributes by filling regimental type positions to become a SM or RSM and will also discourage soldiers attempting to maintain location or lifestyle choices.

15. Regimental WO2s require to develop 'Corps' and 'Any Corps' experience to be competitive beyond WO2 as they transition into ECN 350. At WO2, a posting to RAEME coded SM positions in the Corps training schools allows the SMs to remain in touch with the

Corps whilst developing experience in Land units and 'Any Corps' positions to compete in a wider 'Any Corps' peer group in the future. This balanced approach should increase the Corps ability of having RSMs amongst the ECN350 RSM peer group who can articulate to Non RAEME Officers and other RSMs, Corps issues and potentially gain advocates to achieve Corps goals.

16. **Representational positions.** It is important for the Corps to have high quality CPLs and SGTs in RMC and Kapooka as part of a Trade/ECN or Regimental career progression to represent the Corps in the 'Any Corps' environment and in the case of RMC, present a professional Corps to potential Officers of the future.

17. For soldiers that have been identified as having the best attributes to represent the Corps at institutions like Federation Guard, RMC and ADFA, one regimental to two trade postings could be utilised.

Conclusion

18. The 'Any Corps' MAE provides the required pathway and career guidance for soldiers who are identified or choose to pursue a Regimental career. The Corps requires to ensure that this is balanced with a Regimental soldier who understands in detail Corps business.

19. As a Corps, RAEME must enable the building and promotion of an enduring structure to identify, mentor and encourage soldiers to pursue a Regimental Pathway to ensure positions within major workshops as SM are filled with our personnel. This will also strengthen the regimental progression in RAEME to fill corps coded RSM positions and provide representation in Tier B and C RSM positions in the future to provide advice on Corps related matters.

20. Encouraging our best soldiers to consider 'out of trade' postings across Defence will promote the professionalism and resourcefulness of the Corps as well as promoting the Corps at institutions such as RMC-D and ADFA.

21. A defined pathway and mindset to mentor, advise and encourage our soldiers on both trade and regimental careers must be adopted and supported by DSCM-A and the leadership group in workshop units.

Recommendations

22. A Corps Instruction sponsored by the Corps RSM be raised to outline the Corps requirements of SM and RSM. This Instruction would be nested inside the current RAEME MAEs and would provide DSCM-A with a framework to manage Regimental soldiers.

23. In collaboration with the Corps RSM and DSCM-A, compile and manage a briefing pack of the requirements and opportunities of the Regimental Pathway and representational positions to be available to WOs of the Corps to present to soldiers who show an interest in these positions.

What measures can the Corps implement or assist with to increase the diversity of personnel in the Corps?

MAJ Tim Hawley

Introduction

1. An initial assessment of diversity within RAEME notes that the Corps currently enjoys a strong degree of diversity. This includes broad demographics; employment categories; methods of entry; education levels; technical and non-technical perspectives. There is however one key aspect that is lacking across each of these- gender. RAEME's current rate of gender diversity, represented by the rates of female participation in the ARA up to the rank of Colonel is 3.9%, significantly lower than the other Logistic Corps, where RAAOC boasts 44% and RACT 26%. RAE as another Corps employing Science, Technology, Engineering and Mathematics (STEM) qualifications has higher representation, with 6.2%. Even RAA has a stronger female representation rate than RAEME, with 4.1%. This highlights that potential female applicants have a greater choice in which corps they can be employed within, and that RAEME must take every opportunity to attract them. As a result, the focus of this paper has shifted to addressing the most significant shortfall in the corps' level of diversity, by generating RAEME specific options to increase female participation.
2. The importance of Gender Diversity is often understated and overlooked in favour of more pressing issues believed to be more closely aligned to the generation of capability. However, gender diversity is a key driver and fundamental input to capability through the powerful diversity of thought it provides. The Broderick Review in 2012 identified the importance of gender diversity as a powerful means of enhancing problem solving, decision making and innovation. For these enhancements to be capitalised on, gender diversity needs to be represented in key appointments and senior leadership roles. This creates a new problem set associated with generating these individuals, which this paper will not address. However, Broderick does highlight that large numbers of 'highly trained, talented people leave ' before they are senior enough to fill these key roles, focusing us on the need for stronger female recruitment, training, retention and promotion strategies.
3. The Broderick Review identified four barriers to ADF female progression as follows:
   a. Lack of critical mass of women in the ADF;
   b. Rigid career structures and high degree of occupational segregation;
   c. Difficulties combining work and family; and
   d. Cultural issues including poor leadership and unacceptable behaviour.
4. **Scope**. This paper initially defines what is meant by the term 'diversity' before addressing three key three components; the current diversity status within RAEME; the various initiatives currently employed by Army; and proposed methods to enhance gender diversity within RAEME. This paper does not seek to provide the answer to the gender diversity problem faced across Australian society or the Australian Army, but rather provide a RAEME specific approach to enhance the current rate of female participation.

Aim

5. This paper proposes a combination of potential programs and initiatives available to RAEME to enhance the level of female participation as a means to enhance the Corps' gender diversity.

Definition

6. The Macquarie Concise Dictionary provides the definition for CA DIR 30/16 -Army Diversity and Inclusion Framework 2016-2020:

   "Diversity is the state or fact of being diverse; of a different kind, various forms or character"

RAEME diversity

7. RAEME currently enjoys a strong level of diversity, with personnel representing many demographics and backgrounds, generating a key strength in 'diversity of thought'. RAEME achieves its strength through two key areas: utilising all available methods of entry; and offering a variety of employment opportunities and categories within the Corps. This paper in conjunction with the corps conference, seek to exploit this strength, in order to address the key shortfall identified in RAEME's diversity - female participation, recruitment and retention.
8. RAEME currently utilises all available methods of entry into both the Officer Corps and Enlisted/ Other Ranks (OR). Within the Officer Corps, RAEME appoints individuals against:
   a. ADFA;
   b. RMC-D;
   c. Post-Qualified (PQ) Direct Entry Officers (DEO);
   d. Sponsored Undergraduate DEO;
   e. In-Service Corps Transfer;
   f. Army Senior Non-Commissioned Officer and Warrant Officer Commissioning Scheme (ASWOCS); and
   g. Lateral Transfer Scheme.
9. Officers can be employed against General Service Officer (GSO); Generalist Plus (GSO with complimentary tertiary qualification); Technical Specialist (previously termed Specialist Service Officer, now referred to as DEO); Capability Manager; Instructional; Staff Officer; and Logistic roles. With further breadth of employment available across four of the five domains (Land; Air; Sea and Space).
10. A similar range of entry methods are offered to OR, including an extensive list of Ab Initio training schemes; and PQ Fast-Track programs through either lock-step or self-paced courses. OR have a significant choice of ECN to select from, with the option to branch away from technical roles, into the Regimental Stream. The extensive range of employment opportunities and categories within RAEME, further enhances its diversity, attracting individuals with varying motivations and aspirations. However, this has not adequately addressed the key area that is lacking across all of these Officer and OR categories and opportunities, is RAEME' s gender diversity.
11. The use of these methods of entry for both Officers and OR allows RAEME to gain significant diversity of thought through the different cultural, spiritual, technical, and educational backgrounds each individual represents. As outlined previously, the potential 'multiplying effect' that stronger gender diversity can have across all facets of RAEME is a significant 'missed opportunity' that the corps must address in order to continue to contribute towards building a more capable Army in the future.

Recruitment & retention initiatives

12. The Chief of Army addresses the importance of our personnel in his Commander's Statement 2018; Australia's Army - An Army in Motion, expressing '*Our people are our Army. They lead, inspire and make a difference. They are our competitive advantage.*' A clear focus on our people, made more pertinent by the expectation that the future Australian workforce will reduce significantly over the next decade as the number of new entrants is considerably lower that those expected to leave the workforce. This applies significant pressure on Australian employers to gain any form of advantage or edge over their competition as the labour market tightens. As a government department, the ADF is not exempt to these pressures and must adapt to the changing environment in order to remain competitive.

13. **ADF.** The ADF employs a number of programs and initiatives seeking to improve recruitment and retention rates. These seek to address the significant increase in career mobility that Australian society is experiencing, and provides an opportunity to become the 'employer of choice' amidst heavy industry competition. To achieve this, the three services share a number of common programs, which are complemented by bespoke single-service initiatives, all seeking to enhance Defence capability. Some of these programs focus specifically on female participation rates, demonstrating the importance of female participation as a key enhancement to capability. The Women in ADF report 2016-2017 outlines these programs and their rates of success. A copy of the report's executive summary has been uploaded on the Corps Conference SharePoint page.

14. The ADF Total Workforce Model (TWM) has been developed to *'attract and retain the people we need'* in an ever increasingly competitive Australian labour market. The TWM incorporates extensive research and feedback into the drivers impacting retention across the ADF. This identified that employment flexibility was a common concern raised amongst the 10,000 permanent and reserve ADF personnel surveyed. The TWM provides the framework to address this, seeking to utilise the extensive experience and skill base across the entire ADF workforce in a *'more agile and integrated way, so the Services can access the right people at the right time to get the job done.'*

15. Army. Army specific initiatives are divided into two categories, nested under the ADF framework, grouping them as either recruitment or mentoring programs (mentoring programs are also referred to as retention programs). Currently Army utilises six recruitment initiatives and five retention programs. A summary of these initiatives and programs is attached in annex A. These initiatives provide an opportunity for RAEME to generate, enhance, or modify existing programs to address the corps specific concerns. Science, technology, engineering and mathematics (STEM) strategies provide the greatest opportunity for RAEME to enhance and exploit. Three distinct phases seek to address the identified risk areas for STEM; attract & select; consolidate & sustain; and utilisation.

16. The risks associated with the majority of STEM strategies, that both Defence and Australian industry identify, are also relevant to any RAEME initiatives. Mitigation of these risks are key to success. The most notable and relevant of these risks to RAEME initiatives are summarised as follows:

    a. Significant incentives (both financial and guaranteed short-term career progression) are currently on offer to high school students undertaking STEM subjects which are related to future employment prospects (Aurecon and BHP Billiton are among the most lucrative).

    b. Concerns over the immediacy of employment within the chosen discipline and a lengthy training continuum impacts individual motivation and commitment.

    c. Recognition of qualifications, and appropriate employment associated with the demonstrated skillset is limiting organisational loyalty.

    d. A reliance on STEM 'expertise' and appose to 'literacy' results in an over qualified workforce further exacerbating retention concerns.

    e. A transient workforce provides significant retention concerns, particularly the more specialised the skillset.

    f. A rigorous application and selection process is circumvented by large corporations (creating risk of inappropriate recruitment). Their size affords flexibility to conduct inter-department transfers to allocate individuals to positions appropriate to their strengths and weaknesses.

    g. Until recently, leadership and *'generalist officer qualities'* have been deemed more important to a candidate's selection during the Army Officer Selection Board process than relevant and strength of tertiary qualifications.

Enhancing gender diversity in the future

17. The greatest challenge to RAEME in implementing a corps specific approach, is the need to account for and balance each consideration; existing initiatives, risks and barriers associated with female participation in a predominantly STEM related technical corps. This paper proposes RAEME approach this topic under the framework of *'GRECO'* - Generate; Recruit; Enlist; Create; Officer corps allocation.

18. **Generate.** The generation of a central agency for the management of Army's gender equity issues was recommended in the 2012 Broderick Review, however this has not been fully realised. The benefits that this agency would provide to Army and RAEME are relevant to the issues faced today. The addition of STEM as a focus would provide significant benefit to the corps. The allocation of appropriate levels of staffing and resources is the greatest obstacle for the generation of this agency. Despite agreement on the benefits it would provide, the agency has not been generated, and in recent years engagement on the issue has waned, along with the possibility of it coming to fruition.

19. Engagement with DGPERS and DCAP PLANS-A to reinvigorate this topic of discussion has the potential for it being generated. The consideration of staffing and resource levels remain an obstacle as Army approaches its ' average funded salary' (AFS). However , the combination of numerous smaller initiatives into a single coordinating agency has the potential to address female participation, STEM recruitment issues and more generally the retention pressures felt across the Army;

20. Recruit. The Directorate of Recruiting and Retention (DRR) and Defence Force Recruiting (DFR) have historically achieved the best results possible with their respective resource allocation. Greater interaction with RAEME provides an opportunity to enhance their results, particularly when combining STEM and female recruitment efforts. DFR possesses both a female specialist recruitment team, and an engineering specialist recruitment team based in Brisbane, both of which are restricted in size and capacity. This limits their ability to source the quantity and quality of candidates to apply for Army from across the country. This provides RAEME an opportunity to bolster these activities through the provision of a ' RAEME fly away team' who in the majority of cases can be generated from the locally based units in support of the recruitment centres, particularly in Adelaide, Albury, Brisbane, Canberra, Darwin, Hobart, Melbourne, Sydney, Toowoomba and Townsville. The other centres with limited unit and formation representation may require additional resources for a RAEME team to support; these are the areas of Cairns, Gold Coast, Maroochydore, Newcastle, Perth and Wollongong.

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21. The generation of the central agency, outlined above under the heading of generate, would facilitate the desired support, based on the activity being conducted and the assessed need on a case by case basis. The greatest challenge is the coordination of individual's being released from unit commitments to undertake recruitment training requirements and participate in scheduled activities. The identification of suitable RAEME representatives within each region would facilitate early engagement and the creation of bespoke teams for each activity. This list of suitable individuals would need to be provided to DFR each year by the regional Corps Reps. To date, limited corps specific support has been requested by DRR or DFR, resulting in missed opportunities for STEM related corps with low female participation rates. The underlying theme being missed is the concept of ' you cannot be what you cannot see'.

22. Enlist. Significant shortfalls currently exist at specific ranks and qualification levels throughout the RAEME ranks, from tradesperson to senior Officer. Current policy constraints are limiting Army' s ability to enlist service from individuals who do not fit neatly in the junior components of both the Officer and OR employment specifications. For example, a senior Technician Electronics Systems (Army ECN 421 equivalent) enlisting from civilian industry would be expected to enlist at the rank of Craftsman, instantly precluding a large portion of the civilian workforce from joining Army based on the perceived reduction of responsibilities from their civilian employment. This is also pertinent to individuals attempting to make use of the SERCAT system to transition in and out of civilian employment, particularly if on return to Army their experiences and further qualifications are not recognised.

23. The concept of 'enlistment at rank ' into a position commensurate with civilian appointments is under development, noting the vast differences in civilian award schemes compared to Army, with a number of concerns requiring attention before policy can be drafted. The intent is sound, and provides significant opportunity to bolster STEM corps ranks with suitably qualified individuals to undertake the work required.

24. **Create.** The creation of formal STEM-related mentoring programs and development groups, similar to the Army Aviation Engineering Development Group (AAEDG), provide dedicated forums for concerns and issues to be addressed within specific employment groupings. One key strength of the AAEDG is the flexibility of the group to address any perceived issues and develop a consensus on the method for rectification. Although the AAEDG focuses on aviation specific concerns, many of the discussion topics relate to other groupings within RAEME, where a united approach across the corps would provide a stronger submission for consideration by senior leadership. These groupings would also provide greater opportunity for cross-trade engagement and an opportunity for in-service applications for additional training and tertiary study to be undertaken.

25. **Officer corps allocation.** A key consideration identified during the preparation of this paper is that both the RAAF and RAN are achieving significantly stronger female participation rates within their technical Officer workforces compared to Army. The underlying concern identified was the risk associated with not being employed within the individual's chosen discipline if they joined Army. RAAF and RAN offer applicants with a guaranteed mustering or corps, during their undergraduate studies, while Army relies on the Corps allocation board (CAB) conducted as the individual nears graduation from RMC-D. This clearly makes the RAAF and RAN letters of offer more attractive to an individual with a desire for employment as an engineer, precluding Army from consideration by a number of STEM students. This is particularly prevalent for female applicants undertaking a bachelor of aeronautical engineering with a keen interest in rotary wing aircraft.

26. The perceived risk of being allocated a corps other than RAEME, was deemed too great for a number of applicants interviewed. This was most notable when the RAN guarantees employment as an engineer with rotary wing aircraft. The most concerning part was that the individuals had no previous interest in service with Navy, aboard a ship, and originally applied to Army. The alternative to these individuals was to join the RAAF who would also guarantee employment as an engineer, but with fixed wing aircraft. Army was quickly dismissed as an option due to the lack of guaranteed employment as an engineer. The obvious solution to rectify this is the introduction of ' Officer corps enlistment' which is relevant to both ADFA selection and the Sponsored Under-Graduate scheme. A consolidated approach across the STEM related corps ' would provide a stronger argument to ensure consistency across corps allocation.

Conclusion

27. The question of diversity within RAEME initially appears to be an easy one to answer, with strong representation from a variety of demographics and backgrounds. However, the critical shortfall of gender diversity slowly grows in relevance, with female participation across the many opportunities available in RAEME being lower than almost every other corps. More importantly the corps is missing the opportunity to capitalise on 50% of the diminishing Australian labour market and the benefits associated with stronger diversity. The importance of female participation as a force multiplier cannot be overstated. This enhances both the strength and depth of RAEME's diversity, and the associated benefits which the corps currently enjoys. The ultimate goal of contributing to a more capable Army in the future requires greater harnessing of the strengths offered from the female workforce.

Recommendations

28. In support of enhancing female participation rates across RAEME, it is recommended that the corps adopt the following five points ('GRECO – Mafia clan from Sicily and Calabria):

    a. Generate – HOC to write to DGPERS and DCAP PLANS-A requesting an update on the initiative to generate and resource a central managing agency for all Army gender equity issues within Army STEM.

    b. Recruit – Engage with DRR and DFR to support STEM-based recruitment and retention initiatives through the provision ofRAEME fly away teams. Regional corps reps to facilitate the early identification of suitable representatives in their respective regions.

    c. Enlist – STEM 'at rank' enlistment and appointment strategy I framework be supported for further development in 2019, with specific to RAEME considerations to address the corps' needs.

    d. Create – Formal STEM mentoring programs and development groups be created, similar to the AAEDG, across the two key technical employment groupings. The AAEDG is chaired by SO1 TAAL and the ground equivalent by SO1 TECH MNGR. Although both posns are within HQ FORCOMD, invited members from SOCOMD, CASG and 1 DIV are to be included in the development group.

    e. Officer corps allocation – Army Officer Entry utilise a 'corps enlistment' strategy for STEM related corps. HOC to write to DGPERS requesting amendment to recruitment policy for technically qualified

Annex:

A. Army Recruitment Initiatives

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ADF Total Workforce Model

Pathway to Change: Evolving Defence Culture

The Global Gender Gap Report 2017, World Economic Forum

Chief of Army Commander's Statement 2018 - Australia' s Army; An Army in Motion DG CM-A DIR 03/18 Command Guidance 2018

World Economic Forum ' Global Gender Gap Report 2017'

Annex A

Army Recruitment Initiatives

1. The current Army initiatives for improving the current female participation rate are divided into two categories as follows:
   a. Recruitment initiatives – increasing the inflow
      i. **Media.** Marketing initiatives , including the "This is my Army campaign" which focuses on Women in unusual and non-traditional female roles. The 'Recruit to Area' and 'Recruit when Ready ' campaigns further enhanced the messaging and resulted in tangible increases to enlistment.
      ii. **Specialist recruiting teams.** Dedicated female recruitment teams within Defence Force Recruiting Centres in Perth, Brisbane, Canberra, Melbourne, Adelaide and Parramatta. These are supported by an engineering specialist engineering recruitment team based in Brisbane.
      iii. **IMPS.** Review of the initial minimum period of service identified a greater return on investment was possible for some categories. Within ten non-traditionally female categories the IMPS was reduced to 12 months in an effort to attract II,1ore female interest.
      iv. **Gap Year.** Offers a 12 month program for young women to experience life in Army without a long term commitment. This program enlisted 91 women in 2017, five were deemed unsuitable, leaving 86 to commence training. 73 of these women continue to serve on beyond their initial 12 month commitment.
      v. **Pre-conditioning program.** Assists women meet the general entry-level fitness standard, build resilience and provides recourses to assist in the completion of Kapooka. This has had significant growth, starting with 22 attendees in 2014 and now boasts a completion figure of 125 in 2017. Of the 187 women who have attended the program, 160 finished Kapooka and commenced their initial employment training.
      vi. **Army Physical Fitness Program.** Similar to the pre-conditioning program, the Army Physical Fitness Program provides a 12 week civilian strength and conditioning coach led program which focuses on the physical requirements for employment within an Army Corps. This program is under review following low completion rates.
      vii. **RAAF and RAN Experimental camps.** Both RAAF and RAN conduct Experimental camps that are worthy of investigation by Army. These camps provide young women with an opportunity to gain hands-on experience in non traditional roles. RAAF further refine the opportunities by running two separate camps; Flight camp for aspiring aircrew and Tech camp for engineering and technical roles. These camps raise the profile of RAAF and RAN as an ' employer of choice' for women.
   b. Mentoring – retaining the workforce.

      Up to Two-star Mentoring. Although not a formal program, Chief of Army encouraged the development of mentoring relationships in September 2016. This had previously relied upon the mentee seeking out an appropriate and willing mentor. As an unofficial program it lacked control measures and oversight, which has subsequently been rectified. There are now resources and training materials available IAW CA DIR 31/16.
      ii. **Army Regional People Forum.** Provided women with mentoring and networking opportunities through the Army Women's Networking Forum in 2007. This has expanded to include additional opportunities not specifically directed to women and re-titled the Army Regional People Forum. This forum informs the Army Gender Diversity Council with a structural review underway to improve its effectiveness.
      iii. **Army Industry and Corporate Development Program.** Previously titled the Army Outplacement Program, provides an opportunity for a small number of Army's future leaders (Officer and OR) to undertake a placement within civilian industry for up to six months. This provides insight into diverse work environments and change management strategies.
      iv. **Chief Executive Women's Leadership Program.** This program provides an opportunity for women in senior leadership roles to engage with other executive level women across civilian industries.
      v. **Great Leaders Are Made (GLAM) Program.** Developmental and empowering social dynamics program aimed towards highly talented women, particularly those in male-dominated work forces.

Force Support Element 9 Workshop – OP Accordion – "Diary of a Tradie"

Eleven RAEME members and one 'Q' storeman deployed as part of the Workshop Team of Task Group 633.9, Rotation 9, otherwise known as Force Support Element (FSE9). Equipped to provide integral, close and general maintenance across a number of concurrent operations, the workshop team provides the following snippets of activities so far in their deployment rotation:

CFN Nathan Bartholomeusz – 9 FSB. *I was force assigned to Task Group Afghanistan to support the Protect Mobility Vehicle, or Bushmaster, upgrade and then follow on with providing ROCL relief in Qargha. The PMV FIT support was to assist in the upgrade of the Powered Weapon System from GEN 1 to GEN 2 and also upgrade the radios with the digitisation of the communication suite. The main body of work for a Technical Electronics (ECN421) in Qargha is Electronic Countermeasures (ECM) based with a focus on 6 RAR's equipment and PMV's. I also had the opportunity to do some short notice work at HQ Resolute Support on some Up-Armoured SUVs. The task overall was interesting, and gave me a chance to work on equipment that I would not routinely see. A memorable moment while in Qargha was travelling on a RAF Puma to and from HQ Resolute Support.*

CFN Clint Mcilwain – 9 FSB. *My time so far being at Al Minhad Air Base (AMAB) has been quite different compared to life back home; the general work for my trade (Vehicle Mechanic) is quite busy compared to other trades back in Australia. Over here it is the opposite, vehicle mechanics in AMAB have to be reactive to short notice tasks in the Middle East Region (MER). We have a lot of out of trade tasks such as conducting weapon handling tests, range safety supervisor for RSO activities, raising facility work requests for plant maintenance, networking with the other Corps and Services, ensuring that the turtles are fed and garden is looked after. After work it is common to see the RAEME mafia in one of the gym locations or at the volley ball court dominating the opposition. So far this trip has been a great experience to learn a lot more about the customs and traditions of the locals and how each corps and the RAAF play its part in the bigger picture to achieve the mission.*

CFN Liam Mercieca – 2 FSB. *As a Vehicle Mechanic deployed with the Force Support Element in the Middle Eastern Region, I have had the opportunity to provide technical support on a variety of platforms. The localised equipment is quite unique and specific for the region; this diversity has created a new challenge in a maintenance perspective. This new exposure has allowed for greater professional development and further altered the methodology that I would apply as a tradesman in approaching and undertaking maintenance procedures. I would encourage any member to seek the opportunity to hone their trade skills by nominating for future deployments.*

PMV in FSE Workshop.

CPL Nathan Wieland – 3 CSSB. *I am an Electronics Technician deployed as the J36X Force Protection Electronic Countermeasures (FP-ECM) Maintainer as part of FSE-9. I am responsible for maintaining all FP-ECM systems utilised in the Middle East Region. This involves constant engagement with all Task Groups for scheduling upcoming services, liaising with FP-ECM Supervisors to ensure that all equipment is performing as it should, provide technical advice to Task Groups if problems arise and travel to each location where FP-ECM is prevalent in order to conduct regular servicing. This ensures that operators can be confident that the equipment they are using is functional and performs as it should.*

CPL Marley Birkett – 9 FSB. *If you don't like Electrical Integrity Testing (EIT), this job is not for you! My account of the Middle East Region so far has been mostly managing the rectification of technical maintenance, management of parts, equipment, and material. We, as a team, used the skills taught in our recent LEAN 6 Sigma training to try to stream line processes, both on and off the workshop floor, and to clear any unnecessary clutter in our day to day business. I have also done a considerable amount of Technical Electrical (ECN418) work and a fair bit of EIT (approx. 1000 items this month). On top of the work, there is the area beautification project of our beloved turtles and fish pond and small garden. People from all other nations and services hear of our "pets" and come to see for themselves which gives us the unique opportunity to network with people both from Australia and from other defence forces. All in all the experience has been a positive one and the group of people I work with get you through the day and we all support each other.*

The workshop of FSE 9 comprises of:

- ASM – WO2 Chris Lach
- EMEOPS – SGT Andy Gorine
- VM – CFN Clint Mcilwain
- VM – CFN Liam Mercieca
- Fit/Armt – CFN Mark Dias
- Fit/Armt – CFN Ryan Hofmann
- Metalsmith – CFN Dale Gray
- TES1 – LCPL Dominik Sydow
- TES 2 – CFN Nathan Bartholomeusz
- FPECM Boffin – CPL Nathan Wieland
- FPECM Storeman – CPL Gary Tennant
- Tech Elec – CPL Marley Birkett

Task Group Taji VII – Iraq Technical Support Platoon

LCPL Mitchell Wiley

Task Group Taji (TGT) is a combined Australian-New Zealand training unit providing the Iraqi Security Forces with training at the Taji Military Complex (TMC) 20Km north of Baghdad, Iraq.

TGT comprises around 300 Australian and 100 New Zealanders and has a TGT Technical Support Platoon (TSP) which is responsible for providing SME guidance, equipment maintenance and repair of equipment to the Task Group.

The TSP includes eleven ADF members (from 6 RAR and 2 CER) and five NZDF members. It encompasses EMEOPS, Vehicle Section (VEH), General Engineering (GE), Electrical Instruments and Radio Section (EIR), Repair Parts Store (RPS) and a two pers RAE Construction Management Team (CMT).

EMEOPS is where the leadership and experience is provided. The ASM is WO2 Wayne Davis and WKSP 2IC is SSGT James Kirkland (NZDF). They ensure the Task Group's equipment is always at a high readiness level and provide TGT headquarters with maintenance planning advice.

VEH section is led by LCPL Mitchell Wiley, with CFN Ryan Pentland and CFN Blake Pezzelato. They have been one of the busiest sections throughout the rotation with work including a number of PMV transfer case replacements, differential replacements and numerous power pack removals for a variety of repairs. VEH section has also been responsible for the replacement of all the Transparent Armour (ballistic glass) on the PMV fleet; this provided the greasers with a large amount of technical experience. The section also played a big part in the mobility divestment package to the Iraq Security Forces (ISF). The U.S led divestments have given the section an excellent opportunity to inspect and operate U.S military vehicles and allowed them to operate within the coalition environment and receive an exposure to our partner force's equipment.

GE section is led by CPL Andrew Casey and his team, CPL Daniel Shelton (NZDF), LCPL Thomas Walbank and CFN Nigel Cervellin. The armourers have been busy with various range support tasks, weapon technical inspections, AMW compliance and a lot of fabrication tasks including everything from targetry, bike stands, door frames for the training teams and a vast range of other projects. They have played a large role in the U.S led weapon divestment process, assembling and inspecting the suite of small arms and heavy weapons prior to divesting to the ISF.

EIR section consists of two trades, the Eleckies which is led by CPL Ben Lints (NZDF) and assisted by CFN Matthew Baker. They are responsible for the compliance of all electrical items within the task group, as well as providing electrical trade advice and assistance to the ISF elements as required. Besides electrical integrity testing, these boys have been busy with the inspection of multiple ISF generators within the wider area of TMC. They have also assisted in the planning of power distribution for A/C units at the Baghdad Fighting School.

The second half of EIR are the Boffins, CPL Nick McCulloch (NZDF) has a team of two, CFN Ian Gilzean and CFN Nathan Welch who are responsible primarily for the vehicle communications suites, whether it be repairs or inspections. Additionally, they provide support to the Taji Medical Centre for medical equipment inspections and repairs, the medical equipment takes up the majority of their time as these inspections are required frequently.

CMT is led by RAE CPL Adam Sunderland with SPR Ty Fergus, these

two chippies have hardly stopped since they got here. They have constructed a large quantity of timber facades for the training teams to use as an urban training aid and have built some luxury items for the HQ. If you can think of it, they can build it. The majority of their work now comes from individuals who have seen the results of previous work.

RPS is a two man team lead by SGT Adam Leverton as the parts distributor for the Aussies and assisted by CPL Hayden Bennett (NZDF) for the kiwis. This being said, they are never afraid to help each other with the requirements of their jobs. Understanding the differences between SAP and MILIS is beneficial to the Aussie elements as they may well be using SAP in the near future.

The TSP has been consistently busy supporting the task group. The U.S led equipment divestments (vehicles/weapons) have included the majority of the TSP, from operating and inspecting the equipment to driving the vehicles to the divestment location itself. There work too has involved the fitting of transparent armour to the PMV Fleet, heavy weapons support at the Besmayah range and technical inspections of weapons for the embeds at FOB Union 3. Overall, TSP maintains an extremely positive attitude and is always prepared and capable of committing their efforts to any task that may arise.

Now with the serious work spoken for, it's time to have a laugh about the capers that have occurred during our rotation. These begun when TSP won the Logistic Company Games Night, that was tailored to allow the Q-store to gain an easy victory but as usual the TSP boys came up with a plan to defeat their "sure win".

As a RAEME workshop tradition the 'Tool of the week' is awarded as a 'reward' to the individual who has done something 'worthy' of the title during the week, which seems to have a frequent home in EIR and VEH sections.

For the most part TSP has kept in good spirits and health. There have been many laughs and some tough weeks where a few of the boys have been hit with the famous Taji tummy (aka the squirts) which has created some vacancies on the workshop floor for a few days whilst they recovered. Now at the half way mark we are still focused at the getting the job done and getting home by Christmas.

From the boys in TGT VII WKSP – Arte et Marte

Rotary Wing Aircraft Maintenance School

MAJ Pete Pile

The Rotary Wing Aircraft Maintenance School (RAMS) is responsible for conducting individual aviation technical training for Army and the Fleet Air Arm in order to provide a trained workforce to sustain Defence rotary wing and Army tactical unmanned aerial system capabilities.

This means that RAMS is busy, and getting busier – our student throughput in TY 17/18 was 232 and expected to be in the vicinity of 280 to 290 in TY 18/19, due primarily to the planned Multi Role Helicopter (MRH) technical training surge in 2019 (as part of Plan PALISADE) - and it would be easy to conclude that RAMS is all work and no play. As with most units, however, that is definitely not the case here at RAMS, with us still finding time to conduct a myriad of other tasks and activities. Some noteworthy activities included:

CH-47F Chinook Technician Training Precinct

The final piece of the training system arrived in June - the CH47-F Avionics Trainer (CAT.) A team from Kratos flew in from the states to set up the CAT and conduct training for the CH-47 wing. The CAT provides students with the ability to conduct Avionics training on the CH-47F 'like' system, and gives the students experience in Removal and Installs, troubleshooting and testing key avionics components. The CH-47F Technician Training Precinct was officially opened by

The CH47-F Avionics Trainer (CAT).

Official Opening with Chief of Army and Managing Director Boeing Defence Australia.

Chief of Army – LTGEN Burr and Managing Director Boeing Defence Australia – Mr Darren Edwards on 18 October 2018.

Resilience Training

The premiere resilience training activity for RAMS was Kokoda Tribute, a CO's resilience activity consisting of a 7 km track from Webb Park at the top of the Toowoomba Range, down to Redwood Park at the bottom of the Range, then back up to Webb Park via a goat track. The teams consisted of 7-8 personnel, drawn from both students and staff. The teams were 'issued' with a number of items (a stretcher, three 20-litre water jerry cans, an ammo box filled with weights, an artillery shell (full of concrete) and a concrete block) when they arrived at Redwood Park and instructed to carry them to the top of the Range. In addition to being physically demanding, the activity reinforced the previous week's Professional Military Education (PME) presentation on the Kokoda Track campaign. The day went very well, with all participants appearing fatigued, but in otherwise good spirits and with no injuries. This was in no small measure due to the sterling efforts of SSM RAMS, WO2 Brett Mesken.

Additional activities included the CO's Physical Challenge. Scheduled to occur following the completion of the PESA by most of the RAMS Staff and Students, and building upon the rigorous (and I use that

A tired but happy RAMS on completion of Kokoda Tribute.

term advisedly too) PT conducted by the AAvnTC PTIs, this activity was designed by CO RAMS to truly test unit members' all-round fitness. The full challenge saw individuals complete a total of 100 heaves, 200 push-ups, 200 squats and 200 butterfly sit-ups (spread across 10 rounds) with three additional run-legs totalling 3.5km. CPL James McMullen took out individual honours with CFN Li / CAPT More winning the mixed team event.

RAMS staff and trainees distinguished themselves in two external endurance events. First was the – the Milne Bay Military Challenge, a team-based endurance event, which challenged teams of 2, 3 or 4 people, with a choice of 7km, 15km or 30km tracks. Team RAMS took home the silverware for the 15km course. Second was the inaugural Canungra Combat Challenge, held in support of Legacy. This was a gruelling 7.5km event, consisting of a 3km Sandbag Carry, 1km Log Carry, Obstacle Course, Body Armour Sprint, 400m Stretcher Carry and a freezing swim across the Canungra River. RAMS raised over $5000 dollars for Legacy Brisbane and Legacy Toowoomba, and one of our teams managed to win the event, beating the second place team by over 4 minutes. This was extremely impressive given that they were competing against teams from USMC, 8/9 RAR and 6 RAR.

RAMS marches through Oakey led by 2IC RAMS, MAJ McNamara.

Community Engagement

The main community engagement activity for RAMS each year is support to ANZAC Day activities, which as usual consisted of the bulk of RAMS Staff and Students parading at the local town, Oakey. RAMS also provided the catafalque party, and CO RAMS was the Reviewing Officer. Other members of RAMS also made ANZAC Day speeches at towns throughout the Darling Downs region. Unanimous feedback from these members was that attendances continue to increase year-on-year, which bodes well for the future. RAMS also supported countless work experience, Army Cadet Unit and local charity activities throughout 2018.

RAMS Birthday

RAMS birthday celebrations were conducted on 26 July 2018. Teams from each wing were pitted against each other across several events including Egg Throw, Spanner throw, Tug-o-war and an endurance event. Each wing was also challenged to construct a mechanical

Some of the participants in the Egg Cannon Challenge.

CO RAMS – The Target of the Egg Cannon Challenge.

'egg-propelling' mechanism (AKA Egg Cannon), the target of which was CO RAMS (wearing suitable PPE, of course.) HQ RAMS was the winner of the 'Egg Cannon Challenge', with a device which used the ADJT's land rover's compressor and was consequently capable of accurately firing a raw egg well over 100m. The CO was actually required to 'defend himself' against one of their efforts. CH-47 wing were adjudged overall winners and took home the RAMS trophy.

Our People

This month also saw one of RAMS' instructors, SGT Tyrone Tynan, selected for representational duties in France. The visit was in response to SGT Tynan being selected as AAvnTC Instructor of the Year in 2017. In addition to a battlefield tour, SGT Tynan also represented the ADF at a ceremony commemorating the Australian liberation of the village of Harbonnières, as well as escorting the ANF at the 100 year commemoration of the Battle of Amiens.

Key Personnel Changes

- CO
  - LTCOL Brett 'Running Man' Nelson – off to TTMU in CASG.
  - LTCOL Miles 'yet to get a nickname' Irving – posted in – currently the S4 / Brigade Aviation Maintenance Officer (BAMO) at 16 Avn Bde
- ADJT
  - LT Pat Williams – posted out – bound for 5 Avn Regiment
  - LT James Skeggs – posted in – an Engineer 'Lateral Transfer' from the British Army, currently posted to 21 Constr Regt, who will assist the OPSO to counter the influence of the 'Australian book of made up words', commonly known as the Macquarie Dictionary...
- SSM
  - WO2 Brett Mesken – posted out – off to get what hair he has left frizzled at 72 EW Sqn, Cabarlah
  - WO2 Jason Lehmann – posted in – arriving from 1 ARMD Regt – is he in for a culture shock...

In addition to the above, 15 other members of RAMS Staff are posted out at the end of this year. On behalf of all the members of RAMS, I would like to bid the departing members adieu and wish them well for the next phase of their military careers. 2019 promises to be yet another busy year, and members posted in will have to hit the ground running in order to build on the success of their predecessors. Bring it on.

Aviation Maintenance Awards – 30 November 2018

The Rotary Wing Aircraft Maintenance School hosted a dinner celebrating the 76th Anniversary of the formation of the Corps. The Hawker Pacific Innovative Solutions Award and the Shannon Nichols Award were presented as part of the evening's events.

The Hawker Pacific Innovative Solutions Award presented to the Tiger Maintenance Organisation.

Hawker Pacific Innovative Solutions Award

Hawker Pacific prides itself on being a world leader in the aerospace industry capable of delivering superior levels of reliability, innovation, integration and safety. These core values underpin the Annual Hawker Pacific Award and remain critical criteria for selection of recipients. For this reason, the Tiger Maintenance Organisation of the 1st Aviation Regiment is awarded the Hawker Pacific Innovative Solutions Award for its sustained and diligent performance in 2018.

Noteworthy achievements for the Tiger Maintenance Organisation are:

- Supporting the Tiger's return to the flying, following the tragic accident involving a German Tiger in 2017, through conduct of extensive maintenance and inspections of all aircraft.
- The conduct of transcontinental deployments of a Tiger Squadron via RAAF Strategic Airlift. The deployment of aircraft, stores and personnel was conducted efficiently by the maintenance element resulting in the first Tiger sorties being flown within 48 hours of C-17 landing.
- During Exercise HAMEL 18 saw the maintenance organisation surge to support 10 day/24 hrs sustained operations at very high readiness notice to Joint Task Force Headquarters and the 7th Brigade. The Tiger Maintenance Organisation provided reliable and sustainable aircraft availability enabling operational highlights including the successful conduct of Manned Unmanned Teaming with Shadow 200 and integration of Tiger into the Counter Fast Inshore Attack Craft Drills.
- Concurrent to HAMEL 18, the remaining Garrison maintenance workforce was able to maintain an above average rate of effort supporting continuation training at Gaza Lines in Darwin.
- Embarkation of Tiger for First of Class Flight Trials Phase 2 on HMAS CANBERRA. The ability of the maintenance personnel to integrate and innovate whilst embarked on the Landing Helicopter Deck has had an enduring and positive impact.
- Throughout 2018, Tiger maintainers have consistently achieved unprecedented availability rates whilst simultaneously operating from demanding amphibious and land environments; generating trust in the capability amongst wider Army. The maintenance element's commitment to the Tiger has been complemented by their strong support to fleet planning and maintenance burden reduction initiatives which, in turn, are having positive implications across the Army's Tiger fleet.

The exemplary performance of the Tiger Maintenance Organisation in the 1st Aviation Regiment is underpinned by strong leadership at all levels, a focus on safety, commitment and innovation to support mission success. The Tiger Maintenance Organisation truly embodies the core values of Hawker Pacific and is considered a worthy recipient of the 2018 Hawker Pacific Award.

Shannon Nicholas Award

Awarded to the trainee judged as the ITT Student having the highest grading from courses conducted at RAMS during the training year. Trainees are judged using a combination of academic and OJT results, attitude to training, and overall performance throughout the course.

The 2018 winner, CFN Shannon Armstrong-O'Meara, was a student at RAMS from June 2018 for the Aircraft Technician, ARH Technical Type course, Session 0042.

During his time at RAMS CFN Armstrong-O'Meara undertook both theory and practical components and carried out daily trades person tasks.

CFN Armstrong-O'Meara showed exceptional levels of motivation and his skills and application of trade knowledge were above level expected during training. It was a pleasure to see CFN Armstrong-O'Meara seeking out additional tasks demonstrating his work drive. In addition, CFN Armstrong-O'Meara has established an admirable all round performance through superior results in physical training and community involvement through the 1st place in the Canungra Combat Challenge.

Overall, CFN Armstrong-O'Meara achieved a very high standard and attitude throughout the ARH ITT course and will be an asset to 1st Aviation Regiment, ARH and the wider Aviation capability. For his performance, integrity and general military professionalism during the ARH ITT course, CFN Armstrong-O'Meara is awarded the Shannon Nicholas Award.

The Shannon Nicholas Award winner – CFN Shannon Armstrong-O'Meara.

1st AVN REGT – Tiger Maintenance Organisation

CAPT Louise Farrell

The soldiers, airmen and contracted technicians of Technical Support Squadron (TSS) and the Technical Support Troops (TST) of 161 and 162 Reconnaissance Squadrons began 2018 by supporting the Tiger return to fly program. These personnel worked consistently to rebuild the Tiger's reputation for performance following the tragic accident involving a German Tiger in 2017.

The months of June and July were marked as a fast-paced, intensive activity for the Tiger Maintenance Organisation as a TST deployed under the banner of Task Unit POSSUM, exercising the ADF's ability to conduct a transcontinental deployment of a Tiger squadron via RAAF C-17. The rebuild of aircraft was conducted smoothly and efficiently by the maintenance element resulting in the first Tiger sorties being flown within 48 hours of landing in Townsville. The quick rebuild and reconstitution of the aircraft allowed for a successful four day Mission Rehearsal Exercise with Task Unit WARHORSE. This enabled the establishment of new working relationships and development of Air Assault Escort / Combat Recovery procedures which set the conditions for the success of Task Group GRIFFIN during Exercise HAMEL 18.

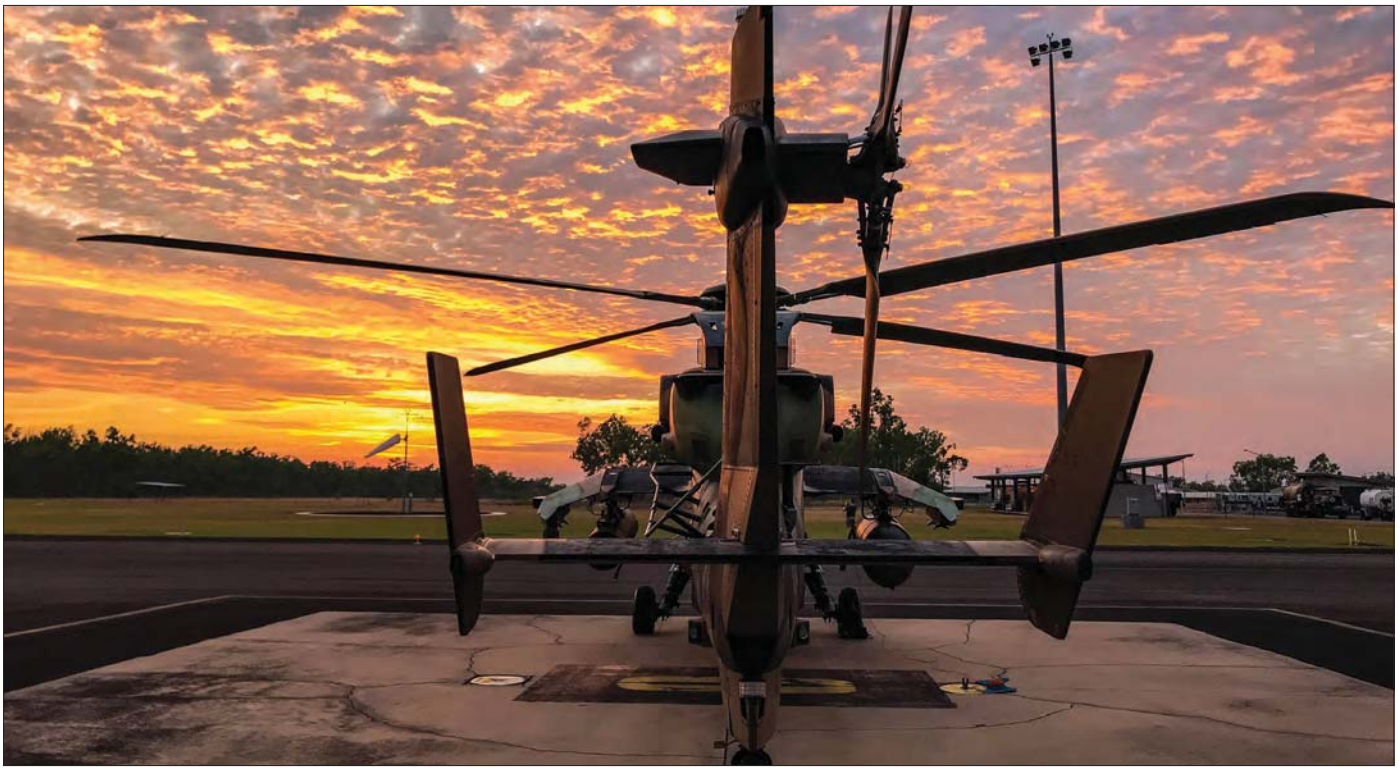
Exercise HAMEL 18 saw the maintenance support crews generate a 10 day continuous surge of aircraft to provide 24 hour Very High Readiness support to the Joint Task Force Headquarters and 7 Brigade. Tigers were enacted daily and conducted Air Assault Escort, Ground Convoy Escort, Armed Reconnaissance, Close Air Support, Army Attack Aviation Call for Fire, Aerial Observation Posts for Indirect Fire and Integrated Manoeuvre with 7 Brigade's Battle Group WARHORSE as common practice. The Tiger Maintenance Organisation provided reliable and sustainable aircraft availability enabling operational highlights including the successful conduct of Manned/Unmanned Teaming with Shadow 200 and, breaking new ground, providing Armed Reconnaissance support to the Amphibious Task Group over a period of several days. Support to the Amphibious Task Group culminated with successful integration of Tiger into the Counter Fast Inshore Attack Craft Drills.

During the conduct of Exercise HAMEL 18, Tiger flew a total of 193.7 AFHRs. The maintenance element provided serviceable aircraft for every Very High Readiness task in addition to providing serviceable aircraft for each deliberate planned mission. As proof of the capability, no sorties were dropped due to unserviceability for the duration of the exercise. During the absence of a large maintenance element on Exercise HAMEL 18, the remaining maintenance workforce was able to maintain regular flying operations at Gaza Lines in Darwin.

The Tiger Maintenance Organisation has continued to support the development of the Tiger as an amphibious option for the Australian Government, embarking for First of Class Flight Trials Phase 2 on HMAS CANBERRA. The 1st Aviation Regiment was able to conduct Deck Landing Qualifications while supporting the development of Ship Helicopter Operating Limits, which will ultimately provide flexibility to Canberra Class vessels, Commander Amphibious Task Force and Commander Landing Force. This key contribution to the achievement of an expeditionary amphibious capability was conducted while a consistent Rate of Effort continued to be generated at Gaza Lines in Darwin.

Occurring simultaneously with the First of Class Flight Trials Phase 2, the Tiger capability's Forward Air Control (Airborne) Recertification was conducted from Gaza Lines. The result was an absolute success – on time, on target. Again, the Regiment did not drop a single sortie and the availability rates enabled valuable training sorties in addition to the programmed Forward Air Control (Airborne) missions.

Throughout 2018, Tiger maintainers have consistently achieved high availability rates whilst simultaneously operating from demanding amphibious and land environments. Looking forward to 2019, both Tiger and its logistic support arrangements will again be tested and improved as the Regiment embarks on its most exciting year yet. Watch this space.



Career and Advanced Training Wing (CATW)

Army School of Electrical and Mechanical Engineering

HQ

2018 has been a busy year for Career and Advanced Training Wing (CATW), having already delivered a huge 50+ courses and successfully trained more than 300 students. As you may be aware, CATW is responsible for the majority of ground RAEME's specialist maintenance and recovery courses, in addition to the Subject 4 Career courses. As RAEME technicians you will most likely see your way though several CATW courses throughout your career, including LTs.

July brought a significant change to how CATW operates, with instruction for many of our courses now delivered by Wodonga Institute of TAFE (WIOT). This has kept the OC (MAJ Dee-Ann Jackson) and ASM (Laurie "Wal" Wallace) out of the office having "contract meetings" (usually at the café) for the majority of the year. Additionally, dealing with grumpy WO2s and super keen SGTs has kept them on their toes.....respite posting they said!

Rounding out the HQ team is the 2IC, CAPT Nathan "the Phantom" MacDonald, who was thrust in at short notice from ACW to fill the void left by CAPT Adam "the week old cake's still good" Hill and the acting OPSWO, SGT Blake "who the f#*k thought that was a good idea?" Medway. WO2 Terry Nieuwenhout made a cameo appearance before being snatched up by ASEME HQ to fill the Training WO void.

Careers Cell – SGT Cheyne Truelove

Careers Cell has come together this year to review and renew aspects of the training delivered across the Subject 4 suite of courses. The Cell has re-invigorated parts of the content and learning outcomes, reflected in updated LMPs.

Our Corps NCOs, SNCOs and WOs are expected to be able to operate and lead effectively in an ever changing, complex environment. The Cell utilises emotional intelligence training to equip students to understand the importance of being able to lead yourself before you are able to effectively lead others.

This is re-enforced through defining the roles that values; standards; and beliefs play and the importance of identifying and modelling excellence that has gone before them.

The Cell's vision is to transform the Subject 4 RAEME Promotion Courses from attendance courses to selection courses, where students will be selected to progress to the next rank based on their attributes to contribute and lead the Corps into the future.

The fruition of this vision will aid in building our future non-commissioned leaders; to enable them to navigate themselves and their teams to pursue excellence; enabling them to thrive in the complex and rapidly changing environments they may find themselves in.

Specialist Equipment Training Group (SETG)

Vehicle Cell

A Vehicle Section – Mr Andy "Mac" McAdie

The tenth Armoured Vehicle Maintenance Course (**NOT "SUPER A"!!!!**) commenced in September this year and there is no approved plan to remove the Course from the training continuum at this stage. There has, however; been a training analysis conducted on the M113AS4 and ASLAV Vehicle Maintenance Courses resulting in new LMPs with the pilot M113AS4 course that commenced in October.

The review of the LMP has generated the ability to have the theory component delivered via an on-line platform, such as MOODLE in the future, once the LMP has been trialled and reviewed. This will enable sessions to be delivered within Units with the practical components of the course delivered and assessed by qualified and approved Unit technicians. The pilot course will be delivered residentially at ALTC. The ability to run individual platform courses will enable technicians to be trained on a specific platform and reduce the amount of time away from their Unit when not posted to a Unit that holds all four platforms.

Bushmaster Section – MR Adrian (Booka) Macilai

It's Ground Hog day for the good old Bushy maintenance course with next to no changes to course content or method of delivery. Sadly, the only thing that is certain is there aren't as many course being run as previous years. DTR is now mainly for RAAF, ARES and civilians.

The 0097 Bushmaster Maintenance Course has just concluded and we are now a few courses away from a mile stone... triple digits! Yes, the 100th Bushmaster Maintenance Course is fast approaching, so if you want in, get your ASM on board and keep an eye out for nomination requests.

Kalmar RTCH Section – MR Adrian (Booka) Macilai

Hi again – long time no read. The Kalmar course is not so much ground hog day but edge of tomorrow. You know, that movie with Tom Cruise and Emily Blunt; Tom gets covered in the blood of an alien and gets its powers to go back in time to a point and re-live that time again to find a scenario where they win the war. Anyway I digress. The Kalmar course!

The Kalmar course is alive and strong and is specifically focused on 10 FSB with the odd 9 FSB member and civilian contractor.

10 FSB graciously allowed us to visit in September 18 to deliver the Ground Guide Only and maintainer training. Special thanks to LTCOL Neil Peake (CO 10 FSB), WO2 Mick Moody (30 TML) and WO2 Jason Lee (ASM 10 FSB) in authorising and helping gather resources, and organising specific areas to conduct the Kalmar training.

Electronic Systems Cell – SGT Dean Trainer

Shout out to all the RAEME brethren as we look towards the end of a great 2018 of swinging spanners... not done yet though, so hang on in there. Unlike the other SETG Course Managers, if I were to ramble on about all five courses that I manage and every single LMP amendment we would be here for a while... "aint nobody got time for that". So... to keep it simple.

Abrams Tank Control Systems. Session 0026 is off to a cracking start with only a couple of weeks down and a couple of months to go. There has been a few changes with removal of FBCB2 and replaced with the MFoCS. I anticipate a few changes to delivery of the course, but only time will tell.

ASLAV Turret Control Systems. Future of the ASLAV is coming to an end, with it being replaced by the Boxer CRV in the coming years. In saying that, the maintenance courses will continue as there is still a demand for maintainers. Session 0034 has been moved to early 2019 and session 0035 will continue as scheduled.

RBS-70 Medium Maintenance Course. For those that are unaware (or even care), the RBS-70 course was delivered at 16 ALR for 2018 but it will be back at ASEME for next year.

AMSTAR Medium Maintenance Course. The gift that keeps on giving... for all the boffins wanting a pay rise, start sweet talking your ASM because this offer won't last forever. I call it the pay group dash, three and a half weeks in sunny Bandiana for an extra pay group. In all seriousness, there is still the requirement for maintainers so get your noms in.

Bio Medical Equipment Maintenance. Yes... you read it. It does still exist and it will feature significantly next year. It will be delivered by Box Hill with an on-line learning and residential components. So the future is once again promising for those boffins in the hunt for deployments and requiring Biomed IOT be nominated. Well that's it from me, everyone have a great RAEME Birthday.

Armament Cell

Artillery Section – Mr David Clarke and Mr Gaylard

Army's newest Artillery piece the M777A2 155mm lightweight Howitzer, is proving to be a very dynamic weapon system. It is constantly undergoing upgrades to its Digital Fire Control System (DFCS) Software (Sw) and Hardware (Hw); as well as to the platform and ordnance.

The latest introduction is the DART system and new Leica theodolite, which are due to be issued to Units soon. This will do away with the need to have a plumbline in workshop to level the trunnions during DFCS and Optical Fire Control Systems tests. The DFCS Sw and Hw systems are due to be upgraded again in 2019.

We have also been busy staying up to date with recent changes to EMEIs. Mostly those relating to M777A2 documentation procedures. Fitters are to record all maintenance on MILIS and are no longer responsible for making any entries in the GM120 or checking any operator entries in it.

There has also been a LMP Amendment actioned to remove all reference to the Abram from the Ordnance Examiner course. As there is no requirement to conduct Examinations of Ordnance on the Abrams. All members from Craftsman up that complete the Abrams Turret Armament course are qualified to conduct the 180 day PMCS check.

AFV Cell – Mr Don Cullen and Mr Allen Clarke

M1A1 Abrams Tank, M113AS4 and ASLAV Turret courses

I got the word that this article is a little too Armour oriented, well guess what....

The 27th M1A1 Abrams Tank Turret course is nearing completion with only a few weeks to go, this being the second one for this year. That puts us here at around 60 turret lifts since we started in 2006, so we've just about got a handle on it!

The end of this course will see us roll straight into another M113AS4 Turret course and then straight into the third and last ASLAV Turret and Armament course for this calendar year.

We have recently completed the Maintenance Task Analysis on the Fitter side for the Abrams Tank. This hopefully identified all things that require maintenance 'now' and items that may be subject to failure into the failure.

We have now separated the Tank Documentation out of the Artillery Principles package. The up side of this is we now teach Tank specific documentation. The old problem of trying to comprehend the dated artillery EMEI that deals with the maintenance of the Tank gun is still there, there is essentially a patch job on the Tech manuals every time we receive a new piece of equipment, some dating back further than me. So....., ideally we will one day have an EMEI similar to the M777A2 that deals with ALL things tank.

Recovery Training Centre (RTC) – SGT Luke Craig

Having completed Basic Recovery Course 0032 and Subject 4 "don't call yourself a Recky Mech if you've forgotten how to do your job" Corporal course, is now undergoing changes at a rate that no old crusty could possibly cope with.

The Dustbowl has undergone further renovations including new drainage, new bog holes and of course a new cliff face roughly 50 metres long and peaks at 5.5m high, otherwise known as The Great Wall of Recovery.

BRC 0033 has been postponed to allow our staff (the SGT's at least) time to develop and test a new training package that includes the new HRV 45M. "It's not a crane, it's a ROTATOR!" The specialist courses continue on, despite the course manager somehow managing to disappear during every single one of the courses and, as I type, also managed to break the M88 again!

Looking forward, RTC will be fully adopting the ASEME manning policy, by having less people and more work for 2019 and beyond. Also, welcome back, WO2 Groth for his 47th attempt at the ARA.

Conclusion

It's been an extremely busy past 12 months for the CATW staff as highlighted above, not only with our core function in delivering training to technicians but in looking to the future to identify and implement initiatives and innovation to ensure as a Corps we remain current and relevant in delivering the required maintenance effect to a modernised Defence Force and an Army in Motion.

I would like to thank all the CATW staff for their hard work and achievements.

Wishing everyone and their families a safe and Merry Christmas and Happy New Year.

Arte et Marte

Technical Support Troop, 162 Reconnaissance Squadron – Marlins at Sea

LCPL Patrick Schweikert

162 Recce Sqn have flown a very successful year, with the Technical Support Troop working hard to keep up the Regiment's tempo and supporting the greater Army to meet our capability and preparedness requirements.

The Sqn's involvement in the Griffin Guns series gunnery exercises this year has not only increased the capability of the platform but exposed our new maintainers to a fast-paced environment. The second half of the year was an extremely exciting time for the Sqn. An aviation FRT and support elements embarked on HMAS CANBERRA to conduct First of Class Flight Trials (FOCFT) Phase 2.

The aim of Phase 2 was to expand the capability of the airframe by constructing the Tiger Safe Helicopter Operating Limits (SHOL) to define safe landing and take-off parameters from the LHD under different sea/wind conditions and at different aircraft weights/configurations.

With weeks of preparation and packing the Sqn deployed two Tigers via C-17 from RAAF Darwin to RAAF Richmond. Once the aircraft were reassembled by the FRT, the detachment joined the Army's instrumented test Tiger, A38-001, in Sydney Harbour. With integration with the LHD underway the ship sailed to Darwin and the detachment was able to conduct numerous sorties with the instrumented test aircraft. This phase of the trip also tested some of RAEME's best maintainers – new exposure working in an embarked environment took 110% teamwork with the Navy's aviation department. It was a rewarding and challenging environment for the FRT.

The night shift works into the early morning on a hydraulic system fault.

Arriving in Darwin the detachment met the remainder of the 162 Recce Sqn and this signalled the beginning of the 10 day sail to qualify the Sqn's pilots in deck landings. This was also an opportunity to expose the other technicians to embarked maintenance. This phase of the trial was so successful that the Sqn was able to provide the same deck landing opportunities to additional pilots from 161 Recce Sqn.

A Tiger on standby on Spot 4, HMAS CANBERRA.

The next phase of the trip consisted of an international visit to the picturesque tropical island of New Caledonia. During the sail out into the Coral Sea, the trial was able expand the SHOL to test the airframe in the open ocean conditions. A typical day on the flight deck exposed the airframe to winds up to 40 knots and a rocking flight deck. RAEME aircraft maintainers worked in these arduous conditions fixing faults and conducting routine maintenance. A different and rewarding experience – focussing on the task at hand whilst a test pilot lands an airframe on a moving deck only a landing spot away! Then, when called upon, technicians conducted engine compressor washes under the Tiger's turning disc only metres away from a 27m drop off the edge of the ship. No matter the weather conditions the RAEME aircraft maintenance crew were there keeping the airframe maintained.

162 Recce Sqn RAEME aircraft maintainers conducting a weekly aircraft wash on the flight deck somewhere off the coast of Australia

On arrival into port after a tough week transiting from Darwin, the FRT arrived in Noumea (New Caledonia) where shore leave was granted. With the RAEME boys feeling like salty sea dogs and missing the constant stillness of land, the adventure began, tasting some the island's food and ale. Well rested and having explored a lot of the island, the FRT were able to expand their cultural horizons and bring back onto the ship some picked up lingo. Being a French colonised island and working on a French aircraft the technician's new French words made for a high morale work area... "Quand est smoko?"

Returning to mainland Australia saw the boys working flat out until the aircraft took off from the deck in Sydney Harbour. A quick three aircraft flyby of the embarked Tigers signified the end of FOCFT Phase 2. With the trial done, the successful of the trip resulted in 95% trial completion, 548 Deck landings and 1734.7 logged man-hours of maintenance.

The FRT then backed up the six weeks at sea with a two week exercise working with SOCOMD and 6 Aviation Regiment. With 100% aircraft availability during the exercise, it showed the exceptional quality of our maintenance crew and maintenance leadership. With a total of eight weeks away from sunny, warm Darwin the FRT and aircraft returned. However, the last Griffin Guns of 2018 was about to start and with around the clock support needed the maintainers were back to big and challenging days.

The 162 Recce Sqn maintenance crew faced long and flexible work hours throughout this year. Many members showed exceptional leadership by stepping up to the task. Traveling across Australia and overseas, facing hard faults, and at times limited support, the RAEME aircraft maintainers were able to provide innovative maintenance management and the classic RAEME "can do safely" attitude to ensure maximum operational availability enabling the commanders to win the land battle.

1st Aviation Regiment Ground Support Troop

CFN Adam Skennar

2018 has seen a lot of new faces marching into the reputable Ground Support Troop of the 1st Aviation Regiment. Some members were confused and nervous about how 'non-army' the aviation world is, but they soon settled in after their first café latte.

With a slow start to the year filled with routine maintenance, the standard impossible TTFA repair, and a constant struggle between hazelnut or caramel latte, it was soon time to set off down the Stuart Hwy for Hamel 18. This was a vastly different perspective for CPL Brown whom had posted in from 3 CER and rapidly learned that surprisingly he was no longer a substitute grunt and was actually employed as a craftsman.

Mitch Jacobson was kept busy with the construction of some gorgeous tri-colour coated Deployable Air Maintenance Rig (DAMR) stands that unsurprisingly were neglected by civilian contractors in their transportation back to Robertson Barracks. Additionally, on day one craftsman Tim Blakey seized the opportunity with a mint idea to delay a 1 CSSB posting and nearly cut off his thumb whilst removing a cable tie. This resulted in two MRH90 rides, 18 stitches, a severed tendon, and the rest of the Ex drinking coffee and eating fruit cake. He is still posting to 1 CSSB in January.

The highlight of the trip for some was a certain recovery Corporal (Howie) who lost a complete wheel station off his 20T enroute to SWBTA. It was last seen bouncing through 'farmer Joe's' paddock by Mitch Jacobson creating a path of destruction in its wake. If found please return to 1 AVN Regt before the poor farmer has a nice surprise whilst conducting his 2018 harvest.

Earlier in the year GST had an overnight PL shakeout at Kangaroo Flats Training Area. Due to some members of the troop having not completed postings in a combat unit; they learned how to set up and pack a cam net over a vehicle, occupy a harbour, and conducted refreshers on night routine. CPL Woolley delivered an outstanding set of FRT orders; the troop did a bit of field welding with the MOSA, and in proper field RAEME fashion; finished off the night with a BBQ dinner around a campfire.

The 1st Aviation Regiment has witnessed a massive turn-over of equipment in 2018. CFN Igo lost his hard fought battle to become the 'DAMR Master', or affectional referred to as the 'trailer specialist'; two new JP157 civilian fuel trucks arrived to reduce the growing workload of mechanics, and then almost 50 MAN trucks and trailers were issued to replace 11 Mogs and 3 Macks; ultimately ensuring the craftsmen are always busy with non-stop Technical Inspections and scheduled servicing.

As we approach the end of 2018 we have said numerous farewells to members leaving the Regiment to either new units or starting civilian adventures. We farewell CFN Scully who is off to bigger and better things outside the Army as he relocates to the nation's capital. We wish him and his family all the best in their future endeavours as they brave the upcoming winter. We farewell CPL Robert 'Bob' Revermann who is retiring at his prime of 60 years old so he can move back to the sunshine coast with his new boat and golf buggy. It is safe to assume that although workplace hazards will drastically reduce; no workshop within the Army will ever be the same without his personality and antics. A significant farewell goes to the head butting, karate chopping, ever smiling ASM who is heading down to Melbourne to join his CASG brethren in sipping pumpkin spiced lattes and tying top knots for hipsters. His respected presence will be severely missed as the Regiment takes a huge hit with his absence.

As 2019 and the Talisman Sabre series rapidly approaches; the 1st Aviation Ground Support Troop maintains the rage in their quest of land materiel maintenance excellence.

1 AVN GST Workshop.

2/14 Light Horse Regiment (Queensland Mounted Infantry)

V58

CPL Maroske

SPT SQN-TST hit the ground running for 2018 with a few fresh faces to complement our already undermanned main workshop. With 7BDE coming online mid-year there were plenty of up and coming major field exercises to test out the Regiment requiring everything to be FF by yesterday. Looking at the forecasted SQN tracker it looked like we would be doing more bush than Bear Grylls.

Once the field period kicked off we knew we were in trouble when our fearless leader LT Banks was cosying up with his fellow officer mates in the EMEOPS shelter watching "Princess Diaries", and the RASM was more interested in, where he could get some cam cream; when he could start wearing it; and if it was safe to eat or use as an all over body moisturiser.

The Regiment provided us with many challenges mainly coming from the M88, Abram tanks, and truckies not knowing how to drive the new fleet of vehicles without hitting trees. All trades worked to an exceptional standard on a plethora of tasks ranging from fabricating 8 - 20mm steel tank and ASLAV targets; numerous random vehicle/weapon repairs; servicing tanks; and running power to everyone in the echelon before they began to cry why their phone was going flat. I think the Boffins also did a job.....can't remember.

Special mention has to go to CPL Woo providing great hospitality to any member of the Regiment at his "Party tent!" Members of the workshop and Regiment as a whole need to ensure they gather around his GMV just as he is setting up wanting to go to sleep, in his swag, on a stretcher. Coming from Infantry it was noted by the Fox that CPL Woo was the biggest Pogue of all.

As the year draws to a close SPT SQN-TST will look to continue what it has done for the year thus far. To support the Regiment in all of its random request glory, to the highest standards, whilst maintaining a great level of morale, having a laugh, and working together as a great group of guys.

V18

CPL M. Cremin

The start of 2018 had an air of excitement around the V18 crew, with some new faces keen to start another year and some familiar faces ready to dust off their post CSS CONOPS hangover with a fresh start.

This year's crew consisted of WO2 Shaw (ASM) back from a 12 month hiatus, CPL Jenkins and CFN Ryan (Fitters), LCPL Peters and CFN Basterfield (Boffins), CPL Walker and CFN Pearce (Recovery Mechanics) and finally CPL Cremin, CFN Dixon and CFN Couper as the vehicle mechanics. Honourable mention goes to CPL Heinrich from SPT SQN who ran on and off the bench for the A1 all year.

As per usual in V18 there was no time to waste with the first shake out for the vehicles and crews being Stage IV at WBTA in March. The troop hit the ground running and deployed both V18 cars in support of the activity. With the shoot concluded and troop training called off due to lack of interest (It actually rained an enormous amount), the team packed up for the road run home.

As with all things Army, nothing ever goes to plan. You need to be flexible to adapt and overcome, especially when you just want to get home. With the A1 roaring home and everyone in high spirits, the ASM, not entirely happy with the outcome of the exercise, had concocted a plan for some troop training of his own and had his driver parallel park his vehicle in a ditch on the side of the highway. The Recovery Mechanics were enacted and all was successful (after quite some time).

Next on the program was Stage V, Stage VI, EX WARFIGHTER and CATA all conducted at SWBTA prior to EX HAMEL kicking off for the year. With the entire A1 loaded into both vehicles (minus Luke Walker who defected to CSQN), there was not much room for activities in the LAV-F and R. When the line troops were off conducting their Stage V serials there was plenty of time after the daily replen to get set in a hide and chew the fat. As the troops rolled through their serials the odd repair came through and V18 was called upon to play enemy party for the line troops to practice their manoeuvres. This was subsequently the catalyst for a NODUFF CASEVAC where the A1 was enacted to assist in escorting the casualty. I would also like to make a special shout out to V12 for their vehicle cas at Sabina Point which provided the A1 with some much needed troop training for amphibious operations on the beach.

V28 — CPL Kurt Flanders

2018 has been another busy year for B Squadron of the 2/14 Light Horse Regiment (Queensland Mounted Infantry). Luckily V28 were allocated a wide eyed and optimistic bunch of tradesmen who are up to any task the regiment can throw at us. Consisting of ASM - WO2 J. Madden,

SGT S. Longton, CPLs J. Cottrell, K. Flanders and D. Murphy. CFN S. Ball, M. Bonsor, B. Duff, S. Lanza, B. Morley and K. Randall. The year started at full speed and as normal there was plenty of maintenance to conduct with the aging fleet of LAV's that we have the pleasure of maintaining.

Our first outing was to WBTA where B SQN showed the other SQN's how real men do battle runs. The practice consisted of a Stage 4 shoot, STAB runs and V21 conducting a 3 day Stage 5. We finished up at the firing point where the crews hot seated faster than a Friday early knock! The LAV's were showing their age as most of the vehicles ended up heading home needing repairs after a big few days.

V28 was handpicked to support V21 on Sea Series as a part of the 8/9 RAR RDG, where the pre-deployment schedule ensured we didn't have much time to ourselves. Once on HMAS Canberra things did not settle down too much with a lot of tactical training as the FRT was fully integrated with V21 to run as a 6 car recon patrol. The food was better than the best hotbox you can think of, having salmon as a meal choice every 3 days. Most of the team enjoyed the time on board with the main problems being overcrowding and lack of water, who would have thought that you can run out of water on a ship?

There were multiple deployment training exercises whilst on board, from our rooms to the ASLAV's, onto the LCM8's, to land and back again. This led up to a night time insertion onto SWBTA that had a rough start due to a missing shore guide group (which had been landed on the wrong beach Gallipoli style) and an extreme high tide, but succeeded due to the V28 vehicles being first on the beach and leading the way to the extraction site.

We then cracked into Exercise Hamel with the rule of "if it's not dark we aren't moving", creating an increased skill level at night driving and crewing. V28 became the hard shoulder that V21 could depend on, showing them our all corps skills and giving the Cavalrymen a challenge at their job as well. As always we won the battles which led to us winning the war, this was done while still remaining dry and flexible, because "if your ridged you will snap."

The second half of the year has been more focused on courses as well as providing help to the other SQN's as required. We have one more stage four for the year and then some much needed RTP before it all starts again next year.

T38 — CPL A Algie

2/14 LHR (QMI) C SQN A1

M1A1 Abrams arrived in Brisbane towards the back end of 2017. Initially one troop's worth with the bare minimum of operators, and a rag tag team of spanners brought in from 2/14 LHR (QMI), 7CSSB and 3CSSB. With limited personnel, most of which having no unit experience with tank, we were thrown in the deep end from the start, having to organise tools, parts, POLs and servicing prior to C SQNs first exercise with the M1A1.

The live fire exercise in Shoalwater Bay started off without a hitch, but repairs eventually started to stack up, nevertheless the, spanners were up to the task. Just when we were getting on top of things, the maintenance heavy M88A2 took it to the next level, breaking down on the way back from a late night FRT. With the exercise completed, the post field servicing and repairs occupied us up until 2018.

At the start of 2018 we were looking more and more like a complete squadron each week, with new tanks, tools, and other equipment arriving regularly. The parts flow was hampered as each new item required had to be loaded to district prior to ordering, though with every new hurdle that presented itself, the ASM was able to pull some strings, enabling the A1 to work around the issue.

As the 2018 field block drew closer, it was a mad rush to get the squadron ready, especially as each new tank that arrived required servicing and had outstanding repairs required.

For many of the new C SQN A1, it was their first time working with tank in the field environment. Learning on the go, as each new objective unearthed new faults, the A1 managed to keep the squadron afloat, for the majority, with the odd exception that took a little bit longer to fix. For the recovery mechanics, it was a busy exercise with constant callouts with the M88A2, and bulk track work in their down time.

A few weeks into the exercise and the A1 was split with T38C and all of 3 Troop being attached to 6 RAR. This added a new dynamic to the equation by having to share tools and personnel over two combat teams. Periodically the A1 would reunite in order to conduct some all-night repairs, usually consisting of pulling a tank power-pack out, or breaking track, or both.

Like all good things, the two month field block, spanning across three exercises came to an end. The back half of the year was a lot more sporadic, with leave, courses and FRTs back up in the bay keeping us all occupied. With more servicing and repairs filling in the gaps back at the unit. Although we have come a long way in a year, there is still a long way to go, with the ongoing struggle for parts along with other adversities, ever present.

The capability and success of C SQN this year would not be possible without the hard work put in by the A1, consisting of WO2 C Hawkes (ASM), SGT S McClure-Maher (Fitter), SGT D Stoman (Rech Mech), CPL A Algie (Fitter), CPL A Kellet (VM), CFN A Green (Rech Mech), CFN T Gurney (Fitter), CFN H King (VM), CFN O Pocock (Boffin), CFN M Thompson (Boffin), CFN B Winder (VM).

A special thanks is also due to the rest of RAEME from 2/14 LHR (QMI), as well as 106 FD WKSP for coming together and helping to keep this new squadron running at various points throughout the year.

5 AVN REGT

Taipan MRH90.

The maintenance organisations (MOs) of 5 Avn Regt have once again excelled in the provision of maintenance support to generate and sustain the Army's Air Assault capabilities in support of Joint Operations. Both the Taipan and Chinook maintenance teams have enabled significant capability development and operational milestones throughout 2018.

Key achievements have included generation of the first dual-platform Aviation Combat Element (ACE) within the Australian Amphibious Force for Sea Series 18, the first operational deployment of the CH-47F Chinooks during Op PNG ASSIST, first of class flight trials for CH-47F on HMAS Choules, and operational deployments for the MRH-90 Taipans on Op ATLAS (Commonwealth Games) and Op APEC ASSIST (PNG). Throughout the entire year the technicians of 5 Avn Regt have provided the core for success, producing operationally ready aircraft to allow our pilots and aircrewmen to support Australian soldiers.

In addition to the operational commitments presented in the TST jottings below, the Chinook MO has welcomed the first CH-47F IETs from RAMS. Just in time to support an increase in rate of effort (ROE) to 2200 AFHRs as the capability continues to mature. The MO is now well established having accepted new maintenance facilities in Dec 17 and a third deeper, maintenance hangar in Sep 18 under Project L4502. Boeing Defence Australia (BDA) continues to provide a stable level of contractor support to the maintenance effort and additional uniform growth also under L4502 has been largely confirmed through the recent Capability Establishment Review.

For the Taipan MO, 2018 has again been one of great challenges, success and demonstration of RAEME ingenuity and dependability. In addition to the operational commitments presented in the TST jottings, the Taipan MO has introduced a series of initiatives to transform Production, Planning and Control (PP&C) systems for the platform. These initiatives have been centred on two key lines of effort; a significant restructure of the Taipan MO, including the Airbus contracted workforce, and implementation of advanced Production Control Applications (PCAppS) to better manage the complexity of Taipan maintenance.

The Taipan MO restructure has included the development of Integrated Planning Cells (IPCs) which are critical to effective PP&C for complex aviation systems. The restructure will enable greater retention of Taipan systems knowledge and manpower flexibility as the transition of military members to 6 Avn Regt under Plan PALISADE occurs from 2019.

Key to the effectiveness of the IPCs is the PCAppS suite of tools which enables the management of optimised maintenance programs. The implementation of PCAppS has occurred through a collaborative arrangement with Logistics Branch- Airforce (LOGBR-AF) and provides the IPCs with greater awareness and control of maintenance planning data from CAMM2 with an integrated user interface and smart visual management systems. The PCAppS afford the MO the ability to more effectively plan, execute and control Taipan maintenance with greater productivity, consistency and second order improvements to safety.

As I come to the end of my tenure as OC TSS I would like to thank the men and women of the 5 Avn Regt MOs and the broader stakeholders who have had a hand in the success of Army's Air Assault Regiment. I have had the privilege to lead and share a laugh with some of the best technicians, Artificers, Engineering Officers and support staff in our Army. We have overcome significant challenges as we have sought to operationalise the Taipan and Chinook capabilities. Well done and thank you!

Excellence is a habit. Arte et Marte

OC TSS – MAJ Jason Long

A SQN TST "Dogs"

A SQN TST has continued to support amphibious capability development domestically and internationally in the last 12 months. This included one month at sea proving multi-aircraft type operations on the LHD with MRH-90 Taipans and CH-47F Chinooks during Ex Hamel. With plans to add ARH Tiger and a second LHD for Talisman Sabre 2019, A SQN TST will play a key role as the subject matter experts in maintenance and sustainment of aircraft in the amphibious setting.

The troop also supported a four aircraft deployment to Madang PNG for conduct of high-density altitude training (Ex Helicon Luk). The disruption of sustainment flights into Madang due to Op Indo Assist created unique challenges for the TST. These challenges were overcome and good serviceability achieved through disciplined maintenance using the resources available.

PNG Op Indo Assist.

Ex Helicon Luk was immediately followed by a logistically challenging self-deployment to HMAS Adelaide for the conduct of Op APEC ASSIST. Personnel, stores, support equipment and tooling were transferred across the PNG highlands, firstly via MRH-90 and C-130, followed by hire cars and LLC (LHD Landing Craft) from Port Moresby airport to the ship. The concept alone was enough to turn Q-store personnel pale. Fortunately, it was successful. The end result was excellent aircraft serviceability to the joint task group in support of PNG during the APEC summit.

HMAS Adelaide.

Helo Casting.

B SQN TST "Bucks"

B SQN TST has experienced another technically challenging and rewarding year for 2018. The year began with support to the Queensland Police Service at the Commonwealth games on OP ATLAS where we provided Aircraft online on 24 hours Notice To Move (NTM) response. This was a milestone itself for MRH90 and required consistent maintenance effort.

B SQN then moved into preparation for ISLS18 as the Land Component and was highly successful as in its provision of Rotary Wing Aero Medical Evacuation (AME) throughout the exercise. This allowed the TST to refine its processes in provision of aircraft on 24 hours NTM.

On return to 5 Avn Regt, B SQN prepared for assuming the online role. This included a range of activities including CBRN, weapons qualifications, and soldier skill training. The TST grew as it embraced two Airbus teams and an increased fleet of aircraft. This provided new challenges as well as a wealth of learning opportunities.

The TST concurrently prepared for a Troop level deployment to Adelaide in support of Ex Predators Run. This proved MRH's capability for a light Air Self Deployment with minimal support equipment for a period of time. This was despite challenges due to APU restrictions. The TST now looks forward in modernisation and refining the newly raised TST Integrated Planning Cell and suite of planning tools.

Overall it has been a very busy year at B SQN TST doing what we do best.

C SQN TST "Cavemen"

2018 Ramped up very quickly for the Cavemen of C Sqn TST with the deployment of an FRT + in support of First of Class Flight Trials (FOCT) on HMAS CHOULES. This activity saw two of the ADF's greatest lift capabilities and crews, Chinook and Choules, tested for interoperability. The testing was a resounding success with Ship/ Helicopter Operating Limits (SHOLS) defined and refined.

While FOCFT was in progress, 5 Avn deployed TG Brahman including three Chinooks and two FRT's to provide aid relief to the remotest and highest areas of PNG after an earthquake. Members of the deployment went above and beyond their normal duties with many maintainers volunteering to support the aircrew with loading and unloading vital aid to villagers.

Sea Series 2018 was an awesome sight to behold with both CH-47F Chinook and MRH-90 Taipan deployed onto HMAS Canberra in ongoing efforts to improve the ADF's amphibious capability. Two Chinook FRTs were deployed split onto two shifts. As usual, the two Chinooks performed flawlessly providing ship to shore resupply, troop and external load lift capability to the exercise.

The last half of the year has been punctuated with bulk flying in support of training, Helo casting, SF support, load trials of Hawkei and G-Wagon variants. The TST also welcomed its first group of Ab-Initio trainees directly from IET training with all members assimilating into the unit seamlessly. The Cavemen of C Sqn TST are looking forward to a little stand down before it all commences again in 2019.

Aircraft Repair Troop "Sharks" – Taipan C17 Load Trial

In Sep 18, 5 Avn Regt hosted the MRH C17 Load Trial. This was a critical capability development activity to enable the rapid deployment of Taipans via strategic air-lift. In past operations, the average time required to disassemble/load and unload/reassemble the MRH90 was 8-10 hours at either end of the trip. The aim of the trial was to reduce this time to initially 6 hours and then further to 3 hours.

This would be achieved by the introduction of simplified maintenance procedures, new ground support equipment and an effective training regime. The trial received significant support from operational units and capability development groups including Aircraft Repair Troop (ART), the Directorate of Aviation Capability Management, RAAF No. 36 Squadron, Airbus Australia Pacific, MRH Project Office and Air Movement Training and Development Unit.

New transport technique for MRH C17 load trial.

The timings were collected from two different FRTs that operated on separate MRH90 aircrafts. As the FRT COMDs, maintenance managers were the single biggest contributors to the success or failure of this trial. The FRTs SGTs were ultimately responsible for the execution of lead-up training, coordination of maintenance and relaying accurate information to the technical chain of command in order to find greater efficiencies.

Both FRTs were successful in achieving all of the trial requirements, they proved that rapid deployment of MRH90 can be consistently achieved to support CPD requirements. Using these trial results, the various capability development groups will establish engineering and logistic arrangements to pave the way for service release for early 2019 and tactical loading configuration (3 hour duration procedure) for end 2019.

Directorate of Technical Regulation – Army (DTR-A)

The Directorate of Technical Regulation – Army is the AHQ listening post located in Bourke St Melbourne on the likely avenue of approach for any Land Systems Division move towards Canberra. The outpost is not as strong as it was in DTR-A/MAS times: we are now 7 ARA, 2 ARES and 7 APS staff. Our mission is to ensure that Defence adopts a progressive risk conscious approach to the engineering, use and maintenance of Land Materiel.

Executive. COL Damien McLachlan splits his time between his office in Melbourne and the Director General – Logistics' (BRIG Todd Ashurst) mat in Canberra whilst also attending pretty much every steering group and meeting known to man to ensure that the Army is using its equipment in a safe manner. The boss' job over the past year has become somewhat more difficult after the re-direction of everyone's favourite business manager Ms Bronwyn Rowleson, who was moved by the Defence Finance Group to ATAC SPO two levels up in Defence Plaza Melbourne.

Chief Engineer – Army. The Chief Engineer – Army is LTCOL Nick Beumer who seems to be the busiest LTCOL in the Army as he is often travelling around the country to swan off and have what he calls "his best Army day ever" in Cairns by leaving his subject matter experts at home to do the heavy lifting. He also likes to work as a lone wolf as the two members assigned to his group are currently deployed. MAJ Matthew Hay, the SO2 Technical Investigation is currently deployed to Kuwait as a Logistics advisor in the joint HQ, after only spending six months in the directorate before taking off. WO1 Jon Spargo was another member who swanned of on a deployment for the best part of 2018 and is expecting to come back to work in mid-November refreshed and raring to go...for about two weeks before marching out to move back into CASG on the Armoured vehicles...again. Jon will be replaced in 2019 by WO1 Dave Poulsen who is looking forward to the new challenges that an AHQ posting will offer and also to wearing his pollies every day.

Finally someone is able to teach WO1 Spargo tactics; many have tried and failed!

Land Maintenance System. What has become known as "The Lean Maintenance Cell" is headed up by LTCOL Sandeep "Sunny" Jadhav who is a master black belt in Lean Six Sigma and also the Victorian Father of the Year for 2018. A lot of work has been achieved within the Land Maintenance system cell with the recent introduction of the Land Materiel Maintenance SOPs and the amount of training in maintenance improvement techniques being delivered to a number of units across the ADF – this means more work being completed with less effort. Kaizen!

With the early departure of MAJ Luke DeJager (we all knew it was coming as he's a Reliability Engineer so obviously snapped up by KPMG) a position opened up and quickly snaffled by a non-engineer qualified ex regimental ASWOC posted into an engineer assigned MAJ position, in the shape of MAJ Rob Arnold in July. MAJ Arnold has finally finished up at ASEME after what seemed like an eternity as a WSM, OC and 2IC. Bringing home the LMS cell is WO2 Chris Gordon who has had an eventful year being the only OR and therefore the hardest worker within the directorate. Chris will be disappearing into the ether at the end of 2018 and will be replaced by WO2 Colin Davis who will be looking forward to spending more time at home and not travelling every other week with his ACAU team.

Policy. Policy section are really the ones to blame for the TRAMM-L as they're the ones who actually write it. This is headed up by the chief protagonist Mr Ian Johnston and is staffed by the robust Mr Andrew Moffat and our resident computer nerd Mr Ken Mason. This team has worked tirelessly (although not between the hours of 1100 and 1230 as that is when they walk to Port Melbourne) to deliver numerous versions of the TRAMM-L and will be delivering the a new set of regulations under a new name in 2019. You asked for fewer regulations and this team deleted a whole lot of them.

Proactive Assurance. Somewhat of a rudderless ship for a number of months with the retirement of a DTR-A stalwart, Mr Tony Cook, proactive assurance has cracked on with a number of AEO audits by the dedicated team of Mr Peter Holek and Ms Jacqueline (Jayqwellan) Castro. Eventually, Tony was replaced after a lengthy recruitment process from within by Ms Judy Rochow in late November. Proactive Assurance has also been busy conducting audits on various JLU business units around the country with the help of some very dedicated members from the ACAU Technical Integrity and Maintenance teams. These audits have proven valuable in ensuring effective support to Army units and pretty much keeping them honest. Finalising the team is the risk profile guy, Mr Lewis Borrett, who looks at the results of all the audits and tries to derive some meaning out of it all.

Military Risk Management. This team of risky Reservists is led by LTCOL Darryl Blazley from Hobart. WO1 Bob Kaindl has been escaping his day job at JLU(V) to glean from MAJ Jim Ayliffe's expertise before he retired in October. The MRM guys have been working on the new risk assessment tool, going to 'Bow Tie' and safety workshops and providing training on the new Army Standing Instruction for MRM.

There you have it, a brief rundown of the directorate who writes and issues the TRAMM-L and its resulting SOP and the characters within. Give us a call if you need help with policy, technical, compliance or maintenance improvement advice. If you are looking for a posting to the Melbourne area but cannot see yourself as a member of the slow turning CASG OODA loop, please consider DTR-A as an opportunity to test every coffee shop within a 2km radius.

DTR-A Audit staff preparing for an exit brief

Technical Support Troop – 8/12 Regiment RAA

CPL Daniel Morris

OJT CFN Berthier firing the M777A2 on Ex Predators Run 2018.

Well another year has gone by at TST 8/12 Regiment and the VM's have hit the ground running, some of us have just plain old hit the ground and HARD! We have cut our teeth to the gums with the ins and outs of the new 121 fleet. For the newer members of the unit, experiencing the Cultana training area has been a steep lean maintenance curve #ISHIKAWA. With thoughts of Corps transfers, members on courses and the ever present bird flu worry, VEH section has been able to meet all of the arduous tasks set to it 'On Time, On Target' (#OTOT) and all the while with a smile on their collective faces. Two question remain: If the RPS has a bloke in barracks all year again, will our parts come any quicker and if not will the pearly white smiles and sanity of these brave men and woman of VEH section still be there come the end of the year? Only time will tell.

First Exercise with PMGMV using crane to fix 1.3 KVA. CFN Harding providing local defence!

Sparks were flying when we let two fresh-out-of-OJT CFNs captain the ship of EIR. The supervisors due to post from CSSB never made it due to their short notice civilian status. It was a challenge the young lads were excited to take on, knowing it would be a steep learning curve.

The biggest lesson learnt this year, is that fresh barista coffee and pancakes go well together in the middle of Cultana. They have identified a real need for a "LOCTITE fridge" next EX. 2018 has been OTOT, and with more faces joining us next year, EIR will be looking like a formidable rig!

GE had their hands full this year with the addition of four M777A2 howitzers, increasing the total to 12. This kept the skeleton crew busy conducting maintenance both in NT and in SA at Port Wakefield Proof and Experimental Establishment. 2018 wasn't light on field either with three Cultana trips and several jaunts into the ever popular Mt Bundey TA.

The presence of US Marines from Mike BTY MRF-D allowed for a unique insight into how maintenance is conducted within another armed force and an opportunity to share trade secrets, as well as show off our custom field living quarters. The latter of which was met with comments such as: "Is that a BBQ? And lounge chairs? And fridges?" We expect a few lateral transfers from the USMC next year.

GE's key mission (bodgies) was also a success this year with many cold tins raised for the workshop throughout 2018, thus ensuring the end of year function will be well catered for. 2019 will usher in a plethora of fresh faces that will be certain to keep the dream alive, the only advice we have for them is this - 'Keep an open mind, as you can never predict both the innumerable and incomprehensible ways that a Gunny can break something. #DFGC.

1 CSSB HRV connected to a M777A2 during a Battle Damage Assessment & Repair (BDAR) activity on Exercise Predators Run 2018.

We are on our third ASM in as many years, and next year will make it four as WO2 Buchan moves up a couple of ranks and heads back to TSV. It is not that it is too much awesome to handle, it just seems there is a new rule that every ECN 006/007 gets to have a turn as the TIS at the best Gun Regiment in Army! SGT Sullivan in EMEOPS is the CoC continuity, along with the young LT Tomlin if we can find him in his office and not on course. C'mon Sir, five months of courses in one year is enough. BTW, when you get back, you know where to wear 'em. 8/12 TST - On Time, On Target.

Arte et Marte

1 CSSB – Technical Support Platoon

LT Michael Caluya

Technical Support Platoon (TSP) provides close maintenance support to 1 Bde units in South Australia, as part of 1 Combat Service Support Team (CSST) which is a dislocated sub-unit of the 1 CSSB. Located in RAAF Base Edinburgh in the Northern suburbs of Adelaide, we regularly support 7 RAR and 1 AR, as well as other 1 Bde units when they concentrate in South Australia for exercises in the region. TSP has a posted strength of 3/90 comprising all RAEME trades and RAAOC storemen in the RPS. In 2018 the TSP command team was headed up by CAPT Justin Pape and WO2 Brian Dawes. SGT Jamie 'Woody' Harwood (VM) was in charge of EMEOPS and LT Michael Caluya and LT Mitchell McDermott commanded Forward Repair Group (FRG) and Bde Service Station (BSS) respectively.

1 CSST Technical Support Platoon

The first half of the year saw us finalise implementation of the BSS and integration of maintenance support from JLU-S. The reset phase of the Force Generation Cycle (FGC) saw us fulfil various Non-Platform Support Requests (NPSR) for All Corps and maintenance effects across Army, from NCO instructors assisting courses at ASEME to Combat Service Support (CSS) Platoons supporting various activities. LT McDermott led a CSS Pl comprised of TSP and other CSST members tasked with providing CSS to RMC-D First Class during their Stability Operations field phase in Cooma. This provided our soldiers insight into how potential Officers conduct training prior to commissioning. SGT David King (Recce Mech) led a CSS detachment supporting 1 Bde's Live Fire Exercise (LFX), Exercise Thunder Walk in Cultana Training Area (CUTA). Of course, those of us in barracks continued to provide close maintenance in the workshops and forward repair to 1 Bde units.

During this time we also saw the introduction into service of Project Land 121 Medium/Heavy vehicle variants, where 1 Bde South received its allocation of HX77 ILHS and 40M trucks. This kept our vehicle mechanics busy ensuring that 1 Bde's allocation of vehicles were inspected and suitable for use whilst maintaining the legacy fleet to enable 1 CSST's driver training so 1 Bde could transition to the new trucks.

In May TSP deployed on Ex Predators Walk as part of 1 CSST supporting 1 Bde. It was an excellent opportunity for TSP to build camaraderie while testing our soldier's trade abilities in the field. Our junior NCO's seized the opportunity to step up and provide training to our soldiers in trade, CSS and All Corps skills. It was also a perfect opportunity for LCPL Jacob Bigiolli (Tech Elec) to put his culinary field skills to the test in his ERV dubbed 'the field kitchen.' He prepared gourmet dishes and even a birthday cake for LCPL Paul Rowe (Recce Mech) to celebrate his birthday out field. CPL Paul Dudley (Boffin) and CPL Lydon Fisher (VM) experienced their first field exercise with the Australian Army after their lateral transfer from the UK. They shared experience and knowledge from the UK Army which provided good insight on how we may better achieve maintenance with the new vehicle fleet. In true RAEME fashion TSP soldiers made a valuable contribution out field, whether it was providing lessons to junior soldiers, completing FRT tasks to 1 Bde units, or assisting within 1 CSST, our soldiers were always willing to lend a helping hand.

Over half the platoon participated in Ex Predators Adventure in June, a 1 Bde Adventure Training Activity comprising rock climbing and abseiling at the Grampians and Flinders Ranges and sea kayaking in Port Lincoln. Our soldiers were put to the test to develop and enhance their physical and mental resolve, but all returned having thoroughly enjoyed the activity and the challenging situations that tested their grit and resilience.

Throughout the year we have also had the opportunity to send our soldiers on trade and promotion courses. One such member from TSP was particularly busy while on Subject 4 for CPL – CFN Adonis Krvavac's (VM) efforts on course earned him the Student of Merit award, an achievement that he can be proud of and is well deserved.

In July 1 Bde begun the readying phase of the FGC which saw the focus shift to sub-unit training where CPL Kris Miller (Fitter) was a keen contributor to developing the 1 CSST All Corps training program. Various members within TSP delivered lessons to enhance the soldier skills in field craft, RATEL, care of the battle casualty and first aid. CPL Greg Warland (Tech Elec) led the 1 CSSB team in the 1 Bde Military Skills competition, where a record was set by the team for the water crossing. Soldiers of TSP also participated in the instructor led Army Combative Program, where they would learn and practice hand to hand combat and weapon disarming techniques. Some were left physically bruised and slightly battered but nevertheless their spirits remained high and they enjoyed what they had learnt over the week long program.

First Aid training

TSP recognises that hard work deserves reward so in late July, TSP held the inaugural 1 CSST RAEME Spanner Club spearheaded by SGT Harwood and LCPL David Seymour (VM). RAEME personnel across South Australian descended upon our workshops for the festivities, including personnel from 7 RAR, 1 AR, 16 ALR, ASEME (SA Wing), 9 CSSB, JLU-S, P&EE Port Wakefield, WONCO (SA wing), DSTO and our fellow RAAF and RAN tradespeople. The day commenced with some formalities including the promotion of LCPL James Hall (VM) who was honoured by being promoted by COL David Cocker and the awarding of the RAEME Association SA's Craftsman of the Year Award. Activities and competitions included a CrossFit 5000 assault bike challenge and a G-Wagon 25 metre pull for teams of three. The day concluded with the raffle draw for over $2,000 worth of prizes all generously donated by local businesses in South Australia. The South Australian RAEME brethren raised over $1,600 for Defence Shed Port Adelaide. TSP have already commenced planning for next year's spanner club aiming to make it bigger and better.

RAEME Spanner Club G-Wagon Pull

At the time of writing, TSP has been working hard to ensure 1 CSST and 1 Bde units' equipment is prepared for Ex Predators Run which 1 Bde will complete in CUTA in September. This exercise will see TSP unite with 101 Field Workshop Company to provide maintenance support to 1 Bde units on Exercise Predators Run.

Despite the challenging tempo, soldiers in TSP have maintained high morale. This could be thanks to the efforts of CPL Adam Walsh's (VM) one liners to boost spirits. On behalf of the TSP command team, I can say it has been an absolute pleasure to work with such a dedicated and enthusiastic platoon. Arte et Marte.

Army Marine

LT Adam Gregg

From cruising around the Torres Strait in a Regional Patrol Craft (RPC) to boat-mounted live fire weapons trials with the 2nd Commando Regiment off the coast of Townsville, my posting to Army Marine in the Hydrographic Systems Program Office (HSPO) within the Capability Acquisition and Sustainment Group (CASG) has been filled with incredible experiences.

Upon being informed of my posting to HSPO at HMAS Cairns I had no idea what to expect – it was certainly an unusual posting for an Army Lieutenant straight out of training and study. Since then I have learnt just how fortunate I was to be provided the opportunity, as the experiences of the posting have been irreplaceable.

Returning from Logistic Officers Basic Course (LOBC) in mid-April, I was immediately tasked to support planning for the Land 121 Phase 3B vehicle trials on the Landing Craft Mechanised 8 (LCM8). This gave me the opportunity to apply skills and knowledge learnt throughout my engineering degree straight away, tackling challenging problems including calculations of vessel stability and vehicle restraint requirements. The experience gained through this trial also allowed me to take on the role of lead HSPO representative for the Hawkei on LCM8 trial later in the year.

After completion of the LCM8 trials, I was then tasked to manage upgrade of the Lighter Amphibious Resupply Cargo 5 Tonne (LARC V) Fire Suppression System, a project of $500K of responsibility. Once again this gave me the opportunity to apply areas of my degree, specifically project management and systems engineering processes.

HX77 on LCM8.

Upon departure of the Army Marine SO3 Engineer in June, I was then given the opportunity to take on some of the engineering management and coordination responsibilities, a big part of which was management of RODUMs on Army Marine equipment. This role saw me liaising directly with the materiel management cell in Army Headquarters, significantly developing my understanding of strategic capability management.

Being posted to Cairns also gave me the chance to experience and understand the role of Regional Force Surveillance Units (RFSU), specifically 51st Battalion Far North Queensland Regiment (51 FNQR). Becoming a member of the 51 FNQR Porton Barracks Mess lead to the opportunity to command a Combat Service Support Team (CSST), which saw me travelling to 51 FNQR company outposts in Weipa and Mt Isa with a team of RAEME, ordnance and transport soldiers.

Cape York LT A Gregg and WO1 D Goninan.

Amongst these major activities I've also been exposed to many other areas of work that have been keeping the Army Marine office busy, including but not limited to: the Air Drop Rigid Hull Inflatable Boat (ADRHIB) mid-life refreshment program, investigation of Noosa Cat safety craft replacement, watercraft trailer modifications for compatibility with the new Land 121 vehicle fleet, procurement of a new fleet of trailers for the 4.4m Dinghy, introduction of the 55 Horsepower Multi Fuel Engine (MFE) Outboard Motor (OBM), and LCM8 and LARC V life of type extension (LOTE) studies.

ADRHIB Weapons trial.

Outside of all of this, life at Army Marine has been conducive to a balanced work-play lifestyle, which allowed me to explore Cairns and appreciate what this beautiful place has to offer – my weekends were generally spent exploring, including visiting the Great Barrier Reef, Fitzroy Island, the Daintree Rainforest, and multiple famous beaches, hikes, waterfalls and mountain bike parks throughout the region.

Despite the rarity of a Lieutenant being posted to CASG, the posting has provided me with an incredible breadth of experience that could not have been replicated elsewhere. I would highly recommend a posting to Army Marine for any engineer/marine qualified RAEME personnel, as you would never regret it.

102 Fd Wksp Coy

2018 has been a very exciting and busy year for 102 Field Workshop Coy. We have supported a number of exercises this year, moved into a new workshop, received new land capabilities and represented 3 CSSB in a number of sporting activities. We have definitely made a name for the Coy throughout the year as the "go-to Coy" within the Bn as we have had many challenges but always succeed.

Participation in Sports

102 Field Workshop Coy took out the 2018 Bn cross country and helped achieve 3rd for the Bn in the Bde cross country (since the Bn team consisted primarily of members of the Coy). The first 102 Fd Wksp Coy member to cross the line in the Bn cross country was CFN Sam Shelton. Later that day and after placing very strongly in the cross country, WO2 Marty de Haan went on to compete in the Bde Triathlon - finishing first overall. 102 Fd Wksp Coy then dominated in the Bn obstacle course competition, but unfortunately due to technicalities, ended up placing second. We went on to win the Bn athletics carnival and tied first for the Bn swimming carnival.

New Recovery Vehicles

In May 18, the Coy was lucky enough to send a recovery mechanic to complete the 45M Recovery Course. Upon his return, SGT Hardman wasted no time informing the world that he had shed his status as a Small Time Operator and subsequently joined the ranks of Big Time Operators. All he requires now is a truck and a valid permit. In Aug 18, the greatest Recovery Platoon received a new-old-new M88A2, fresh from the paint line... "refresh maintenance facility". The car was originally named 'Jurassic Park' by its previous owners and it was decided that the name will continue for posterity. Jurassic Park came with little to no surprises; requiring only minor maintenance to get it to an RU classification, a deficient CES list longer than the main winch and enough sand blasting grit to make a beach in the compound.

Receiving the PMV GMV

The Coy received three Protected Mobility General Maintenance Vehicles (PMGMV) in August 2018. This new asset is already proving itself as a great capability as it bolsters repair capability in the field environment with its modifications including an inbuilt crane, toolbox, work benches and awnings.

EX BROLGA SPRINT 18

On EX BROLGA SPRINT 18, 3 CSSB deployed a CSST to TFTA in support of both 3 Bde and attached elements from other Combat and Enabling Brigades, the US Army, US Marine Corps and the Japanese Ground Self Defence Force. The CSST provided pax-lift to hundreds of dismounted foreign armed forces members between activities, with a small element of a dozen Unimogs fitted with PAX Modules. These vehicles were kept running by a small RAEME contingent within the CSST, who conducted over 22 recovery tasks with one HRV within the two and a half weeks. We also repaired everything from the Unimogs to the Brigade Commander's vehicle.

During the same exercise, one of our Recovery Mechanics, CPL Kane Jones gave a presentation to the then Chief of Army, GEN Angus Campbell AO, DSC, demonstrating a capability proposal which was being trialled by 102 Field Workshop Coy. The capability entailed a Surveillance and Reconnaissance variant G-Wagon (SRV) that had been fitted with recovery, first aid equipment and crewed by an FRT. This was to provide a rapid response capability to vehicle accident/battle damage, and provide a quick assessment of a stricken vehicle. CPL Kane Jones demonstrated the various first aid and accident response equipment that the vehicle had been equipped with and explained the value of a quicker response. Particularly important when a rapid response to a serious accident or vehicle rollover could mean the difference between life and death.

M88.

EX HAMEL 18

The Coy provided an EME Platoon as part of the REDFOR CSST for EX HAMEL 18 supporting 3 Bde's task of OPFOR to 7 Bde. There were minimal maintenance tasks for the Pl during the activity but we were provided the opportunity to conduct some supporting tasks for the exercise and test the potential new rapid response capability. After CPL Kane Jones briefed the Chief of Army on Ex BROLGA SPRINT 18 about the Rapid Response capability, this exercise saw the first opportunity for him to employ the capability in an exercise environment.

The team was able to show their potential to be a *first-at-the-scene* capability for a vehicle or non-vehicle accident and provide a good assessment back to the CP for what assets were required. We also had the opportunity to conduct some training so the recovery mechanics under the guidance of WO2 Mark Ingleton simulated a load carriage across a river using the MRV.

The Platoon was given the opportunity to defend Sabina Point in Shoalwater Bay from 2 RAR's beach raid team. Although 2 RAR were quick to post on Facebook how well they went, they had no idea what they were going up against. This left them surprised when our first .50 cal opened up along the beach with members getting caught in the concertina wire, meaning a number of them got rather wet. After allowing them to clear that position and presume the beach was clear, a beautiful white beam from the floodlights of our Rapid Response Capability vehicles flooded the beach, removing all low-light vision and NVG advantages from the raid team while simultaneously enfilading the beach with both a mag 58 and another .50 cal that were located up a rocky cliff.

After allowing them to clear our position and proceed to clear a designated LZ, the Platoon hit them again with another Mag 58. This was interesting to watch for everyone as we could see the helicopters arriving to pick up the raid team before they were turned around due to the contact. This continued for 30 minutes until they were eventually extracted. This was a great opportunity for the members of the Platoon to do an IMT task with the ability to think of creative methods of execution.

102 Fd Wksp Coy has had many achievements for 2018 and has a number of challenges to follow. As we progress into the back end of 2018 we are looking forward to a number of upcoming activities including RAEME Birthday for North QLD held at the workshop, resilience training, ASMs golf day and a number of sports carnivals.

Arte et Marte

North West Mobile Force

Operational Support Squadron, Technical Support Troop

FRT members on their way to Centre Squadron pause for a rest and photo opportunity at Devils Marbles.

ARA members – WO2 Ben Carthew - ASM, SGT Brett Shearn, CPL Laisenia Keresi, CPL Marcus Rice, CPL Michael Scotman, CPL Anthony Simpson, CFN Thomas Edgword, CFN Adam Geaney, and CFN Harry Stirling.

ARES members – SGT David Evans, CPL Renee O'Brien, CPL Matthew Strudwick, CFN Ben Paterson.

2018 has been a busy year for the Workshop lads. With a decrease of five full time members from the manning in 2017, the workshop boys have had to ensure that they keep busy and maintain the unit's equipment.

TST conducted 3 FRT's to Broome, Alice Springs and Nhulunbuy this year, making sure our remote depots equipment is kept to a functional standard. As well as the FRT's, the GE workshop has provided support to multiple boat courses, driver courses, Op Resolute, and specific NAVY training. With the unit receiving the new Enhanced Austeyr (EF88), GE Section has increased the skill set of the unit's soldiers by ensuring the weapons were functional and ready for immediate use for training and exercise. Whilst also keeping busy by also managing to fabricate and design multiple unit presentation pieces and items for key events such as RSM Plaques for Soldier of the Year – NORFORCE, Historic presentation display boards, Unit Flag Stand and parade markers for the Inaugural RFSG parade involving the Chief of Army.

CPL Rice was responsible for providing support to the PTCO Course in March and providing Subject Matter Expertise when required. He was GE lead fitter on FRT to Broome in April and then deployed to Operation Resolute (Rotation 3) in May. In July CPL Rice provided sound advice for the NAVY and their training exercise and then again twice more in August finishing with more support in September.

CFN Geaney has had quite a busy first year at NORFORCE starting with the PTC-H Course in early February and then enhancing his driving skills with the LR2J course in March. He was then the lead fitter for the Alice Springs (CENTRE) FRT in May and then provided exceptional support to DWN SQN in their activity at Coburg. CFN Geaney then enhanced his Marine skills by completing the Marine Safety Equipment course in July before heading onto the Small Watercraft Maintenance Course in September and coming straight back and leading the GE section on the FRT to Nhulunbuy in September/October.

This year the vehicle repair section has seen an almost complete changing of the guard with SGT Shearn being the only member staying on from last year. We hit the ground running with the FRT's out to KIM SQN, CEN SQN as well as catafalque party, VVIP support tasking's and drivers course support. The FRTs were a sharp learning curve for Vehicle Sect as the distance between workshop and vehicles is extensive, which in turn provides a new set of problems. Vehicle Section, aided by 1 CSSB Recovery, provided repair/breakdown support during the force concentration period. The end of this year has seen the final FRT out to Arnhem Squadron and CFN Stirling assisting in an AIDP course.

The Medium Recovery Vehicle blew a tyre while on route to conduct a repair task in vicinity of Broome.

EIR consisted of one member at the beginning of the year. It started with CPL Keresi instructing on the initial RFSG RIC in February 2018 for two weeks. The recruits consists of local young talents that were drawn from all over the Kimberly, Arnhem and the Tiwi Islands. It takes a lot of sacrifice and hard work to all the dedicated staff to mould these young men to be part of NORFORCE. The late WO2 Anderson was also part of the Recruit staff. Thank you Sir, you have touched the hearts of so many who owe you a life time of gratitude.

NORFORCE EIR also participated in the unit concentration in WA and were deployed to RAAF Curtain as part of OSS. Members when not busy were tasked with kitchen or driving duties. Time was also given to members to visit the Big Prison Boab tree at Derby which was very interesting.

CPL Keresi was tasked to lead the FRT deployment to Arnhem SQN in Nhulunbuy. The FRT deployment went well as planned. All the relevant trade personnel on the team conducted their duties in the highest standards. During the down time, FRT members went fishing and to explore the local area.

The year is 2018 the RPS CPL is CPL Simpson (some would say the best RPS CPL at NORFORCE). During the year CPL Simpson has provided the workshop with most items they require so the capability of unit does not decrease and remains combat effective. This includes all parts and tools for the G-wagons, Trailers, RPC's, Tinnies, Zodiacs and weapons that we hold.

It has been a busy year for CPL Simpson as he runs Regimental PT and thanks everyone for their attendance and enthusiasm during the year. He is also Treasurer for the unit which has its own responsibilities.

CPL Simpson also deployed on OP Resolute Rotation 6 as the SQ to Thursday Island from 10th to 26th August 18.

Technical Support Platoon – 5 RAR

Introduction

Within the 5th Battalion, the Royal Australian Regiment (5 RAR), Technical Support Platoon (TSP) provides integral maintenance, repair and recovery capability to the largest fleet of PMVs and integral Infantry weapons and equipment within 1 Brigade. Being the sister of the 7th Battalion, the Royal Australian Regiment (7 RAR), 5 RAR holds the motorised capability within the Northern region.

Technical Support Platoon has had a very busy year. Throughout the start of the year, TSP 5 RAR worked hard to remediate a large number of Corrective Action Requests (CAR), which resulted from the ACAU audit in late 2017. Of the 15 CARs in the Technical Integrity and Maintenance (TIM) space, 11 have since been closed, with evidence submitted for the remaining 4 (now in remediation status) awaiting closure by DTR-A during a pending visit in Oct. A large amount of evidence was required to be produced and uploaded, with a huge improvement in the corporate governance across the Battalion as a whole. From the original 50 CARs issued, 38 have been closed and the remainder are in remediation.

In line with the remediation of CARs, TSP focused on the preparation of equipment for Exercise Predators Walk (EX PW18) which was conducted from 14 May 18 to 25 May 18.

EX PW18

Support from TSP for this exercise provided integral maintenance, repair and recovery capability. This saw members supporting live firing activities utilising three Forward Repair Teams (FRT). These FRTs were either operating from an A2 Echelon formation within a Platoon setting or attached to the A1 Echelons in order to provide proactive repair and maintenance capability to the Battalion.

In between supporting the A1 and F echelons, members from TSP also conducted infantry minor tactic training (IMT) in order to fulfill the ATLS 2B requirement. This included individual soldiering skills, section attacks and vehicle mounted counter ambush scenarios. This training directly influenced the development and revision of both Standing Operating Procedures (SOP) and Tactics, Techniques and Procedures (TTP). Overall, the exercise was a success with TSP meeting the ATLS 2B requirements in preparation for the Readying phase of the Force Generation Cycle. TSP successfully provided the equipment availability which directly enabled all sub-unit elements of 5 RAR to complete their training levels and objectives.

Military Training 2018

In preparation for upcoming exercises and potential deployments, Logistic Company (Log Coy) organised a series of training outcomes that saw all members participate in live firing serials.

Over a two day period, members were exposed to F88 and F89 live fire activities. This included live fire serials on the MTR and GZR within Robertson Barracks Training Area Shoal Bay (RBTA, Shoal Bay) and section defence range at Kangaroo Flats Training Area (KFTA). In addition, a number of personnel from TSP were trained to employ the 84mm Medium Direct Fire Support Weapon (Carl Gustaf). This training culminated with the live fire serials at KFTA, IOT provide effective anti-armour capability to the Coy and the Battalion. Overall, the required ATLS 2B training outcomes were achieved, with TSP participating in live fire serials for F88, F89, Mag 58 and 84mm.

Variety Bash

One vehicle mechanic from TSP and one driver specialist from Distribution Platoon (Distro. PL) had been assigned to support Variety Bash in Townsville. Variety is a Children's Charity that supports children and families who are facing many challenges through sickness, disadvantage or living with a disability. Their work allows children to gain mobility and freedom, to get out and about in the community, to communicate, achieve independence and increase self-esteem, and where possible, assistance to help them integrate into mainstream school and activities.

The Variety Bash is Australia's largest and longest running charity motoring event. Participants drive vehicles that are at least 30 years old across Australia in direct support of Variety, raising funds for children in need. Between 23 Aug 18 to 31 Aug 18, the 2018 Variety Bash to Townsville was executed. The main effort for TSP and Log Coy members was to provide transportation for the variety bash container which contained life support mechanisms for the event and sustainment for the teams on arrival to Townsville. Their secondary effort was to provide mechanical support to the event. The support to such a unique event strengthened relations between the Australian Army, 1 Brigade, 5 RAR and the community by actively getting involved in a charitable event that had a good cause, to help children in need.

Exercise Predators Run 2018

Following EX PW18, TSP were preparing the PMV fleet for road lift movement south to Cultana Training Area (CUTA), in preparation for Exercise Predator Run 18 (EX PR18). This coincided with TSP supporting multiple concurrent exercises and activities for the Battalion, including Exercise Tigers Run, Exercise Koolendong, Exercise Wirra Jaya and the 1 Bde MILSKILLS Competition.

Within this highly intensive period of operations, TSP conducted a total 1457 hours of work between the period of 11 Jun 18 to 29 Aug 18. This comprised a total of 103 vehicles, 73 of those being PMVs. Even with these statistics, there are still work orders being closed to remediate the backlog for the Battalion. Concurrently to this, TSP provided FRT support to the A1 Echelons of each rifle company and deployed them directly in support of the aforementioned exercises and activities.

This proved that TSP 5 RAR could plan and execute repair, maintenance and recovery tasks and effects in order to deliver capability and support to the Battalion, for multiple activities and commitments. This was paramount to mission success for the upcoming exercises. Without the efforts of members from TSP, 5 RAR wouldn't have been able to conduct the number of exercises that they had committed to in 2018. This showed the consistent hard work and teamwork from all members within 5 RAR that is evident within the workshop.

Throughout this high intensive period of maintenance, there were a few challenges that TSP had to overcome. With the shortage of transparent armour (TA) windscreens across Australia, 5 RAR had 38 vehicles that were unserviceable (XX) due to their windscreens not being able to pass the Capability Acquisition and Sustainment Group (CASG) template. With the FORCOMD template that was released in early August, TSP had identified out of the 38 vehicles that did not pass the CASG template, three did not pass the FORCOMD template. This was a total of 35 vehicles being able to be reclassified from XX to RU within the constraints directed by FORCOMD. This allowed TSP to reclassify these windscreens and ultimately support the readiness of the PMV fleet within 5 RAR.

The three vehicles that did not pass the templates was mitigated through a Technical Risk Assessment. This allowed the 5 RAR Commanding Officer to accept the risk of the delaminated windscreens to be utilised within an RU capacity. These vehicles were only to be used within a field training area with the addition of risk mitigating factors, such as operator and technical inspections, to identify whether the windscreen is serviceable and safe for operators to view out of. This was successfully completed and the PMV fleet was successfully moved to CUTA in preparation for EX PR18.

In preparation for the Exercise, a Maintenance Team was deployed early in order to prepare the vehicles of any last minute maintenance or repairs needed before EX PR18 commenced. This ensured that the overall readiness of the PMV Fleet within CUTA was complete before the arrival of the combat teams. This opportunity gave members of the maintenance team valuable experience and exposure as a dislocated callsign and the ability to execute tasks independently. Priority of effort and guidance on maintenance issues was provided remotely by the TSP HQ.

Future intent

With the remainder of the year still ahead, TSP still have the task of supporting 5 RAR throughout EX PR18. This will see FRTs integrated into each of the rifle Company's A1 Echelons. This is to introduce and mimic the potential manning and formations for upcoming deployments within the Battalion. By attaching the FRTs to the A1 Echelons, the lines of communication are shortened, and the integral repair and maintenance capability is now combined. This will set the Battalion up for success for future deployments as interpersonal relationships are being formed whilst conducting exercises. This will ultimately solidify SOPs and TTPs throughout the Battalion.

The intent is to cement these opportunities throughout the Exercise Period for 2018 and achieve the overall training outcomes. It is an exciting time within 5 RAR and all the efforts from TSP members have given the Battalion enhanced capability through high levels of equipment readiness – always conducted with skill and fighting.

2 RAR (AMPHIB) Technical Support Platoon

Overview

SGT Ryan Murray

The New Year heralded in drastic changes to our manning levels as the unit finally found its amphibious feet as a designated Pre-Landing Force. We saw 12 positons slashed from our Workshop with GE coming out winners with the largest presence due to their undeniable importance. We welcomed our new RAEME PL COMD LT Dominic Lloyd and several new faces: In RPS, we saw PTE Keren Baleilakeba arrive to reconcile the RPS for the newly promoted LCPL Wormington. Our new Boffin CFN Hodgetts could not get here fast enough from 3 CSSB. Having only arrived last month, our new Armourer, CFN Thomas Woods came from Darwin to fill the fitter vacancy.

The year began in customary fashion for 2 RAR with five exercises to support in the space of two frantic months. Once dusted, we experienced the 2 RAR Sea Series, EX HAMEL and EX RIMPAC 18 all run concurrently, splitting the majority of our workforce over HMAS Adelaide and HMAS Canberra. The work did not stop here for the Fitters. With the addition of another small boat platoon came a two-fold increase to the unit's boat fleet. In addition, their workload was increased with the arrival of the new Multi-Fuel engines. However, in the finest traditions of RAEME, we have adapted and achieved a substantial amount of technical maintenance among a small and dedicated crew.

At the time of writing this article we welcomed our long and two-years-overdue PMGMV variants to the workshop. Sadly, we will retire another two Land-Rover 110 GMVs; they will no doubt find themselves a new home in the expansive (yet somewhat diminishing) 3 CSSB Workshop yard.

Despite Townsville living up to its 'Brownsville' tag, two of our tradesman have moved on to greener pastures. We farewelled Fitter CPL Dave Cope (for a second time). He now finds himself in the jungles of PNG where he will perform the enviable job of keeping drill rigs running. We also farewelled a VM CFN Oliver Cran. We are not sure what he is doing now, besides frequent visits to the Ville casino, we suspect it will involve Centrelink or a mine site with a well-equipped gym somewhere.

Later this year we say farewell to SGT Murray who was indispensable as the second VM SGT, and farewell to SGT Colvin who cannot wait attend WONCO NQ for some respite. We also farewell LCPL Mitch Keogh, who departs us for 2 CDO; CPL Trent Bristow-Hamilton, although no one is sure where he is going as yet; LCPL Sean Sweeney who leaves us for 7 RAR, and LCPL Simon Wormington departs us for 7SIG.

Lastly, we thank PTE Rayne Madden who has patiently waited all year for his spot on the next Fitter Armaments course at ALTC.

We wish him all the best and will be missed as GE scramble to find someone else to disassemble and lubricate submerged EF88 gunlocks into the near future.

Our trusty ASM, WO2 Ian Downey will be here next year to steer this amphibious workshop through some more unchartered waters. Bon-voyage for another year.

EX SEA SERIES — CFN Jackson Attwill

SEA SERIES 2018 saw 2 RAR send a small, yet highly skilled RAEME element attached to HMAS Canberra. Their job was to provide an integral maintenance capability for the boat platoons, thus allowing them to stay combat ready in the field environment.

Trades personnel CFN Michael Rule and CFN Jackson Attwill worked closely with PLF-A, which held the majority of the marine capability for the exercise. They also assisted the clearance divers attached to HMAS Canberra.

The main technical effort comprised of F470 Zodiacs, 40hp Mercury OBM's and the new 55hp Evinrude Multi Fuel Engines (MFE). This was the first exercise for the new engines which still needed to be 'broken in'. The grunts took this statement literally and tried to break the engines, running most of them on the wrong fuel setting on the first day and even managing, according to the diagnostic report, to try and start one of the MFE while still in gear 134 times..

Ruley and Jacko were also kept busy with transom board installations to support the new MFE, Zodiac repairs and preventive maintenance on weapons systems so rusting of critical components did not occur.

Overall, Sea Series was a success for 2 RAR as a whole in allowing them to demonstrate their amphibious capability. It was reported that Jacko has put in a formal request to do it all again in 2019.

EX RIMPAC 18 — CFN Ash Boehm

Exercise RIMPAC 2018 saw the 2nd Battalion operating with over 13 other countries including USA, Tonga, Sri Lanka and Japan in beautiful Hawaii. The mission was to hone skills and practice interoperability between our partner nations in the Pacific region.

TSP contributed one FRT comprising of CFN Ash Boehm (Fitter) and CFN Deiter McNaughton (VM) who set off on HMAS Adelaide for the sail over. They were later joined by LCPL Mitch Keogh (Fitter) and LCPL Sean Sweeney (Boffin) who enjoyed a first class ride in a RAAF KC30.

A batch of brand new Zodiac F470's accompanied by brand new 55hp Evinrude MFE headlined 2 RAR's amphibious capability as they showcased multiple beach landings, humanitarian aid and recon operations.

Their first exposure actually occurred during the Indo-Pacific Endeavour stage of the exercise (prior to the commencement of RIMPAC). Here, a small team from 2 RAR, headed by SGT Rimmer took the new MFE for a capability demonstration and training opportunity with the Samoa Maritime Police Wing, while HMAS Success was alongside in Apia Harbour, Samoa.

Thankfully, without any RAEME craftsmen on hand, there were no notable failures despite a gentle rear-end collision between two of the Zodiacs. Overall, the new marine equipment performed well and there were little to no problems in completing the required tasks. Small Boat Platoon even tried their hand as Special Forces throwing some boats out of helicopters with the help of the US Marine Corps.

Due to the lack of RAEME work being generated during the exercise, our tradesmen were unceremoniously employed as part-time truckies, making sure everyone got where they needed to go, using a makeshift vehicle pool of green fleet and white fleet hire cars. After two weeks supporting operations on the island of Oahu, we deployed to the big island of Hawaii to support 10 days of range activities. Ash, Deiter and Sean were at the tip of the spear making sure any faults with weapons and vehicles were swiftly rectified, meanwhile Mitch stayed on the ship making sure the food was well eaten and the gym was well used.

There was a heavy media focus surrounding RIMPAC and the journalists wasted no time trying to get their much desired Kodak moments from whole ship, with photos down to the RAEME craftsman conducting the ships wet and dry environmental rehearsals (WADER) package. Ash's glorious Mo was always there to steal the show along with Deiter's bright orange Crocs, which he somehow got away with wearing all over the ship despite the RSM's clear resentment.

Overall the boys were happy with the experience that the trip had to offer, especially the beers down at the Marine's Boozer in K-Bay and in Waikiki at the end of RIMPAC. It was great to meet with other countries, develop positive relationships and see how they do business in the amphibious sphere of training and operations.

106 FD Workshops 2018

LT Ryan Curtis

106 Field Workshop (106 FD WKSP) celebrates its 50th anniversary on 01 Nov 18 this year. The workshop was originally raised in 1968 to improve the battle worthiness and allow recovery of damaged materiel for the 1st Australian Task Force operating from the forward operating base in Nui Dat, Phoc Tuy province of South Vietnam. The workshop was primarily made of tradesmen, but also included elements from Ordnance, Medical and Catering Corps. Today our ORBAT looks similar, being primarily comprised of RAEME personnel, being supported by other logistic corps such as RAAOC in the Repair Parts Store.

Cutting the 50th birthday cake.

While it has a long and illustrious history, 106 FD WKSP is still making valuable contributions to Army's capability through innovations, fostering local and regional relationships and deployments.

Some of the innovations the 106 FD WKSP diggers have made include those on the new L121 fleet. An issue with the trucks is that the 50W comms suite is yet to be rolled out. The boffins have come up with a temporary fix: A 20W amp (The man pack normally plugged into the Harris 152) and 3m antenna are installed on the 40M cab. The operator can even do this once the parts have been readied. This equipment vastly improves the capability of the Harris 152, which before had to be operated in the handheld configuration. There have been reports of these having better comms than the G-Wagons with full suites (mostly due to the height of the trucks). The soldiers are currently looking at adapting the system to work on other new rollout vehicles, such as the new PMV-GMV variant.

Speaking of the new PMV-GMVs, the workshop received three of them in late March. These allow us to send out FRTs with integral protection instead of relying on escort vehicles. The PMV can carry up to four craftsmen with a large stock of repair parts. Some of the additions for this PMV variant is the 0.5t crane, a collapsible workbench and a high work platform, so the L121 fleet can be serviced. All three of our PMVs deployed on EX HAMEL, and two were used in amphibious landings as part of the Integrated Sea Land Series.

106 FD WKSP provided maintenance and recovery support to the Great Endeavour Rally from

14 - 24 Jun 18. The Endeavour Foundation is a non-profit organisation that helps people with special needs enter the workforce to allow them to live more independent lives. The rally is a yearly fundraising event organised by the Endeavour Foundation and is a rally car race that tours through a number of rural towns through Australia. A workshop heavy logistics team had a great time following the Rally around. Some of the highlights included the nightly social gatherings

106 Field Workshops 50th Celebrations.

where "charity auctions" (light hearted extortions) occurred, and a competitor paid $300 to buy back his old carburettor.

Two members deployed on Exercise Coral Warrior as part of the introduction to service of the Unimog fleet to the defence force of Tonga. This helps foster regional relations and improves the capability of our defence partners. Three members of the Tongan Army also came to Australia as part of the exercise and deployed on Exercise Hamel with 106 FD WKSP. They timed it perfectly with the rain, showing up to live in the mud with us for a few days whilst learning about some of our workshop standard operating procedures before heading home.

Throughout 2018, 106 FD WKSP has been rotating soldiers through Operation Accordion. This is a Force Insertion Extraction Group (FIEG) task that is based in Al Minhad Air Base (AMAB). The day to day tasks of deployed personnel include the kitting, training and movement of force protection elements in and out of theatre.

As 106 FD WKSP celebrates its 50th birthday this year, we continue to make valuable contributions to the Australian Army's capability and face the many challenges the future holds.

3 CER Workshops

SGT Tim Penna

3 CER Workshops.

This year was a big change for 3CER workshops, with a complete head shed change and a few key characters posted out of workshop. Never the less production needed to continue amongst the amount of range shoots and field EXs. Workshops maintained great attendance to all of the Dingo shoots this year while still being able to keep spanners swinging in the workshop.

EX Hamel left most of the Crafty's back at the WKSP with only a small contingent deploying with 25 SQN Spec troop to maintain operation of the ROWPU. Following EX Hamel the WKSP went into a maintenance focus across the regiment to prepare for an ACAA audit.

The remainder of the year has been focused on passing its learnt knowledge to the new readying BDE and to allow the Soldier/ Tradesmen of the Workshop to focus on self-improvement and development.

Bulley's perspective

The start of this year has been interesting for 3CER WKSPs with a full head shed change bringing in fresh leadership and capability to the premier combat engineer regiment. The WKSP would be led by LT Dylan "Dribble Bit "Taylor, the young spritely LT so keen, so competent that within 6 months he was already acting SQN 2IC.

Our maintenance would be under the watchful eye of WO1 Ian "The Mouse Killer" Moorhouse. The new ASM ensuring the WKSP is up to date with every RODUM known to man, if your inbox wasn't full by the end of the week you were misinformed.

EMEOPS had somewhat of a shuffle with the new VM CPL taking his place at the helm, pushing aside the EMEOPS SGT. CPL Nathan "Mini ACE" Harmon having spent a long, testing previous posting at 3CSSB came crashing into EMEOPS mid-year (we actually are still waiting for his posting order). Nathan would be aided by CFN Joel "Loose Arse" Wilkinson and SGT Tim "The Bus Driver" Penna.

RPS was headed by none other than Transport SGT Jon "Mack n 20" Bate. Needless to say our parts weren't an issue SGT Bate – "equal to the task". SGT Bate was helped by LCPL Alex "Bert" Woodhouse known for drinking more Mothers than medically advised by ASADA. Alex surprisingly didn't move as fast as you would think. Mid-year we lost PTE Robert "Doughnut" McDonagh to injury and gained PTE Jess "Earny" Earnshaw. That's why when walking into the RPS it was very similar to being on Sesame Street. Bunch of Muppets.

GE was run by CPL Chris "Stampy" Stapleton, Chris has this uncanny ability to stamp his feet and whinge causing the Diggers to get anything he was whinging about done. Most of his workgroup was managed by CFN Scott "Scooter" Ancell and CFN James "Environmental Incident" Ziebarth.

VM side of house had most of their work completed by CSSB, but jobs where started by CFN Zac "Half-Job" Hutton-Morel. Zac didn't like work as much as he liked durries and coffee. His right hand man Dylan "Dingo" Cordingley was more concerned with the freshly shaven contours of his calves than he was maintenance, so WKSP had to send him to 16 SQN where surprisingly he manages to do even less!

Recovery changed a lot but still didn't do much. Recce Mech CPL Alex "The lion" Warsing was left by himself, due to CFN Rob "The Chippy" Miller discharging to be an actually tradie. His job to manage the Elec section fell by the way side as the Elec section remained Corporal- less, despite CFN Alec "acting CPL" Bulley trying his hardest to control CFN Daniel "BDE Asset" Moon. Our sole Boffin CFN Sean "TI King" Kneen was accepted to go to the dark side which opened up a sought after position. Boffin worked had doubled at that instant, but then tripled when CFN Theo "Quallowitz" Qually showed up. The Eleckies had to welcome CFN Rene "Big Daddy" Diaz straight off OJTs who brought a whole new dimension of funny to the workshop.

3 CER 18 SQN

It's been a non-stop start to the year for the 18 SQN FRT with CPL Andrew "The Handbrake" Smith and his trusty VM CFN Ashley "Waitlisted" Lamprey, taking over the ruins of the abandoned FRT. Armed only with a dusty desk and ever reliable GMV, they leapt into action teaching Sappers to paint over the rust bubbles on their trucks and how to grease the brake callipers with great success. Further accolades soon followed for the "Trusty" duo including the trial of camel back hoses as a replacement to GMV fuel lines and the destructive testing of trailer handbrakes. The pair not satisfied with all their success went in search of their next big thing, and find it they did..... Carriers, Carriers everywhere. With only hopes and dreams and not a qualified hand or help in sight, the boys called out "Just Send It" we got this, only time will tell how wrong they were.....?

3 CER 16 SQN

16 Sqn FRT headed by VM CPL Brad "EKO" Barnett has had a change in Crafties with Joel "Loose Arse" Wilkinson moving up to EMEOPS and Dylan "Dingo" Cordingley being promoted from the main workshop to FRT life. He came in timely fashion as he was needed with the lack of field trips he was need for as 16 Sqn deployed on Hamel and the Dingo series of exercises disjointed from the Regiment. This left Brad pulling his hair out and developing a somewhat unhealthy coffee addiction dealing with maintaining the RBG PMV fleet with hopes and dreams as parts are somewhat non-existent or seem to disappear between the short drive from one warehouse to another if they were ever picked.

Let's not mention PMV Windscreens as this has turned Brad into a Spreadsheet Ninja. Surprisingly this worked out as nothing broke down whilst deployed on EX. RBG has passed and the FRT is settling into a reset stage focusing on courses and the introduction of the new toy the PMGMV. This should hopefully lead to the FRT being deployed with the SQN and not back in the BMA with 1RAR playing army and not getting any call outs.

JLU-V (P) SHORAD WKSP – A workshop stepping out of the shadows

CPL Adam Somerville

What follows is an excerpt from a phone conversation between a SHORAD WKSP CPL and a member from one of the JLU-V's locally supported units (LSU):

CPL: *Good morning JLU-V SHORAD WKSP CPL X (Name redacted to save embarrassment) speaking.*

LSU *Caller: Ah yeah good morning, I have two G-Wagons ready for drop off for their next service interval and I just want to organise a time for ...*

CPL: *Sorry Sir but that isn't our workshop, you want the Broadspectrum (BRS) Service Station located in the JLU-V secure compound.*

LSU *Caller (now slightly confused and annoyed): Hang on I called JLU-V isn't that you?*

CPL: *No you're right we are a part of JLU-V but were not the part you're looking for. You have called the Short Range Air Defence Workshop. Our Workshop is currently manned by only RAEME Boffins, so unfortunately we can't service your G-Wagons.*

LSU Caller: *I have been posted to the School of Artillery (SOARTY) in Pucka for nearly eight years and I have never heard of your workshop.*

CPL: *Yeah that's not surprising very few people know of our existence, even within the Pucka units. We are one of the few maintenance workshops located in Victoria (Note: the School of Armour, also located on Pucka, has a newly raised workshop). You said that you were located at the SOARTY, funny that so are we.*

LSU Caller: *B@#*$&^!*

CPL: *No seriously we are located in Building 340 within the GBAD Hanger, our workshop is the white demountable building up the back to the left of the ping pong table. If your office faces Building 340 then you should be able to see the large metal sign depicting the words JOINT LOGISTICS UNIT (VICTORIA) PUCKAPUNYAL SHORAD WORKSHOP, the sign has been located there for nearly four years. I guarantee that you have run past that sign hundreds of times during your PT sessions.*

LSU Caller: *Oh yeah I see it now, guess you learn something new every day. So can you fix my vehicles?*

CPL: *No Sir, but here is the number of the Service Station.*

LSU Caller: *Cheers, thanks (Hangs up)*

A short time later the SHORAD phone rings again.

CPL: *Good morning JLU-V SHORAD WKSP CPL X (Name redacted to save embarrassment) speaking.*

Different LSU Caller: *WHO have I called?! Anyway that doesn't matter I have a range shoot scheduled for tomorrow and our F89s have not come back from the JLU-V Armoury.*

CPL: *(Sighs and internally mutters to himself) Damn it here we go again!*

It is a conversation like this which, up until about two years ago, was indicative of exactly how unheard of JLU-V's SHORAD WKSP was to the wider Army.

The JLU-V SHORAD WKSP is located within the Puckapunyal Military Area (PMA) co-located within the SOARTY's Bridges Barracks. The WKSP is currently manned by four CPLs and three CFNs, all of whom are ECN 421 Boffins. WO2 Bruce McIntyre is the WKSP ASM and has filled this position since 2014. This is not his first posting to the unit, having previously been a CPL here from 2004 to 2007. The other members of our small, but not insignificant, WKSP include:

CPL Matt Hinton (Posting out 2018)

CPL Alan Ahmed

CPL Josh Mohan

CPL Adam Somerville (Posting out 2018)

CFN Tom Price (Posting out 2018)

CFN Chris Gibson (Posting out 2018)

CFN Laurie Taylor

In 2019 SHORAD will welcome in CPL Sander Vloothuis, CFN Bradley O'Brien, CFN Justin Hughes and CFN Struan Law. CFN Taylor will be promoted internally to fill the vacant CPL position.

The WKSP's primary role is the maintenance of the SOARTY's GBAD training fleet, which comprises the RBS70, PSTAR-ER Radar system and TACCS fleets of equipment. The WKSP is a medium grade repair facility for each of these fleets and has on the odd occasion conducted heavy grade repair/modifications upon request from various fleet managers.

As the WKSP is solely manned by Boffins and that we are one of the only AMOs within Victoria, our WKSP is a primary POC for the repair and servicing of other electronic systems. These systems include not only those used within the PMA but those also located within the various units, training establishments and Defence contractors within the state of Victoria. Two of these systems include BGC3 and Biomed equipment. The workshop is currently assisting the SOARTY with standing up their local BGC3 PMV mounted network and on an annual basis the WKSP deploys a maintenance team to Malaysia in order to inspect and repair the medical equipment owned by RMAF Butterworth.

Being one of the few WKSPs within Victoria means that we are periodically contacted in order to conduct short notice repair and maintenance tasks to a wide variety of external units. Some of the units/groups which we have assisted in the past have included Prototype & Test Services (AKA Accredited Test Services) Monegeetta, Elbit Systems in Melbourne, Joint Proof & Experimental Unit Greytown and the odd "odd" request from CASG.

Our WKSP is uniquely positioned to fill the maintenance niche which occurs when utilising a Defence contractor is either too cost prohibitive or the TRF requirements of a particular piece of equipment do not allow for a contractor to complete the task. It is this area of work which has increased radically in the past 24 months and has seen our WKSP come to the attention of units of the wider Army. It is predicted that the WKSP will continue to utilised for these type of maintenance tasks well into 2019 and beyond.

SHORAD WKSP also works closely with JLU-V's two main Defence Contractors, these being Broadspectrum and Linfox. Members posted to SHOARAD WKSP are given a unique insight into the heavy grade maintenance provided by Broadspectrum and the logistic services provided by Linfox. Sufficed to say that together without our contractors and our APS lead HQ, our WKSP could not provide the maintenance effect that it does

Joint Logistics Unit (East) Hunter Valley

CPL Carl Norling

A busy year thus far for the three uniformed Armourers of Joint Logistics Unit (East) (JLU(E)) Hunter Valley.

CPL Palermo being the stalwart for the new march ins SGT Hurst and CPL Norling, with Hursty coming from the Joint Proof and Experimental Unit (JPEU) Port Wakefield and Norlo having been a marine fitter for the last six years, the re-learning curve has been steep.

The tempo has been consistent with School Of Infantry providing plenty of range call outs and weapons abused by IET's, with a good variety of faults that keep us scratching our heads. Not to mention the quarterly ATI's of every weapon used by the Platoons. At the time of writing the three of us have conducted a cumulative 1700 weapon Technical Inspections (TIs).

Our undermanned reservist brethren have called on JLU for support and we have answered the call, with FRT's to 8CSSB Newcastle. Future FRT's planned to 12/16 HRL Tamworth and 41 RNSWR Lismore to pick up the slack, we certainly get around.

The delivery of our brand new, flash as Michael Jackson, Range Response LC79 Cruiser was well received, with the poor old Mazda Bravo sent out to pasture after 13 years' service to Defence as the oldest white fleet still hanging on.

JLU Hunter Valley truck.

Community engagements have included hosting the Cessnock Men's shed here on base, with displays, and some trigger time at the WTSS, which bought a smile to the faces of the members. As well as our commitment to the Defence Work Experience program, providing a steady stream of slave labour...ahem, aspiring RAEME Soldiers through our small workshop.

All in all, it's been a fulfilling year for a small detachment of Fitters.

Arte et Marte.

RAEME Corps Awards 2018

The Corps Awards are an annual presentation to the best ARA and ARes Craftsman, both nationally and regionally, as well as to the best students on the Logistic Officer's Basic Course, Subject Two for Sergeant and Warrant Officer and Subject Four for Sergeant and Warrant Officer.

The following personnel have been awarded the 2018 Corps Awards.

ARA Craftsman of the Year
CFN Joshua Keir, 1 CSSB Darwin

ARes Craftsman of the Year
CFN Anthony Smith, 13 CSSB Perth

Vic/Tas ARA Craftsman of the Year
CFN Damien Thompson. 4 CSSB Melbourne

Vic/Tas ARes Craftsman of the Year
CFN Anthony Heafield, 4 CSSB Geelong

Central ARA Craftsman of the Year
CFN Adonis Krvavac, 1 CSST Adelaide

SQld ARA Craftsman of the Year
CFN Nicholas Farrington, 7 CSSB Brisbane

SQld ARes Craftsman of the Year
CFN Alan Smith, 11 CSSB Brisbane

NQld ARA Craftsman of the Year
CFN Dustin Murphy, 3 RAR Townsville

NT ARA Craftsman of the Year
CFN Callen Hutchins, 5 RAR Darwin

LT Peter Jennings Award
LT Dylan Taylor, 3 CER Townsville

Artificer of the Year (Sub4 WO)
WO2 Adrian Gray, 3 CSSB Townsville

Regimental Award (Sub2 WOCSS)
SGT Troy Hardman, 3 CSSB Townsville

BRIG Martins, OBE Award (Sub4 SGT)
CPL Nitin Biswas, ASEME Albury/Wodonga

Junior Regimental Award (Sub2 SGT)
CPL Erin Taylor, 6 ESR Amberley

CFN Adonis Krvavac was also awarded the 2018 AEME/RAEME Association of SA, Soldier of the year Award and the 1 CSST WKSP MVP award.

Editor's Note: Due to the timeline to get this year's magazine to the publisher, we did not receive photos of the other award winners. Most of the photos included came from social media. We congratulate the winners and apologise that we could not include photos of more of the award recipients.

CFN Adonis Krvavac; Central ARA Craftsman of the Year.

CFN Adonis Krvavac's haul of awards.

CFN Anthony Heafield; 4 CSSB Vic/Tas ARes Craftsman of the Year.

RAEME Corps Dinner 2018

The Corps Dinner capped the 2018 Corps Conference over a full two days and six months of work at home and at Randwick Barracks on the future of maintenance in the Army and the Corps.

The Corps Dinner was presided over by the Corps RSM, WO1 Rick (the first Recce Mech Corps RSM) Colefax, assisted by LT Alex Norton, with the invited guest, the Strategic Director of Raytheon Australia, a past Head of Corps and the Representative Colonel Commandant designate, Mr David Creagh, AM, CSC giving the main address. Diners subsisted on chicken and leak pie or beef steak for entrée, braised beef or roast pork belly for mains, and apple and rhubarb crumble or coffee crème brûlée for dessert.

The Head of Corps, BRIG Freeman, farewelled the Representative Colonel Commandant, BRIG David McGahey, CSC and the two Deputy Heads of Corps, DHOC (Ground) LTCOL John Bouloukos, CSM and DHOC (Aero) LTCOL Brett Nelson, CSM, as well as presenting WO2 Adrian Gray with the Artificer of the Year Award, and promoted CPL Nathan Harris of ASEME to the rank of SGT.

Pre-dinner drinks.

Mess is assembled.

Head table 2018 RAEME Corps Dinner.

Serious conversations.

HOC RAEME Brigadier Freeman addresses the dinner.

HOC presenting LTCOL Nelson a certificate recognising his service as DHOC-A.

Brigadier Ashurst.

Inaugural Trainee Dining In Night, RAAF School of Technical Training

CAPT Jack Herrod

The mess assembled.

The RAAF School of Technical Training is where the ADF sends all personnel who are entering a career in aviation maintenance. The courses aren't just about swinging spanners and completing their apprenticeships though, trainees from all three services gathered together for the Inaugural Trainee Dining In Night on the 30th of August for a taste of the more social side of military life. It was the first time the school had run this event and it aimed to help develop social mastery amongst the trainees, as well as being a prime opportunity to instil customs and traditions of the Army onto the new Crafties.

Kicking off at around 1800, The Airmen's Mess quickly filled up with trainees, excited for their first time experiencing a military dinner, and also a chance for a break from their studies. RAAF SGT Anthony Bell filled in the role of Mr Vice to direct the evening, with all other positions filled by the trainees. Mr Vice gave a brief explanation of his role after the Dining President had commenced the dinner, then handed over to CFN Walter Tagiloa to say grace. Trainees representing each service then had a chance to address the dinner, and speak about their own specific customs and traditions.

PTE Sheridan delivered the Army specific customs to his fellow trainees, giving the Crafties a brief history of their traditions, and an idea of what to expect at a dining in night. The Crafties were also able to glean an insight into the history and origin of the other service traditions at dining in nights.

PTE Sheridan addressing the Dining In night.

The night progressed well, with officers and NCOs on staff alike getting their hands dirty cleaning up between courses and serving out the next meal while the trainees socialised outside. CO SPS,

Passing the port.

WGCDR Anthony Grimmer addressed the trainees as the guest speaker, and provided some advice for their future careers. Some of the key messages he delivered were to fight for the career they want to have, that taking jobs no one else wants will give you skills no one else has, and that technicians need a wide variety of skills, because it isn't all about swinging spanners.

The last formality of the evening was the pouring of the port and the toasts which were delivered by the trainees. After the final toast, the trainees ran a charge session with Mr Vice, plenty of banter was thrown between courses and services, resulting in fines for those trainees involved. The trainees enjoyed a chance to have a laugh over some of their not-so-finest moments, and the end result was over $800 donated to legacy. Once that had concluded, the dinner was over, and the Crafties were able to retire to the Airman's Club with the other trainees for a few social beverages, where they were able to share a few stories, and probably make 1 or 2 more for the next charge session.

The night provided an opportunity for the Crafties to enjoy a break from course along with trainees from the other services. They managed to learn about the military, its customs and traditions, as well as have some fun while doing so. Overall the night was a success and the school plans on repeating the event in 2019.

CFN Readhead, CFN Chapman & CFN Suthamwuthinant.

Regimental Artificer Sergeant Major (RASM) WO1 Simon Butler's Farewell

WO1 Simon Butler will complete his final posting to 1st Armoured Regiment (1AR) as the Regimental Artificer Sergeant Major (RASM) this year. He was farewelled at the ASM's Golf Day in early December 2018 by all the RAEME members of the Regiment.

He was presented a side table that was made from armoured vehicle parts. The top sprocket is from the rear of an Abrams M1A1 tank, the legs are ASLAV shock absorbers and the tier is a M113 AS4 idler wheel. The table was topped with a 10mm thick piece of glass with an etching on the underside.

Out of the 26 years WO1 Butler has been in the Australian Defence Force, 10 years have been spent in 1AR. For those members that know WO1 Butler, you would all agree that he is very passionate about his armoured platforms. WO1 Butler's passion and commitment will be sorely missed from the Unit; however, all things must come to an end.

From all the RAEME members here at 1AR, we thank you for your dedication to the Unit and wish you all the very best in the future.

1 AR WKSP.

WO1 Simon Butler (RASM) 1AR with table.

OC Support Squadron with RASM.

RASM's Table.

1st Armoured Regiment RAEME members.

ASEME

ASEME Mil Skills Competition Pool Gun Carry.

ASEME Mil Skills Competition sand drag.

ASEME Relay for life site.

ASEME Mil Skills Competition Section Attack.

EESW Relay for life team.

Vale Major Lloyd Keith Millican

15 September 1953 – 03 March 2018 24th Class Apprentice Vehicle Mechanic

Lloyd *"from the Army, perhaps you've heard of me"* Millican joined the Australian Army as a 24th Class apprentice vehicle mechanic on 13th January 1969. His dedicated career spanned almost 50 years and included service in the ARA as a vehicle mechanic (predominantly on armoured vehicles) until 1994, in the APS as an instructor at ALTC on numerous specialist courses and then as a member of the Army Reserve right up until his passing. During his reserve service, he also served several periods of continuous full time service (CFTS).

Lloyd was promoted to CPL in May 1977, SGT in May 1981 and WO2 in May 1985. He crossed to the "Dark Side" and was appointed as CAPT in 1995. He was subsequently promoted to MAJ in 2001, although the mischievous Crafty spirit was still well and truly alive in his personality right until the end. His postings included 2nd Field Engineer Regiment, 1st Armoured Regiment, Melbourne Workshop Company, 4th Base Workshop, RAEME Training Centre, ALTC, CATDC and LWDC.

Due to his varied career and the generation in which he grew up, Lloyd had a vast range of friends / work colleagues who would all describe him as your quintessential larrikin. In the same breath, he was likewise described as a true gentleman who had a fantastic sense of humour.

Lloyd displayed and maintained a work ethic second to none. As detailed by his son Allister and unknown to most who worked with him, Lloyd would often spend many hours at night preparing his material for the next day, ensuring he was up-to-date for the subject he was delivering and enable him to provide a current, professional and well-informed lesson.

This explains why he was known as "Encyclopedia Millican", able to understand numerous complex vehicle systems and explain these in layman's terms, ensuring his entire audience (regardless of rank) would assimilate the content and enjoy learning at the same time.

Lloyd was an expert level instructor ("fart smella"). His sense of humour and magnetic personality had trainees eating out of his hand - he has instructed generations of Army personnel. In addition to his brilliant achievements as a vehicle mechanic tradesman and instructor, Lloyd taught civilians how to operate simulation systems in support of Army courses and instructed all manner of personnel in support of major Army exercises. He had the knack and the vocabulary to get a point across in the most concise way possible. You could fill this magazine with stories from & about Lloyd but unfortunately, we are limited to only a single page – it is rumoured his wife Denise, may release a book of "Lloydisms" in the future...

Lloyd was, through-and-through, a dedicated family man. Married to his soul-mate Denise for 43 years & 359 days, he was a great family man who always sought to put them first. Father to Allister, Lauren and Alana (who said she was the favourite), Lloyd ensured he supported them all as well as he could, including his own parents, Denise's parents and the entire extended family network. He was a very proud grandfather to Ella, Austin and Poppy.

In 2017, his grandson Austin was diagnosed with leukaemia. Lloyd and Denise made the support to their grandson and daughter the number one priority. They assisted in the raising of funds for Austin and put their own retirement on hold to achieve this.

Lloyd was diagnosed with lung cancer on 05 January 2018 and passed away in the presence of his loving family on 03 March 2018. His passing has left a massive hole within his own family and his Defence family. There is no doubting his legendary status as a husband, father, brother, son-in-law, brother-in-law, grandfather and great friend to so many.

Lloyd Millican.

Lloyd Millican truly was an officer and a gentleman – he will stay in our hearts forever.

CPL Lloyd Millican.

Lloyd & family.

Vale WO2 Michael Joseph Kenny

21 May 1963 – 14 February 2018 Vehicle Mechanic

ASEME Mil Skills Competition Pool Gun Carry.

2018 has seen the passing of another one of our Corps legends, with WO2 Michael "Mick" Kenny finally succumbing to his long and determined battle with cancer.

Mick was born on the 21st of May 1963, just after his twin brother Peter in Quirindi, a small town approximately 70 kilometres south-south-west of Tamworth to his parents Patrick and Frances. He was the fourth of eight children.

Mick worked for his family business as a diesel mechanic from the age of 16. He met, and later married, Sandy in 1990. His daughter Jess was born in August 1992 and he moved to Orange in 1994 at the age of 32. Mick took up a position in a farm machinery business which ended due to the business closure. He started working in a garage, however his true love was the big machinery; trucks, tractors and headers, but he found that cars simply frustrated him. Sandy worked for the army as a civilian and spoke with a WO1 about Mick's situation. Mick started talking about joining the army and wanted to "work for the RAEME Corps" repairing trucks and tanks. He finally made the decision and enlisted on 24 October 1995.

Mick in Iraq.

Mick was really excited about joining and was the eldest (33 years old) of the group at Kapooka. When he marched out, he was awarded best shot and was incredibly proud of this achievement. Mick had always wanted to make it to a Warrant Officer so with his passion and drive for the military, he quickly moved through the ranks.

He served in a wide variety of units including 1st Avn Regt, 3 BASB, 21 Const Sqn, 1 CER, 2 CAV Regt and finishing back at 2/14 LHR (QMI) where he was still serving as the TRF WO when he passed. He saw operational service in Bougainville in 2000, East Timor in 2001 and 2010 and in Iraq as the ASM of SECDET X in 2006.

Mick was a likeable character and always had time for a chat. His TRF audits would often take days longer than scheduled as he worked his way around the Regiment sharing a coffee and smoke with everyone he met, often talking the ear off unit members about the upcoming NRL game or poor refereeing last weekend. His love of his trade was evident by the many 'bodgies' he had on the go. Lawn mowers and chainsaws littered the workshop and his shed in various states of repair.

Mick has always loved his sport and was always involved at some level either playing or supporting. He loved the NRL and his beloved Tigers but also played touch footy, darts, baseball and softball. He loved coaching younger kids in sports when the opportunity arose and was always their biggest supporter.

Mick had been fighting a long and courageous battle with cancer. Those that knew him saw the resilience and determination he displayed as it gradually took over. True to form, he fought hard to the end and would not accept defeat even in his last days in palliative care – he talked of being released from hospital to have a beer at the Gaythorne RSL with his mates.

His military funeral in Hervey Bay was no small affair and attended by many who knew him from both his civilian and military careers. Complete with an ASLAV-F holding ground, gun carriage, military band, armed escort party, bagpiper and firing party, his family members present were truly touched by the support from Army.

Mick leaves behind his daughter Jess, partner Vicki, a large loving family and many hundreds in the Corps lucky enough to call Mick their mate.

WO2 Michael Joseph Kenny – Arte et Marte until the end!

Vale 2018

13 November 2017 – Francis "Frank" Busby

21 December 2017 – Mick Farrar

01 January 2018 – Howard "Andy" Anderson

05 January 2018 – Les Tobin

06 January 2018 – Darren Campbell

17 January 2018 – John Thomas Loch

22 January 2018 – Brian Frederick Cooper

03 February 2018 – Arthur Nicholls

14 February 2018 – WO2 Michael Joseph Kenny

17 February 2018 – WO1 Kingsley Wayne Duncan

28 February 2018 – MAJ Lloyd Keith Millican

1 March 2018 – Barrie Englishby

6 March 2018 – WO2 Frederick (John) Putland

22 March 2018 – Neil Tweedale

25 March 2018 – Kevin Pearce

23 March 2018 – Kurt Butler

10 April 2018 – LTCOL Frank Poole

12 April 2018 – James "Jimbo" Farrell

20 April 2018 – Grahame "Duff" Kennedy

20 April 2018 – Graham Ruprecht

29 April 2018 – Brian "Yorky" Greetham

30 April 2018 – Peter "Pumpkin" Sherry

05 May 2018 – Ian Hicks

19 May 2018 – Brian Ian Tucker

24 May 2018 – MAJ Ashley Fry

02 June 2018 – SGT Reginald Stratton

06 June 2018 – LTCOL Roger Jackson

22 June 2018 – Harold John Baker

01 July 2018 – Ken Onley

24 July 2018 – Bill Budgen

31 July 2018 – Mick Dilger

28 October 2018 – David Campling

12 November 2018 – LTCOL Ross Manley

17 November 2018 – CPL Dave Graham

19 November 2018 – Malcolm Dunn

26 November 2018 – WO2 William (Blue) Brechin

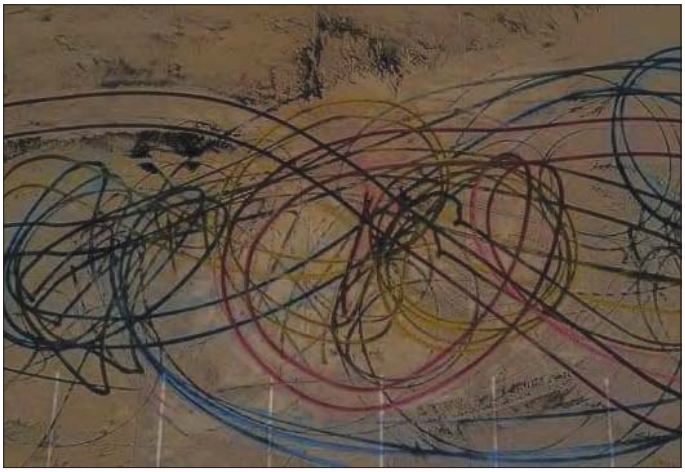
'Arte et Marte'

Your Corps thanks you for your service.

'REST IN PEACE'

Editor's Note: Apologies for any inaccuracies or omissions. These notices are compiled based on emails sent to the RAEME HOC Cell and posts to the 'RAEME' and 'RAEME Mates' Facebook groups. The detail supplied varies greatly.

RAEME Birthday – Southern Queensland



RAEME Birthday – Sydney

Raeme Birthday – SA region


WHA 184


RAEME

RAEME Birthday – North Queensland

RAEME Birthday – Bandiana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