RAEME CRAFTSMAN

The Corps of Royal Australian Electrical and Mechanical Engineers

Issue No. 70 2019

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.

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

Army drill

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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.

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Lost and found

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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

EDITORIAL BOARD

EDITOR:

MAJ Perri Hobbs

WO1 Dave Clarke

EMAIL

Perri.Hobbs@defence.gov.au

David.Clarke15@defence.gov.au

FOR NEXT ISSUE

Articles should be sent to:

raeme.hoccell@defence.gov.au

The Editor

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HOC, ALTC

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RAEME

CRAFTSMAN

The Corps of Royal Australian Electrical and Mechanical Engineers

Issue No. 70 2019

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Head of Corps

BRIG Andrew Freeman – COMD 17 CSS Bde

Another year has flown by and my time as Head of Corps is quickly coming to an end. To be the RAEME Head of Corps has been a goal of mine since I was a young Lieutenant, and now having completed over 2 years in the job I wish I could retain this honour longer. Every promotion is a privilege; however, I found my promotion to Colonel a little confronting as you replace your RAEME Corps badge with a different hat badge and your RAEME Corps lanyard is removed. After 26 years of wearing the RAEME Corps Badge and lanyard this was an uneasy feeling! So when becoming HOC I again had the privilege to wear our Corps lanyard when fulfilling Corps Duties, but unfortunately after the 1st December 2019 I will never have that honour again.

That said, I am pleased to announce the next HOC of RAEME will be BRIG Todd Ashurst. He is an outstanding RAEME Officer who will take our Corps to the next level. He has been CO ASEME and is currently DGLOG; hence, BRIG Ashurst has an excellent understanding of the Corps, is aware of our future challenges, and importantly he is in a very influential appointment which will ensure the Chief of Army is well informed of our Corps issues, concerns, and recommendations.

As HOC I had the opportunity to visit many RAEME call signs both in barracks and on exercises. During my visits and engagement with those who we support it should be no surprise to you that the standard of craftsmanship, the pride we have in our work, our all corps soldier skills and the respect we hold for each other has not diminished – in fact I believe it has continued to grow. Fellow Brigade Commanders and Commanding Officers have only the highest regard and praise for our Corps as they often commented on the quality of soldiers and officers, and of your professionalism. So to you all, well done on maintaining your high personal standards and representing the Corps in the way that you have.

On the recent Exercise Talisman Sabre 19, when driving around Shoalwater Bay I saw that the spirit of our Corps is very much alive. The number of tri colours flying on very high flag poles, some with LEDs which wasn't the most tactical at night, but it was inspiring. Then there was all the RAEME tac plates on vehicles and the back of road sign posts spray painted with Arte Et Marte. Well done guys!!!!

Looking forward, the Corps has a great many challenges and opportunities in the near future with the continual modernisation of our Army and the introduction of new equipment. Over the coming years we will review the construct of our trades, how we conduct trade training, and how we use emerging technologies to reduce the maintenance liability. Changes like this are not new to our Corps, but rather it is an exciting time as we will be challenging how we do business today and planning how we are going to do business tomorrow. One of our recent initiatives that I am very proud of was the establishment of Master Artificers for each of our trades. These Master Artificers will assist the HOC ensuring that our trades are appropriately represented as we go forward and that the Corps remains modern and relevant.

Fellow soldiers and officers of RAEME, I wish you all the best for the coming years and I sincerely believe that the Corps will continue to embrace modernisation and ensure Army's equipment is mission ready. I thank you for your commitment to serving our country and for being amazing ambassadors of our Corps – Arte et Marte.

Corps RSM

WO1 Rick Colefax – RSM ASEME

My second year as Corps RSM has been as rewarding as my first as I have been privileged to see the various initiatives coming to fruition to better train and enhance the skills of our tradesmen and woman. As this year draws to a close the opportunity for two vehicle mechanics to be placed with EREBUS Motorsport has come to fruition, the agreement for the placement of a Crafty or two into the Land 121 build line with Penske and the inclusion of an officer into Penske Racing has progressed.

The coming year will provide some challenges with the Maintenance Workforce Segment Review (Employment Category Review) and how this will affect what our trades look like into the future. With the introduction of differing technologies, RAEME as an entity will need to change in how we train and maintain our trades and how we provide this capability to Army.

Unfortunately, I did not get around as much as liked this year, but still had the opportunity to talk to the soldiers and officers coming through our school and ASLO whilst on their career or specialist course. I can tell from the enthusiasm that these officers and soldiers have that the Corps is still thriving. As now Major General Freeman has related, the pride we have in our Corps is still huge now as it was when I transferred over.

We as a Corps need to look to the future more than ever now to ensure we are providing the capability that Army requires, in all domains. We must continually challenge our ideas to ensure that we stay relevant and modern and also find different ways to achieve the outcomes we desire.

I would like to take the opportunity to thank MAJ GEN Freeman for his stewardship of the Corps over the last two years and wish him well in his new position in America.

I look forward to seeing you in the New Year with the new HOC, BRIG T Ashurst as well as catching up; if you are in the AWMA area.

Stay Safe

Arte et Marte

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Fom the Editor

MAJ Perri Hobbs

As I observed in the last edition, the various tasks completed by the Head of Corps Cell would still be done: As you read this, The Craftsman has still come out, the RAEME Awards were still presented to the most deserving of our soldiers, and the RAEME Birthday is still financially supported. Although, I believe the Corps RSM Is so much busier these days.

The last twelve months has seen a shift in the Head of Corps Cell workload from the SO2 Corps to the two Deputy Heads of Corps and to the Corps RSM. The work is still done, just by different people. In between the extra tasks for the remaining personnel of the Head of Corps Cell, the Corps still found time and resources to conduct the Army Maintenance Effects Conference.

The AMEC was held in Brisbane in October of 2019, with a reduced topic load compared with the Corps Conference, but more narrowly focused on maintenance and the supporting training. I have reproduced three of the four topics here in the magazine. For the fourth, or to read the original documents, and to comment on them if you wish, please go the RAEME page on ForceNet. Thank you to Majors Angela Langdon, Alex McDonald, Jack Francis and Adon Cadona for giving up some of your time to get me the articles.

The Corps is looking at ways to reduce the cost in time and money spent on specialist training – time away from family and unit, as well as the cost to capability that our current suite of specialist courses (and our absence on them) impose on Army. What can the Corps learn from civilian industry and REME, and how is Plan Centaur working on developing these concepts. Topic One addresses the challenges and recommends some Corps responses to modernise our systems of training. Topic Two looks at the ranks and positions within a workshop and seeks to align their duty statements with maintenance doctrine, the required competencies and address similarities between the aviation and ground streams. Topic Three seeks to optimise maintenance methodology through Reliability Centred Maintenance methods. There is also a presentation and the original report written on the introduction into service of the ARH – a pertinent article considering the new Boxer CRV and the upcoming IFV.

Have a read of the article from LT Nicholas Hood on the PMV battery test conducted at 5 RAR. Engineering and testing is not limited to Land Systems Division and the article by LT Hood is an excellent example of that. There are engineering, maintenance and testing activities that any workshop can carry out that will have a positive impact on maintenance across Army. Even if your activity didn't work out, and you write a 'lessons learnt', this is still valuable to the Corps.

To the crafties and engine-less race car drivers of 7 CSSB, I do admire the effort you have put into your car to improve the handling and durability of your vehicle during high speed cornering. However, I do believe that more attention to the caster angle rather than just a very negative camber, will give you similar levels of cornering performance, while increasing wheel durability. Well-designed caster and camber angles will minimise lateral forces on both wheels (not just the outer wheel) and could allow the use of bicycle wheels with much lower rolling friction and weight – therefore a faster vehicle. Unless you happen to be on the hoon circuit, if you do wish to push the boundaries on negative camber, or adjust the caster, or toe-in / toe-out, read William Milliken's Race Car Vehicle Dynamics.

Also, have a look at some of the photos from 7 CSSB. Some of the most artistic maintenance I have seen in a while. Thank you for some awesome photos of our men and women at work.

If you wish to write a letter to the editor, please feel free to do so, and we will publish the letter with any responses.

For those that wrote articles or unit jottings, thank you – without your support, this magazine would be limited to nothing very much. If you do wish to see your unit and your activities that you have contributed to over the course of 2020, we are taking submissions as soon as you wish to send them.

Thank you and enjoy the magazine.

From the Editor

WO1 Dave Clarke

Yes, I'm still here helping out with the manning shortages in the RAEME Head of Corps (HOC) Cell. Once again I was asked to assist with compiling the 2019 RAEME Craftsman. Whilst this year's edition hasn't been as well supported as last year's, we still have a good variety of articles including plenty of Unit Jottings. We all love reading these, just to see what our mates have been getting up to. Although social media probably does that for most of you anyway.

I still enjoy the role as Editor as it gives me the opportunity to read all the articles first. Although it's been a while now since I've been out to the Units. I find reading the articles helps keep me up to date with what's happening in today's Army, and there is certainly is a lot happening….

Amphibious operations is mentioned in several articles within the magazine in regards to coming to terms with operating on board the Landing Helicopter Docks (LHD). There are a couple of interesting articles about getting our various helicopter assets certified for operations at sea. There's also some interesting accounts of a cruise around the Indian Ocean and Asia that some of our members undertook. 2 RAR submitted an interesting article regarding the challenges of working on Army equipment in a Navy environment; plus the burden of having to choose between pork belly and slow cooked ribs for lunch!

There is an informative article regarding the rollout of SAP in the not too distant future. Although not fully developed yet, it looks like we will get a more intuitive system which is less manpower intensive to run. It also looks like we are getting to the stage where tradies are issued tablets (the IT type, not the medicinal type) as part of their toolbox.

There are a couple of articles from members on operations from HQ JTF633 and TG Taji. Once again the members deployed all seem to be working hard and meeting all the challenges put to them. Although it would be nice to see more operations articles in the future. I've had to reproduce a story from Army News on some excellent work done by Force Support Element 10.

There is a very interesting article from one of the 2018 ROBC-G graduates on a trial conducted on 5 RARs Protected Mobility Vehicle (PMV) batteries. I look forward to reading the outcomes of the trial in the future.

RAEME members have an exciting new career stream working in the Explosive Ordnance (EO) field. There is an interesting insight into this career stream within CASG. This is mainly aimed at Engineering Officers, but there are openings for Warrant Officers and RAEME officers that have completed CTMC as well. The article is a real eye opener as to how much new EO is being introduced into service in the not too distant future.

The Army Drone Racing Team (ADRT) have submitted there now annual article, detailing how the team is largely made up of RAEME members and it explains why the sport is suited to RAEME members. The article also details all the activities where the ADRT have competed or represented the Army.

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.

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.

Can I also ask that if you are providing articles for the 2020 Craftsman, we cannot send articles formatted in columns or with the photos embedded in them to the publisher. As such, please send photos separate to the article and labelled as you want them to appear. If you decide to just send photos that's fine, but please provide some sort of explanation of why/where the photo was taken and who is in it.

I hope you enjoy the 2019 edition of the RAEME Craftsman as much as I've enjoyed putting it together.

WO1 Dave Clarke

Arte' et Marte'

Aircraft Maintenance at Sea – 5th Aviation Regiment

CFN Tim Hoerlein and LCPL Matthew Chin

As an Army Aircraft Maintainer, I have spent more time at sea on Navy ships than I have out field. The normal reaction to this would be of disbelief or intrigue. For the last few years the 5th Aviation Regiment have embarked a force of aircrew, maintainers, mission support, and logistics personnel onto the newly acquired Canberra Class of ships more commonly known as the LHD's (Landing Helicopter Dock). This type of operation is becoming more commonplace within Army aviation. With each embarkation growing in number, it can be said that the army has unfurled its sails and set a course for amphibious operations.

CH-47F embarked

Many past and present aviation personnel can attest that putting aircraft in the sky is no easy feat. It requires endless amounts of knowledge, experience, and resources to accomplish. During Sea Series 19, four MRH-90s and two CH-47Fs were embarked to test out the skills and maintain proficiencies of aviation personnel in an amphibious environment.

MRH90 embarked

The maintainer's role during this period was to provide serviceable aircraft, ensure maintenance support for a highly modern and technical aircraft, and refine their Downed Aircraft Response Team (DART) activities within a tactical setting. These are identical to what is expected in the regiment, albeit compounded by a naturally corrosive and logistically demanding environment.

As can be expected, there are noticeable differences on how business is conducted on board the LHD, mainly having to work within the limiting confines of a ship and sharing what little workspace is available. Additionally, the Navy have their own aviation element embarked simultaneously, which naturally results in the inter-service idiosyncrasies causing administrative friction points.

Flight operations at night

It was testament to the Taipan maintenance element as MRH-90s, whilst an extremely capable asset and prone to challenge even the most experienced of maintainers, were able to meet the required needs of the exercise by providing three serviceable aircraft daily, regardless of maintenance or unserviceabilities that presented.

Army's vertical medium lift capability, the CH-47F, became the aviation centre of gravity during the conduct of Sea Series 19. Two Chinooks were embarked on HMAS Adelaide for the three week exercise, with regular flights conducted to support ground forces and

HMAS Canberra for procedural compatibility and vital tasking.

The CH-47F maintainer and support elements carried out over 2300 hours of maintenance to achieve over 120 hours of flight time. "We as a team had a focus, and that focus was safety," stated CPL Edward Deren, "By working closely with Navy AVN and MRH elements,

we – as a team of teams – were able to minimise double-handling of flight deck assets and met our flight windows with a one-hundred percent serviceability."

With each exercise, or activity in which we embark, our ability to work with the other relevant elements on the LHD is getting better and more efficient. Reciprocally, continued LHD operations reinforce our ability to accomplish more complex and frequent amphibious tasking, embedding Australia's foothold in the modern Battlespace.

Reflections from the 5 RAR PMV-Medium User Study

LT Nick Hood & MAJ Matt Barnes

The role of the RAEME Platoon Commander (PLCOMD) has been a key theme amongst previous Corp conference topics and discussion. Questions were raised regarding their role and baseline skill requirements required to effectively plan and execute maintenance, repair and recovery effects in conjunction with the Artificer Sergeant Major (ASM). With recent development, the Corps has seen a new direction set for Junior Officers, introducing them to a technical role that is required for an Army that is modernising its equipment and digitising its capability.

In the past 12 months, the Corps has sought to invest in enhancing relevant technical skills for Junior Officers through the implementation of the RAEME Officer Basic Course-Ground, piloted late in 2018. The course introduced different levels of repair and maintenance which culminated in an exercise that saw the planning of maintenance and repair tasks that involved technical risk assessments, deviation from maintenance procedures and the utilisation of local engineering changes. The exposure to these tools introduced PLCOMDs to a complimentary range of technical skills that are required for them to operate alongside the ASM. This is required for an Army that is rapidly modernising its equipment and capability. The challenge for junior RAEME Officers is to seek out opportunities to develop this foundational skill set and progress their technical mastery and competence through their service in the Australian Army.

With the recent introduction of motorised assets within the 5th Battalion, the Royal Australian Regiment (5 RAR), there were a number of technical issues in learning to employ the capability. One of the issues discovered through past training serials, courses and exercises was the rate of batteries consumed. The trends of the battery issues were identified by vehicle mechanics (VM) of Technical Support Platoon (TSP). Throughout 2018, VM Section identified a high usage rate of batteries for the Protected Mobility Vehicle – Medium (PMV-M) fleet of vehicles (FOV). This was identified when the supply chain could not keep up with the demand from the Unit's PMV-M FOV.

During 2018, there were 148 batteries consumed and replaced and between 02 Feb 19 – 29 Aug 19, 147 batteries were consumed and replaced. The demand lead time for batteries was also increased due to the remote locality of Darwin. In addition to the increase usage rate of PMV-M batteries, it was also determined through field exercises and activities that the PMV-M FOV could not sustain the power requirements needed for the radio and communication equipment. This was assumed to be directly related to the increase battery usage rate and the inability to have consistent performance from the current in-service batteries.

The battery usage rate for the PMV-M over the period January 2018 - August 2019 was 295 batteries. Within a high tempo unit, this has been assessed as unsustainable, particularly if the current technical solution is to use Direct Unit Funding to purchase an alternate battery. A RODUM had previously been raised for the identified battery issue (Please refer to RODUM 20170573, PMV Batteries for initial report and outcomes). The following summarises the outcomes of the RODUM and closure signals:

RODUM 20170573 – PMV Batteries: Odyssey 900 batteries can be installed into PMV-C fitted with additional communications equipment on a case by case basis. The installation is to be authorised by a Brigade or Unit local engineering change (LECP) that is approved by an appropriately qualified engineer/MAAR and is self-funded. FORCOMD are currently facilitating a 3 BDE trial with the intention of addressing power generation/power budget/power stowage issues across multiple platforms (including PMFOV). This trial seeks to provide a long term power solution across multiple platforms covering the issues reported in this RODUM.

Based on the technical advice from CASG via the RODUM and consultation with the current unit resources, it was assessed as unsustainable for 5 RAR to purchase and sustain new PMV-M batteries for the current fleet of 74 vehicles. This constraint also presented an opportunity to leverage off the resident expertise and apply technical acumen to conduct a user study to understand the requirements of the PMV-M fleet of vehicles.

To ensure the conduct of the user study was within Army's trial framework, both MAJ Barnes and I attended the Introduction to Test and Evaluation and CERT IV in Test and Evaluation course through AHQ's Land Test and Evaluation Agency. This professional development enhanced and complimented the existing Engineering qualifications and Technical Authority held by MAJ Barnes and I within our current appointments. At the completion of this course, the user study framework for the 5 RAR PMV-M User Study was established and the directive was presented and endorsed by CO 5 RAR, LTCOL Travis Gordon, CSM.

The aim of the user study was to evaluate the PMV-M power requirements in an operational representative environment in order to investigate the sustainment of power to critical electrical components and mission essential equipment.

The objectives of the User Study was:

1. to quantify the battery usage rates for the PMV-M
2. to quantify PMV-M battery usage rates for the RESET/ READYING period
3. to confirm the battery load usage profile for selected PMV-M variants
4. to analyse an alternate OEM battery profile and performance specification
5. to evaluate the current in-service issued batteries for PMV-M and whether it meets the user requirement for a basic mission profile within a Motorised Infantry Battalion.

The methodology adopted was a data acquisition approach which utilised the Army Health and Usage Monitoring Systems (HUMS) to monitor identified key inputs. The main input that was monitored was the voltage from the ECU, Alternator and the voltage from the 24V Battery System. To attach these to a vehicle, a Technical Risk Assessment was drafted and approved by the Executive Authority, CO 5 RAR. It outlined the way the HUMS equipment was going to be connected and stowed for the duration of the user study during the Exercise. It outlined and articulated the risk to each connection and attachment with mitigation factors to reduce the likelihood of any risk event to occur.

To effectively achieve the aim and objectives of the user study, the implementation of a data acquisition system was employed onto specified PMV-M variants. The two variants that were analysed was the Protected Mobility Vehicle Troop (PMV-T) variant and Protected

Mobility Vehicle Command (PMV-C) variant. All vehicles were digitised with communication equipment and BMS. The PMV-Ts had one BMS screen whilst the PMV-C had three BMS screens. The PMV-Ts had the capacity to utilise two communication stacks whilst the PMV-C had the capacity to use four communication stacks. One command variant was located with BHQ and the other was located with CHQ. This allowed data to be captured through the two different C2 nodes with different communication and power requirements. The PMV-Ts were utilised as Section vehicles within a Platoon. The data captured was able to be analysed and compared to the exercise scheme of manoeuvre to identify any trends and patterns within an operational representative environment.

The data collected captured 12 days of Exercise Talisman-Sabre 2019 (EX TS19), from 14 Jul 19 through to 26 Jul 19. During this time, the initial findings established that the frequency of start-ups were high and increased over the course of the exercise. The data reflected each start up and electrical draw in support of the movement of the vehicles around the battlespace. During EX TS19, 37 batteries were consumed which contributed to the total of 147 batteries consumed for the duration of 2019 (effective end date of 29 Aug 19).

The battery load usage profiles for the PMV-T and PMV-C variants have been gathered for further analysis and can be made available upon request. The report will be released NLT 01 Nov 19 with the analysis, findings and recommendations of the user study provided through CO 5 RAR to both the respective Command and Technical chains.

The user study has shown that, as a Technical RAEME Officer, there are significant opportunities to apply skill through the existing tools provided under the TRF. With the correct approvals and mentoring, the conduct of user studies and land trials on existing equipment can be easily facilitated on behalf of their units to inform improvements to existing capabilities. In addition, it allows members to identify issues, demonstrate innovation and articulate risk with their resident technical knowledge while developing their technical competence through the practical application of engineering principles.

Overall, it was a demanding technical activity but proved to be professionally rewarding and was a fantastic opportunity to grow and inform the development of capability in Army from the ground up while continuing the pursuit of technical mastery in support of the 5th Battalion, the Royal Australian Regiment.

PMGMV was utilised integrally to support the User Study – SWBTA 2019

Snapshot of the data that was acquired during the data acquisition phase of the User Study

Maintenance and Contracts – Civilian and Military Collaboration to Support the DJFHQ

LT Benjamin Costello

During Ex Talisman Sabre 19, the 1 Sig Regt was tasked to support a 1200 man camp for the duration of the exercise. Historical data had shown that the Regiment holds sufficient manning and equipment to support a camp of roughly 600 pers. This proved a challenge for planning the deployment of electrical services, noting the sheer size and spread of the position.

During initial planning, ELEC SECT and EMEOPS identified the potential shortfall. The challenge was not how we were to lay the position out, but where the equipment would come from. Noting the quick turnaround of 1 Sig Regt operational deployments, there had been limited scope for tradesman to remediate ELEC equipment to full operational standard. With quantities of items such as fluorescent lights, 40A turtles and 15A distribution boxes in high demand across Army, chances of procuring required repair parts and having the equipment repaired in a timely manner was slim. It was clear that a contracted solution was required, to fill the shortfall in organic equipment.

To bridge the gap, 1 Sig Regt sought contracted solutions through AHQ and FORCOMD. A 200kva generator (with supporting FPDS) and lighting were required. The challenge for

ELEC SECT was communicating their requirements from our 'lingo' to civilian trade standards. As the Army contractual process passes through many hands, we learnt that it is critical to ensure that personnel at all levels are able to determine your support requirements. As the personnel handling the contracts may not come from an ELEC trade background, this proved challenging. To combat this, it became evident that the user should remain in constant communication with the contracts cell. Requesting timely information allows one to remediate issues prior to the deployment of the equipment, rather than in location.

Once exact support requirements were determined, the question of inter-operability came into question. As Army's in-service FPDS fleet ages, it proves difficult to source a contracted solution which is compatible. Incompatibility required alternate circuits, of only contracted equipment, to provide the services required for Ex Talisman Sabre. As compatibility proved difficult to attain, it required FSR support from the contractors themselves to remediate any issues with equipment on the ground.

Not all aspects of the contracts process was a challenge however, 1 Sig Regt ELEC SGT identified the potential to deploy a standalone contracted fuel tank (5300L capacity) to support the contracted 200kva generator. This fuel tank was filled over the course of multiple TPA refuels, and proved highly effective in limiting the TST dependency on bulk fuel operations. Noting the static nature of the DJFHQ, the fuel tank solution proved a useful concept for extended operations, noting the estimated 30 day OVP once full.

Whilst challenging due to the short-notice requirement for contracted support, it proved an excellent learning opportunity for all members of 1 Sig Regt TST to experience

inter-operability with civilian contractors and providing maintenance support to our allied partners. The challenges faced were rectified, and the TST successfully supported the largest Talisman Sabre to date. Congratulations to all of the soldiers who made it happen.

ERP and SAP – The Future of Maintenance in the ADF

WO1 Wes Rickard and LTCOL Adam Dobney

What is Enterprise Resource Planning (ERP)? You've probably heard of it as SAP, but to be technically correct, Defence is getting ERP enabled by the software company SAP. In most cases the two terms can be interchangeable. For those of you that have heard about the project you can dismiss any stories that you've heard about its functionality; as you will soon read, it is too early to tell.

For the uninitiated, ERP is a concept where resources are managed across an entire organisation through one system. As opposed to having a series of applications to manage individual functions, an ERP provides an organisation a more timely and accurate picture of its assets, through one integrated system. While it will provide a better source of information for commanders to make decisions, it will also benefit the Cratfy. The SAP ERP will enable proper planning of work orders and confidence in parts visibility and availability. It will support modern work practices, giving you access to everything you need at the job site through mobile devices. Additionally, it will streamline the paperwork and admin that keeps you away from swinging spanners.

How ERP can accomplish this and why we should all be looking forward to the 2023 roll out will be discussed in this article.

Getting the data right

The first thing is, regardless of what you have heard, SAP is a tool for resource management, it is not a robot for resource management, so while some data fields will be automatically filled in, users will be ultimately responsible for ensuring that the system has valid data to work with. It is also important to acknowledge that the new system is heavily reliant on the quality of its data. This emphasis on data management will require new skills and mindsets to get the most out of the system. The ERP data team is conscious of this and are beginning a period of data cleansing and enrichment, cleaning up MILIS data and creating whole new types of data that we have never had before. In some cases it will almost be like starting from a clean slate. As we move forward, more guidance will be given on what you can do to assist this process and ensure that the ERP is an asset and not a liability.

The new system will be more integrated with the way you work and will be harder to bypass, ensuring data integrity is maintained. All of this data will be used to better plan stock holdings and optimise the supply chain to get what you need, when you need it. Fleet Managers will be better equipped to manage their sustainment budget and, as the whole system is integrated, it will remove the guess work in inventory management. The result is that when you look up a part you can be confident that the part number is correct, it is the correct part for the Mod Status of the equipment you're working on and that the fleet manager is aware of any items that are obsolete/obsolescent.

How will it be better than MILIS?

The program is in the early stages and will be rolled out over a number of years, adding capabilities in "tranches" so we cannot definitively say what the final system will look like, however, one thing is for sure – it will be superior to MILIS and deliver a modern, reliable system. Tranche 1 will focus on Land Materiel Maintenance and Supply Chain and will begin rolling out to units in mid-2022. While that seems like a long time, the complexity of the task requires a methodical approach to the design which consults with you, the end user.

Over the coming months, workshops will be held with our system integration partner (IBM) to establish what Defence's requirements are and how the system will look and function. Army has a team of experienced Warrant Officers working with the Program to ensure we design a system that will work for us. They are actively engaging with the wider Army to gather "Use Cases" which explain what we do and what we want to do better in the future. These will form the basis for our requirements as IBM build the system. A possible scenario of how we will conduct maintenance is as follows:

Tradesman (Crafty)

You turn up to work, grab your handheld device (tablet) and log on to your account. On the screen there are a number of tiles (called Fiori tiles) that link to all of the different applications your particular job needs. When you tap on one, a list of your day's tasks appears. You see your first job. The equipment has already been called in and is waiting in the workshop because the system has alerted the operator that it was scheduled for work. Any specialist tooling, including cranes and hoists are reserved for you and the expected parts that you need to complete the job are ready to be picked up from the RPS (if you're lucky, someone in RPS has already put the parts in the bay). You open the job, which automatically updates it to "in progress", the instructions to complete the task are embedded in the Work Order, making them easily accessible.

During the repair, you come across some growth work, so you grab your tablet and look for the parts you will require and the system tells you if they are available or not. With this information, you then speak to your supervisor who authorises you to conduct the repair or scheduled it for a later date. At the completion of the job, you enter the time it took to complete and fill in any notes about the task and digitally sign the work order. Every stage, including the ordering of parts, you are able to conduct on your tablet.

Maintenance Supervisor (CPL)

You open up the maintenance schedule for your work centre. In the schedule each of your Crafties is listed individually with times that they are unavailable due to leave, courses, etc. On one side of the screen you can see all the jobs that the Maintenance Planner has allocated to your work centre. You simply drag the job to one of your Crafties that has a sufficient gap in their schedule. If they don't have the correct qualifications or the work order is going to exceed the DER, you are alerted by the system and can shuffle things around to make the plan work.

You are now able to walk the floor to actually supervise, mentor, stop any unsafe work you see happening, and order parts for growth work so the Crafty can keep going with his task (because you too have a tablet). By having the CPLs back on the floor we will increase productivity as well as increased quality control and continuous development of our soldiers.

Maintenance Planner (ASM/EME OPS)

You put your feet up and watch the magic happen . . .

But seriously. Schedule Maintenance tasks (MSTs) can be planned out as far as you require so that you can manage jobs around Unit activities. Other maintenance tasks will still require to be triaged so that you can assess if the job is within the scope of your Unit. If the job is out of your Unit's scope you can forward it on to your

supporting work centre (eg: CSSB) with the touch of a button. Otherwise you raise a work order from the maintenance notification (the new EMEFIX) and list the tasks that will be required to return the equipment to mission capable/serviceable. The tasks already have the required qualifications, parts required and time to complete listed. You can then place a requisition for the required parts, for which the system will give you an ETA. With all this information you can then allocate the job to a work centre (current work group) in your Unit that has the capacity to complete the job in the time required.

Not only will the system give you the tools to more efficiently do you job, it will also provide you the data and tools to inform decision making and provide evidence-based advice to the chain of command.

Sounds too good to be true?

The above scenario is not far-fetched, though there are a few points that should be noted in order for it to become a reality. Firstly, as a Corps, we need to ensure that we give the system the data it needs. To assist with this, we are asking questions about what data we are capturing and how will it be used. If it has no value, then let's get rid of that field. Data for the sake of data capturing is not useful, it's just inefficient.

The system will also need clean data. I'm sure that you have had your ASM breathing down your neck telling you to fill in the correct information. Why? Because ensuring that you have the correct information exactly when you need it is invaluable. It allows an organisation to effectively plan maintenance activities and increase unit readiness. Not only that, it makes your job easier! Something as simple as filling in the duration properly will provide information to the SPOs to investigate and amend the expected time to better reflect the actual time. This will enable us to better plan our work, utilise our time better and make sure that what we're asking soldiers to do is achievable. Get in the habit now of putting the correct information into MILIS so we can get a running start in SAP. Not only that, if you see incorrect data, raise the issue and have it fixed. It's an investment in your future and will make a big different in how the Corps functions in the future.

What else is important to know?

HR - The functionality of the planning tool is limited to the HR functionality being delivered in tranche 1. We are looking to build the fundamentals such as leave and courses into the work centre timetable automatically. Qualifications and tech authority will be included on a tradesman's profile. These basics will be further developed in later tranches as HR is fully integrated down the track.

Parts holdings - Having a maintenance task with times and parts already included requires a lot of work to set up. Newer platforms coming into the system may already have this in the data pack, but otherwise it will depend on the "bang for buck" in converting legacy tech data. There will be a lag before supply chains become more efficient as it will take time for the system to learn from usage data. So while there will be an initial period where you may not see a benefit, every transaction you make is being absorbed by the system and will be used to give you better support. So trying to 'cheat the system' by finding that 10 second shortcut will only hurt us all in the long run.

Call in/call out - Finally, the best maintenance plan will come undone if the equipment isn't being delivered to the workshop on time. The equipment is called in, then again and sometimes a third time. This process is drawn out and hard to plan around. What's important to understand is that the ERP is not only a tool for loggies and maintainers. It is a decision support tool that will be used by commanders at all levels to manage their capability. COs and OCs will be able to see when their equipment is called in and how long it took them to get it to the workshop. The data will show if someone ignored a call-in until the Friday afternoon before an exercise. There will be no hiding. But be aware that it works both ways.

Disconnected Ops - The implications for disconnected ops for maintenance is a real consideration for tranche 1. Currently this is accomplished with third party applications, however, this is being addressed in the Defence and Security (D&S) application of SAP which will form part of the 2022 software release. In order to meet the requirement to support disconnected operations the program is working with SAP Australia in order to develop a solution by the time we go live with the first tranche. Until the details are fully known any further information would be speculation. Needless to say, what has been proposed appears promising.

When am I getting ERP?

The roll out of ERP is still a few years away and we are only just beginning to establish how it will look. The potential to streamline our operations is huge, but don't think that an ERP will do your job for you. The requirement to input data still remains, albeit in a decreased way. AHQ is looking into how we can exploit the ERP to improve the way we do business. Some of these initiatives (such as Wi-Fi tablets to begin evolving work practices) will be hitting the units well before ERP arrives.

An important aspect of the program that you need to remember is that ERP is being built for all of Defence and not just Army, however, the Maintenance and Engineering team has been working hard to ensure that Army's and the Corps' interests are at heart.

More information will be coming in the near future. If you have any questions or ideas that you think we should consider, please get in touch with the team – this is your solution and we'd love to hear from you.

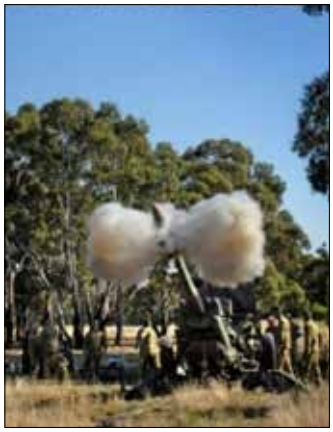
Land Explosive Ordnance Systems Program Office Explosive Materiel Branch (EMB)

Major Brenden Matthews and Major Roger Brinkworth

The Australian Army is changing as is the ADF. Whether it is changing to accommodate new technology or whether it is changing to combat new adversaries, RAEME has and will always play a vital role. These changes herald significant technology improvements when it comes to Explosive Ordnance (EO) to increase the lethality of our force. Right NOW, RAEME is training up people in the EO domain to assist the war fighter. WHY IS THIS IMPORTANT? There is not enough RAEME personnel to fill the designated positions within the EO domain. There is an opportunity (an opportunity RIGHT NOW) for RAEME people to gain training, experience and promotion through this lucrative specialisation. So with this increasing sophistication of our weapon systems (including Guided Missiles), the call for technical RAEME personnel is essential - this article will highlight that RAEME has real relevance in this EO domain and there are opportunities for those interested in getting amongst Army's emerging lethality capabilities.

General Overview

No doubt you've heard of the range of new equipment coming into service, these new platforms and systems herald a new era for Army's EO. In fact, 80% of Army's EO will be replaced in the next 5-10 years with more complex, lethal and effective solutions. As a result, Explosive Materiel Branch (EMB) has evolved its internal structure to best support Army's capability needs.



Land Explosive Ordnance Systems Program Office (LEOSPO) within EMB, oversees the Introduction into Service and Fleet Management of Army's increasingly complex and lethal capabilities. With an integrated workforce of ADF and APS staff, LEOSPO is focusing on introducing replacements and upgrades to our ordnance that provides Army higher performance through improving safety and lethality effects.

The SPO operates in four Integrated Project Teams (IPT): Combat Support, Soldier Combat Systems, Armoured Fighting Vehicles and Aviation (outlined below).

Combat Support (CS) IPT

CS IPT focuses on the acquisition and sustainment of Indirect fires munitions. CS IPT supports the effort to enhance the Army's Indirect Fire System (IFS) including precision/near precision guided munitions. The IFS will apply lethal and non-lethal effects from mortars, howitzers, ships and aircraft. CS IPT will procure and deliver the next generation of 155mm ammunition for the M777A2 Lightweight Towed Howitzer (LTH)

Land 17-1C2 sees the introduction of the 155mm ASSEGAI family of ammunition providing: increased range, including an extended range capability; reduced vulnerability by achieving a high degree of explosive fill insensitivity; and enhanced lethal and non-lethal effects in terms of effectiveness, IR illumination and multi-spectral screening capabilities.

CS IPT is working with Land 19 - 7B to replace the Bolide missile, a relatively simple missile system launched from the RBS 70. The team are looking to a more sophisticated strike capability utilising AMRAAMs , currently in service with the Air Force IOT achieve an enhanced Ground-Based Force Protection system. The system is based on the National Advanced Surface to Air Missile System (NASAMS) with the AMRAAM AIM-120 missile and the locally developed and manufactured CEA radars.

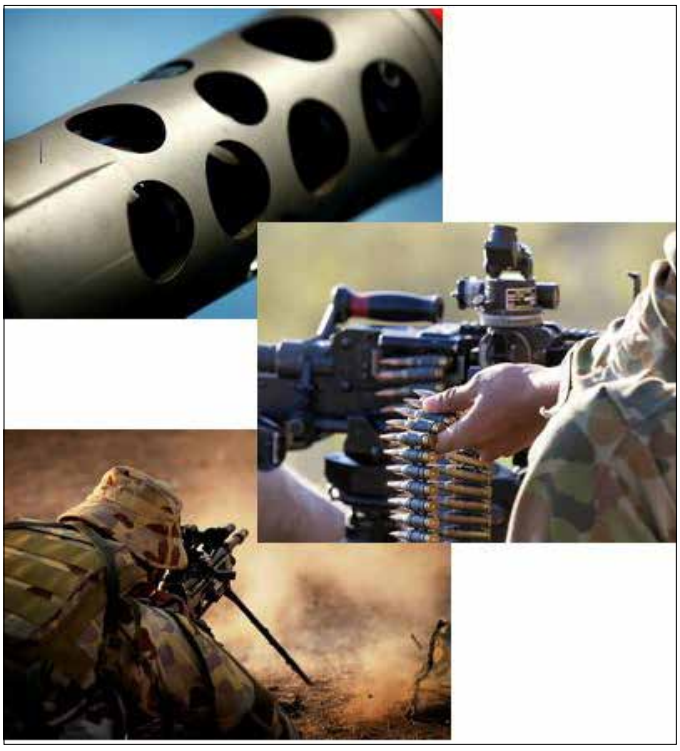
Land 19 - 7B will deliver the Army-operated component of the Joint Integrated Air and Missile Defence (IAMD) capability. The project scope includes acquisition of new capability elements including radars, missile launchers and Command & Control systems, as well as integration with existing Army vehicles and radios. This is a real step change in technology and capability with the Initial Operating Capability is scheduled for delivery in FY2022/23

Soldier Combat Systems (SCS) IPT

SCS IPT focuses on acquisition and sustainment of Small Arms munitions as well as pyrotechnic and explosive munitions. SCS IPT supports the lethality program beyond weapon replacement by focusing on the explosive ordnance aspects that will deliver a capability edge for the ADF

SCS IPT is working with Land 1508 Greyfin and LAND 159/4108 to introduce a raft of new small arm natures to replace the in-service range including a new grenade with a suite of multi-purpose area effects

Improved lethality effects will be introduced with upgrades to platforms and ammunition of the light (Minimi), medium (MAG58) and heavy (.50Cal) Machine guns



The team are looking to introduce an upgrade for the 84mm Medium Fire Support weapon (Carl Gustaf) as well as replacement for the Javelin.

Aviation (AVN) IPT

AVN IPT Land 4503-1, will see the EO capability of the replacement ARH upgraded to meet lethality demands to support the Joint Force.

Land 4503-1 will acquire a mature, proven, off-the-shelf, manned armed helicopter to replace Tiger to deliver Armed Reconnaissance effects in the close and deep contested battlespace. Currently the EO components on the tiger include the Hellfire II, which provides heavy anti-armour capability, plus 70mm rockets and 30mm cannon.

Land 2097 Ph4 will deliver an enhanced Special Operations Aviation (SOA) capability, which will work together with the MRH90 Taipan. The EO capability of the replacement SOA is yet to be determined; however, it will enable Special Operations to provide a rapid response to the full spectrum of SO tasks.

Armoured Fighting Vehicles (AFV) IPT

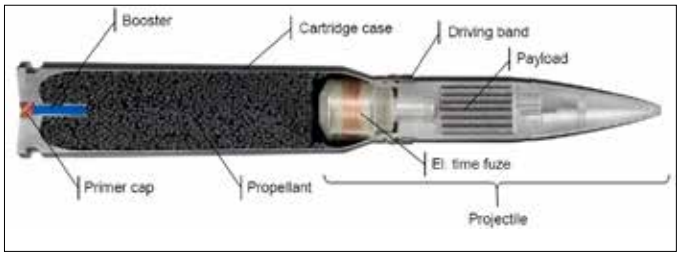
AFV IPT focusses on the acquisition and sustainment of main armament natures as well as pyrotechnic and explosive munitions. The IPT support the Armoured Capability Systems by focusing on the EO aspects of the armoured fleet.

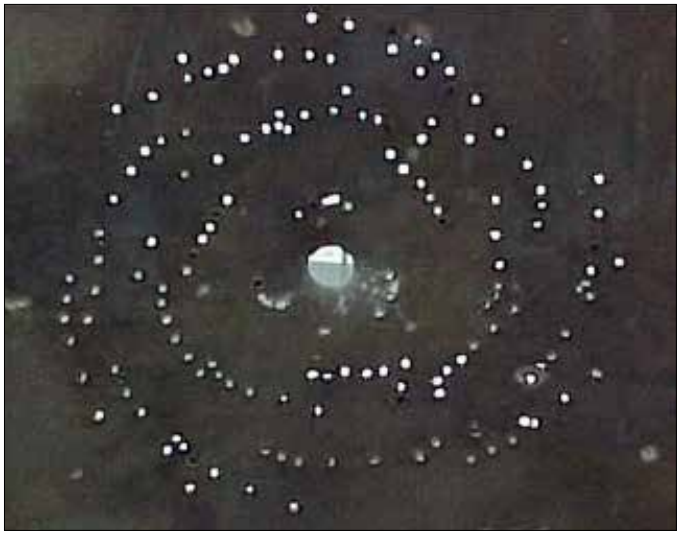
Land 400 - 2 brings a range of 30mm munitions including the new 30mm Kinetic Energy Time Fused (KETF) round, which has a complex air burst ignition fuze. A step change in the application of lethal effects when compared to the equivalent 25mm ASLAV round with a simple mechanical fuze

This is a programmable fuzed round designed to release a payload of 162 cylindrical tungsten projectiles at a programmed position to impact into a target. A fire control computer allows the calculation of detonation at the optimum position, resulting in an airburst effect that is capable of damaging both air and ground targets.

Additionally, the round can also be fired un-programmed, resulting in the ejection charge detonating on impact and the tungsten projectile penetrating into the target. This round will self-destruct after 8.2 seconds, approximately 4km from its point of origin.

It is intended to be used against threats that are particularly susceptible to fragmentation such as Infantry Fighting Vehicles, Anti-Tank Guided Missile bunkers, dismounted troops and helicopters.





Land 400 - 2 will also introduce a new Anti-Tank Guided Missile (ATGM). The Spike LR-II is a long range missile which can Lock On After Launch (LOAL) allowing the operator to obtain a target if it is not in the line of sight and even switch targets in flight or to compensate for moving targets..

This weapon has not previously been used by the Australian Defence Force (ADF) thus constituting a new inventory item into service. It will be launched from a Missile Launching Pod (MLP) integrated into the vehicle's turret.

The missile uses a tandem-charge high explosive warhead, consisting of two shaped charges. The first warhead (precursor warhead) seeks to detonate any explosive reactive armour present on an armoured vehicle, whilst the main warhead is used to penetrate the underlying armour. The launch motor is a solid-propellant rocket, using a piezoelectric trigger as the detonation mechanism.

Survivability will be improved through the Iron fist Active Protection System (APS). Mounting this to the new armour fleet provides a dynamic response to anti-armour threats.

Land 400 - 3 will acquire a Mounted Close Combat Capability, comprising of up to 450 Infantry Fighting Vehicles to replace the ageing M113 Armoured Personnel Carriers. EO acquisition is expected to occur in 2022.

AFV IPT is working with Land 907-2 and 8160-1 to introduce the new Mine Clearing Line Charge (MICLIC) breaching capability and improved 120mm munitions.

Career Pathway

The creation of LEOSPO represents a new pathway, previously only enjoyed by our Air force and Navy counterparts. The SPO has secured an O5 position as the CENGR which, along with the established O3 and O4 positions, allows Army officers to develop within this pathway with further opportunities at the O6 and 07 level including Director LEOSPO, DG Explosive Materiel and DG Explosive Ordnance.

To support this pathway, EMB annually sponsors one position for BEng qualified O3/O4 to attend an Explosives Ordnance Engineering (EoE) Masters or alternately the Guided Weapons Masters serial at Shrivenham UK. These courses are a 12 month posting, aiming to provide officers with technical training in a wide range of EO topics including; energetic compositions, munitions design, target response, blast and fragmentation effects and guidance systems. Similarly, this pathway is also applied to those RAEME officers with the skills and knowledge gained from the CTMC. Opportunities exist to gain further training and experience with postings with the UK MOD at the Defence Ordnance Safety Group (DOSG). This then provides the requisite skills for a return posting to the Australian Directorate of

RAEME OFFICER CAREER PATHWAY - EXPLOSIVE ORDNANCE SPECIALIST

CAPT 1 2 3 4 5 6
MAJ 1 2 3 4 5 6
LTCOL 1 2 3 4 5 6
COL 1 2 3 4
BRIG 1 2 3 4

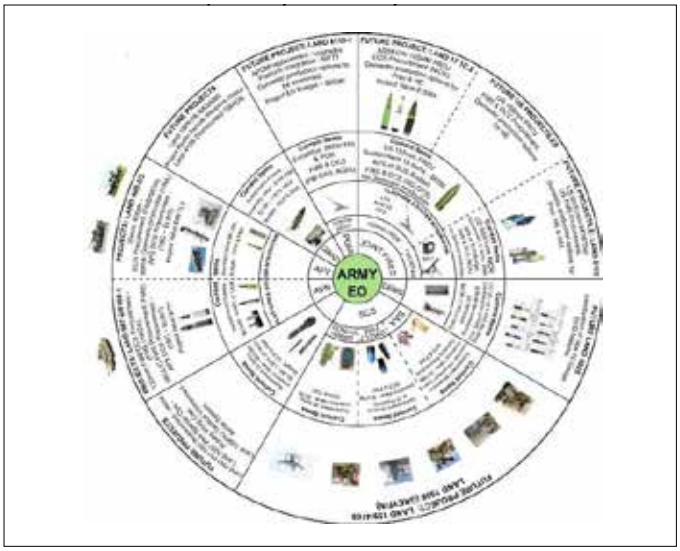
	CAPT	MAJ	LTCOL	COL	BRIG
Domestic Posting Options	LEOSPO (EO Engineer)	• CTMC • LEOSPO ACQ (Project Engineering Manager) • LEOSPO SUS (Project Engineering Manager)	• LEOSPO ACQ (Chief ENGR) • LEOSPO (AFV IPT)	• DOS • Director-LEOSPO	• DG EM • DG EO
International Posting Options	Shrivenham UK - Masters (EoE, Guided Weapons)		DOSG (follow-on posting to DOS)		

Ordinance Safety (DOS).

For SNCOs with a passion for weapon system maintenance and control as well as explosives, pyrotechnics and propellants, some great opportunities exist here in the branch and we need that RAEME know-how and technical knowledge to help us bring these capabilities to Army.

RAEME has an essential role in the introduction and sustainment of new capability. To achieve effective EO lethality effects, an understanding of technology, platforms and networks is required - EMB is working to integrate these to provide an effective EO capability for Army:

More information on careers in Explosive Ordnance can be fielded by relevant Career Advisors or contacting the LEOSPO team through the EMB Website: http://drnet/DMO/emb/Pages/EMB-Home.aspx



RAEME Officer Basic Course – Ground (ROBC-G)

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. In 2018, the first iteration of ROBC-G was developed and facilitated through a collaborative effort between ASEME and Employment Category & Training Design Group (ECTD).

ROBC-G with CO and instructors

This year has seen an adjustment to the course content of ROBC-G and a second trial course run through a combined effort of staff at ASEME, Army School of Logistic Operations (ASLO) and ECTD. The course has undergone a significant change since its first iteration. The course has been reduced from six weeks to four based on the learning review from the pilot course. The course is now focused around providing Lieutenants with a foundation of risk communication in a materiel management context so that they are better prepared for their initial command appointments.

Course Overview

The initial two weeks of the four week course where attended by twenty members moving into both the Ground and Aviation streams. The course began with a series of presentation from visiting lectures from DLOG-A, Reliability Engineering Cell and a tour of CASG in Melbourne. These presentations gave the course an introduction to the entire maintenance process and the equipment life cycle. Once the students had grasped an understanding of Army's holistic operation to materiel management they moved to ASEME to conduct ECN familiarisation training, facilitated by the various Wings of ASEME.

ROBC-G with ASMs

The final two weeks of the course saw the Aviation personnel return to their units and the Ground component start in full swing. These two weeks introduced students to providing technical planning advice to CO/OC, the conduct of Technical Risk Assessment, Battle Damage Assessment Report briefs to Commanders and the application of maintenance support planning in various environments.

Course Feedback

"The ROBC-G has provided myself with an understanding of the RAEME workshop and the critical capability we provide for commanders at all levels. The scope of content provided during the course has been invaluable, with exposure to the training and development of our highly skilled craftsmen, to the acquisition and sustainment of land material. This course has provided opportunities to develop my command and management abilities and to develop a Technical support network which will be invaluable moving into the future" - LT Sam Hasler

Overall, the thirteen course graduates, a mix of newly graduated General Service Officers (Engineers and non-Engineers) and Direct Entry Specialist Service Officers, agreed that they were better prepared for the future roles as Workshop Commanders. Whilst the course still requires some refinement in regards to its learning objectives and assessments, the course is meeting the intent of better equipping RAEME's Junior Officers with the skills required to fulfil command appointments in a ground workshop.

ROBC-G getting out and about in ASEME

Doug Borlace remembered

The RAEME Association of South Australia recently conducted a dedication ceremony in memory of Craftsman Douglas Borlace who was killed in action in July 1968.

CFN Borlace was killed when the M113 APC on which he was traveling drove over a land mine in the Phouc Tuy Province, South Vietnam on 15 July 1968. CFN Borlace became the first RAEME soldier to be KIA in Vietnam. At the time of his death he was posted to A Squadron 3 Cavalry regiment Light Aid Detachment (LAD).

Having joined in 1962, CFN Borlace originally spent three years with Royal Australian Armoured Corp as a driver/signaller until he transferred to RAEME and trained as a Vehicle Mechanic as part of the adult tradesman program.

He landed in Vietnam in June of 1968 as a new member of 3 Cav LAD and celebrated his 24th Birthday on 10 July. He was killed 5 days later having arrived in Vietnam only 26 days earlier.

Following the funeral service in his home town of Bridgewater South Australia, he was buried in the Stirling Cemetery. The gravesite originally made no mention of Doug having been killed in action. In 2003 the AEME/RAEME Association of South Australia, with permission of the family, arranged for a supplementary plaque to be installed to ensure Doug's' sacrifice is recognised.

This recent addition to the gravesite is an interpretive sign that provides more detail not only on his service and circumstances of his death but also on his personal life.

RAEME Association of SA President, MAJ Richard Moyses commented the original intent had been to have this sign installed in time for the 50th anniversary of his passing. While we missed that date by over 12 months the result is excellent and provides the next level of detail in the Doug Borlace story.

The RAEME Association of SA received funds via a state government grant for the project that involved the design and manufacture of the new sign.

Doug Parmenter and Bob Kiloran unveil the new sign

The sign was officially unveiled by Vietnam Veterans Bob Killoran and Doug Pammenter on Saturday 21 Sept. The modest crowd in attendance included members of Doug's family, school friends, Army colleagues and many association members.

Chaplain Mark Dickens provided the words of dedication and prayer during the ceremony which was supported by a catafalque party made up of students from Sacred Heart College dressed in battle

Bob Kiloran, Doug Parmenter and MAJ Richard Moyses at unveiled sign

dress uniforms from the 1960s.

MAJ Moyses said the short but important ceremony was the culmination of a lot of work that would not have been possible without the assistance and support of the Adelaide Hills Council, Veterans SA, family members and of course many members of the RAEME Association of SA.

Doug's service and sacrifice is also acknowledged with the Borlace Club located at Gallipoli Barracks, Enoggera, being named after him.

The unveiled Borlace sign

MAJ Richard Moyses President and MR Don Harvy Secretary with the RAEME Assoc of SA Flag

WO1 Heath Arblaster ASM 16 REGT & COL David Crocker COLCOMD SA at the unveiling

Army Drone Racing Team (ADRT)

MAJ Richard Moyses

Drone with Army team motors

Throughout our proud history, RAEME Spanners have a distinguished heritage of not only participating in but excelling in a variety of defence sports such as Tug of War, Rugby, Touch, also RAEME birthday specials such as Billy cart races, Earth ball soccer and the old Spanner Toss.

These sports all contain common elements of physical movement and critical strategic thinking that enhances the performance of our day to day jobs. For example Spanner's participating in Tug of War, would utilise these skills when assisting in the recovery of a bogged or sunken vehicle, whilst Billy cart races engage the majority of our trade skills, through the design, manufacture and maintenance of the carts, all in the pursuit of RAEME birthday glory and bragging rights.

Although the requirement to recover vehicles from a variety of states, or the need to develop, and enhance our trade skills has not changed, the continued modernisation of equipment, digitisation and networking of both Aviation and Land Material, has resulted in the everyday spanner getting more exposure to electronics and component replacement. This exposure means that traditional roles and trade skills need to have a wider understanding of not only electronics but also radio communications.

This is where I believe involvement in the latest sport to enter the defence sporting sphere, First Person View (FPV) drone racing, can assist in developing the skills and knowledge our present and future spanners and make FPV Drone racing the next RAEME dominated sport.

FPV Drone racing can be best described as the F1 or Mario Kart of the skies. The drones that the pilots fly can be of varying size and class, however, typically for racing these are 5 inch quadcopters (Quads). Pilots control the Quad via 2.4 MHz radio link and navigate around a predetermined course at up to 150km/hr, or perform freestyle tricks for points. To do this Pilots receive a direct video feed from a camera positioned on the front of their Quad giving the pilot the Mario Kart style viewpoint of the drone and course.

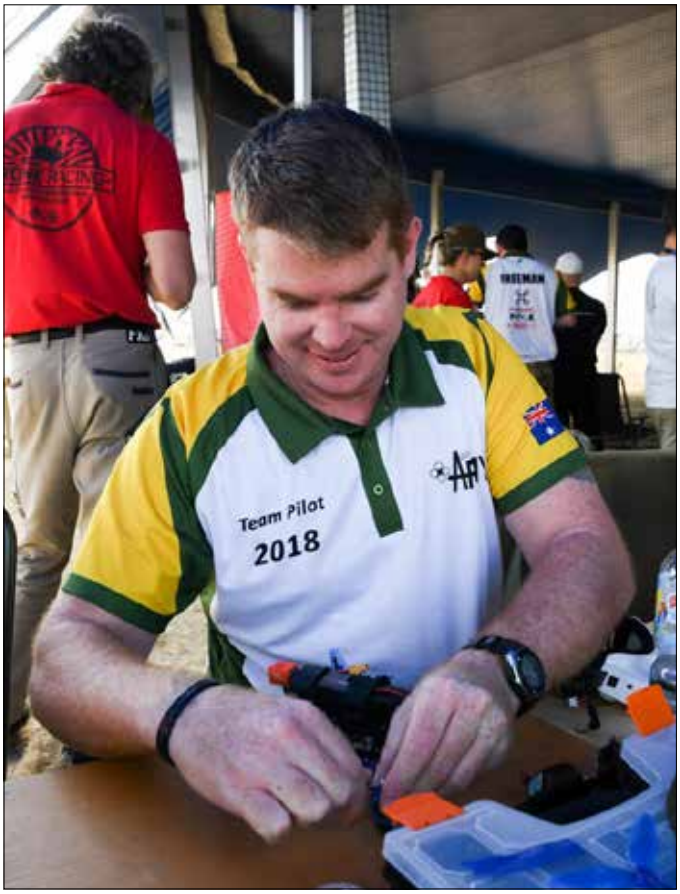
Although flying the Quads no matter the size is a great buzz, the typical sequence of events in FPV racing is Build, Fly, Crash, Repair, and Repeat. This is where the skills and knowledge of our RAEME brethren come to the fold, whether it's the fine tuning of racing quad setups or the need for troubleshooting various components when the inevitable fault or crash occurs.

The skills and knowledge that can be obtained from being involved within FPV drone racing are not purely limited to the mechanics of the frames and the electronics required for flight, it also provides a level of what we phrase as Drone Literacy. This means that the team members are well versed with regard to safe operation of Unmanned Aerial Systems (UAS) and the current extant regulations covering the FPV scene, as well as the Military UAS space, and are able to communicate and educate the community regarding them.

Other areas that members have also gained skills within are the 3D printing and design, and the organisation, conduct, commentary and broadcasting of races, as well as video editing and cinemagraphic use of drones. The 3D printing skills and knowledge are utilised to create replacement parts, decrease damage to components, personalisation of style and enhance performance with aerodynamic covers. The conduct and broadcast of the racing allows us to host and run races whilst also reaching the wider community through live streaming.

Given the variety of potentials skills and knowledge mentioned above I believe that FPV Drone Racing provides a wide range of options for skills and knowledge development within our Corps, which will continue to assist our Spanners in the modernisation of our equipment.

Currently the Army Drone Racing Team (ADRT) consists a total of 14 Pilots, of which 8 are RAEME. These team pilots represent the Australian Army on a national level but also amongst the international Defence communities competing against other nations Military Drone Racing Teams.



WO2 Christopher (MT) Payne tightening a propeller nut

RAEME ADRT competitors at Avalon

Avalon Competitors

The members of the team not only compete within local, national and international race events, but also continue to engage and encourage the pursuit of Science, Technology, Engineering and Mathematics (STEM) within the community.

Since its inception in 2017, the ADRT has attended a wide variety of events and functions ranging from STEM engagement and Industry activities, like Science Alive and World of Drones Congress, to

Avalon Racers

CAPT James (JENKO) Jenkins playing Quad tunnel ball at Science alive Brisbane

hosting the inaugural Military International Drone Racing Tournament and racing under the big top and a display on the active runway during the Avalon Airshow 2019.

This interaction and community engagement helps facilitate a larger pool of community members pursuing education and employment within industries and professions that are in line with our trades.

If you are interested in assisting the ADRT as an association member or keen on becoming a Team Pilot, contact the ADRT through Facebook, just search Australian Army Drone Racing Team.

RAEME flag under 5 inch

Who's shooting in the Army?

CFN Aaron Turner

In 2019 apparently a lot of ADF members are competing in Pistol shooting events across Australia. Who are they, where are they from, and what are they shooting? Are you interested in shooting or already pistol shooting and never heard of AASPA?

Who are they? Men and women for the ADF competing in these events are members of the Australian Army Sport Pistol Association (AASPA). AASPA is a team of pistol shooters made up of permanent, reserve, ex-serving and defence industry members dedicated to their sport. Established in 2006, the association has a long standing reputation and involvement with tournaments across multiple disciplines from Australian Police and Services Match (APSM) to International Shooting Sport Federation (ISSF) and more recently AASPA has a lot of members competing in International Practical Shooting Confederation (IPSC) which includes rifle and shotgun competitions. AASPA supports members to compete across all levels of competition including international, national and state levels.

AASPA has active members from all states and services. At the end of this financial year membership comprised (membership numbers include ARA, ARES and Ex- serving);

- Army – 170 members
- Air Force – 26 members
- Navy – 9 members
- APS – 6 members

This members list totals 211 members, nine of these members are RAEME. These numbers are reflected in the results across the state and national level IPSC matches conducted in 2019. In fact, AASPA had members competing in every state and national level IPSC competition across Australia this year.

IPSC has a number of different divisions that members have competed in over 2019. The difference between these divisions is the type of pistol that you aloud to use. a basic description for them is as follows;

- Classic division – 1911 style semi-auto pistol
- Production division – double action or striker fired semi auto pistol
- Open division – custom pistol with no restrictions
- Standard – single action semi auto pistol that has to fit in a box
- Production Optics – same as production but with a red dot.

For more information on the divisions please see IPSC website - https://www.ipsc.org.au/contacts/faq/handguns/

In January 2019, South Australia held their State Titles. AASPA had four members representing it in this event.

In February 2019, Victoria held their State Titles which also represents the second largest tournament of the year behind the IPSC Handgun Nationals. AASPA had 13 members representing it.

March 2019 the IPSC Nationals Championships were held at Blacktown Pistol Club NSW, this year had 352 competitors compete in the competition. AASPA had 16 members compete in this year's Nationals. The RAEME members that placed were:

Production

- 16th Aaron Turner – RAEME

Aaron Turner

Standard Division

- 13th Jon Cooper – EX RAEME

Additionally to the IPSC Nationals, AASPA held their own IPSC Nationals. This match was conducted after the main match, utilising three of the stages of the IPSC Nationals with some AASPA modifications. Members competed in two divisions, Open and Standard, with the top three competitors of each division receiving an AASPA challenge coin.

AASPA members before AASPA IPSC Nationals

NSW and WA both held their State titles in April, with the NT State Titles held close after in May 2019. AASPA had four members compete in NSW State Titles and one in the WA State Titles. Carl Reck - RAEME came 8th in the NT State Titles Production Division.

June 2019 saw both the IPSC Rifle and Shotgun Nationals held on separate days on the same weekend at the Practical Pistol League of Australia pistol club, Little River, Vic. AASPA had six members attend the Rifle competition and one compete in the Shotgun competition.

The latest State Competition was held in July, the QLD State Titles, at Raglan Pistol Club Central QLD. Aaron Turner - RAEME came 3rd in the Production Division.

Dimiri Vafias, Matthew Giarola & Aaron Turner

As well as IPSC, AASPA members compete at the APSM. APSM 2018 was held at the QLD Police Pistol Club in Belmont, QLD. The APSM is a match conducted over three days, the first day is a practice sight in day, the second and third are the match days. Your respective teams shoot together in a squad and take turns in doing range duties and shooting. The match itself is a version of service Pistol match and the teams are categorised by divisions. The divisions that AASPA teams shoot in are:

- Division 2 – Full time and Active Part time members of the ADF, one team per service per state
- Division 2A – Full time and Active part time members of the ADF, Ex full time members, including National servicemen, Ex part time members who have completed the obligation of service and are eligible to be awarded the Australian Defence Medal (ADM)
- Division 5 – Associate members of divisions 1, 2 or 3 Pistol Clubs.

ASPA members before APSM

2018 AASPA had 42 members compete in the APSM, their team results were:

Division 2

- 1st QLD Army – Sean Fraser, Qi Hang, Nigel Tegg, Paul Cannard
- 2nd VIC Army – George Plessey, Aaron Turner (RAEME), Alistair Cooke, Robert Bennet, Clint White (RAEME)
- 3rd ACT Army – Geoff Stacey, Mick Huber, Mick Smallman, Tim McNamara, Andrew Byrnes
- 4th VIC RAAF – Mike Krcevinac, Wayne Newman, Astrid Krcevinac, Rowan McBride, Nicole McBride

Aaron Turner in sitting position at 50m

This year APSM is going to be held in Canberra over 9 – 10 November weekend. This year could see the biggest AASPA attendance to the APSM for a number of years, with numbers in the high 40's to mid 50's. In saying this about the APSM, it is projected that the 2020 IPSC Nationals could have as high as 25 – 30 members attend the Townsville Pistol Club run IPSC event. These higher numbers in participation levels across the shooting disciplines is a tribute to our current members' efforts in recruiting new members. We are still looking for new members to join our association, hopefully this article helps spread the word about shooting as a sport in the ADF and one day shooting can be an ADF approved sport for everyone to enjoy. If you have an interest in pistol shooting and want to know more, please contact AASPA at australianarmy.sportspistolassociation@defence.gov.au or visit the website at www.aaspa.online .

John Webb

See you at the Range! Arte et Marte.

RAEME Comfort Care Packs and Operation Spanner Pack

Major R.G. Norman OAM (Retd)

JTF633 Spanner Pack

In early 2007, the RAEME Association New South Wales (RANSW) commenced a comfort care pack program for RAEME men and women on operations. Mr Fred Jolly and Mr Clyde Cook managed and coordinated this early program on behalf of then President and Committee of RANSW. During this period approx three hundred packs were dispatched to RAEME members on operations.

In November 2007, the President RANSW, Mr Brendan Robertson, wrote to other state and territory RAEME Associations requesting assistance with this program and RAEME Association Queensland (RAQ) agreed to take over the management and coordination of the program.

South Sudan Spanner Packs

"Operation Spanner Pack" was created by the RAQ and the program was managed and coordinated by RAQ until 2011, at which time, the RAEME National Association (RNA) now the RAEME National Network (RNN), was formed. The President of the RNA negotiated with RAQ to take over management of "Spanner Pack", as it became known, as well as the coordination function, to remain with RAQ. In 2016, RAQ once again for various reasons assumed the management and coordination function of "Spanner Pack".

Many former and serving members of the Corps have assisted in the packing and distribution of these packs over the years, and all those who have participated are delighted that our serving men and women get a significant lift in their morale, and a break of the daily routine, from the content of the packs, but also knowing their Corps members (old and new) care about them on operations.

To June 2019, 4576 (approx 9050 Kg) "Spanner Packs" have been dispatched to RAEME members on operations in Iraq, Afghanistan, Solomon's and Timor including embedded RAEME members. The program will continue while there is a single RAEME person serving overseas in operational areas.

We have been grateful for the support of many organisations who have funded the program over many years including the following:

- RAEME Corps Committee;

RAEME tradies wearing their new RAEME caps

- All RAEME Regional Associations;
- Individual RAEME members; and
- Several Defence Contractors

Spanner Packs have included item such as magazines, grocery items, RAEME memorabilia and merchandise, and solar charging panels to name a few. We are always looking for new and popular items to put in the pack and appreciate feedback on their contents.

Operation Spanner Pack has been a great success and a moral boosting program. Many letters of thanks from our RAEME men and women have been received over the years. Sample letters can be viewed below, including some photographs of appreciative members of the Corps. Donations to Spanner Pack can be made by visiting www.qld.raeme.org.au the "SHOP" page and the donation field.

Spanner Pack Packing Team

TASK GROUP AFGHANISTAN

RESOLUTE SUPPORT

Camp Qargha, Kabul, Afghanistan
Afghan National Army Sergeant Major Academy
Advisor Team -2
Australian Army

17 January 2019

Dear Raymond,

Thank you very much for your care package. It has arrived safely to us in Camp Qargha. Special thanks to the RAEME Association, for the items that you placed in the care package.

My name is Chris and I am the Logistics Advisor to the Sergeant Major Academy that is part of Marshal Fahim National Defence University.

We are located in Kabul, the capital city of Afghanistan. Our Camp is called Qargha and the Australian soldiers here work in conjunction with other nations such as the British, Danish, Americans, Germans and Turkish. Whilst the food is quite British (baked beans in every meal), we are lucky to have most of the luxuries that most Australians are privileged to have; internet, gym and good company.

Our mission here is to Train, Advise and Assist the Afghan National Army in training and developing its future generation of soldiers and leaders.

My kindest regards to the RAEME Association, your care package is greatly appreciated. I hope everyone is doing well back in Australia. All the goodies you sent are greatly appreciated.

I arrived in Afghanistan October 2018 and will be remaining until late 2019. Whilst it is tough spending this much time away from home, we are lucky to have good company and get along well with the other nations that we reside with. When we arrived here, the temperature wasn't too dissimilar from Townsville summer, where I am based. However by the time my tour has ended, we will be moving through the snow and wearing plenty of cold weather equipment. I visit the RAEME detachment here in camp every week and help them out with some brew gear when I can. It is great to see they are keeping the RAEME spirit alive and well all the way over here in Afghanistan.

Once again thank you very much for the care package, it means a lot. We are doing Australia proud and maintaining the reputation of the Aussie Digger.

My kindest regards,

Warrant Officer First Class, Christopher Renall
Logistics Advisor, ANASMA AT-2
Qargha, Afghanistan

Michael.Lane2 Sun, Dec 23, 2018, 9:42 PM

to me

UNCLASSIFIED

Dear Ray,

I write to thank you and the RAEME association for the very well received spanner packs.

As the OC Logistics Coy of Task Group Taji VIII (TGT VIII) in Iraq, a RAEME Officer and an ex-apprentice, I can say with absolute certainty that all of the RAEME Corps members who are part of TGT VIII were the envy of the remainder of the contingent (AUS and NZ) when the spanner packs arrived.

This display of Esprit de Corps and support for our deployed members not only provides envy to the other Corps but works wonders for the morale of the deployed RAEME Corps members and for this I thank you.

Please pass on our gratitude to both the QLD branch and the National branch of the association. The Spanner packs have certainly achieved their intended effect.

Kind Regards

Army Maintenance Effects Conference 2019 How Does Army Maintenance Training Reduce Specialist Courses?

MAJ Adon Cadona

FOREWORD

1. This paper proposes a holistic change to the maintenance training system that includes the adoption of systems based exportable courses to meet the requirements of Army within the raise, train, sustain environment. A number of options are proposed with a recommendation for the Corps to consider. It also includes a number of other recommendations for consideration during the 2020 Workforce Segment Review and for further development through PLAN CENTAUR. The paper first outlines some of the issues with specialist maintenance training in Army and then explains the research and analysis involved in the development of this position. The options for discussion at the Army Maintenance Effects Conference (AMEC) and subsequent recommendations commence on page 12.

INTRODUCTION

2. Maintaining the Land Force in the 21st Century requires a robust training system that meets the needs of the technicians within the Royal Australian Electrical and Mechanical Engineers (RAEME) throughout their careers. The current system incorporates initial trade training, career promotion courses and specialist courses designed to qualify technicians to be able to maintain specific equipment types. However, as Army aims to reduce specialist courses across all Corps and ECNs, RAEME must also review its training system to identify where improvements and efficiencies can be made.

3. The Chief of Army's Land Force Maintenance Directive released in January 2019 outlines the need for qualified, competent, current and deployable maintenance personnel. Revision of the maintenance training system falls within the ongoing requirement to provide Army with qualified, competent and current maintainers. Specialist courses play a role in qualifying technicians to be able to legally maintain and certify equipment for use under the Technical Regulatory Framework (TRF) and Workplace Health and Safety (WHS) regulations. These courses also provide an opportunity for technicians to gain the qualification in that equipment type, developing the competence and potentially, depending on when in their career a technician conducts a specialist course, their currency. However, the timing of specialist training in a technician's career is often less than optimal, being conducted after they are posted in to a unit that employs specialist equipment, around the unit's training program, the Army School of Electrical and Mechanical Engineers' (ASEME) training program, the Force Generation Cycle or personal requirements. This results in inefficiencies in the system at the expense of personal training and experience, both technical and all-Corps, unit production and at significant cost to Army.

4. Included in this review must be a consideration of what specialist maintenance training provides Army in its current form. If it is simply to provide the technical qualification for legal purposes, are their more efficient ways to assess and certify technical competence? Does each specialist course teach new skills, or are there common skills used across all types of equipment that will allow the consolidation of numerous specialist courses into one? Who has the authority to determine technical competence and what level of risk is Army willing to accept? These questions are necessary to generate a framework for specialist training moving forward and identify the most suitable training system to meet Army's needs.

Aim

5. This paper aims to review how the Corps conducts specialist maintenance courses by outlining the current training system and analysing alternate training concepts for consideration. Included in this paper is a consideration of the future needs of the Corps and its soldiers and the direction of Army's current initiatives under PLAN CENTAUR. Finally this paper aims to provide consolidated recommendations that provide a way forward for the Corps.

Objectives

6. This paper has the following objectives:

   a. outline how specialist maintenance training is conducted presently, including the positive and negative issues this training creates across Army

   b. present options for the reduction of specialist courses or how greater efficiencies can be generated in the conduct of specialist training

   c. provide a recommended Corps position that will enhance the delivery of specialist training within RAEME and can value add to current and future improvement initiatives.

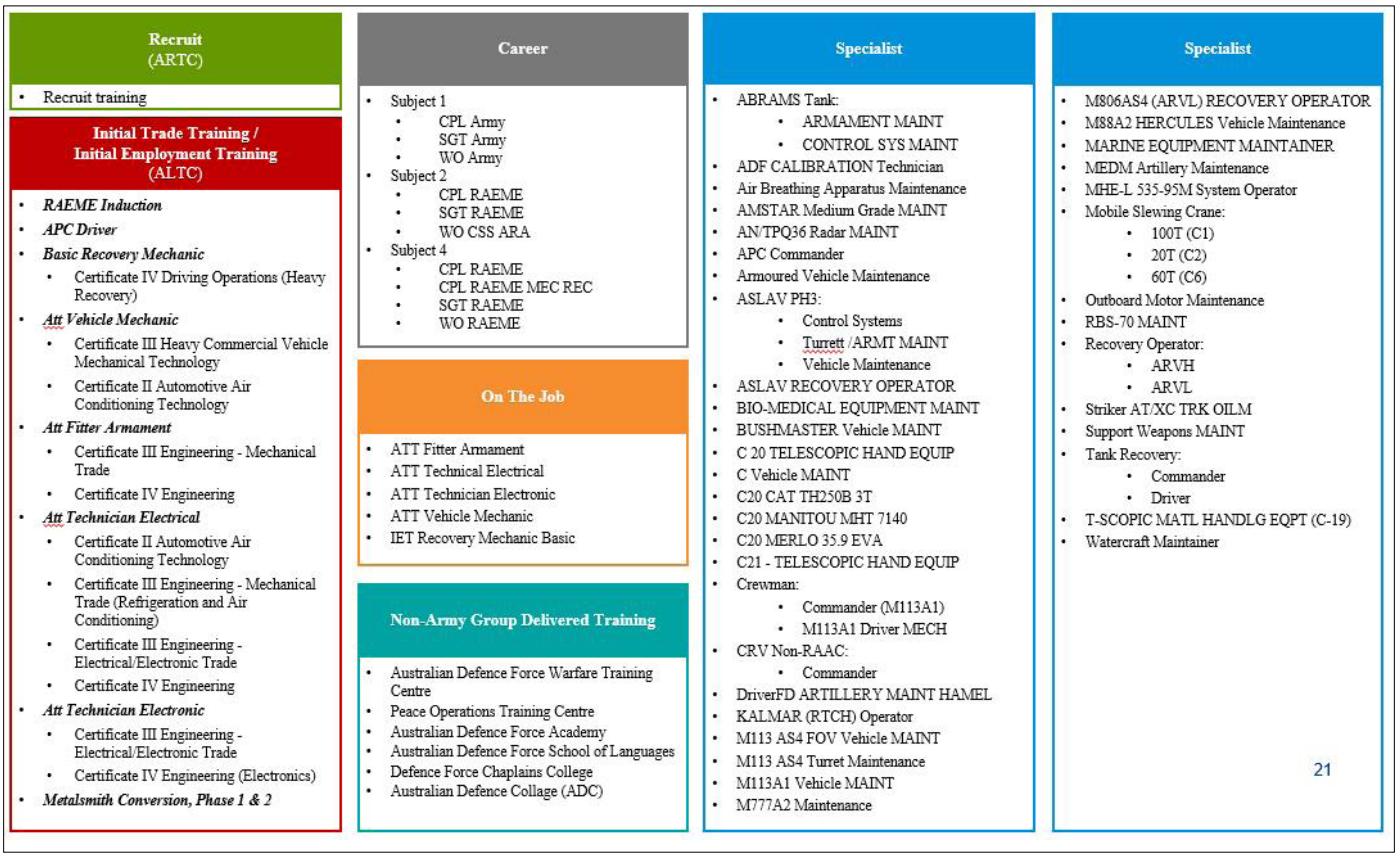
THE PROBLEM

7. As mentioned in the introduction, specialist courses serve a purpose for Army and the Corps. They provide the qualification that is the basis for technical authority for technicians to perform maintenance of specialist equipment. Each specialist course has been designed to provide the technician with the knowledge and a baseline level of competence. The qualifications gained from the courses provide assurance to Army and the Australian government that Army's maintenance, and subordinately operation of its equipment, is being conducted in accordance with WHS regulations. However, is this the most efficient system to meet Army's requirements? For example, ASEME, as the certified training establishment, is the only institution within Army that can provide these qualifications to technicians. Whilst this has the advantage of ensuring standardised training across Army, it may not be the most efficient means of qualifying personnel. Outlined below are a number of issues identified with specialist training in its current construct for consideration.

   a. Effect on the unit. Specialist courses are often conducted as 'in-time' training, meaning technicians may only conduct the training when they are posted in to a unit that requires someone with that qualification. In order to conduct specialist courses, prospective trainees are usually required to travel to ASEME for a specified period of time. Not only does this mean that the unit loses production for that

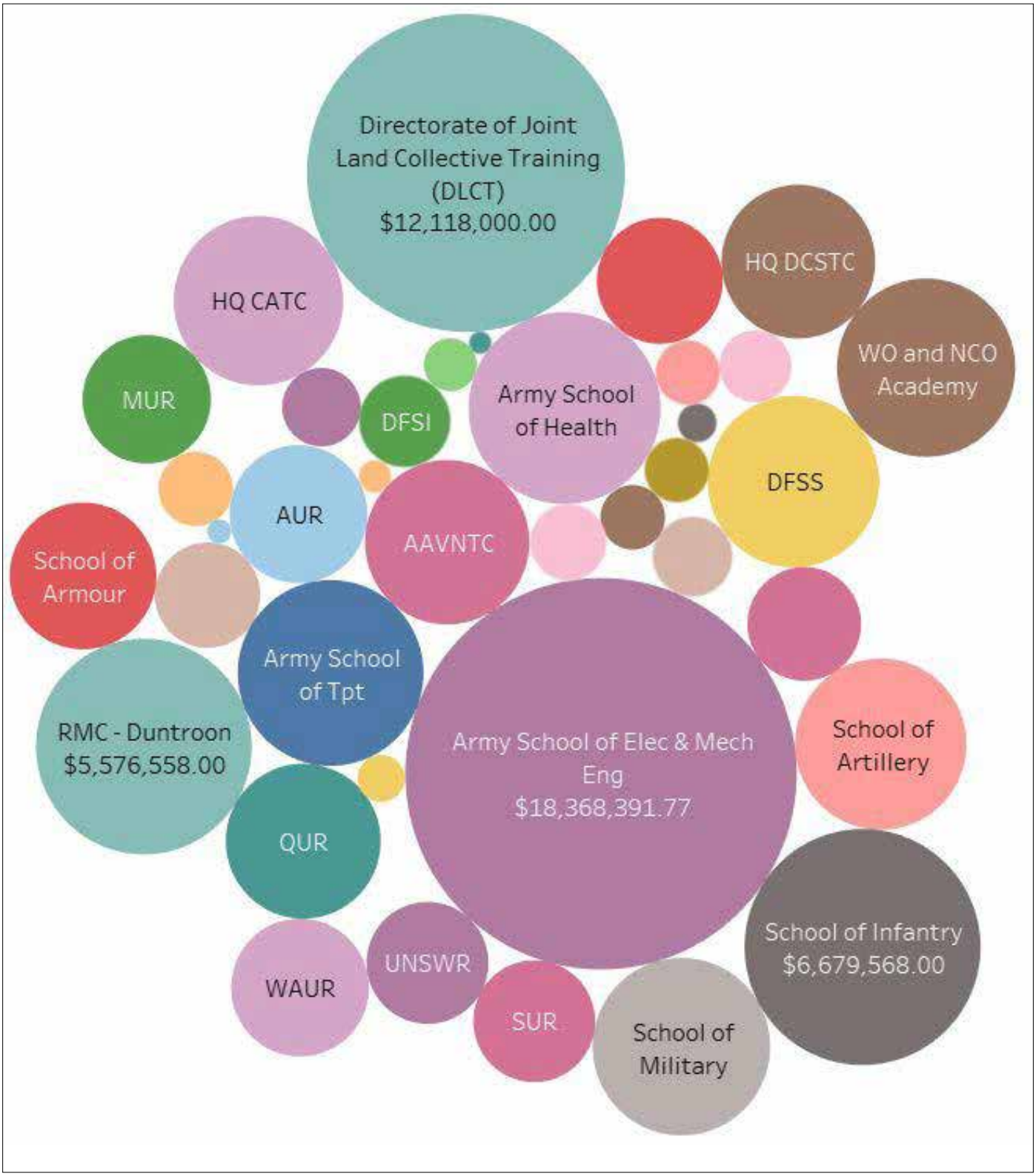
same amount of time, the unit must also wait until a course becomes available with enough positions for the member to be panelled. If the unit's or personal requirements do not align with the ASEME course program, technicians can potentially wait months or years into a posting before they can get the required qualifications. This places a significant burden on the unit to manage its personnel and qualifications. The burden is greatest on the CSSB under CSS CONOPS, where they are required to manage their own training deficiencies whilst also backfilling the deficiencies from the dependent units within the Brigade. The secondary effect of this, is that technicians may be asked to maintain specialist equipment under the supervision of a qualified person, resulting in them already being knowledgeable and experienced on the equipment by the time they conduct the course.

b. Number of specialist courses. Not including Land 121 courses, there are currently a significant number of specialist equipment maintenance courses across all trades and three specialist recovery courses conducted at ASEME (see Figure 1). The majority of these courses are for the maintenance of A Vehicles, placing the greater burden on the Armoured Combat Regiments and the CSSB. For example, there are three separate specialist courses M1A1 Abrams, ASLAV and M113AS4 for ECN146 and two for ECN421. ECN229 has amalgamated individual A Vehicle maintenance courses into one, however still have separate courses for Bushmaster. This training model does not take into account commonalities across equipment types. For example, why were the A Vehicle courses amalgamated on their 'A Vehicle' designation, rather than on the type of engine? Why do we not conduct a singular course for gas operated weapons? Whilst each type of equipment may be different in design, basic maintenance principles largely remain the same or similar. This suggests that specialist training is designed more to satisfy the qualification requirement than provide technical competence. Whilst individual equipment courses do provide contextualisation for the soldier on that type of equipment, is the completion of this training on a separate course the most efficient method?



(Figure 1: RAEME Trade Curriculum)

c. The cost of training. Reducing the number of specialist courses will provide Army with financial savings. Not only does this refer to the cost to run each specialist course (the cost of facilities, equipment, staff, etc.), Army already commits a substantial amount of funding to the incidental costs of training for specialist courses. Incidental expenditure includes the cost of travel, incidentals, accommodation and separation allowance, simply to conduct specialist training at ASEME. Meanwhile, the Army posting cycle means that new technicians are posted into specialist units each year, increasing the training burden on Army. For this reason, Army is committed to exploring alternate solutions to specialist training that can minimise the incidental costs of training. Figure 2 outlines the relative expenditure of training establishments for FY18/19.



(Figure 2: ACMS High Level Summary on Training Centres costs for FY18/19)

d. Future requirements. Consideration of whether the current specialist training design is appropriate for future maintenance requirements is essential. The current model to raise specialist courses based on equipment types may not be sustainable as more new and increasingly complex equipment is introduced into service. Examples for consideration include the introduction of L400 vehicles into service, the increase in and use of Original Equipment Manufacturers (OEM) or contracted maintenance, and whether the current trade structure meets future requirements. Any amendments made to specialist training must be adaptable to these considerations and able to endure through future periods of change.

RESEARCH CONDUCTED

8. The initial intention of the research into this topic was to be as open and broad in scope as possible in order to consider many differing positions and options as possible from the various centres of expertise. Engagement was sought from workshops in each of the three Combat Brigades; training development and training delivery organisations, Employment Category and Training Development (ECTD) Group, ASEME and the Army Aviation Training Centre, the UK Army and civilian maintenance organisations. Although PLAN CENTAUR were engaged early, they were not included in the original research in order to consider the other sourced information in an unbiased manner. This also allowed for a better comparison and incorporation of PLAN CENTAUR later, to enable the AMEC to develop a position that adds value to PLAN CENTAUR in the future. The following information is a summary of the research conducted, including the identification of points for further consideration and significant outcomes.

Unit and Brigade Level

9. In order to understand the effect of specialist training at the user end, consideration of how specialist training effects FORCOMD units within the raise, train, sustain environment was required. This includes an analysis of both the direct impact on the units to send personnel away to conduct specialist training and the benefit of that training for the technician at the unit level. As mentioned earlier, the effect of specialist training is felt the most at the unit level, both by increasing unit maintenance capability through the provision of trained technicians whilst also contributing to a reduction in unit capability at times. Engagement with senior maintenance staff at the Brigade and Unit level was essential to begin with to understand the effect of specialist training, both positive and negative, in its current format.

10. In order to achieve this a series of PME was conducted at each of the Combat Brigades through the Combat Service Support Battalions' (CSSB) Workshop Companies. A set of questions was sent to each Workshop Company to guide the discussion, however did not limit the discussion or subsequent points that were raised. The questions were directed at, but not limited to, senior technical maintenance personnel within the workshop. The focus was on the following:

    a. understanding how the conduct of maintenance that requires a specialist course is conducted in a workshop,

    b. the relevance of the various courses to the conduct of technical maintenance,

    c. the impact of sending people away on courses on unit capability, and

    d. the level of support for alternate training options, including distance or computer based training and distributed training.

11. The following points were the main outcomes from the Unit and Brigade level research:

    a. Current training system. All returns identified that the current courses and training continuum were suitable to meet the requirements of the TRF as it currently stands. The level of training was considered to be high with technicians able to apply their courses directly in the unit environment. However a number of inefficiencies were identified that are outlined in the following points.

    b. Time and approach. The returns identified that a common perception that technicians were spending too much time away from units to complete training. This led to a discussion on the relevance of specific courses and whether a systems based approach to specialist training was more appropriate than as individual equipment course. For example, both 1 and 3 CSSB identified that an M1A1 maintenance course is appropriate due to its unique engine type, however specialist training that covers M113AS4 (diesel engine) maintenance is not necessary based on prior training already provided to technicians.

    c. Panelling on central courses. Conversely to the previous point the returns also suggested there was difficulty getting enough personnel panelled onto specialist courses run centrally out of ASEME. For example, 3 CSSB outlined that they had only been successful in panelling 30% of their personnel in the previous 18 months prior to July 2019. When combined with the previous point, this suggests that units are having difficulty getting enough people trained at the right time, which therefore impacts unit capability.

    d. Decentralised training. Each Brigade was open to the potential for decentralised training. The primary reasons were due to a need or desire to train and qualify their technicians at a time appropriate to the unit or the Brigade within the FORGEN Cycle. Whilst the training provided at ASEME was considered appropriate and beneficial, the timing of specialist courses does not always coincide with the most appropriate time for the unit. However, most returns caveated that any form of decentralised or distributed training would require the appropriate training system, including suitable training facilities and equipment in each location.

    e. Linking specialist training to pay. The returns also raised the issue of linking specialist training to pay. The linking of pay and training provides an incentive for technicians to seek a specialist course in order to attain the higher pay increment (5) associated with the designation of trade 'specialist'. However this does not necessarily match Army's needs. The common theme was that specialist training should be conducted in accordance with the unit requirements at the time. For example, within a CSSB or ACR, a set number of people should be trained to maintain the various A vehicle platforms, whilst the remaining vehicle mechanics maintain the B vehicle fleet. Under the current system, this would create an inequality between those selected to do specialist courses and those that do no not. Similarly, if everyone cycles through the specialist course then this will limit the unit's capability by continually having personnel unavailable to undergo training.

    f. Specialist training over promotion courses. A similar theme was raised regarding motivating technicians to seek development to higher rank levels. 1 CSSB identified an issue in encouraging CFN to attend Sub 1 CPL courses or seek promotion to become a Junior NCO. Part of this may be due to the limited increase in remuneration between a fully qualified CFN that has completed a specialist course and the rank of LCPL.

CAREER PROFILE – TECHNICIAN ELECTRONIC SYSTEMS SPECIALIST (ECN 421-5)

SUB FUNCTION DESCRIPTION – TECHNICIAN ELECTRONIC SYSTEMS SPECIALIST (ECN 421-5)

Sub Function	SFN Desc	SFN Short Desc	Skill Grade	SKG Desc	SKG Short Desc
SF61591	Tech Electronic Systems Spec	TECELSPEC	S011855	Tech Elec Sys Spec	421-5
Start Rank	**Start Rank Description**	**End Rank**	**End Rank Description**	**Reg Sal Plan**	**RES Sal Plan**
E02	Private	E04	Lance Corporal	PAF	RAF
Force Type		Trained Force	**Skill Grade Proficiency**	P107127	
Employment Category Grouping		TECH ELEC SYS (ECN 421)	**Employment Category Sub-Grouping**	Ground Maintenance	

CATEGORY/PAY REQUIREMENTS – TECHNICIAN ELECTRONIC SYSTEMS SPECIALIST (ECN 421-5)

Employment Category Grade	Pay Grade	Employment Category Requirements					
		Serial	Course Title	Cse No.	Proficiency Title	Prof No	Additional
Technician Electronics Systems Specialist (ECN 421-5)	6	To be classified as a Specialist, an (ECN 421-4) needs to complete one of the following courses.					On successful completion of one of the courses listed in serial 5.1 to 5.6, CMA are to assign Skill Grade Proficiency P107127 to the member's profile and remunerate the member with Skill Grade S011855. Notes 1 & 2
		5.1	ABRAMS TANK CONTROL SYS MAINT	203053	ABRAMS TANK CONTROL SYS MAINT 203053	P104342	
		5.2	ASLAV PH3 CONTROL SYS	200541	ASLAV PH3 CONTROL SYS 200541	P101142	
		5.3	AMSTAR MEDIUM GRADE MAINT	202958	AMSTAR MEDIUM GRADE MAINT 202958	P104336	
		5.4	BIO-MEDICAL EQUIP MAINT	120135	BIO-MEDICAL EQUIP MAINT 120135	P101969	
		5.5	RBS-70 MAINT	120126	RBS-70 MAINT 120126	P100488	
		5.6	GIRAFFE AMB MAINTENANCE	213565	GIRAFFE AMB MAINTENANCE TRAINING	P115617	
		Fully qualified for category		**TECHNICIAN ELECTRONICS SYSTEMS SPECIALIST ECN 421-5**		**P107127**	

Note:
1. On completion of one or more of serials 5.1 to 5.6, POR raised by unit, CMA staff are to assign Skill Grade Proficiency P107127 and remunerate the member with Skill Grade S011855.
2. The following courses are now Inactive and are no longer delivered; however, they still satisfy the requirements for skill grade advancement if previously completed: 200092 AN/TPQ36 RADAR MAINT P100488 and 120134 ADF CALIBRATION TECHNICIAN P100342.

(Figure 3: Example of ECN421 Specialist Training Requirements and Link to Pay Grade)

Training Delivery Establishments

12. ASEME. The information received from the Unit level provided a picture of some of the issues generated by specialist training in its current construct. The next step of the research was to understand specialist training from the training delivery organisation's context. The aim of engagement with the training centres was to identify the requirements and constraints associated with maintenance training and outline any efficiencies to be gained from the training delivery perspective or ongoing efforts to improve the delivery of specialist training. Engagement with ASEME focused on the delivery of ground based specialist courses provided through Career and Advanced Training Wing (CATW) and Armament and Construction Wing (ACW).

13. The personnel engaged from ASEME reviewed the initial Topic 1 Discussion Paper and were subsequently sent a series of questions to consider, that focused but did not limit the following discussion. OC CATW and OC ACW provided responses following internal discussions with their own senior technical and training delivery staff.

14. The following points were the main outcomes from the engagement with ASEME:

    a. Flexible training. CATW acknowledged and reiterated some of the issues with the timing and duration of some of the specialist courses. They outlined that they have already commenced liaison with Brigade ASMs, FORCOMD and ALTC to explore flexible training options. This includes a number of concepts such as virtual learning, e-learning, distance learning and remote classrooms, with the objective being a reduction in the residential phase of a course.

    b. Systems based training. Similar to the responses provided at the Unit/Brigade level, the consideration of systems based training was again advocated. Rather than the completion of individual equipment courses, the more efficient option is to train to maintain a system that is similar across multiple platforms. This would only require a form of familiarisation on the individual equipment types, which can be conducted at the unit. This option reduces the number of specialist courses required, whilst also immediately making technicians more qualified and employable in a workshop. The example provided by ACW was to have a singly gas-operated weapon system proficiency as opposed to individual weapon systems. However this concept can be applied across each of the trades and specialist maintenance courses.

    c. Increased use of technology. This concept follows on from systems based training, in which it was proposed that the increased use of digital training aides can support a technician's familiarisation with specific equipment types. For example, if a CFN is trained on gas-operated weapon systems and they are required to maintain an unfamiliar weapon, they can review the unique aspects of that weapon digitally but the common maintenance principles remain the same or similar. ASEME is already using a form of this through the 'ASEME Toolbox' website, but this concept can be applied to interactive EMEIs and other digital options.

    d. Tracking currency. The returns identified the need to track currency, especially in the case of a systems based approach. Specialist training only provides the qualification, but a technician's currency on specific equipment or systems is poorly tracked within the ground trades. This can be linked to the log book concept outlined in the discussion paper or integrated into SAP following its rollout.

    e. Risks with decentralised training. ASEME also outlined the risks with decentralised training. This focused on the standardisation and moderation of training and assessments. If training is conducted in various locations, who is responsible for ensuring that the training is conducted to the appropriate standard? Currently ASEME for these aspects of training, but a complete training system review would need to be conducted to ensure the right mechanisms were in place to enable decentralised training to be completed.

    f. Risk acceptance. Any change to the training system would

require a review of the associated risks by DTR-A and the training and technical authorities of senior maintenance personnel across Army. A systems based approach to specialist courses would require acceptance that personnel may not have been specifically trained on the exact platform or variant, but understands has the requisite skills to be able to complete the task in a safe manner.

15. AAvnTC. As this topic is focused on the ground trades, engagement with the Army Aviation Training Centre (AAvnTC) was focused on the training conducted at the Rotary Wing Aircraft Maintenance School and trade development work already being conducted for the introduction of the 'Master Specialist' and 'Technical Warrant'. This enabled a comparison between the two streams and the applicability of similar concepts to the ground trades.

16. The following points were the main outcomes from the engagement with AAvnTC.

    a. Specialist, Master Specialist and Technical Warrant. Under AHQ direction the Aeroskills stream is implementing a new trade rank system that formalises a technical stream for specialist technical trades. Within the Aeroskills stream and in future across Army, the specialist rank will be seen as the SME in their field and renumerated appropriately as they develop their experience and skill level, not only in pay but also by other pay and conditions, including DHA housing bands and access to the Sergeants Mess once they reach the agreed level.

    b. Training. Personnel who elect to nominate for and are subsequently selected for this pathway will be required to undergo some industry based training with a liability of approximately 10-12 weeks training and 6 months OJT. This cross-trains the specialist between the ECN 411 and 412 trades to provide a more experienced specialist.

    c. Applicability to the ground trades. Under Plan Centaur and the Employment Category Modernisation Strategy, this framework may become applicable to the ground trades. Moving into the advance ground platforms and digitalisation of those platforms, Army is looking at how they are best supported from the maintenance and fleet management perspective. However, whilst this framework may be able to add incentives to retain ground technicians and motivate their continued development, it does not at this stage address the lack of JNCO depth within the current ground trades. Nor does it reduce the requirement for specialist courses within the ground trades.

Training Design and Development

17. EC&TD. The review of the training delivery establishments enhanced the consideration of alternate training options and the associated risks focussing on the delivery of training. The next step is to review the how training is designed and developed. This required engagement with Employment Category and Training Development (EC&TD) group to identify any points regarding the design of specialist courses. This included consideration of the policy or technical opportunities and constraints that impact training design and development.

18. The personnel engaged from EC&TD reviewed the initial Topic 1 Discussion Paper and were subsequently sent a series of questions to consider, that focused but did not limit the following discussion. SO2 RAEME ECM provided responses following internal discussions with his own senior technical staff.

19. The following points were the main outcomes from the engagement with EC&TD:

    a. Investment in maintenance capability. EC&TD's return highlight that specialist maintenance course are an investment in maintenance capability and should be viewed as such. The timing and planning of courses is an ongoing requirement and units hold a level of responsibility to effectively plan for their personnel and capability in advance of the requirement. However, it also acknowledged that there were efficiencies to be gained by incorporating alternate training methods in the design phase.

    b. Blended or flexible learning options. EC&TD highlighted that they are currently working on providing more exported or blended learning options. These include the conduct of theory components at home locations and increased use of computer based learning to minimise the residential components of courses.

    c. Distributed or exported training. EC&TD are supportive of making courses more exportable, thereby enabling them to be conducted in Brigade or unit locations. However they advised that there is a need for any exported training to be centrally managed through ASEME to ensure the standardisation of training and assessments. Again this would require an organisational review to determine where personnel could be moved from to manage training that is not conducted centrally. The response also noted the risks of exported or decentralised training, including where authority for final sign off sits and whether this requires a review of technical authorities.

    d. Competency log books. Competency log books was an idea raised in the discussion paper to support or complement specialist training. The proposal was that technician's working on new equipment could conduct training in units through instruction observation and individual assessment, which is tracked through a competency log book. This proposal supports the concept of systems based training, where a technician is already qualified on the system, but needs to learn the unique aspects of the new equipment. EC&TD were supportive of this concept, however primarily as a means to track currency on various equipment types. Under the current system, the risk is too high to accept training being conducted without standardised assessment.

    e. Engagement with EC&TD. EC&TD response noted that they occasionally have limited involvement in the discussion of training systems and design. In order to develop effective training to meet any changes to specialist training within the Corps, they should be engaged early to understand the intentions and direction of the changes to the training system.

Civilian Best Practice

20. Engagement with civilian industry was briefly sought to compare Army's approach to specialist training against civilian best practice. The common thought amongst Army is that we do not conduct training in the same manner as civilian industry. This point was raised once during the discussions regarding the effect of specialist training at the unit level. However EC&TD provided an example in which civilian company Komatsu was previously engaged to share their maintenance training requirements, which was subsequently compared to Army's:

    a. Komatsu initially trains their tradesmen to an initial standard. Subsequently, they are required to train on each individual platform they are expected to repair in their workshop. This is regionally dependant based on the type of equipment and work being conducted in the area. They are also required to complete various levels of training to qualify as the next level certified technician in order to progress their career, which

also comes with civilian accreditation. In these respects Komatsu's training continuum is very similar to Army's.

b. Where Army's training system differs from civilian best practice is the extra requirements of Army service. The Komatsu example outlines a career model in which a tradesman conducts his job, gains experience, qualifications and continues in his trade throughout his career. Maintenance in Army however, is subject to the extra requirements of military training both as a participant and as a Training Support Request, posting cycles that shift personnel around units, locations and capabilities and out of corps roles that diminish currency, etc. For example maintenance personnel within 1 CSSB this year have deployed on three field exercises between March and July 2019. This combined with in barracks all-corps training has meant that time to complete courses has been minimal. Alternately, when technicians are sent on specialist courses, the unit accepts risk in that individual's other service requirements. This is not to suggest either system is worse than the other, rather this simply explains that it is not a direct comparison.

REME (UK) Case Study

21. The Royal Electrical and Mechanical Engineers (REME) conducted a similar review of specialist training in 2018, with the aim of minimising the training liability and generating efficiency for the units. The outcome of this review saw the Corps move towards a system of 'Distributed Training', by which structured learning that had been developed by the training organisation is exported to units for delivery. This enables units to train their own personnel at the time the training is most required, thereby minimising the number of unqualified technicians in units and limiting time away whilst conducting training.

22. It is also worth noting that the UK 'Distributed Training' system is only used to qualify personnel. This system is complemented by a framework that monitors a technician's proficiency on the various equipment types. The level of knowledge and understanding that an individual accrues through working on equipment is recorded in a chart or log book, which provides the supporting evidence for an Engineering Officer to sign off the individual as being competent on that equipment.

23. Currently, there is no quantifiable data or information as to changes in the effectiveness or efficiencies from the roll out of the new training system across UK units. A review is planned for Q3/4 of 2020 to assess against the previous training system. However it provides an example of an alternate option that may be applicable in a whole or partial format to the Australian Army. The intent of the REME review was very similar to the Australian review and therefore provides an interesting case study to monitor into the future.

PLAN CENTAUR

24. Army identified the need to modernise its maintenance capability to meet future requirements earlier this decade. As a result, PLAN CENTAUR, the ongoing program aimed at optimising the Land Force maintenance capability was raised. PLAN CENTAUR consists of three lines of effort, which include a review of the maintenance training system and therefore specialist courses. The second line of effort, 'Modernising the Maintenance System', will heavily influence the maintenance training system and the relevance of specialist training moving forward, through the following concepts that are already in motion:

a. The provision of portable ICT devices to support maintenance activities. Portable ICT devices will be provided at the technician and section level to generate efficiencies during maintenance activities. Affording ready access to technical information may also create efficiencies in training, experience and currency that allow a rethink on where and how technical training can be conducted within the workshop.

b. An Employment Category Review (ECR) of RAEME trades looking at future trade requirements. The influx of new and emerging technologies and equipment into Army will challenge current maintenance requirements and by extension, the training system.

c. Maintenance task analysis to optimise equipment. This includes a review of the type of maintenance activities expected of technicians in the future. It also includes consideration of the maintenance system and the role of Army technicians versus contracted maintainers and OEM. This will influence the training requirements and standard of the RAEME technician.

25. PLAN CENTAUR developed an Agendum Paper that was presented to the Land Capability Steering Group in April 2019 and subsequently to the Chief of Army's Senior Advisory Committee in June 2019. Within this Agendum Paper, PLAN CENTAUR raised the issue of specialist training across the Corps with the proposal of three COAs for the development of specialist training to meet Army's future maintenance requirements. The COAs are outlined below:

a. COA 1 – The extant technical training model/s and skill levels with the adoption of distributed point-in-need learning to replace in-school-house replacing specialist courses. This COA would reduce the time an individual would spend in the school-house over their career.

b. COA 2 - The extant technical training model to produce a lower skill level at IET with distributed point-in-need learning and on-the-job experience facilitating growth of deep, broad maintainer / engineer over time. This COA would reduce IET time in addition to in-school-house training over an individual's career. This COA will transfer an additional training requirement to RTS organisations.

c. COA 3 - The extant technical training model supplemented by maintenance/construction/engineering management supervisors being sourced from industry. This COA would enable maintainers/ vertical trades/engineers to remain on the tools longer and assist to mitigate wastage from the perceived up, or out culture.

26. These COAs were developed in accordance with the evolution of civilian best practice, which currently sees the reduction in Initial Employment Training and an increase in "point-in-time and distributed learning". These COAs provide flexibility and generate efficiencies in the ability for units to train their personnel at the appropriate time, albeit differently. Furthermore, these proposed COAs are in line with the appetite for change and concepts proposed at each organisation level targeted for engagement during this study.

27. At present, no decision has been made as to a specific COA within PLAN CENTAUR for specialist training. There is further research to be conducted and the final COA may be comprised of a combination of all three previously proposed. This provides an opportunity for the Corps to review PLAN CENTAUR's proposal and propose a position to support the final direction taken.

28. Throughout the next 12 months, PLAN CENTAUR will participate in the Workforce Segment Review, which includes an Employment Category Working Groups to be held for RAEME trades. These Working Groups will lead the development and presentation of COAS at the 202 ECREM. Concurrently, PLAN

CENTAUR has also commenced a project that is reviewing Training Systems and Competency Management, which is currently assessing the technology capabilities of Army's training centres to propose further options for improvements to specialist training. This provides another opportunity for the Corps to provide a position that enhances PLAN CENTAUR's review.

FURTHER CONSIDERATION

29. Future equipment and technologies. Consideration of known future equipment is necessary to design training for the short to medium term. This can be achieved by reviewing the new capabilities, such as L121 and L400, and assessing the maintenance requirements for Army technicians. Similarly however, consideration must be given to new or emerging technologies and their maintenance requirements to ensure the training system is appropriate and enduring. This includes consideration of the role of diagnostic and data capturing tools and how they will influence how maintenance is conducted in the medium to long term future.

30. Future training options will be required to consider the emerging maintenance information system and the management of maintenance data. Technicians will be required to know how to navigate, identify and analyse electronic data in order to conduct maintenance. A developed training system must decide if this training is provided during Initial Employment Training for all personnel or simply conducted for specific specialist courses that encompass equipment that produce digital information.

31. Workforce Segment Review. As mentioned, Army is conducting a Workforce Segment Review of technical trades in 2020. This will involve a review of the Corps' current employment categories and training system to determine if they still meet Army's needs. This review will likely propose or determine the direction of the Corps for the next 10-20 years. It is essential that all organisations within the Corps have 'buy in' into this review, including units, Brigades, training establishments, EC&TD and PLAN CENTAUR in order to determine the best outcome moving forward. Through mediums including this AMEC, the Corps has the ability to provide a consolidated position or proposal for the Review to consider.

32. Training establishment accreditation. ASEME is the only organisation in Army that is accredited to provide the recognised Defence qualifications to allow technicians to conduct maintenance on equipment. Changes to the training continuum must include consideration of who is authorised to conduct training and how that is managed. This must also include consideration of how an appropriate level of standardisation can be achieved if training has been exported to raise, train, sustain units.

OPTIONS

33. This paper has outlined the requirement to reduce the number of specialist maintenance courses. The requirement to technically assess and certify maintenance personnel on specialist equipment, however, has not been removed. Outlined below are a number of options for consideration:

    a. Option 1 – Flexible/blended learning. This option sees specialist training remain as it currently is with platform based specialist maintenance courses being conducted. However courses are to be reviewed for the incorporation of blended or e-based learning options that allow theory training to be conducted in barracks and minimise the time of the residential phase. This increases production in the unit as the technician is away for a smaller period of time, whilst still training the member to the appropriate standard. This COA has the advantage that all training and assessments are managed centrally through ASEME and does not require a review of the risk tolerance or technical authorities to certify training. Concurrently students are at risk of over tasking by units and therefore limiting their time available to conduct the theory based parts of their course.

    b. Option 2 – Systems based training. This option sees the review of the current training requirements and the amalgamation of specific courses into a systems based approach, e.g. engine type, weapon operating system, control systems, etc. Not all courses will be able to comply with the systems based approach and will require a separate platform course, for example the Abrams Tank Vehicle Maintenance Course, however where commonalities apply this approach is taken. This is complemented by a platform specific familiarisation package that can be conducted in barracks, physically or computer-based, and tracked through a competency log book. This option has the advantage of minimising the number of courses required to qualify a technician across multiple platforms, thereby increasing the capability of the unit and minimising loss of production. It is also flexible and can be manipulated to include the introduction into service of new equipment fleets. However, this option will require a review of technical authority and risk acceptance by DTR-A in order to allow unit staff discretion to provide technical authority to personnel to maintain platforms they haven't been formally trained on.

    c. Option 3 – Distributed/exported training. This option sees the development of courses that are able to be exported to Bde or unit locations. This option is in line with PLAN CENTAUR's proposed 'point-in-time and distributed learning' COA. In this, more specialist courses are conducted in unit or Brigade locations at the time required by the unit/Brigade. However, not all courses will be able to be exported as ASEME has the facilities and technical expertise to run some of the more facility and resource burdened courses. This option is more appropriate to work around the Raise Train Sustain requirements of units and enables identifiable capability gaps to be readily managed. This presented option sees the courses being fully exported and run by qualified maintenance personnel from within units, however can be adapted to consider fly-away or regionally based teams from ASEME delivering the training. Under these conditions, a robust training standardisation and moderation system would be required to ensure training is conducted appropriately and able to suitably qualify personnel. It will also require a risk tolerance review and acceptance from DTR-A.

    d. Option 4 – Competency Log Books. This option proposes that specialist training could be conducted in unit through a competency log book system. The aim of this system is that training is conducted on real equipment, minimising the loss of production for specialist training. Specialist training is still conducted in a logical process. Technicians would first observe maintenance being conducted, then conduct maintenance under supervision, before being assessed. This proposal places more responsibility on the technical chain of command for technical maintenance and training. Certification of the competency or qualification being completed is provided by the unit ASM or, if ASEME must hold final certification, the regional TTMO. This system allows a number of options:

        1. Training can be provided to technicians posted into units with specialist equipment. The log book would be issued by the unit and the technician maintains the qualification thereafter.

        2. Alternatively, the competency log book is maintained

throughout the technician's career. It is also used to assess 'currency', meaning that any qualification is only held a specific period of time before they must be reassessed to reattain competence.

e. Option 5 – Holistic Training System Review. This option proposes a complete review of the maintenance training system along three lines of effort:

1. The development of a systems based approach to specialist training, complemented by a platform based familiarisations. Competency log books are used to track and monitor currency and require the technician to be reassessed on their currency for each platform at a set interval that coincides with the posting cycle.

2. Where possible courses are to be exportable to unit or Brigade locations. Fly away teams from ASEME are used to conduct short standardisation and moderation package for instructors, training aids and assessments prior to the commencement of courses, with courses conducted by qualified unit personnel. All assessments are then sent to ASEME for review and approval in order to authorise the qualification.

3. The inclusion of e-based learning, pre-course packages and MOODLE are to be developed where possible to minimise the duration of courses. Training aides such as the ASEME Toolbox, digital lessons or instructional videos are to be used to enhance training and professional development, pre, during and post courses.

4. This option provides the greatest efficiencies to the units and the technicians. However it will require a review of the training system and ability for units and brigades to take on the training burden with their RTS requirements. It remains in line with proposed PLAN CENTAUR COAs and is able to be developed to meet future requirements.

RECOMMENDATIONS

34. As a result of this topic study and discussion, the following recommendations are made:

a. Corps position. The Corps provide a consolidated position regarding its preferred approach to specialist training to PLAN CENTAUR, in support of its review of specialist training, and the Workforce Segment Review in 2020.

b. Option. The recommended option is for the Corps is the Option 5 – Combined Approach, which provides the greatest efficiencies to the trainees, units and Army.

c. Technical currency. Regardless of the chosen option, the Corps implement a consistent means of tracking and managing technical currency for technician across all platforms. This can be through the employment of a competency log book, the introduction of SAP or another tool, with the mechanisms and requirements consolidated in the TRF. Although various land and air trades employ differing means to maintain currency, this recommendation would make the requirement commensurate across the Corps.

d. Risk. For any changes to the current specialist training system, a review of the risk tolerance parameters and thresholds is required to be conducted by Army. Each COA presented requires the acceptance of different forms of risk and may require an amendment to technical authorities. It is important to note that none of the options are advocating a change to the qualification standard, simply who is responsible for authorisation and where the risk is held.

e. Link between pay and specialist courses. The current link between pay and specialist courses does not seemingly meet the requirements of Army. It advocates for specialist training to be considered as a personal incentive rather than in accordance with Army's needs. This means that technicians are completing courses they may not require, simply to attain the qualification and pay, which has an associated financial cost to Army. It is recommended that the Workforce Segment Review and PLAN CENTAUR led ECR review the requirement for pay to be linked to specialist courses with the objective of removing the requirement. This may lead to the advent of a 'Specialist' trade/rank for ground maintainers in the future pending the outcomes of the Aeroskills trial.

CONCLUSION

35. The position presented represents one option to achieve Army's intent of reducing specialist courses. The main advantages to be gained result in improved efficiency for both individual technical training and production within unit workshops. Simultaneously, Army can benefit from a reduction in specialist courses by reducing the burden on units and limiting the financial expenditure required to run specialist maintenance courses. The positions and recommendations generated from this paper are important to the future of the Corps and the Army maintenance training continuum. Not only will it influence the future of RAEME's specialist training, it will provide the basis for a review of training and trade requirements during the Workforce Segment Review to be conducted in the next couple of years.

References:

A. Administrative Instruction – Army Maintenance Effects Conference 2019

B. CA Directive 01/19: Land Force Maintenance dated 17 Jan 2019

C. Technical Regulation of ADF Materiel Manual – Land

D. Land Materiel Safety Manual (Draft)

E. Royal Electrical and Mechanical Engineers Corps Instruction No E9 – The Management of Distributed Training

F. UK Army Publication – Land Equipment Engineering Standards

G. PLAN CENTAUR Phase 3 Implementation

H. Land Capability Steering Group Agendum Paper – Land Maintenance Workforce 2030 – Flag A dates 05 Apr 19

I. Land Capability Steering Group Agendum Paper – Land Maintenance Workforce 2030 – Flag B dates 05 Apr 19

J. Professional Military Engagement with 1 CSSB and 1 Bde Technical Maintenance Staff

K. Email – Army Maintenance Effects Conference Discussion Paper PLAN CENTARU – AHQ – CAPT Peter Stanton dated 26 Jun 19

L. Email – AMEC Conference Paper – 3 CSSB – MAJ Daniel King dated 20 Aug 19

M. Email – AMEC Conference Paper – 7 CSSB – MAJ Angela Langdon dated 05 Sep 19

N. Email – AMEC 2019 Topic 1-CATW – ASEME – MAJ Abushankar Babu, dated 07 Aug 19

O. Telephone Conversation with MAJ Richard Keller dated 10 Aug 19

P. P. Email – AMEC 2019 Topic 1 – EC&TD – MAJ Gordon Watkin dated 27 Aug 19

Q. Email – Army Maintenance Effects Conference – AAvnTC - LTCOL Timothy Baker dated 04 Sep 19.

R. Komatsu Certified Technical Accreditation System

S. Komatsu Technical Trainer Product Champion Chart – 2016

T. Employment Specifications – Royal Australian Electrical and Mechanical Engineers – ECN146 Fitter Armament – Part 2 Employment Category Management Guidance, dated 29 Jul 19

U. Employment Specifications – Royal Australian Electrical and Mechanical Engineers – ECN226 Mechanic Recovery – Part 2 Employment Category Management Guidance, dated 08 Apr 19

V. Employment Specifications – Royal Australian Electrical and Mechanical Engineers – ECN229 Mechanic Vehicle– Part 2 Employment Category Management Guidance, dated 08 Jul 19

W. Employment Specifications – Royal Australian Electrical and Mechanical Engineers – ECN 235 Metalsmith – Part 2 Employment Category Management Guidance, not dated

X. Employment Specifications – Royal Australian Electrical and Mechanical Engineers – ECN418 Technical Electrical– Part 2 Employment Category Management Guidance, dated 04 Aug 19

Y. Employment Specifications – Royal Australian Electrical and Mechanical Engineers – ECN421 Technician Electronic Systems – Part 2 Employment Category Management Guidance, dated 17 Jun 19

Z. Employment Specifications – Royal Australian Electrical and Mechanical Engineers – ECN411 Technician Aircraft – Part 2 Employment Category Management Guidance, dated 13 Nov 18

AA. Employment Specifications – Royal Australian Electrical and Mechanical Engineers – ECN412 Technician Avionics – Part 2 Employment Category Management Guidance, dated 13 Nov 18

Army Maintenance Effects Conference 2019 – Topic Two - How Does Army Baseline the Doctrinal Roles, Responsibilities and Tasks for all Key Maintenance Positions and Ranks?

MAJ Angela Langdon

FOREWORD

1. This paper generates discussion for the revision of duty statements across ground maintenance streams in order to align practices with aviation methodologies. Proposed duty statements for all ground trades and ranks are provided as an enclosure. The way in which RAEME manage competencies is also addressed and provides a comparison of both streams for the purpose of identifying shortfalls and how the Corps can bridge the gap between the two. Through the conduct of this study, it has been identified reviews of employment specifications and trades are scheduled to occur in 2020, including the CSS Officer Employment Category Review and the Workforce Segment Review. Currently, ROBC-G has been endorsed to commence trail over the period 16 Sep – 18 Oct 19, and PLAN CENTAUR are conducting Competency and Currency Management to support Heavy Vehicle licencing; with lessons learnt still to be applied. The aforementioned trial and reviews may have an impact on the proposed duty statements and recommendations.

INTRODUCTION

2. The significant scope of maintenance tasks, responsibilities and job requirements necessary to meet the implementation of new Land Materiel is extensive and complex. To meet ever changing user and dependency requirements, we need to ensure foundation level maintenance activities are updated within duty statements and doctrine.

3. As a result of the extensive work conducted at the Army Maintenance Effects Conference (AMEC) 2018, Topic Four outcomes resulted in the adoption of standardised duty statements for a junior workshop commander and the ASM. This is presently being implemented into doctrine and training serials across Army.

4. In order to develop this outcome more broadly across the Corps, Topic Two of AMEC 2019 will identify parallels to align ground and aviation doctrine, and revise duty statements to ensure maintenance tasks support future capability requirements.

Aim

5. The aim of this paper is to generate discussion regarding the current doctrine, duty statements and competency management within both ground and aviation streams. This has been conducted through the analysis of extant job descriptions, with the intent to explore 'best practice' methodology to align maintenance activities.

Objectives

6. This paper has the following objectives:

   a. to describe the baseline doctrinal roles

   b. identify gaps in current doctrine

   c. describe the responsibilities and tasks for all key maintenance positions and ranks

   d. outline competency management within aviation and ground maintenance

   e. to shape discussion as to how to best align ground and aviation duty statements to support the presentation and plenary discussion.

THE PROBLEM

6. There are multiple sources of information which encapsulate how we define our roles, responsibilities and tasks of all key maintenance positions and ranks. The problem relates specifically to ground stream; however lessons from aviation have been implemented to align our maintenance activities.

7. Each Unit will have individual nuisances to achieve maintenance effects, however this topic has developed duty statements to build a common basis in doctrine and training for key positions within a workshop environment. In order to reach this desired end state, a review was conducted to determine extant baseline doctrinal roles, responsibilities and tasks for all key maintenance positons. Outcome is as follows:

   a. Baseline doctrinal roles.

      1. Manual of Army Employment (MAE). Provides all employment specifications of RAEME ground and aviation maintenance personnel. This includes the CSS RAEME Officer, EME Aviation Officer and All Corps GSO (LT-LTCOL) employment category capability requirements.

      2. LWP-CSS 4-2-2 RAEME Commander's Handbook. Details roles, functions and tasks specifically for maintenance organisations (such as a TST and FRG), with direct correlation of these roles to be conducted by a RAEME Officer or an ASM. The scope of roles and responsibilities is limited to these two positions. Army aviation maintenance responsibilities are broad Service roles and capability effects.

      3. LWD 4-2 Maintenance Support. This defines RAEME maintenance responsibilities to Army. It also details typical roles of the ASM and EME OPSO in relation to maintenance contract management activities, and warranty responsibilities of trades personnel, Maintenance Commander, Brigade/Force Combat Service Support Staff.

4. Australian Air Publication. Functional roles and responsibilities key to maintenance Production Planning and Control (PP&C).

b. Gaps in doctrine. The MAE captures extensively the topic question and considered the primary doctrine used to baseline our job descriptors. However, this is not strongly evidenced in RAEME Corps doctrine at present; with minimal inclusion. In order to capture the full spectrum of Corps related maintenance activities, the following provides a secondary method:

1. Unit TIMSD. Tailored to each Unit, the TIMSD also specifies maintenance responsibilities for key personnel.

2. Unit Duty Statements. Required for each ECN and rank, duty statements within Units allow for additional roles and responsibilities to be added which may only be applicable to the immediate workplace. Duty Statements were reviewed across both streams, which identified aviation common practice is the inclusion of: essential and desirable attributes, experience and PMKeyS proficiencies.

WKSP COMD DUTY STATEMENT	Where taught
Provide reports and advice to the Executive Authority on all equipment and maintenance matters	ROBC-G 1.5(4)
Provide technical advice to the Executive Authority and Senior Equipment Manager with due diligence and referencing the appropriate source with the required technical authority	ROBC-G 1.5(4)
Coordinate the planning of production periods and de-conflict support priorities in conjunction with the ASM ensuring provision of clear priorities to EMEOPS	ROBC-G 2.1(2)
Direct maintenance priorities on behalf of the supported commander	ROBC-G 1.5(2)
Develop and synchronise WKSP Battle Rhythm to align with Unit Battle Rhythm / Annual Training Plan, incorporating technical training programs and directed individual and collective training levels in accordance with FGC	ROBC-G 1.5(2)
Attend unit/formation briefs requiring maintenance input, including Commander's Update Briefs, Operations Conferences, Planning Conferences, Equipment Management Conferences etc.	Career
Actively seek involvement in planning, providing direction to planning staff on maintenance support requirements	ROBC-G 2.3
Determine repair priorities based on the plan, MEEL and prioritise maintenance accordingly	ROBC-G 1.5(2)
Task and monitor the planning and deployment of Forward Repair Teams	LOBC
Command the deployment of the WKSP, including the movement to, defence of, and redeployment of the WKSP element	LOBC
Manage all workshop resources, including manpower, tooling, parts, fixed plant, deployable stores and equipment in order to generate required outcomes in accordance with repair priorities, reviewing when priorities change	ROBC-G 1.5
Develop the Unit Technical Integrity Maintenance System Directive for endorsement by the Executive Authority, ensuring it complies with required policy and procedures	ROBC-G 1.5(2)
Ensure unit operates in accordance with the Technical Integrity Maintenance System Directive	ROBC-G 1.5(2)
Manage the technical certification of unit engineering change proposals and modifications	ROBC-G 2.2
Manage the organisation's local engineering activities	ROBC-G 2.2
Managing the professional development of all technical personnel	ROBC-G 1.5(1-2)
Oversee the administration and discipline of subordinates	RMC

Figure 1. WKSP COMD Duty Statement and Implementation

Roles, responsibilities and tasks for all key maintenance positons and ranks

9. The 2018 AMEC reviewed in detail the WKSP COMD (PL COMD) and ASM duty statements. This resulted in the adoption of these duties contained within the LMP ROBC-G trial and All Corps Officer Training Continuum.

10. The 2019 AMEC will review the proposed ground duty statements, expanding on the WKSP COMD and ASM positions to canvass all ground ECNs from CFN – MAJ. The duty statement responsibilities are derived from the MAE, however also include essential and desirable attributes, experience and PMKeyS proficiencies. Proposed Duty Statements are provided as an enclosure.

11. The use of essential and desirable discriminators has been conducted in order to better inform members and commanders of their requirements and professional goals, but also serves as a mechanism to quantify 'experience' within a workshop. Under the TRAMM-L, Technical Authority Assignment is provided to the tradesperson by the Technical Integrity Supervisor (TIS) specifies the technical authority of trade personnel, based on a number of factors, including experience. Incorporating experience as discriminator enables clear articulation of understanding of job expectations. Furthermore, at present there is no formal method to verify a tradesperson's experience. This is based on a face value, qualifications, training and judgement.

12. Additionally, given proficiencies, competencies, job roles and responsibilities are throughout multiple sources, consolidating this into a standardised duty statement makes it easier for use and readability.

13. Moreover, key personnel are required to execute a vast array of mandatory governance tasks which are not listed in doctrine. Although this also pertains to the All Corps environment, the roles performed by our maintenance personnel still need to be captured. By attempting to determine essential and desirable attributes, experience and PMKeyS proficiencies, it is assessed this will standardise duty statements within ground streams and align closer to aviation practices.

Competency management

14. The analysis of duty statements and information contained within posed the question of how we manage competencies within the Corps. Varying methods were examined, with the following results:

    a. Ground stream. Utilise a combination of tools to record and review competencies: PMKeyS, Business Reporting Tool, Competency Log Books, Unit spreadsheets and Unit level TRF registers through Objective. The Technical Authority Assignment also contains a summary of their qualifications and competencies. This is a cumbersome method and reduces our ability to maintain accurate, consistent records across multiple sources. Additionally, COY/PL level trade training is captured through the Materiel Occurrence Log (MOL) which articulates the target audience, but not recorded down to individual tradesmen.

    b. Aviation stream. Phased out traditional hard copy log books in favour of an electronic IT system, Patriot Excalibur (PEX). Prior to each maintenance task, PEX is reviewed by trades personnel and supervisors to determine currency, training shortfalls or restrictions imposed on the member. This also a risk mitigation measure to ensure personnel carrying out maintenance activities are not only qualified but conversant with up to date technical procedures and EMEI publications. It also provides the following maintenance functionalities:

        1. maintainers workbook (history logbook, certifications, competencies, yearly summary of trade tasks and hours, courses, and trade restrictions).
        2. visually flags when a tradesman is 30 days out from expiry and when re-certification is due.
        3. visually flags re-training requirements and technical waivers.
        4. displays hierarchal qualifications in order for tradesman to undertake maintenance tasks.
        5. upload RODUMS and Safety Alerts, and supervisor can interrogate if all personnel have read.

RESEARCH CONDCUTED

15. 15. The initial Topic Two paper was raised to generate discussion amongst the Corps and as a mechanism for members to provide feedback. The main focus area was duty statements from CFN-WO2 defined key maintenance personnel, however; HOC provided additional guidance stating the topic was to also encapsulate CAPT-MAJ. Thus, the topic was widened to identify key maintenance functions for all workshop personnel. This was further echoed by feedback obtained on ForceNet and general Corps opinions that RAEME Officer roles are not solely administrative in nature.

Duty statements

16. A review was conducted specifically analysing 7 CSSB, 20 STA, RAMS and 2018 AMEC duty statements. They were cross-referenced with the MAE, RAEME Subject Course LMPs, ALTC Employment Category & Training Design Group, and responsibilities within the TRAMM-L and DASR. Additionally, a survey was conducted within 7 CSSB which canvassed all trade ranks and ECNs, with over 100 responses. Questions posed:

    a. What roles, tasks and responsibilities do you currently perform which are not reflected in your duty statement?

    b. What competencies do you require to perform your primary work role?

    c. What are the recommended essential and desirable attributes, experience and proficiencies for your trade and rank?

17. Initial feedback. The initial discussion paper outcomes, HOC recommendations, ground stream survey and coupled with aviation stream lessons learnt; workshop duty statements were revised to include essential and desirable attributes, experience and proficiencies. The duty statements were then provided to 1 CSSB and 3 CSSB workshop for consultation.

18. It has also been posed that given duty statements are typically held at Unit level, this could potentially be stored within DSCM-A and DOCM-A gazettes, or essential and desirable skills listed on posting order's as additional information. This would enable the baseline attributes, experience and qualifications to be articulated to member's when determining future posting's or upon receipt of a posting order, and provide them with sufficient time to work towards achieving course and trade requirements within specific positions.

19. Proposed duty statements feedback. Some minor deficiencies were identified in regards to essential qualifications (which have since been amended). The general consensus is that a baseline of essential and desirable tasks would be feasible, however each Unit would still require to have the ability to personalise for the specific job role. For example, what is defined as an essential requirement in one Unit, may only be a desirable requirement in another.

Competency management

20. A review was conducted specifically analysing methods of competency management of: 7 CSSB, 5 AVN REGT and ADF Land Range Safety Branch. Consultation was also sought from 16 AVN BDE, PEX support representative, AHQ and civilian contractors.

21. Feedback. There are several tools and methods of competency management. This is evidenced through the use of different IT systems each organisation utilises to support their information requirements. A key reason for the implementation of specific competency management systems has been the result of significant safety issues across Army.

22. A study of civilian contractors within the workshop was conducted and it was determined that the way in which civilian industry maintain competencies is on parity to ground streams current practices; providing the TIS with civilian accredited documentation and certificates, licences and experience history. This is also held by their employer.

23. AHQ feedback was centred on the management of competencies is not limited to commonly known systems such as PEX or PMKeyS as the user solution. Other options, such could be explored. However, the challenge associated with implementation of a maintenance record system across ground stream would require a culture shift to adopt.

RECOMMENDATIONS

24. The following recommendations are made as a result of this study:

    a. Corps position. Ground trades incorporate essential and desirable qualifications, experience and proficiencies within duty statements. This will provide a common baseline across ground and standardise roles. Submission of a user requirement for competency management system as a single repository within ground stream.

    b. Risks. The initial staff work associated with the input of competencies is considerable and cost associated with the development of a suitable IT system to meet specific ground maintenance needs.

    c. 2020 CSS Officer Employment Category Review and the Workforce Segment Review. Outcomes of Topic Two to be included in employment specification reviews.

CONCLUSION

25. 25. The analysis of duty statements across all ground trades and ranks, identification of baseline doctrine and addressing how competencies are managed within the Corps provides us with the opportunity to align 'best practices' amongst ground and aviation streams. There are valuable lessons to be learnt from aviation maintenance, both in regards to duty statements and competency management. The remit of roles, responsibilities and tasks performed by our maintenance personnel are vast; requiring adaptation to meet evolving maintenance activities in the future.

Enclosures:

1. Proposed Duty Statement – ECN 146
2. Proposed Duty Statement – ECN 226
3. Proposed Duty Statement – ECN 229
4. Proposed Duty Statement – ECN 235
5. Proposed Duty Statement – ECN 418
6. Proposed Duty Statement – ECN 007
7. Proposed Duty Statement – ECN 421
8. Proposed Duty Statement – LT
9. Proposed Duty Statement – CAPT
10. Proposed Duty Statement – MAJ

References:

A. Army Maintenance Effects Conference 2018 – Topic Four, Duty Statements

B. Duty Statements – RAMS, 20 STA, 7 CSSB

C. Manual of Army Employment

D. Employment Specifications All Corps, Part One – Employment Category Capability Requirements, 22 Jan 19

E. LWP-CSS 4-2-2 RAEME Commander's Handbook, 25 Mar 15

F. LWD 4-2 Maintenance Support, 16 Nov 2009

G. TIMSD – 7 CSSB and 20 STA

H. Australian Air Publication, Part 2 – Maintenance Authorisations and Part 9 – Key Relationships and Responsibilities

I. Defence Aviation Safety Regulations (DASR)

J. Land Materiel Safety Manual – Draft

K. Technical Regulation of ADF Materiel Man

DUTY STATEMENT

POSITION DESCRIPTION

Title: MECHANIC RECOVERY GRADE 1
Designation: Army – CFN
ECN 226-3
Location: Brisbane, QLD
Supervisor: CPL Recovery Mechanic
Date: Sep 2019

PURPOSE

The CFN Recovery Mechanic directly reports to the recovery Corporals for all day to day matters. The main function of this role is to maintain the recovery vehicles, equipment and SCES within the platoon and to conduct any recovery tasks assigned to them. Conduct LRTE inspections and updating the LRTE register. Maintain high personal standards of dress and bearing and AIRN compliancy. Be prepared to attend career development courses. Conduct after hours recovery duty when required.

RESPONSIBILITIES

The Mechanic Recovery Grade 1 is to:

- Operate and maintain all recovery platforms, for which they are qualified.
- Conduct any assigned recovery tasks and after hours on-call recovery IAW standing orders.
- Assist in the provision of OJE for trainees within the workplace.
- Observe Work Health and Safety regulations in the work environment.
- Test and inspect Lifting, Recovery and Tie Down Equipment (LRTE) using non-destructive inspection techniques.
- Maintain AIRN compliancy.
- Perform Extra Regimental Duties.

Annex - ECN 226 example

ATTRIBUTES, EXPERIENCE and PMKEYS PROFICIENCIES

Essential

- 207932 MILIS Maintenance Work Order Administrator P107486
- 200335 Army First Aid Certification P102281
- Current 205339 National HRWL – Slewing Mobile Crane 60T P11609
- Current 206023 National HRWL – Dogging P116083
- 120166 Basic Combat Communications Course P103795

Desirable

- 202562 Mag 58 GSMG P010990
- 203143 12.7mm QCB MG P103788
- 216079 BMS Tactical user P124189
- One of the following sets of trade stream courses:
    a. M88
        i. 203323 Tank Recovery Driver P104831
        ii. 203054 Recovery Operator ARVH P104343
    b. ASLAV
        i. 200618 CRV Driver Non-RAAC P103793
        ii. 200120 ASLAV Recovery Operator P021316
    c. M113 AS4
        i. 205687 M113AS4 APC Driver P105943
        ii. 204968 M806AS4 (ARVL) Recovery Operator P105265
    d. Any one of the following Crane or MHE equipment
        i. 120255 Mobile Slewing Crane 20T (C2) P103405
        ii. 205339 Mobile Slewing Crane 60T (C6) P105386
        iii. 209659 C20 Merlo 35.9 EVA P021234
        iv. 209657 C20 Manitou MHT 7140 P021037
        v. 208354 MHE-L 535-95M System Operator (C20) JCB P105465
        vi. 209542 Kalmar RS (RTCH) Operator Cse P101280

SECURITY CLEARANCE

- Negative Vetting – Level 1 (NVL1)

Annex - ECN 226 example

Army Maintenance Effects Conference 2019 – Topic Three - Risk Based Optimised Maintenance

MAJ Alex McDonald and MAJ Jack Francis

ABSTRACT

This paper will discuss on how to develop a Risk Based Optimised Maintenance (RBOM) model to support maintainers in changing an equipment's maintenance strategy whilst on operations. The RBOM model will need to align to Army's current maintenance strategy called the Land Reliability Centred Maintenance (RCM) model. The Land RCM model will be achieved by conducting equipment Maintenance Task Analysis (MTA) workshops that iteratively asks a group of Subject Matter Experts (SMEs) seven questions that determine an asset's failure consequences and the maintenance activities conducted to prevent them. The output determines a more optimal maintenance strategy of the Land materiel for the *Australian operating context.*

Any RBOM model developed needs to consider the limitations that the Land Materiel Safety Manual imposes. It is not envisaged that the RBOM model is used by units during Raise, Train, Sustain needs but should be reserved for operations where the operating context has changed. Hazards need to be identified and managed to ensure Defence operates with risk So Far As is Reasonably Practicable (SFARP), within the operating environment context. The risk definition for the RBOM model will need to be aligned with existing risk definitions of both the Technical Risk Assessment (TRA) and Military Risk Management (MRM) definitions. However, the existing Technical Regulatory Framework allows maintainers to adjust in-service maintenance procedures utilising the RBOM model whilst adhering to the Land Materiel Safety Framework (LMSF). The primary means is through the Land Materiel Maintenance Standard Operating Procedure (LMM SOP) 9 in delaying an 'on-condition' maintenance actions and LMM SOP 8 to certify any Battle Damage Repair conducted.

The RBOM model seeks to have the MTA RCM process record data of Land materiel sub-systems failure modes, consequences, likelihoods and effect on the platform's mission essential function to various environmental conditions and operating profiles. As equipment is placed into operational environments for which the maintenance strategy may not be applicable, the risk to our soldiers and asset performance may rise significantly. This data set coupled with appropriate policy and training will enable maintainers to customise the authorised maintenance procedures to the environmental conditions and mission profiles for that operation. Another key use of this data is that it is able to quantify risk in deferring maintenance by understanding its likelihood and consequence of failure.

The Army Maintenance Effects Conference (AMEC) will give the Army maintenance community an opportunity to improve the RBOM model concept with input into three discussion questions. These are:

1. *What priority of enhanced data should we be recording during the MTA?*
2. *How do we use this data to customise the authorised maintenance procedures on operations?*
3. *What are the methods that use this data and can support Battle Damage Repair?*

By the end of the paper, the reader will have a clear understanding of the boundaries and constraints imposed on developing a RBOM model and how it can customise a land materiel's maintenance strategy to support the Commander whilst on operations.

INTRODUCTION

The Army Maintenance Effects Conference (AMEC) seeks to develop collaboratively derived, robust, official positions and progress updates on selected topics that offers Army's senior leadership achievable modernisation goals for Army maintenance. One of the key topics to be discussed is to the development of a risk based maintenance model for use in the Land force.

Army, through release of CA Directive 01/19 – Land Force Maintenance, aspires to transition to a risk based optimised maintenance model. In support of this, further clarity is required around what such a model would look like and ensure effective understanding across the end-to-end maintenance system. This discussion paper will develop a Risk Based Optimised Maintenance (RBOM) Model, aligned to CA Directive 01/19, which can be used to ensure an agreed terminology within the model and how it supports the maintenance effect across all parts of the land maintenance system. This paper will discuss the following:

- Define what is optimised maintenance in the land context.
- Define what risks need to be managed, with a supporting rationale.
- Provide standardised measures for the elements of risk (probability and consequence) with a focus on the operational capability.
- The model will nest with the Battle Damage Assessment and Repair (BDAR) work from the 2018 RAEME Corps Conference.

There is a trade off in conducting a MTA between considering all potential operating environments and functions and the cost of doing the RCM. Army's answer is to only do the RCM against the RTS operating profiles with RBOM to be applied to operations using the CMAINT provisions. This will enable maintainers to customise maintenance to the new operating context, once that operating context is known.

This paper defines that the RBOM model is the combination of land materiel sub-system data with the appropriate policy, guidelines and training that will support maintenance decisions whilst on operations. The sub-system data includes its failure modes, consequences, likelihoods and effect on the platform's mission essential function to different environmental conditions and operating profiles.

As part of the development of the RBOM model, there will be three Discussion Points asked of the audience during the AMEC. This will give the maintenance community an opportunity to provide input in how we can utilise and develop such a model. The discussion points are:

- What priority of data should we be recording during the MTA?
- How do we use this data to customise the authorised maintenance procedures on operations?
- What are the methods that use this data and can support Battle Damage Repair?

AIM

The aim of this paper is to support a discussion among Army's maintenance community about the development of a Land Force Risk Based Optimised Maintenance model. This will be achieved by describing the inherent requirements and constraints of developing such a model, detailing Army's current MTA process and then provide options for discussion on utilising the existing MTA and current Land Materiel Safety Framework (LMSF).

LITERATURE AND THEORY REVIEW

This literature review will briefly provide context and boundaries for the discussion points to be detailed in the paper. There is considerable guidance, policy and doctrine that shape any development of a Risk Based Optimised Maintenance model. Understanding this policy and working within any requirements is paramount to ensure maintenance actions do not cause undue risk to Defence personnel.

The first key policy to understand is the Chief of Army Senior Advisory Committee (CASAC) endorsed Land Maintenance Strategy (LMS) that was released by the Chief of Army as Directive 01/19 earlier this year. This will set the boundaries in which a model will be developed from. An overarching constraint is compliance to the LMSF. Thus, there will be a review of the future Land Materiel Safety Manual (LMSM) and the extant land Technical Regularity Framework. Finally, a detailed analysis of Army's current MTAs will provide context on how maintenance strategies are changing for Land materiel. This review will provide the knowledge backbone that will allow the maintenance community to understand development of the RBOM model.

The definition of what Optimised Maintenance in the Land context is defined below. This definition was produced using industry definitions coupled with the intent of the CA Directive 01/19.

Optimised Maintenance: Equipment is being maintained to meet the Land capability requirements and operated at the lowest cost of ownership and failure effects.

[Failure effects = Risk & Safety, Environmental and Operational Impact]

CA Directive – Land Force Maintenance

The CA Directive – 01/19, Land Force Maintenance (LFM), describes Army's aspirational Land Force maintenance strategy including its maintenance model. The LFM directive is a principles based strategy that incorporates a range of requirements and Measures of Effectiveness (MOEs) that Land capabilities are to aspire to achieve. The maintenance model that the LFMD directs to implement is called the Land Reliability Centred Maintenance (RCM) Model. This model considers capability, safety and cost of ownership to identify the maintenance option best suited to the equipment, system or sub-system (see Figure 1). The Land RCM model maintenance options are:

- Condition Based Maintenance (CBM) – A practice that monitors the condition of the asset to determine when maintenance is required. Maintenance can be triggered when a predetermined degraded performance level, or imminent failure, is identified by the operator, platform management system, or Health and Usage Monitoring System (HUMS). This approach offers cost savings over traditional time-based preventative maintenance as tasks are performed only when warranted to achieve directed outputs and requirements.
- Preventative Maintenance – Perform maintenance before materiel failure. Approximately only 11 % of failures can be prevented through preventative maintenance.
- Run to failure – If a system fails safely, and it is cost effective to do so, the system will seek to repair or replace when the failure occurs.

The Land RCM Model will be incorporated into the major Army platforms over the next few years through activities called MTAs. Army HQ has recently completed MTAs on both the M1A1 Tank and MHC Fleet of Vehicles (FOV). The EMEIs and UHB for the tank are going through final design acceptance and the changes in the maintenance instructions will see a reduction of 597 scheduled maintenance hours per tank per year (159 Maintainer hours). The implemented Land RCM model is decreasing Army's total cost of ownership whilst increasing operational availability for the users.

Key Observation: Army is implementing the Land Reliability Centred Maintenance Model. Any further discussion or research of a RBOM model during discussions must incorporate the Land RCM model.

Land Materiel Safety Manual (LMSM)

In the near future, the TRAMM-L will be replaced with the LMSM. This manual differs to the TRAMM-L as it clearly articulates Defence's responsibilities towards the Work Health Safety (WHS) act in regards to operation and maintenance of Land materiel. The LMSM includes references to various provisions of the WHS Act and Regulations contained in Model Work Health and Safety Laws 2011 which set out the legal requirements for safe management of plant. Plant, in the context of the Defence Land domain, has been identified as Land materiel – this includes all Land materiel ranging from tools, to parts, to weapons to major platforms. The CA appoints the Technical Regulatory Authority - Land (TRA-L) to define and manage

Figure 1 - The Land RCM Model

the LMSF - the LMSM is Defence's means in defining and managing the LMSF.

The LMSM is applicable across all phases of the Defence capability life cycle regardless of materiel management arrangements or organisational boundaries. The LMSF employs the Land materiel's Safety Management System (SMS), which comprises: all directives, instructions, plans, standards, processes, procedures, tools, forums, data, competencies, certifications, assessments, communication and reporting methods required to eliminate or minimises safety risks and hazards *So Far As is Reasonably Practicable* (SFARP). The SMS is the method used to comply with WHS regulation 36 of the Model Work Health and Safety Laws 2011 *'hierarchy of control measures',* which requires duty holders to implement risk control measures to minimise safety risks SFARP.

Figure 2 depicts a typical materiel's SMS operating envelope. Materiel tasking outside the approved SMS will require another risk assessment for hazard identification, risk management and control of risk for materiel's amended operating/tasking environment. The shaded areas are:

- The complete Pyramid is the desired safe operating envelope for the materiel system.
- The 'green wedge' of the pyramid is the delivered SMS for a safe operating envelope.
- The blue portion of the pyramid is typically where the materiel is operated.

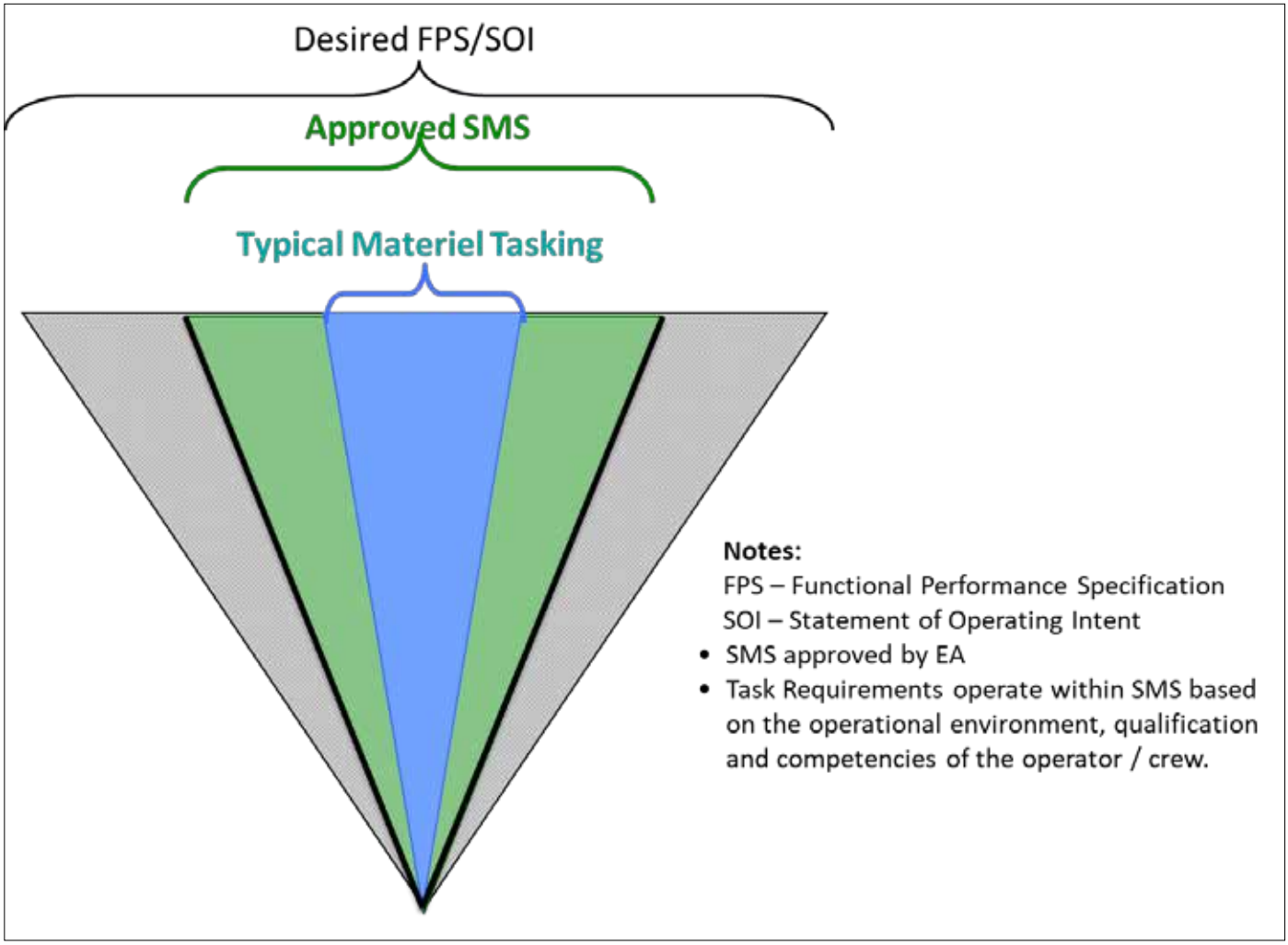


Figure 2 - Land Materiel SMS

The TRA-L's regulatory requirements that provide amplification of statutory safety requirements are called Land Materiel Safety Regulations (LMSRs). LMSR No 13 states that: Persons undertaking Land materiel design, manufacture, supply, operation, or maintenance must use authorised Technical Data. Technical data comes in many forms and may range from technical instructions on how to manufacture, assemble, install, commission, test, inspect, maintain, modify, de-commission to a complex set of maintenance and engineering performance statistics.

With the implementation of the LMSM, any maintenance tasks conducted beyond the authorised technical data would require a risk assessment for hazard identification, management and control for the materiel's new operating condition. This could include adjusting an authorised maintenance procedure or conducting Battle Damage Repair (BDR) where there are no defined procedures. Any changes to the technical data may result in materiel being operated outside of the 'green wedge'. This may induce hazards beyond SFARP that may not be authorised by the materiel's Executive Authority (EA).

System Safety Working Groups (SSWG) are a key component of the Land Engineering Agency (LEA) Engineering Change (EC) process. This is where stakeholders of a particular capability are consulted to ensure sufficient rigour is applied to the safety case/technical risk assessment to provide Defence with materiel certification of the revised 'green wedge'. Additionally, the level of effort applied to these processes must be commensurate with the level of risk assessed. The LMSM does not enforce a new or overly rigorous process on organisations, rather wanting the focus on risk and that level of risk determines the level of work required to reach SFARP.

Key Observation: Any RBOM model discussed needs to consider the limitations that the LMSM imposes. It is not envisaged that the RBOM model is used by units during Raise, Train, Sustain needs but should be reserved for operations where a potential increase in risk can be justified. Hazards need to be identified and managed to ensure Defence operates with risk SFARP, within the operating environment context.

Existing Land Technical Regulatory Framework (TRF)

The Land Materiel Maintenance Standard Operating Procedures (LMM SOPs) provide authorised options that are part of the LMSF, and if followed, ensure that Land materiel is operated within a new authorised SMS (i.e. an expanded green pyramid). The LMM SOPs ensure that hazards are identified, managed and authorised to keep risks SFARP. There are two LMM SOPs that are relevant for this discussion. These are listed below:

- **LMM SOP 9 – Variation to Authorised Maintenance.** This is a temporary deviation from or variation to the following authorised maintenance procedures that includes technical inspections, operator inspections or servicing.
- **LMM SOP 8 – Local Engineering Change.** A local ECs scope is large and incorporates many potential changes to a Land materiel's configuration, use or even to fabricate new Land materiel. Due to this wide scope, the process is arduous and requires a strict hierarchy of sign-off to ensure Defence operates within risk SFARP.

Variation to Authorised Maintenance. Under the Land RCM Model, majority of a Land materiel's scheduled maintenance (i.e. servicing) is moving to 'on-condition'. The LMM SOP 9 currently does not stipulate that these 'on-condition' maintenance actions are considered to be 'servicing'. It was verified by the TRA-L that a Land materiel's 'on-condition' maintenance action is considered 'on-condition servicing', thus allowing the use of this SOP for these types of maintenance actions. Therefore, for the remainder of this discussion, all 'on-condition' maintenance actions are classified as 'servicing' to enable the use of LMM SOP 9.

Key Observation: The LMM SOP 9 process can be used for delaying an 'on-condition' maintenance action.

Battle Damage Repair. *The AHQ definition of BDR is: 'Battle Damage Repair are those maintenance actions conducted by Force Elements to return a Land materiel's mission essential function(s) to an operational state in order to continue with the current mission. BDR ceases at the end of the mission or when the Land materiel is assessed by an Accredited Engineering Organisation (AEO).'*

The BDAR discussion paper, produced by MAJ C Dent 2018, recommended that a LMM SOP be created specifically for Battle Damage Assessment and Repair (BDAR). Currently, there is no LMM SOP for the conduct of the maintenance actions required within the constraints described in the above definition. However, LMM SOP 8 allows the conduct of non-authorised repair or the use non-approved parts – these are the likely maintenance actions during BDR. Therefore, once BDR ceases (i.e. after mission has finished or assessed by an AEO), a Local EC can be conducted to retain the maintenance actions conducted during BDR.

Key Observation. The LMM SOP 8 process can be used to certify BDR.

The Maintenance Task Analysis Process

Traditionally, the maintenance strategy for Land materiel is recommended by the Prime System Integrator (PSI) with amendments subsequently made in response to feedback from in-service experience. The result is that a lot of maintenance tasks are either not required or faults are not detected for subsequent rectification through planned proactive maintenance activities. In response, the LFM directive states that Land programs will apply the Land RCM Model which is applied through MTAs. The MTA modifies the original maintenance strategy to determine an optimal and effective in-service maintenance approach. It consists of a Preventative Maintenance Optimisation (PMO) activity coupled with a RCM Activity that consists of:

- Task analysis to identify all the tasks and resources required for preventive and corrective maintenance of a system.
- Determining the selection of preventive maintenance tasks and allied activities through Reliability-Centred Maintenance (RCM).
- Level of repair analysis (LORA) for corrective maintenance tasks to determine what items will be repaired or discarded, and where these activities will be undertaken.

It is prudent to note that the MTAs operating context is that of the Australian operating environment using RTS mission profiles. It does not consider future operating environments or potential operating profiles detailed in the Land Operating Concept Document.

Key Observation: The Land RCM model is achieved through Maintenance Task Analysis' that include Preventative Maintenance Optimisation and Reliability Centred Maintenance activities. The operating context for these activities is based in the Australian environmental conditions with RTS mission profiles.

History of RCM

In the last 50 years, the way maintenance is conducted has changed due to a number of complex factors. It is due to a huge increase in the number and variety of physical assets which must be maintained throughout the world, much more complex designs, new maintenance techniques and changing views on maintenance organisation and responsibilities.

To adapt to the rising cost of maintenance, a large amount of developments have been made in maintenance concepts and techniques in the last 30 years. These include decision support tools, new maintenance techniques; including condition monitoring, and designing for reliability and maintainability.

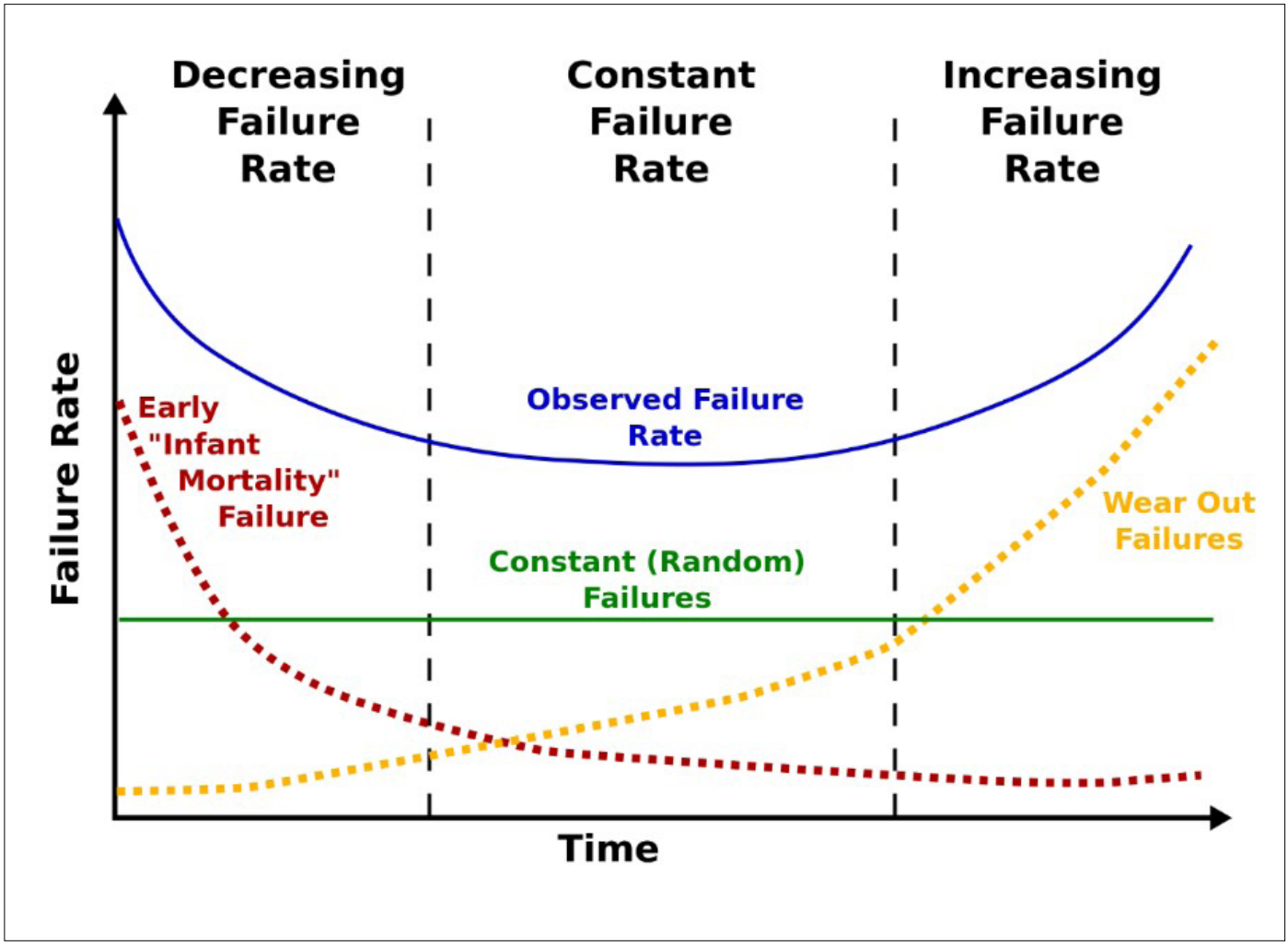


Figure 3 - The idealised bathtub curve

Failure patterns

The 'Bathtub' curve at Figure 3 is the traditional view of how equipment behaves. It shows the change in failure rate over the equipment's life. The 'Bathtub' curve supported the opinion that simply that as things got older, they were more likely to fail. Characterised by starting with an infant mortality period, where failures are occurring less and less, a period of constant failures, and lastly a period of wear out.

Multiple studies of mechanical elements show that not all equipment follow the traditional 'bathtub'. Approximately 89% of failures have a constant failure rate (or exhibit random failures) from their mid to end of life, resulting in only 11% of failures able to be prevented through preventative maintenance. These studies also revealed that several key conditions that must exist for scheduled maintenance to be effective. These are:

- Scheduled overhaul has little effect on the overall reliability of a complex item unless the item has a dominant failure mode.
- There are many items for which there is no effective form of scheduled maintenance.

The RCM Process

The RCM process developed by Nowland and Heap determines the appropriate risk management or mitigation strategy based on what would occur if the asset failed to perform the intended function. This information was documented in a workshop involving all of the stakeholders in the asset, including the designers, the maintainers and the operators. The RCM process asks the group seven questions about the asset or system under review. The questions, outputs and considerations are found in Annex A and this form the basis of MTAs.

The use of RCM has several benefits. These include; maximising safety and environmental health, reducing overall maintenance cost, improving reliability and availability, providing a documentation trail for maintenance program changes, and providing a vehicle for continuous improvement of the maintenance program and equipment performance. However, the limitations are: the existing process produces an optimised maintenance regime based on a single usage profile, and it only treats failure symptoms; rather than finding the root cause of failures.

Key Observation: The RCM process is conducted through a workshop that iteratively asks a group of SMEs seven questions that determine an asset's failure consequences and the maintenance activities conducted to prevent them. The output determines an optimised maintenance strategy of the Land materiel for the Australian operating context.

Likelihood	Consequence				
	Minor (A)	**Moderate (B)**	**Major (C)**	**Critical (D)**	**Catastrophic (E)**
5 Almost Certain	Low (A5)	Medium (B5)	High (C5)	Very High (D5)	Very High (E5)
4 Probable	Low (A4)	Medium (B4)	High (C4)	High (D4)	Very High (E4)
3 Occasional	Very Low (A3)	Low (B3)	Medium (C3)	High (D3)	High (E3)
2 Improbable	Very Low (A2)	Very Low (B2)	Low (C2)	Medium (D2)	Medium (E2)
1 Rare	Very Low (A1)	Very Low (B1)	Very Low (C1)	Low (D1)	Low (E1)

Table 1: RBOM Risk Matrix

The RBOM model Risk Definition.

As part of any future Risk Based Maintenance model, an agreed terminology of the consequence and probability with an appropriate risk matrix is required to determine the risk rating for the maintenance actions. The LEA Technical Risk Assessments (TRA) have moved to a 5 x 5 matrix with the same risk definitions as the endorsed Military Risk Management (MRM) guide. This ensures that the SMS system risk thresholds are common across operating the materiel and the inherent safety case of the materiel.

The proposed RBOM model will need to incorporate these definitions to ensure conformity to current practice. The effects to be considered are to be in alignment with the TRA and Land RCM model. These are: ***safety, performance, cost*** and ***environment***. An amalgamation of the MRM and TRA definitions to provide the RBOM Risk Definition and Guidance is at annex C. An extract of the 5 x 5 matrix for ease of reference later in this paper is shown below.

Key Observation: The risk definition for the Risk Based Optimised Maintenance model will need to be aligned with existing Risk definitions.

DISCUSSION

Discussion Point 1: Enhancing the RCM process

The current MTA RCM process is closely aligned with the proprietary 'Aladon' model and is optimised for assets that are in continuous use and that use represents the entire usage profile (e.g. a factory or mine where preventing downtime is the overriding concern). The Land force requirements vary from the MTA RCM process as the usage profile of Land materiel varies during lay-up, RTS or on operations. Each of these usage profiles have significantly different equipment management goals and risk thresholds.

As discussed in the previous chapter, the RCM process considers the environmental conditions and usage profile in the Australian context - it does not account for extreme or rare event conditions or operational profiles. Furthermore, the RCM model does not take into account situations where there may be limited time and resources available for maintenance. The Commander may need to make informed decisions about what maintenance they will perform to complete the mission, and what risks are evident as a result of the deferred maintenance.

To enable the introduction of a Risk-Based Maintenance philosophy, the Land RCM process will produce both an optimal preventative servicing regime, but also provide a set of detailed data about the system to enable risk-based decisions. This data will consist of the following for each system element covered by the RCM analysis:

- A detailed description of the function it performs
- The relationship between this function and the systems Mission Essential Functions (the minimum tasks to successfully complete the mission)
- The relationships between the function and other system elements (enabling the link to the functions other system elements perform)
- The identified failure modes
- The identified degradation path with defined degradation stages and the likelihood of failure in each of these degradation states
- Change in probability of degradation path for different environments/operating conditions.

The data detailed above is either being completed already during the RCM process or requires more fidelity of the seven questions being asked. Technical detail on how this process will be improved is detailed in Annex B. With the implementation of the Enterprise Reform Program, there is an opportunity to record this information set within a Land materiel's sub-system. Future Business Intelligence tools would be able to easily draw this information and display to technical personnel to provide quantifiable evidence to support risk based decision making.

Key Observation: The MTA RCM process can be used to record data of Land materiel sub-systems. This information can used to support technical risk based decisions.

Discussion Point 1: What priority of enhanced data should we be recording during the MTA??

When to use RBOM

Conducting long term changes to an in-service maintenance regime will adjust a Land materiel's 'blue wedge' that may or may not extend past its SMS. It is unlikely that units will have the quantitative information and experience compared to a SSWG that determines the risk is SFARP. However, this enhanced MTA data coupled with policy and guidance will enable Contingency Maintenance (CMAINT) activities that customise the authorised maintenance strategy for operations. The three CMIANT activities that the data could support are:

- Changing the maintenance regime based on the new operating environment and mission profile,
- Quantifying the risk in deferring maintenance, and
- Supporting the conduct of BDR.

Key Observation: The RBOM model should only be used to support CMAINT activities whilst on operations.

	Safety	Performance	Cost	Enviro
Sgt	-	Low	Very Low	Very Low
ASM	Very Low	Medium	Low	Low
Eng	Low	Medium	Low	Low
CPEng	Low	High	Medium	Medium

Table 2: Authorised Risk Threshold

Discussion Point 2: Customising the Authorised Maintenance Procedures

The data-set obtained with the enhanced MTA contains a sub-system's consequence of failure with a probability (i.e. Likelihood) for failure should the maintenance action be deferred. With the risk matrix and definitions discussed in the Literature review, a quantitative risk rating for deferring maintenance can be determined. Streamlining LMM SOP 9 with preauthorised MAA and EA endorsement to certain risk thresholds (see Table 2) would enable maintainers to quickly defer maintenance. There could be a multitude of reasons, from operational requirements, excess backlog or a restricted supply chain. The thresholds would change based on the operational requirement so Table 2 is just an example of what could be achieved and not necessarily 'the answer'. The 'Authorised Risk Threshold' table is based on the four key risks identified with the definition of optimised maintenance and against maintainers with specific experience/qualifications.

The MTA activity delivers a maintenance regime based on the Australian environment operating with a RTS mission profile. If the Land force were to deploy to a littoral, desert or cold environment utilising operational mission profiles – it is likely the authorised maintenance regime is not suitable. This new data-set, coupled with appropriate guidance and training – maintainers could optimise the maintenance strategy for that environment and mission profile. Thus, enabling Risk Based Optimised Maintenance.

The key question to be asked of the maintenance community is 'how do we use the enhanced MTA data to customise the authorised maintenance procedures on operations?' Some of the key issues would be what guidance, what training, who does it (i.e. EMEOPS?), who authorises and under what tech policy (i.e. LMM SOPs?).

Discussion Point 2: How do we use this data to customise the authorised maintenance procedures on operations?

Discussion Point 3: Supporting Battle Damage Repair

As detailed in the literature review, *'BDR are those maintenance actions conducted by Force Elements to return a Land materiel's mission essential function(s) to an operational state in order to continue with the current mission. BDR ceases at the end of the mission or when the Land materiel is assessed by an accredited engineering organisation.'* Therefore, BDR utilises a quick risk assessment with limited to no technical data to allow maintainers to conduct activities to enable the platform to continue with the mission. If the platform with BDR were to be utilised for further missions, a Local EC would be required utilising LMM SOP 8. The conduct of Battle Damage Repair, maintainers will either repair damaged parts to its functional condition or conduct manufacture of parts – to enable the platform's mission essential functions.

By default, the MTA process develops a Failure Modes, Effects and Critically Analysis (FMECA) for that Land materiel system. This data could be used to support BDR by quantifying the risk in the risk assessment phase of the BDR. The repair procedure or manufacture of part would put the item at a condition unknown in the system (i.e. *probability* of failure is unknown and the point on the P-F curve is unknown). Therefore, the usable enhanced MTA data for BDR only includes a parts – failure modes, effects and its relationships to other systems.

How can this information be used? The information can inform the maintainer what the damaged/failed part has on the system and its criticality. Therefore, we can use this to limit BDR on certain critical items. For certain mission profiles, a HQJTF could pre-authorise BDR to a certain risk consequence applicable to that mission. For example, in a low threat operation BDR on a brake system might exceed the risk threshold due to Safety whilst repairing a damaged radiator might not. By understanding the consequence of failure, we can limit actions to ensure we operate within a risk level SFARP. Another option is to include a different rating for different experience levels/qualifications.

	Mechanical				Electrical		
	Single components (manufacture, gaskets, etc)	Complex mechanical (pumps)	Armour	Hydraulic	Electrical wiring, connections, etc	Circuit Boards	Software
Sgt							
ASM							
Eng							
CPEng							

Table 3: Consequence threshold for components

It is proposed that consideration for BDR be completed utilising the FMECA profile conducted during MTAs. The discussion point is: What are the methods that use this data and can support Battle Damage Repair? Some of the points to consider are:

- Different thresholds for different effects (i.e. safety, cost, enviro, performance), same as Discussion Point 2. This could include safety/non-safety components
- Option is to consider thresholds for different types of components.

Discussion Point 3: What are the methods that use this data and can support Battle Damage Repair?

Conclusion

This paper has supported on how Army could develop a RBOM model. The model is largely defined by the existing Land RCM model with the constraints of the LMSM limiting its use within a RTS scenario. However, the existing TRF allows maintenance actions be conducted in high risk scenarios such as operations to enable the endorsed maintenance regime to change to meet the operational requirement. Enhancing the current MTA coupled with streamlined maintenance processes will allow commanders to make better informed risk based maintenance decisions.

References

CA Directive 01/19 Land Force Maintenance

DEFLOGMAN Part 2, V10, Chapter 2 – Materiel Maintenance policy

ADDP 4.5 Maintenance and Engineering

RAEME Commander's Handbook

Land Materiel Safety Manual (TBI)

Army Standing Instruction – Military Risk Management (MRM)

Commonwealth Work Health and Safety ACT 2011

DEFSTAN 00-45 – Using Reliability Centred Maintenance To Manage Engineering Failures, Nov 2016

SAE JA1011/2 - Evaluation Criteria for Reliability-Centred Maintenance

Chris Dent Paper 2018 – BDAR

Land Materiel Maintenance Standard Operating Procedures

Reliability Availability and Maintainability Manual – 2015 (RAMMAN)

Reliability-Centred Maintenance, Second Edition, John Moubray

Reliability Centred Maintenance Process

The 7 questions asked are:

- What are the functions and required standard(s) of performance of the asset in its current operating context?
- In what ways can the asset fail to perform its function(s)? *(These are the functional failures that represent the failed state)*
- What causes each identified functional failure? *(These are the failure modes relevant to the asset, including any that might be induced by human error)*
- What happens to the asset, the system, the End Item and the surrounding environments when each identified failure mode occurs? *(These are the failure effects at local, system and End Item levels)*
- In what way do the failure effects of each failure mode matter? *(These are the failure consequences in terms of hidden or evident, safety, environmental, operational or non-operational criteria)*
- How can each functional failure be prevented or alleviated? *(These are Preventive Maintenance (PM) tasks with associated task intervals)*
- What should be done if a suitable PM task cannot be found?

These seven questions determine: *hidden failure consequences, safety or environmental consequences, operational or non-operational consequences, proactive task evaluation in terms of effectiveness and feasibility, on-condition maintenance, scheduled restoration and scheduled replacement.*

Scheduled preventative maintenance. Programs are required where the consequence of failure is unacceptable in terms of safety, operation or economy and where wear-out failure of critical items occur. Items are assigned a life (calendar or life units) by which they should be replaced, restored or repaired.

Condition monitoring. Is ongoing surveillance or inspection of the operation of a product or process to ensure proper performance and to detect abnormalities indicative of an impending failure. Condition monitoring may also detect hidden failures. Hidden failures usually have no direct impact on system operation, but they expose the organisation to multiple failures with serious consequences. Failure of a protective device, which isn't fail-safe, is an example of hidden failure.

HOW TO IMPROVE THE MTA PROCESS

Functional failure and relationships to system Mission Essential Functions

The first step of the RCM is to describe the assets functions, the required standards of performance in its current operating context. While all of these components of the question 1 are important, it does not fundamentally answer the question of how the items failure impacts the systems mission essential functions. In many cases, mission critical functions are safeguarded through redundancy or design. For example; run flat tyres, multiple GPS sources for vehicle communication systems. Instead of analysing the function of a part or sub-component; more detail will be recorded to the effect of losing that function, or how a degraded state affects the mission essential function. This will provide commanders information about the functional preparedness of the equipment (i.e. the vehicle's communication systems are all functioning vs. the systems auxiliary battery is at 12.5 volts).

Identified degradation path and defined degradation stages with likelihood of failure

The P-F curve at Figure 4 is a graph that shows the health of equipment over time to identify the interval between potential failure (P) and functional failure (F). Potential failure indicates the point at which we notice that equipment is starting to deteriorate and fail. Functional failure is the point at which equipment has reached its useful limit and is no longer operational.

By proactively checking the condition of the equipment, we are able to infer the rate of deterioration over time. Maintenance personnel are then able to plan and assess whether it is cost-efficient to mitigate the causes of failure given the projected P-F interval.

The extant RCM model identifies the best candidates for the use of condition-based maintenance, or in the instance where there is an appropriate P-F interval, a condition based failure finding task. The RCM process considers whether the P-F curve is linear, non-linear, and whether it its calendar time or usage affected. To enhance the RCM model, each identified failure modes degradation path should be documented, along with the probability of failure associated. This allows an Army Commander to make an informed decision on deferring maintenance by knowing the likelihood of failure of a given element, its degradation path (including what life unit can affect this e.g. fords, km, cycles), and the effect it has to the mission essential function of the equipment.

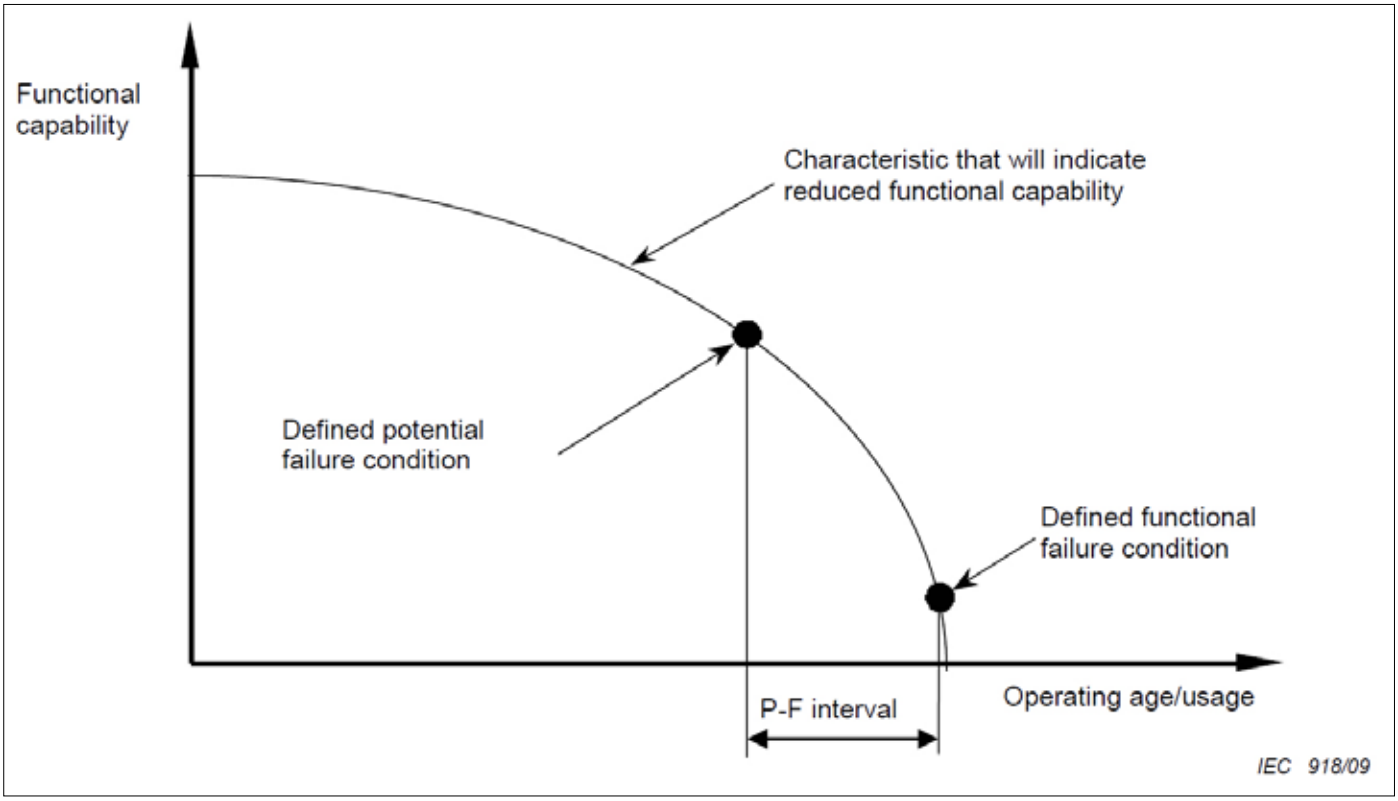


Figure 5: The P-F interval; IEC 918/09

RISK DEFINITION AND GUIDANCE NOTES

Table 1 shows the descriptions used for defining the Likelihood that a mishap will escalate to a specific consequence.

Rating	Likelihood Description for System	Likelihood Description for Activity (e.g. T&E)
Almost certain	Expected to occur several times a year or often during the system life-cycle. Is known to occur frequently in similar systems being used in the same role and operating environment.	Expected to occur during the planned activity. known to occur frequently in similar activities.
Is known to occur frequently in similar activities.		
Probable	Expected to occur one or more times per year or several times in the system life cycle. Is known to occur previously but is not certain to occur.	Expected to occur in most circumstances, but is not certain. Is known to have occurred previously in similar activities.
Occasional	Expected to occur less than once per year or infrequently during system life cycle.	Not expected to occur during the planned activity. Sporadic but not uncommon.
Improbable	Not expected to occur, but possible to experience one or more events during the system life cycle.	Not expected to occur during the planned activity. Occurrence conceivable but considered uncommon.
Rare	Only expected to occur in rare or exceptional circumstances or no more than once during the system life cycle.	Not expected to occur during the planned activity. Occurrence conceivable but not expected to occur.

Table 1 – Definitions of Likelihood

Table 2 shows the definitions used for expressing Consequence with respect to safety, performance and the environment.

Rating	Effect with respect to Safety	Effect with respect to Performance	Effect with respect to Cost	Effect with respect to the Environment
Minor	Minor injury or illness that is treatable in the workplace (first aid) or by a registered health practitioner, with no follow up treatment required.	**Mission:** Minimal Consequence on mission / objective. **Equipment:** Temporary degradation to Defence capability provided by an essential equipment item, capability brick or system. Indicative repair or remediation time: less than two working days.	Equipment or assets with associated costs less than A$100 000.	Damage can be repaired by natural action within one year.
Moderate	Injury or illness causing no permanent disability, which requires non-emergency medical attention by a registered health practitioner or 10 or more injuries or illnesses categorised as minor.	**Mission:** Failure to achieve an operational objective with significant unit /tactical/business implications. **Equipment:** Temporary substantial degradation to Defence capability provided by an essential equipment item, capability brick or system. Indicative repair or remediation time: 2-14 days.	Equipment or assets with associated costs in excess of A$100 000 but less than A$1 000 000.	Damage requires remediation up to 3 months with associated costs < $100 000
Major	Serious injury or illness requiring immediate admission to hospital as an inpatient and/or permanent partial disability or 10 or more injuries/illnesses categorised as moderate.	**Mission:** Failure to achieve an operational objective with serious unit/tactical/business implications. **Equipment:** Temporary loss or temporary severe degradation to Defence capability provided by an essential equipment item, capability brick or system. Indicative repair or remediation time: greater than 14 days but less than 12 months.	Equipment or assets with associated costs in excess of A$1 000 000 but less than A$10 000 000.	Damage requires significant remediation over 3 - 6 months with associated costs between $100 000 and $1 000 000.
Critical	Single fatality and/or permanent total disability or 10 or more injuries or illnesses categorised as major.	**Mission:** Failure to achieve an essential operational objective with significant strategic implications. **Equipment:** Medium degradation to Defence capability provided by an essential equipment item, capability brick or system. Single essential equipment item or system loss. Indicative repair or remediation time: greater than one year.	Equipment or assets with associated costs in excess of A$10 000 000 but less than A$100 000 000.	Damage can only be remediated over 6 - 24 months with associated costs > $1 000 000.
Catastrophic	Multiple fatalities or 10 or more injuries/illnesses categorised as critical.	**Mission:** Failure to achieve a mission that is essential to a strategic objective. **Equipment:** Long term degradation to Defence capability provided by an essential equipment item, capability brick or system. Numerous essential item losses or loss of single asset of significant value. The equipment, capability brick or system is irreparable.	Equipment or assets with associated costs in excess of A$100 000 000.	Damage irreparable, or in excess of 2 years to remediate.

Table 2 – Definitions of Consequence

Table 3 combines the Likelihood rating with the Consequence rating of an outcome, and allocates each outcome to a specific risk level.

Likelihood	Consequence				
	Minor (A)	**Moderate (B)**	**Major (C)**	**Critical (D)**	**Catastrophic (E)**
5 Almost Certain	Low (A5)	Medium (B5)	High (C5)	Very High (D5)	Very High (E5)
4 Probable	Low (A4)	Medium (B4)	High (C4)	High (D4)	Very High (E4)
3 Occasional	Very Low (A3)	Low (B3)	Medium (C3)	High (D3)	High (E3)
2 Improbable	Very Low (A2)	Very Low (B2)	Low (C2)	Medium (D2)	Medium (E2)
1 Rare	Very Low (A1)	Very Low (B1)	Very Low (C1)	Low (D1)	Low (E1)

Table 3 – Levels of Risk

Note 1: ***'Reasonably practicable'***, in relation to a duty to ensure health and safety, means that which is, or was at a particular time, reasonably able to be done to ensure health and safety, taking into account and weighing up all relevant matters including:a. the likelihood of the hazard or the risk concerned occurring; andb. the degree of harm that might result from the hazard or the risk; andc. what the person concerned knows, or ought reasonably to know, about the hazard or risk, and about the ways of eliminating or minimising the risk; andd. the availability and suitability of ways to eliminate or minimise the risk; ande. after assessing the extent of the risk and the available ways of eliminating or minimising the risk, the cost associated with available ways of eliminating or minimising the risk, including whether the cost is grossly disproportionate to the risk.(Reference: Work Health and Safety Act 2011)

Note 2: The elimination of risks, or appropriate controls, shall be as per the ***Hierarchy of Control Measures for risk resolution***, in the following order:

a. **eliminate** risks to health and safety So Far As is Reasonably Practicable (SFARP); and

b. if it is not reasonably practicable to eliminate risks to health and safety—**minimise** those risks so far as is reasonably practicable, by:

i. doing one or more of the following:

1. substituting (wholly or partly) the hazard giving rise to the risk with something that gives rise to a lesser risk;

2. isolating the hazard from any person exposed to it;

3. implementing engineering controls.

ii. If a risk then remains, the duty holder must minimise the remaining risk, so far as reasonably practicable, by implementing administrative controls.

iii. If a risk then remains, the duty holder must minimise the remaining risk, so far as reasonably practicable, by ensuring the provision and use of suitable personal protective equipment.

(Reference: Work Health and Safety Act 2011)

Note 3: A 'due diligence' approach must be exercised in the control of risks, where the SFARP approach to risk mitigation towards zero harm must be demonstrated, due to its legal implications in accordance with the Commonwealth Work Health and Safety Act 2011.

Note 4: Residual Risk is the remaining risk after all enduring mitigations have been implemented.

Note 5: *The "Status" column is used to highlight whether or not there are further actions required to address a specific risk serial:*

Interim Mitigations Required *(See Column L): At the time of signature, there are interim mitigations in place to eliminate or minimise the risk SFARP until planned enduring mitigations are implemented. The impact of the interim mitigations is assessed at Column M.*

Review as Required: *All enduring mitigations to eliminate or minimise the risk SFARP have been implemented; interim mitigations are not required. The risk shall be reviewed based on triggers identified in LSD policy and the Project/Fleet Materiel System Safety Program Plan.*

Force Support Element Ten (FSE-10)

Flt-Lt Dion Issacson and SGT Kirk Peacock

When the workshop team from Force Support Element Ten (FSE-10) arrived in the Middle East, they inherited Mercedes Benz Unimog truck. The problem was, it was spread across the workshop floor in pieces.

The vehicle had been working in Afghanistan when the engine overheated. Repairs were too complex to be managed in Kabul so the vehicle was sent to the main Australian base for attention.

The previous workshop team from FSE-9 had completely stripped the vehicle and replaced the engine, but more problems emerged and they ran out of time to make further repairs.

Inherited Up Armoured Unimog on jack stands

Vehicle mechanic Sergeant Graeme Kennedy, team leader on the Unimog rebuild project, said the officer commanding FSE-10 was keen to get the truck rebuilt to be sent back into theatre if required.

"On handover, the team from FSE-9 gave it to us and said good luck. I was determined to finish the rebuild," Sergeant Kennedy said.

The rebuild team included metalsmith Lance Corporal Daniel Waller and vehicle mechanics craftsman Samuel Jarvis and Joseph Green.

"It was in a million pieces and I knew it would be a mammoth task," Lance Corporal Waller said.

Craftsman Jarvis agreed. "I looked at this huge pile of parts on the floor and said, 'As the junior mechanic I am going to get stabbed with a lot of this', but it was a lot of fun," Craftsman Jarvis said.

The team's biggest challenge was knowing where to start, so they decided to start at the wheels and work up.

Unimog fully stripped

"Completely strip and rebuild a whole vehicle is not something you do at your home unit," Craftsman Green said.

Unlike a toy construction set, the truck did not come with a book of instructions, meaning the team had to draw on their collective tradecraft skills.

"We are quite isolated in the Middle East so it requires a lot of thinking outside the box, especially as there is no rebuild manual for an up-armoured Unimog," Sergeant Kennedy said.

Craftsman Green said he enjoyed going back to the basics of his trade: dissembling and stripping parts, diagnosing what was wrong, repairing and then putting the components back together.

When the team searched for the parts in the supply catalogue, they were often unavailable.

After many emails and phone calls, they eventually found most of what was needed. And, when replacements could not be sourced, parts were repaired rather than manufactured due to engineering constraints.

Thanks to the effort of the hardworking team at FSE-10, the truck is available to continue serving Australia.

"I have pride in my trade and what I can do. I can walk away from this deployment knowing I have been able to re-build a Unimog from ground up," Craftsman Green said.

(L-R) Craftsman (CFN) Samual Jarvis, Sergeant Graeme Kennedy, CFN Joseph Green and Lance Corporal Daniel Waller, in front of the Australian Army Unimog they have rebuilt from the ground up at the main operating base in the Middle East region.

The force support element provides maintenance from the main Australian operating base in the Middle East region and supports forward task groups. The workshop includes vehicle mechanics, electricians, fitter armourers, electronic technicians and a metalsmith.

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Author Flt-Lt Dion Issacson Photos SGT Kirk Peacock

J4 Maintenance HQ JTF633

I recently returned from a deployment as the J4 Maintenance within HQ JTF633 and would like to write about my experience and the position. The J4 Maint position is an O3 position reserved for engineer qualified RAEME personnel. The position is essentially the Brigade SO3 TRF, only for the deployed forces within the Middle East Region (MER). It holds the MAA technical delegation for the MER, reporting directly to the JTF633 J4, and a direct technical responsibility to the JOC MAAR. You work hand in glove with a senior ASM within the headquarters, exactly like in the Bde setting. The workshops are spread across multiple countries, with very different conditions, capabilities, fleet sizes and personnel numbers.

Much like Daenerys was the mother of dragons, I was the father of Dargons. I had direct technical oversight for all the ASMs, with a very large amount of assistance and guidance from the HQ ASM. You are the delegate for their Technical Authority and provide a review and advise function for all change proposals, maintenance deviations and dealings with SPOs on any number of theatre issues. There are occasional requirements to move around theatre for audits, battle damage assessments and other taskings, so being able and willing to travel is a must.

The J4 Maint is a position that directly reports to the HQ JTF633 J4 (O5, tri-service position). Your officer peers within the 4 cell are generally all Major level (other service brethren colloquially known as sky and sea Majors). This presents the J4 Maint with a real opportunity to take on some more responsibility than a regular CAPT position.

I have never been in the position to be in a Brigade HQ as the maintenance engineer (aka SO3 TRF/EME) so being able to fulfil that role for a short duration, gain that experience, and learn its nuisances without needing to have an additional posting order struck was very helpful. Now returning to the formation HQ, I have a better understanding of what the Brigade staff have to deal with and can adjust my planning to better accommodate their requirements. Another real benefit from this position is that while your role is reserved for only Army, a number of the other 4 cell positions are Tri-Service, so you are almost guaranteed to be working day-to-day with Navy or Air Force personal. I will admit, this was another reason that I enjoyed the shorter deployment, gain that tri-service experience of beards and blue uniforms, without going through an entire posting cycle length.

While many people seem to have a dim view of AMAB, I think that is not a fair assessment. The place and community are as good as the energy you put into them. Within the big four caravan park AMAB you have your own room, multiple gyms, great mess, volleyball competition, good public areas and you have opportunities to explore Dubai pretty frequently. Throw in fortnightly trivia, music and three drinks, life is pretty good. Just make sure you do not fall into the trap of thinking that a 'Kornetto' is the same as a 'Cornetto', otherwise disappointment awaits you.

I was the first to change from a six month deployment to a shortened four and a half month duration. After now deploying for a six month and four month duration, I am happy to advocate for the shorter duration. While you miss out on the obligatory two week holiday to Europe to propose to your significant other and spend too much on accommodation because you do not understand exchange rates, the shorter duration seemingly reduced repetition fatigue and made the experience all the more enjoyable.

For any Engineer qualified junior officers I strongly recommend putting your hand up for this position, it is a great learning opportunity, good experience and plenty of fun. The four month duration should also help when trying to get released by your unit, because let's be honest, that is shorter than many will be away for exercise season! Make sure you do the right thing by yourself, get on the TRF staff officer course, be up to date with those annoying career courses and book dental eight months before it is due to expire.

Workshops Task Group TAJI IX

Workshops TG TAJI IX

1 REGT RAA Workshops Task Group TAJI VIII CFN

Zachary Ross

The workshop consisted of ASM WO2 Anthony Kuilboer and SGT Phillip King in EMEOPS, CFN Zac Ross and CFN Lee Simons in Vehicle Sect, SGT Kalki Mason (NZ), LCPL Jack Peters and CFN Jarrath Davies in EIR/Elec, CPL Chris Potroz, CPL Josh Struthers (NZ), and CFN Greg Johnston in GE, and CPL Mollie Turley in RPS. CFN Mitch Clark joined the workshops as a late inclusion with about two months left in the trip and CFN Matthew Raines joined in as the ROCTFA replacement. Additional to the Workshops there was also MAJ Michael Lane (OC LOG COY/S4), LT Tama Verry (S43) and SGT Mitch Reeves (linguist) flying the RAEME flag in the Task Group HQ.

ANZAC Day, TGT VIII L-R SGT P. King, CPL M. Turley, CFN M. Clarke, CFN J. Davies, CPL C. Potroz, LCPL J. Peters, CPL J. Struthers (NZ), CFN Z. Ross, CFN I. Simons, WO2 A. Kuilboer. Absent: SGT K. Mason (NZ) and CFN G. Johnston

The Workshops deployed on the 13th November 2018. For the majority of the workshops it was our first deployment and we were not too sure what to expect. After landing in country and getting a detailed HOTO from TGT VII we were ready and raring to go.

Before we could really get started we had to make sure we took the time to celebrate RAEME Birthday, or St Eligius Day as the REME boys call it. Having only just arrived we didn't have a chance to organise anything, luckily for us the REME boys had organised a church service and a giant birthday cake.

CFN Gregory Johnston firing the AW50

Overall the workshops was constantly busy with the normal work flow of inspections, services and repairs as well as providing support to the training teams working with the Iraqi Army. All of the Workshops members had the opportunity to be involved in tasks 'outside' in the Iraqi camp; whether it was supporting Iraqi range shoots, inspecting and providing advice on facility improvements, or helping out with divestments of equipment to the Iraqi Army. Some of the Workshops even got a chance to visit Baghdad.

There was always great banter between the guys' right from the start and all the way to the end regardless of how many times the trip got extended. It was a great experience working with our Kiwi brethren and like everyone else I feel like I couldn't have done this trip with a better crew. Up the spokes! TGT VIII

PMV Pack lift with the assistance of the REME HRV

Enjoying some downtime with a game of darts

PMV Pack lift with the assistance of the REME HRV

RAEME Birthday/St Eliguis Day, REME, RAEME and NZ contingents TGT TAJI 2018

ASEME

In keeping with the tradition of the Soldier technician, the staff and trainees of ASEME have undertaken a variety of foundation warfighting and Combat Service Support training operations. This training has allowed over 300 trainees to undertake the new Combat Marksmanship program whilst also allowing for trainees to apply their trades in a tactical environment on the ground.

At the time when Army was undertaking Ex Talisman Sabre, the personnel of ASEME were preparing to deploy on Exercise Bluebell, preparing the soldier technicians of the future. From 17 Jun 19, trainees undertook offensive, defensive and logistical operations within Puckapunyal and the AWMA. This training exposed trainees and staff to adverse conditions, and concurrently to vital military and technical training that will allow trainees to enhance capabilities within the defence force.

The first of three training modules undertaken by trainees focuses on Basic Soldier Skills. This package builds on the foundation warfighting principles taught to recruits at Kapooka. Basic Soldier Skills (IMT-1A) exposes trainees to basic defensive operations, section level tactics, Tactical care of the combat casualty, patrolling and navigation. Trainees conducted team building activities such as Blind folded rock climbing under instruction from peers and abseil upside down under the control of a peer. IMT-1A placed trainees in an environment where they were challenged physically and mentally.

Figure 1: Blind Folded Rock climbing undertaken during IMT-1A

The second module, IMT-1B, covers Dismounted Operations. This sees trainees occupy a series of positions throughout Puckapunyal, where they revise their foundational warfighting skills and section level tactics. Following battle prep, the two call signs (21 PL and 22 PL) deployed to their respective TAORs, establishing defensive positions whilst conducting offensive, defensive and basic stability operations.

21 PL deployed to the South, where they conducted tasks at Platoon and Section level to clear EN ISR elements. They established a VCP where they intercepted local civilians, FR military, and MAF recon groups, that were subsequently destroyed. 22 PL deployed North, to undertake counter-ISR operations. This saw them conduct OPs, standing patrols and counter mine drills. Sections also encountered local farmers displaced by MAF, which the sections of 22 PL subsequently cleared from that land, improving relations between the local population and Australian forces.

Due to enemy's rapid advance, 21 and 22 PL withdrew to an MDP IVO CHQ, wherein they dedicated three days developing the position for an impending attack by the 8 MAF Mot Inf Bde lead Bn. The IMT1B Coy (-) position conducted an effective MDB, successfully delaying the Mot Inf Bn's advance. The C/S successfully withdrew to the South to reconstitute with CSS C/S as part of re-org and was postured to continue defensive operations, after a gruelling pack march to Colston's Hill.

The final module, CSS or Combat Service Support, exposed trainees to how a CSS element functions in a field environment, and concurrently allowing for trainees to apply their warfighting and basic soldier skills but within a logistic context. This component of

Figure 2: Staff and trainees dig pits during FTX1 at Puckapunyal

FTX1 saw trainees deployed as part of a CSST-sized element, here trainees covered nine lessons ranging from CSS Daily Operations, Trades in the Field and the conduct of Forward Repair Teams. During this activity, trainees would build upon their soldier skills developed whilst at ASEME as well as significantly enhancing their understanding of CSS effects in a field environment. This exposed trainees to concepts such as how CSS organisations work at the strategic and tactical level, down to daily operations a craftsman would conduct within a field environment.

Figure 3: Trainees using a recovery vehicle during CSS

It was evident that trainees enjoyed the opportunity to conduct their trades within a field environment, whilst displaying to trainees what is expected of them when they complete their OJT and eventually post to their units. They had the opportunity to learn and draw upon instructional experience and knowledge from the staff of ASEME. This also allowed for trainees to enquire about the range of units, job roles and trade specialisations available to trainees following the completion of initial employment training.

Despite the cold conditions and limited access to key resources, staff were able to use their resourcefulness and work within the limitations that they had, but holistically FTX 1 performed to a good standard.

In August, the staff of EESW with support from wing staff of ASEME ran an upskilling program at Kapooka designed to qualify all members of ASEME in the Combat Marksmanship Continuum. The new continuum focuses on a combat mindset, new drills and Rifle Practices (RP) that will enhance the lethality and effectiveness of all Soldiers. This training involved students engaging targets at 5m for the first day learning; post engagement sequences, trigger manipulation, stance, holdover (the distance from the centre of sight to centre of bore) and most importantly, recoil management IOT effectively engage, reengage and scan for enemies at distances out to 300m.

This training led into the introduction the new Rifle Practices, with Trainees and Staff completing RP 1-2 in the WTSS before progressing to a live fire serial, 3A. The aims of these RP serials involve effective employment of a weapon system against multiple targets out to 300m, to break old neural pathways that encouraged hesitancy to engage a target and most importantly reinforce combat behaviours.

The training undertaken at ASEME serves as an important reminder to all, that the training trainees receive distinguishes them as RAEME craftsmen and not civilian tradespeople. As they are able to perform their trades in any scenario and are prepared and capable of defending themselves and their teams against a hostile force.

Figure 4: Despite cold conditions, the RAEME Corps flag flies proudly in the CSST position

Figure 5: Trainees receive a lesson during firing of Rifle Practice serial 3A

ASEME FTX 2 2019 IMT1B – Dismounted Operations

IMT1B – Dismounted Operations (DISOPS) is formed around the headquarters of Armament and Construction Wing (ACW) and is the middle of three military exercises, as part of ASEME's Military Skills Training program. DISOPS is an infantry minor tactics activity, focused on reinforcing the skills taught at recruit training and refreshed at IMT1A – Basic Soldier Skills (BSS). DISOPS is also designed to test the resilience of ab initio trainees in a military context and introduce new concepts and Tactics, Techniques and Procedures (TTP) that they have not been exposed to previously.

FTX 2 was conducted between 14 and 25 Oct 19, with DISOPS deploying to Puckapunyal Training Area for the duration. After issuing stores and equipment, the two platoons marched to their respective harbours for a day of rehearsals and consolidation of the lessons that had been provided to the group as part of ongoing military training, since the last FTX. At stand to on Wednesday 16 October, the scenario went live.

During the first five days of the activity, sections conducted various tasks ranging from routine patrolling to deliberate attacks; mine drills to VCPs; PW handling and liaising with local civilians (of the friendly and rather disgruntled variety). On Sunday afternoon, the two platoons again pack marched, this time to a Main Defensive Position (MDP) location where they proceeded to dig in.

Over the next four days, the soldiers dug down to stage three, with main fighting pits including; sleeping bays, OHP and staked guns. Wire obstacles were constructed and a standing patrol was established and maintained. Constant enemy probing and recon by fire was repelled and as the enemy pressure increased, Indirect Fire (IDF) was received. At stand to on Thursday 23 October, a major enemy assault on the MDP commenced. The assault was preceded by artillery preparatory fire and slowly force concentrated on the left flank of the position. 22 PL responded with heavy direct fire and the enemy assault moved across the front of the MDP and focused on 21 PL's right flank. Ammunition was running low and the 'Delay' mission had been achieved; the order was given to conduct a fighting withdrawal.

The company started withdrawing from 22 PL's flank, in section lots. A friendly IDF mission dropped smoke on the MDP, allowing 21 PL to break away, then HE was employed to disrupt the enemy pursuit. The sections staged themselves in defensive lines at intervals of 50 to 100m and ambushed the pursuing enemy at close range, before bumping back. After three such engagements, the enemy was defeated and no further pursuit was made. The company silently occupied a hasty harbour, and the exercise was completed.

During FTX 2, DISOPS experienced temperatures ranging from 0 degrees to over 33 degrees C, hot sunshine, strong winds and cold rains; all that Pucka is known for. The conditions gave the soldiers an opportunity to show resilience and mental toughness, to gain confidence in the quality of their equipment, and to realise that they can conduct operations regardless of the weather.

By the end of FTX 2, the soldiers of DISOPS had been exposed to a higher level of IMT, worked through arduous conditions as small teams, experienced all-night activities and emerged as better soldiers. FTX developed the soldiers' skills and confidence; and their ability to operate within section/platoon elements. The successful completion of DISOPS will put the soldiers in good stead for the conduct of Combat Service Support (CSS) and their careers into the future.

Career and Advanced Training Wing (CATW)

SGT Cheyne Truelove

Career Cell

Career Cell has continued to lead the way with its development and delivery of the highest quality training solutions within the Subj 4 space; this is on the back of the receiving the 'ALTC Continuous Improvement Achievement of Excellence Award' in 2018. This year has seen the cell anticipate the conversion from the TRAMM-L to the LMSM and adapt its training and assessment material. The Cell's foresight will see a direct influence on the preparedness of the Corps for this change.

ASM CATW WO1 Sean Roberts with the 0044 Subject Four Warrant Officer Course after the presentation of their Artificer Scrolls

CO ASEME LTCOL Gordon presents SGT Truelove with the Student of Merit Award for the 0044 Subject Four Warrant Officer Course

Another major innovation in training that Career Cell has developed this year is the inclusion of a 'Community Engagement Activity' that corresponds to each session of the CPL's course. This initiative provides both staff and students the opportunity to donate their own time and efforts in service of the local community. The training outcomes achieved through this are the development of our JNCOs planning and C2 skills, demonstration of trade and WHS practices, public display of Army's Values and the re-enforcement of Army's culture while providing service to Australia, its people.

The Cell will farewell Cheyne Truelove, while Matt Dowd, Mark Ker-David, Kallum Maitland, Nick Wolfenden and Josh Brown stay on in 2020 to maintain Career Cell as the premier facilitator of promotion courses within ALTC.

CO ASEME LTCOL Gordon presents SGT Parlour with the Best Technical Assessment Award for the 0044 Subject Four Warrant Officer Course

The SUBJ4 CPL course and CATW Staff have completed another fantastic community engagement activity. Beechworth RSL needed a hand in the restoration of some rather large museum pieces. Although the weather gods didn't give us ideal painting conditions the team did a first rate job.

Another successful community engagement activity completed. CATW Staff and students from the current SUBJ4 CPL course fenced and rebuilt a vegetable garden area for the students of Melrose Primary School in West Wodonga. Ensuring they left their Corps colours behind as a reminder of who did the work.

Specialist Equipment Training Group (SETG)

It's been another busy year for SETG with the VMs, Fitters and Boffins all being kept very busy delivering maintenance courses. There was also a trial course for the Supacat SOV; this will course end up being delivered in Units. The imminent delivery of Boxer, means that maintenance training is starting to be discussed with a number of options being considered.

Wodonga Institute of TAFE have also started embedding staff into the various SETG Cells and this is working very well.

We say goodbye to SGTs Dean Trainer, Ray Perry and Jeff Ryan who are all off to greener pastures or in Ray's case ACW!

ASEME Recovery Training Centre

2019 has been a year of first and lasts for the Staff and trainees of the Recovery Training Centre. With the 0033 Basic Recovery Course (BRC) we farewelled our legacy Mack HRVs and ushered in a new age of capability with the 45M HRV being introduced to the Trainees of the 0034 BRC.

Throw in several overlapping BRCs in waiting, six specialist A-Vehicle course and a Pilot Sub 4 CPL Recovery course, Professional Development courses such as Driver Testing Officer (DTO) courses and it would be hard to argue that the Recovery Platoon staff had not squeezed every second of the day to fit in training.

January started hot and early with the usual suspects SGTs Chris Brown and Matty Moore, with guest appearance from Anthony (The Alpha) Wicks. Course Managers WO2s Stephen Groth and Nathan Davis kept the training programs ticking over. Our ARES CM / Instructor and JLU tormentor, WO1 Glen Huckle kept us all on our feet. Not to forget the big man himself, WO1 Terry Jones as the WORM Recovery Training Centre.

45M HRV roll over of PMV

We also still have our resident storeman, MR Greg Cross, who denies on a daily basis that he still has CES for the Centurion ARV (don't believe him) and that he was just resting his eyes.

During the first half of the year, two members from the NZDF came across for ANZAC exchange to see how the boys on the big island do things.

LCPL Harvey (you gonna eat that?) McGinity jumped on board with the 0033 BRC to get up skilled from a lowly VM to one of the chosen, while SSGT Heath (Basil Patch) Palatchie played with the 45M and tried to keep up with our resident road runner, WO1 Glen Huckle.

45M HRV lifting HX77

Sub 4 CPL Recovery this year was as emotional for the staff as it was for the trainees, with a new construct focusing on improving the mentoring skills of the JNCOs who will be assessing the OJEs and helping them get through their workbooks once they arrive in the units. Throw in some bitterly cold, wet days/nights, a lot of "Wait out" and we all came away better for the experience.

M113 up the new recovery cliff

July gave us the opportunity to send one of our own to the Land of the long white cloud. SGT Matty Moore was able to impart some of our knowledge and experience while getting a taste of how things are done in the NZDF (firefighting training, Working at heights and repelling) and trying not to freeze any extremities off.

Cold morning in NZ

NZDF Wrecker & Trailer

NZDF firefighting training

Throughout all this, our resident tech guru and arguably one of the most youthful looking staff members, SGT Chris Brown, has been working tirelessly at bringing the current assessment tools into the digital age by converting all assessment documents into PDF and building pre-courses through ADELE. The aim being that one day soon all assessments will be digital and there will be no more fights in the office about the pink paper in the printer.

At the beginning of Oct, Recovery welcomed a Lateral Transfer from the UK, LCPL James Cooper, who will remain with the PL, until he is posted to 1 CSSB, Darwin at the end of 2020.

With the end of the year fast approaching, we will see two staff leaving and three coming in.

WO2 Nathan Davis will be moving over to Land 121 to course manage the 45M and, soon to be, 42M introduction to service and SGT Anthony Wicks is headed back to 3 CSSB in Townsville to be closer to family and to regain the title of North QLD Alpha Recovery Mechanic (Self-proclaimed, undisputed).

Additions to the platoon in the new year will be SGT Jachir O'Brien as CM Spec / BRC, SGT Andrew Reid and (soon to be SGT) CPL Kane Jones for BRC.

And yes, Greg will still be snoring in the store room.

Recovery out.

Task Unit Marlin deployment on Indo-Pacific Endeavour and Joint War fighter Series 2019

CFN Kyle Barnard

Throughout 2019, 162 SQN have had a successful year. During 2019, 162 SQN have conducted multiple Griffin Guns exercises, Joint War fighter Series (JWS 19) and a deployment to South East Asia on board HMAS Canberra for Indo-Pacific Endeavour (IPE 19). All these activities have been critical to increasing 16 AVN BDE, Army and ADF capability.

After a successful First of Class Flight Trials (FOCFT) culminated 2018, 162 SQN were back in the thick of Tiger capability development. The fast pace of Griffon Gun live fire gunnery exercises transitioning rapidly into an international deployment onto HMAS Canberra, 162 have shown that they were ready to increase the capability and preparedness of the Tiger.

Tiger ARH deploying flares

Unlike the last time 162 SQN boarded HMAS Canberra, this deployment had new obstacles in order to get four Tigers, from Darwin to Subang in Malaysia and then embark onto HMAS Canberra. However good maintenance and logistic planning enabled 162 to successfully accomplish this task.

Once Task Unit (TU) Marlin (162 SQN with attachments) was in Subang, it took us just three days to get four tigers, off the C17s, rebuilt and ready to fly onto HMAS Canberra, from which they would conduct the IPE 19 and JWS 19 over the next 3 months.

TU Marlin Group Photo

While on board HMAS Canberra the team got to experience a lot of different cultures form the four ports they were fortunate enough to visit. These ports would include; Phuket (Thailand), Nha Trang (Vietnam), Singapore and Jakarta (Indonesia) where TU Marlin got to spend a day or two exploring.

Along with the fun and excitement that came with the port visits, the TU Marlin had another objective to achieve. Plan Kestrel, as the objective is called, aimed to see the Tiger achieve new targets whilst working with different Aircraft Types embarked on board HMAS Canberra.

During IPE 19 the team managed to achieve AACI (Army Aviation Capability Increments) 3-4 which involved a single Aircraft type being utilised over multiple spots on the Ship, as well as two point hot arming and refuelling. This culminated with a live fire demonstration of gun, rockets and flares which was greatly anticipated and enjoyed by the Ships Company and JTF on board. During JWS 19, TU Marlin managed to achieve AACI 5-9, which culminated in the Tiger, Taipan and Chinook flying and operating off one and two LHDs. This including tasks such as recon, CAS, escort and counter-FIAC (Fast Insertion Attack Craft) roles in support of all amphibious force elements.

Aerial photo of HMAS Canberra

During the long and flexible working hours the SQN endured, the end result spoke for itself. TU Marlin flew 197 air frame hours on JWS 19 and 40 air frame hours on IPE 19. The beginning (and middle) of 2019 demonstrated the high standard of Tiger operations particularly in support of Joint Capability and the realisation of JP 2048 (of which Plan Kestrel is the aviation component) for completion of the LHD integration into service.

1st Aviation Regiment – Tiger Maintenance Organisation MAJ Boyd Schrader

The soldiers, airmen and contracted technicians of Technical Support Squadron (TSS) and the Technical Support Troops (TST) of 161 and 162 Reconnaissance Squadrons started 2019 knowing it would be a milestone year for Tiger, with both of the Regiment's flying squadrons earmarked for overseas exercises.

Shortly after the first regimental gunnery exercise, 162 TST and TSS personnel force concentrated under Task Unit (TU) Marlin and deployed four Tigers to Malaysia via RAAF C-17, rebuilt and self-deployed to HMAS CANBERRA to start their Indo-Pacific Endeavour cruise. This international, embarked exercise with multiple port visits was a highlight for many of the RAEME Tiger brethren and spoke strongly for the attack aviation capability.

In the background of all this, a main rotor blade special inspection was mandated across the fleet following a safety bulletin from Europe and CPL Dan Bowley, the Regiment's solo RAAF Non Destructive Inspection technician, completed the Darwin fleet before flying to Townsville and completing the aircraft embarked on CANBERRA. The low tempo holiday behind them, TU Marlin charged into Joint Warfighter Series 19 with consistent aircraft availability and a rate of effort that exceeded expectations.

TU Marlin, JTF COMD and members of Ship's Company embarked on HMAS CANBERRA

The Aircraft Repair Troop and Maintenance Support Troop then needed to focus on recovering TU Marlin, refurbishing spares and equipment, and turning it all around to establish TU Possum (based on 161 Reconnaissance Squadron) for a deployment to the USA for electronic warfare testing and a USMC attack aviation tactics course. Just as the first two aircraft and equipment loads were being made ready to depart, the effects of a recent earthquake postponed this international activity until 2021. We will get there one day! As a consolation, TU Possum will support the 3 Bde CATA in Townsville. Almost the same thing, but you can visit North Queensland without a visa.

Continuing a successful tradition at 1 Avn Regt, junior ECN 411 and 412 technicians continued to rotate through the on-site Airbus Deeper Maintenance crew to increase their exposure to longer scheduled tasks and rapidly finalise their Certificate IV (Aeroskills) journals. Additionally, the nominees for the Tiger Maintenance Organisation (MO's) 2018 Tradesperson of the Year – CPL Mitchell Johnson (161), LCPL Patrick Schweikert (162) and CFN Ramsay Fish (TSS) – were finally awarded their flight in the battle captain's seat of a Tiger. Earlier in 2019, LCPL Schweikert was embedded with CareFlight Top End for one week to assist with deeper maintenance cycles on their King Air B200 and Beechcraft B400 fixed wing aircraft.

CFN Fish prepares to pull pitch.

Throughout the year, the Airbus-manned Aircraft Repair Troop has been doing marinisation, de-marinisation, corrosion inspections, gearbox changes and other tasks to support the TSTs. The international – and Navy – flavour of 2019 has been challenging to the way we move parts and data for this complex platform. Our Maintenance Control Section, Boeing-manned Tool Store and RAAOC Repair Parts Store have risen to these challenges and transformed how we prepare for overseas deployments. Their work isn't photogenic but it keeps the Tiger MO running.

2019 has also seen the Regiment engaged by the early phase of LAND 4503 Armed Reconnaissance Helicopter Replacement. Whatever the outcome of the next project gate, the Tiger MO will aim to deliver a trained, healthy workforce that wants to be here and is transferrable to any future attack aviation platform. In the meantime, Australia is the worldwide fleet leader for Tiger with the Australia's 22 aircraft outflying the French, German and Spanish fleets in 2018.

LCPL Schweikert was embedded with CareFlight Top End for one week.

1 Regiment Royal Australian Artillery - Technical Support Troop CPL Christopher Barker

1 Regt RAA on the home front

2019 started with the 1 Regt RAA TST split in two with over half the workshops deployed since Nov 2018 on Task Group Taji VIII and the remainder back home in the Regiment.

Welcome to 1 Regt RAA Technical Support Troop for 2019, it's a new year for some and others business as usual. Let's introduce the new faces amongst the WKSP Pers. Sgt Smith (RPS), CPL Canning (RPS), CPL Barker (VEH), CFN Matthysen (Veh), CFN Kiefer (EIR) and PTE Raymond (RPS).

So once induction training was completed the focus turned towards EX BARCE. This meant finding and fixing all the equipment needed for the exercise. This wasn't without its issues, the constant fight for information meant the goal posts moved day to day. Minor miracles later the REGT deployed to Shoalwater bay and did what ARTY does best.

Post exercise fun revolved around fixing the broken gear whilst prepping for the next activity. All the while sending people to undertake driver's courses, pre-deployment training, and job specific courses so our already tight manning got smaller.

ANZAC day saw the unit (or what was left of it) march thru the city of Brisbane. Before enjoying some fun and festivities at the GUNNERS club in the afternoon.

Before you could blink Ex CUTA reared its headed and once again the unit was a hive of craziness as people tried to make sure they had all their required equipment so that we could deploy once again to Shoalwater Bay to undertake some live firing with the Japanese Self Defence Force. This being the first time in over half a century that Japanese artillery had been fired outside of Japan. Ex CUTA finished with the regiment leaving the bulk of the assets in the bay which allowed many members of the regiment a chance to undertake some piquet work (some would say camping). Whilst the members of the regiment returned to base on Buses.

Post Ex CUTA meant that Ex Talisman Sabre 19 was just around the corner, this meant the unit deploying extra pers and equipment to the bay so that we could be the best opposition for 1BDE. For some this meant stepping away from their base jobs and tackling some interesting and sometimes challenging activities. By all accounts some had more fun than others.

It's now post TS19 and the WKSP has finally reunited with other recently deployed members. So as a full workshop our focus turns towards the tail end of the year and all the activities yet to be sprung on us.

A special mention goes out to the ring-ins this year that have helped us keep on track. Stepping into the vacant ASM position has been WO2 Marty Baylis (perfect excuse to escape from BDE HQ), assisting the gun plumbers this year has been CPL Schwartz (20STA) and CPL Dilley (7CSSB).

10 FSB – Technical Support Platoon 2018/19

The backend of 2018 saw the WKSP deploy on EX Harry's canter. It was a mild four wheel drive experience up the cape where the attached cooks attempted to roll their G Wagon as often as possible. A notable experience was when the convoy accidentally cornered a scrubber bull during a relief stop. There was much scrambling atop of vehicles to make way for the angry beast as it charged one of the boffins. It was a good but poignant exercise as the WKSP began to post out and disband what had been a close knit group.

The end of the year saw the boss CAPT Lemanski move onto greener but simpler pastures at 2 RAR. The ASM Jase Lee got promoted and then became the font of all knowledge for the new MAN vehicles. Griffo went to join the WKSPs great nemesis, the shirt tuckers from 3 CSSB and Mick DeHaan went to put the special in the special world.

2019 got off to an interesting start with lots of new people posting in. It was an interesting period and whilst usually new groups take a while to gel the WKSP was given the opportunity of assisting in the Townsville Flood. The OC 10 LSC took the bold move of giving the WKSP access to two G Wagons to assist in the sandbagging of a large apartment complex in close proximity to the Ross River. Whilst giving the WKSP access to military resources in the middle of a natural disaster was a bold move it paid off with the formation of the WKSP named 'Task Force Snapping Turtle'. Over the space of the Saturday TF Snapping Turtle managed to place approximately 600 sandbags into the apartment complex. Once the apartment complex was sand bagged they repopulated late Saturday night with the rest of the platoon which had been formed up by the newly posted in CAPT Buchan. On Sunday TSP identified an opportunity as they discovered an unmanned sand pile with several thousand un-filled sandbags sitting next to it. TSP and some attachments from other sub units managed to punch out about 2 thousand sandbags before 3 BDE units resumed the sand pile. It was humorous to see the 3 BDE COMD appear in the media posing with sandbags filled by 10FSB.

With the flood over TSP personnel deployed all over Townsville to assist in the clean-up. The new soldiers were now well and truly part of the crew as they shovelled sludge and helped the people of Townsville recover from the flood. Meanwhile the WKSP had its own refugees whom began to return home. Whilst a natural disaster is never good it forged the WKSP for a far greater force of destruction – ACAU.

10 FSB Flood Assist

The ACAU audit aged the ASM 20 years and the CPLs 10. However there was no loss of accreditation and the boats from the Vietnam era are still floating so life goes on.

In July the WKSP had its annual Golf day which was organised by the WKSP social member CFN Dutton, it was an extremely vigorous sporting occasion and was themed double denim. CFN Dutton presented each member of the WKSP with a well thought out gift which if they did not have with them resulted in punishment. A soldier with a receding hairline was presented with a comb and the ASM whose birthday was the week before was presented with an ice cream cake from Woolworths that melted completely by the second hole.

In summary; unbelievably, it's been a quieter year by 10 FSB standards, although it has seen the WKSP living the RAEME ethos from helping out during flooding to helping save the life of our super boffin Squeak who had sustained a life threatening head injury.

Vehicles lined up Ex Harry's Canter

101 Field Workshop Company - 1 Brigade's Maintenance Road to War

CAPT WNC Lavery & LT KH Wang

101 FD WKSP commenced their Road to Ready in January 2019. This journey has involved a huge effort in training all personnel, whether newly posted in or remaining from previous years, to a high standard that enables them to operate effectively in both the barracks and deployed environments. Throughout this journey 101 FD WKSP conducted a number of individual training courses, a detailed Coy and unit training program in barracks and three major field activities culminating in the successful completion of Exercise Talisman Sabre 19.

In order for this to be achieved four Combat Service Support Teams (CSSTs) were generated, Lima 1 through Lima 4. Lima 1, led by HQ 101 FD WKSP, was initially comprised of primarily newly posted personnel; while Lima 4, led by 1 Field Supply Company, was comprised of the remaining newly posted personnel and those with extant postings. Both these CSSTs were required to conduct a "Crawl" activity IVO Coomalie Farm from 04-15 March 2019 – Exercise Carbon Predator. The environmental conditions were harsh with the ground proving dry to the eye but treacherous after a 40M or HX77 had passed by. This ensured our Recovery Mechanics were kept very busy throwing out line and winching trucks to solid ground. The end of the exercise saw a lot of sweaty but highly accomplished soldiers reaching ATLS 3 return to Robertson Barracks IOT prepare for the ALTS 6 training activity – Exercise Buffalo Run.

Lima 2 and Lima 3, comprising 1 CSSB Wksp personnel from both Darwin and Adelaide also conducted their own "Crawl" activities in Cultana during the early part of the year. This exercise was in support of the 7 RAR, 8/12 Regt and 1 Armd Regt War fighter activities. Whilst conditions were not as hot as up north, they had their own challenges that come with the Cultana Training Area to contend with. However this exercise gave them an introduction to operating in the field and set them up for the remainder of the training year.

The end of Exercise Carbon Predator saw 1 CSSB and in turn 101 FD WKSP begin training at a tremendous pace. Preparation for Exercise Buffalo Run 2019 (EX BR19) began immediately. Soldiers from Lima 1 and Lima 4 conducted in barracks lessons on orders and back briefing, CSST deployment, redeployment, and occupation, defence of a CSST, including crash out, and operating in a CSST within a BSG environment. This theoretical training prepared the soldiers of 101 FD WKSP well for what was to come during EX BR19. The deployment date came and the Craftsmen were task organised between the Lima call signs. The deployment into the training area had Lima 1 take the lead for the BSG in securing the BMA. This training exercise saw the CFN of 101 FD WKSP complete multiple FRTs, support DPs, and conduct of Battlefield Clearance Teams (BCT) throughout the fine tuning of the BSG routine and defensive position. After a step up to a new CSST/BSG location and more task specific training, the exercise was drawing to a close. However, one key training outcome had not been tested: crash out. It was a cool dry season morning and the BSG was at stand to. The positon was contacted from multiple directions with intelligence suggesting a nearby larger force was posturing to attack. The chilling words came from L9 over the net "crash out, crash out, crash out". The soldiers leapt into action with the lead up training and rehearsals of concepts all proving invaluable as the entire BSG had withdrawn and begun redeployment within 30 minutes. EX BR19 was a success and brought all 101 FD WKSP Craftsmen to ATLS 6 in preparation for Exercise Talisman Sabre 2019 (EX TS19).

Between June to July 2019, the 1st Combat Brigade (1 BDE) completed its certification training; the Joint Warfighter Series 2019. This included the Ready Battle Group's certification Warfighter Exercise (RBG WFX) for Lima 2 and EX TS19. These exercises were crucial in certifying 1 BDE as the Ready Brigade. During this period the 1CSSB craftsmen, consisting of soldiers from the 101st Field Workshop Company based in Darwin and 1 CSST Workshop Platoon, based in Adelaide, were responsible for providing the brigade with integral to close maintenance support throughout the exercise. Below are a series of short stories offering a glimpse into the work and experiences of the RAEME personnel who supported 1 BDE units through either the conduct of Forward Repair Teams or the execution of medium to heavy grade repair in the Brigade Maintenance Area during the RBG WFX and EX TS19.

FRT to BG LION and BG BOAR by CPL David Seymour (L28 - WKSP PL, 1 CSST)

At the completion of the BG LION WFX, a consolidated assessment of all Brigade equipment was conducted and a maintenance plan established to ensure all equipment was ready for use during TS19. Among one of the highest priorities for this period was the serviceability of the M1A1 and AS4 fleets from BG LION and BG BOAR. With only a short turnaround between exercises and a lot of work to be completed, the BSG stood up an FRT of 21 Craftsmen, 1 Driver and 8 vehicles from 3 different Lima call-signs under the my command.

The FRT got stuck straight into the huge amount of work ahead, kicking off the maintenance activity with an AS4 400hr pack service and brake system service under the control of CFNs Jake Mason, Stephen Porter and Adam Cooper. Concurrently, CFNs Jarryd Bishaw and Kerrin Robb took the lead on two bi-annual M1A1 services with CFNs Dakota Phillips, Amandeep Singh, Greg Minns and Morgan Lynch proving to be excellent trade assistants. Over the course of the next three days, the FRT conducted 3 more tank services in the form of 2 x semi-annual services and 1 x annual service.

M88 lifting AS4 for servicing

With all the 'big tank stuff' happening, the boffin bunch of CFNs Chris Coombs, Ben Crawley and Andrew Balfour worked their electrical magic to fix a number of turret and communication faults in both M1A1 and AS4 turret systems. While tank armourer extraordinaire CFN Hugh Waudby conducted a number of technical inspections and rectified a number of turret hydraulic issues.

CFNs Sheldon Otto, Joshua Clegg and Breyan Watene were kept busy with a handful of AS4 turret inspections and services, as well as providing excellent trade assistance to the vehicle mechanics.

With the AS4 400 hr service completed, attention quickly turned to

three AS4 5500km hull services. A job that can typically take up to 4 days in the barracks to complete, all trades came together as one team to crack out each service in just under 8 hours. Tech Elec/AS4 crew commander CFN Joshua Emms quickly learnt the best method for packing wheel bearings, CFN Shane Collins showed up the young pups in the AS4 driver's seat and remembered his many days working on the M113 Fitters Track, CFN Rajender Kumar on his first field training exercise learnt what it means to be a Craftie in the field and PTE Jack Miriklis (a transport driver attached to Lima 2 workshop) got to witness some of the Corps finest soldiers do their thing.

M88 lifting M1A1 Pack

Overall the FRT did an excellent job working some very long days and even longer nights in some of the most typical Shoalwater Bay Training Area weather. They provided some fantastic maintenance capability for BG LION and 1 BDE and developed a great rapport with the supported DCU's.

Recovery Vehicle lifting M88 Pack

Vehicle Repair and Servicing within the Brigade Maintenance Area by CPL Andrew Bryson (L48 – 101 FD WKSP COY).

During the conduct of TS19, L48 was comprised of both the Brigade Service Station (BSS) and Brigade Maintenance Area COY (BMA). These were not separate elements within L48, but rather one pool of tradies that performed the roles of both scheduled servicing and inspections, and second line medium to heavy repairs. Throughout the exercise we managed to achieve 11 major repairs, 19 services, and 73 pre-RSD roadworthy inspections; however, the biggest job, and most interesting by far, was the replacement of the front axle on a HX77.

This was the kind of job that tradies dream of. The initial planning process went something like this: "This job has never been done before, we don't have the right tools or equipment, and no idea if we can even achieve it. F*** yeah, let's do it!" Luckily, the ASM (WO1 Keats) took a couple of days to do ASM-things and magic up an axle from somewhere, and this gave us (CFN "Irish" Riordan and myself) the time to plan out the job properly. The only sticking point we foresaw was lining up the new axle under the vehicle, without having Crafties crawling around under an unsupported load. We decided we'd have to play that by ear.

The axle arrived, all the tools and equipment we had were in place and, under the scrutiny of a small crowd of observers from the project Test and Evaluation team (no pressure), we hooked in. Every Vehicle and Recovery Mechanic in the position was involved, and the removal of the old axle was as smooth as we hoped. Irish conducted the lift of the HX77 using his 45M, and controlled all movement of personal around the job while this was occurring, ensuring maximum safety. After swapping the wheels over to the new axle, which was a minor battle in itself, the fading sunlight prompted us to call it day.

45M recovering HX77

The next morning we got back into it. Our concerns about aligning the new axle proved to be unfounded, as we had plenty of room to get the support stands under the vehicle once the axle was in and this allowed the tradies to take their time under the vehicle. Once our welders manufactured some special tools for us, everything was connected up and the job was complete.

Now that we know what we are doing, this is probably only a four hour job. However, we were glad to take two days for the first time and feel our way through it, learning the RAEME way, by just doing it.

45M Lifting HX77

45M Lifting HX77 axle

A moment on the gun line By CFN Jayke McNellee (L28 - 101 FD WKSP COY)

"Fire Mission take Post!" the cry came, heard even from the RAEME FRT positioned 75m behind the gun line. 102 Battery, 8/12 REGT, RAA flipped into action as Alpha gun initiated the rhythmic crescendo of firing. Sitting in the back of the 40M the shock is felt through every hair on your body as the M777 propels its 43.2KG 155mm projectile into the air, like a large green football spiralling into the sky. Something was wrong, as if a musician had taken leave of the thundering crescendo, our eyes spy Bravo gun. The gunnies moving over the gun like a nest of disturbed angry ants, the call comes out "TIFFY!" nothing is spoken softly on a gun line. Bravo gun isn't firing, the gun sitting idle as Alpha and Charlie quicken their pace, the earth responding in trembling. "get ya breech open" called the calm voice of the Fitter CPL and the bombardier fulfils his request, "yep broken firing pin, grab a new one" one of the ants scurries off and presents the small metallic pin to the fitter, with a quick flick of a screwdriver and a choice word spoken "Give that a go". A swift crack of the breach closing, "Number 2 fire" with an instantaneous pull on the lanyard Bravo gun jumps into recoil and the gun is back up, continuing the fire mission with its brothers.

Jack and the Boys, Repair of a High Mobility Engineer Excavator by CFN Jack McLeod (L18 - 101 FD WKSP COY)

The day before the war started for Ex Talisman Sabre a HMEE (High Mobility Engineering Excavator) was emergency dropped into the Brigade Equipment Collection Point (Brigade ECP), with some very anxious commanders from 5 RAR and 1 CER. As part of L18, my FRT (Forward Repair Team) was dispatched to the Brigade ECP to assess the damage and conduct the relevant trade, parts planning and repair for the HMEE.

On arrival we discovered that the hydraulics didn't work and this began 8 arduous hours of fault finding and diagnosis underneath the scorching Shoalwater Bay sun. It was hard work underneath the HMEE but the boys dug in and kept at it until we found out what was wrong by a process of elimination mainly because we couldn't get our hands on a manual. As the only person who was C Vehicle Qualified in 1 CSSB, the pressure was on for me to find out what was wrong and get it back online for the big push happening the next day. This was made worse by the anxious rank who needed it back online.

Eventually we found out what was wrong after being doused in hydraulic fluid for several hours, and through a very educated guess and a series of trial and error (pulling PRVs out and plugging them back in), we discovered the faulty PRV and got the HMEE back online. Just in time for the war and the hot box drop off.

Jack and the boys from FRT 1 signing out.

Provision of power to the Brigade Support Group by CPL Alexander Hurley (L48 - 101 FD WKSP COY)

Only two ECN 418 were allocated to L4 during EX TS19, it was our job to coordinate and distribute power for the BSG and all integrated call-signs. This was achieved by use of two 60kVA generators and up to 1.25km of field power distribution system (FPDS) cable, as well as step down capabilities for all other call-signs so as to allow for controlled and timed draw down/roll out of power. Preparation for this task consisted of the allocation of required stores, servicing kits and man power. We were left severely wanting when it came to man power, due of this CFN Hutchinson and I conducted preventative maintenance up to three times a day in order to negate any influx of breakdown maintenance. During EX TS19 we moved four times with one crash out conducted. It was a journey, however our drills were down pat.

Conclusion

The tough training over the six month period has been well worth it. 101 FD WKSP as a part of the Ready Brigade have been certified as 'Ready' for known and unknown operations and contingencies. Looking ahead, 101 FD WKSP will be putting our best foot forward by rewarding our best performing soldiers for their hard work and commitment to the organisation. 101 FD WKSP as a part of 1 CSSB will deploy on operations with FSE 12, LSE 3 and other FIEGs in support of mounting operations. Further, 101 FD WKSP will support international engagements in Thailand, Timor Leste, and Indonesia. The Workshop has had a tough yet rewarding training year in order to reach Ready. The Craftsmen and Officers of 101 FD WKSP are looking forward to the challenges facing us in the coming year.

102 Fd Wksp Coy

The pride of 3 CSSB hit the ground running stronger and faster in 2019. RESET has proven to be extremely busy with support to all 3 Bde units, Training Support Requests and the usual dog and pony shows. It was no easy start since the North Queensland Floods forced those who just marched-in to act swiftly to provide maintenance and recovery support to the Joint Task Force assisting the local community.

OP NORTH QLD FLOOD ASSIST (DACC)

On 03 Feb 19, Townsville experienced a significant flood event that affected the majority of the community. There was an expectation from the community that the Army will be out in force to help, and that's exactly what we did. Some personnel within the Coy lost their houses and belongings but put the task of providing maintenance and recovery support to the Brigade first. In the weeks after the event,

102 Fd Wksp Coy worked closely with 3 CER, going into the flood affected regions to commence the task of cleaning up the streets. It was hot and humid, but many hands made light work of the huge task.

SPORTS

This year 102 Fd Wksp Coy placed first in the Bn Obstacle Course competition. The team of nine made easy work of the course and finished 30 seconds faster than the competition. As usual, participation from the Coy was strong during the Bn Cross Country allowing 102 Fd Wksp Coy to take first place. Congratulations to CFN Quilliam from Vehicle PL for placing first over the 10km track. The workshop is looking forward to the upcoming athletics and swimming carnivals to prove that we are still the Champion Sub Unit of 3 CSSB. More than likely we will take the trophy again this year.

LAND 121 CAPABILITY

Throughout the year, the Coy has been taking ownership of the new 40M and HX77 vehicles replacing the legacy GMVs. Due to ongoing permit issues, Ex Brolga Walk 19 was the first opportunity for the Coy to test the capability of these vehicles in the field environment. This was followed by a maintenance and recovery team with the WHITEFOR CSST on Ex Talisman Sabre 19. As expected, there were some teething issues adjusting to the new vehicles, however, our Crafties have put their heads together to turn a cargo vehicle into a maintenance vehicle.

ACQUISITION OF THE 45M HEAVY RECOVERY VEHICLES - WO2 Mark Ingleton (WORM)

Early on in the year, we eagerly awaited the arrival of the new 45M HRV and subsequently now have four trucks and most of recovery platoon qualified ready to go. Since arriving in the platoon these trucks have proved to be extremely capable and versatile. The guys have been busy coming up with imaginative ways to test the capability of the platform.

The first test for the new trucks was EX SHOT START where the M88 and a 45M spent three weeks at SWBTA supporting 4 Fd Regt on their live fire exercise by moving targetry around the bay. From then on it was followed up by numerous field trips in support of other 3 Bde units.

This year will see Recovery Pl lose a number of its team due to posting; CPL Kane Jones (ASEME) and LCPL Andrew Smith, CFN's Lantang, Taylor and Wilson all off to 2 Cav Regt.

Lastly, we say a sad farewell to SGT Troy Hardman who is pursuing his chance to become an Air Crewman. His loss will be a major hit to the morale of the platoon and we all wish him the best on his career change.

Troy Hardman – GIRTH
Enlisted: 23 May 2005
Transferred: Aug 2019
226 For Life

45M making light work pf PMV

SGT Troy Hardman

OUT WITH THE OLD, AND IN WITH THE NEW - CPL Michael Vaughan and CFN Christopher Reid

For many years 102 Field Workshop was based out of a once, state of the art workshop. Over years and years the Army out grew the workshop and it started to break down, there were electrical problems, roller doors would not open, and the roof was collapsing. The old workshop had stood against the test of time, but sadly it was time to let go of the old and move into the future.

Members of the workshop had been hearing rumours for years of a new workshop. Bigger, better and more thought out than the old one, and with the impending Land 121 fleet rolling through the Army, the workshop needed a new facility to maintain and house the new truck. A change was needed.

In April 2018 between field exercises, 3 CSSB transitioned into a new workshop, sharing the facility with members from 10 FSB and 9 FSB. The improvements were obvious from the get go.

The new work bays are more convenient with a larger work area and a LEAN set up allowing easier access to POLs, air lines and power points. It has much better lighting, air flow and access to computers. The electric roller doors are a vast improvement over the manual chain type we were using in the old workshop, allowing us to put the doors up and down quicker to provide a better capability due to time management.

The larger space also means that we can maintain some of the larger vehicles in the BDE including M1A1 Abram Tanks and M88 Recovery Vehicles over two bays. The larger bays and overall workshop has enhanced our capability in order to support not only our own sub units, but also the rest of 3 BDE's servicing. We now have six drive through bays all equipped with air and lubricating lines next to the bays to aid with speeding up our servicing.

The new workshop compound is now large enough to contain all 3 CSSB sub-unit personal including all their equipment, which makes it less time consuming when vehicles need to be brought into the workshop for repairs. Having the 9 Tpt Sqn operators neighbouring the workshop allows them to get technical advice and have a hands on approach through the maintenance of their fleet.

RESTORATION OF THE CENTURION TANK - CPL Shane Tully

GE were presented the job of restoring a Centurion tank for 3 BDE. A number of metalsmiths (CPL Shane Tully, CFN Brad McDonald and CFN Stephens) and fitters (CFN Greg Vins, CFN Jack Haper, CFN Jake Sommerlad, CFN Tri Nguyen,

CFN Chris Hyland, CFN Leigh Bell, CFN Christopher, Wilden-Zahra and CFN Jordan Worth) conducted the task. Working on the tank was a great opportunity to use our trade skills whilst having fun at the same time. Personally having the chance of restoring such a historic tank to its former glory, and then presenting it in front of 3 BDE will be one of the highlights of my career. I know everyone involved in the restoration of the tank were excited about the project and are keen to show off their welding and restoration skills.

When we received the tank it was due for a massive amount of work. It had been exposed to the elements for many years which resulted in an extensive amount of rust to all its outer components. It took a week to remove all the mudguards, toolboxes, cages and all the outer components off the tank to prepare them to be sand blasted and painted. Whilst some of the parts were salvageable, a majority were not. All of the mudguards and most of the toolboxes had to be refabricated or repaired. It was an extensive task in which we had a relatively short time to complete. It didn't faze me or the other lads, we looked forward to the challenge.

Although the tank is only in the initial restoration stage, I am confident in the trade skills of all the metalsmiths and fitters on the job helping to restore the tank and believe they will do a fantastic job and make 3 CSSB proud.

Getting ready to commence Centurion tank restoration

16REGT RAA - CSS BTY-TST (Formerly known as 16ALR, 16AD) SGT D SHAW, CPL J ELDRIDGE, SGT A SWARBRICK

EIR Section

In January 2019 EIR was graced with 3 new members to the Section. EIR SGT – SGT Somerville, Boffin – CFN Apoyan and Elecky – CFN Dean. The year started guns blazing with the Giraffe Agile Multi-Beam (GAMB) RADAR course taking majority of the EIR work force for the better part of 3 months.

The remaining members worked hard assisting on the Walk/Crawl phase of 16 REGT Exercise period with SGT Somerville, CPL Eldridge, LCPL Cooper, CFN Apoyan and CFN Predo integrating with the sense, warn and locate 111 BTY working hard to keep the GAMB turning and burning in the sweltering heat of the Cultana range.

In April 2019 CPL Harper as well as other members of 16 REGT travelled to Finland to support NATO EX BOLD QUEST to display the capably of the newly upgraded GAMB and to get exposure to the National Advanced Surface to Air Missile System (NASAMS) which has been purchased by Army for the 16 REGT with the first of the fleet to arrive early 2021.

During the cooling down post field period EIR said goodbye to one of our finest as CFN Jobe Predo ceased his employment with defence after 7 years, securing work in the mining industry in WA.

Vehicle section.....the premier trade. (Whatever)

16 Regiment RAA, formally 16 ALR, formally 16 AD Regt, Is one of those postings every one hears about and thinks it can't be that different, I can assure you, it is. Isolated and alone in the beautiful Adelaide Hills at Woodside about an hour from the closet Army unit. 16 Regt has created a "unique" environment.

On arriving to the Regiment in 2018 I was pleased to discover a small fleet of about 50 vehicles and a relatively large workforce of 11 VM's; including our civi Mick. A limited maintenance liability with a large production capability.....every tradies dream posting.

Very quickly it all came crashing down. The year started with the ever stimulating induction briefs, closely followed by EX Sustainers Crawl, EX Sustainers Walk, RBS-70 live fires, GAMB trials, ECM Trials, EX Raptors Strike, the receipt of our 121 fleet, loss of our Civi Mick, the PMV ballistic glass RODUM and then EX Pitch Black where the skies were "black" with aircraft just not where or when we were waiting for them, due to the lack of aircraft and what must have been boredom the big issues became bacon and who was holding it.... apparently the RAEME Loctite fridges were not the right place.

TST farewell for "MICK" from DRAKE, after long service to the Regiment

Mick with his farewell kangaroo sculpture

Once everyone was back, the year continued with minor unit activities, such as field, drivers courses, putting up tents for cadets or attending children's birthday parties etc. Unfortunately the line..... you can't have 100% of your equipment 100% of the time.....became the reality and frustrations grew as equipment became unavailable due to its previous non-existent down time and limited windows to conduct any preventative maintenance. However, it brought about radical innovations such as communication with maintainers.

We also said goodbye to CFN Lynch who posted out and three other members who discharged:

CPL Quinton

CFN Bickerdike

CFN Gill

After what could be called an emotional year, we kicked of 2019 with more vehicles and less VM's. However, the lessons learnt in 2018 are being used, which has enabled a focussed push toward our workloads to meet the unit's requirements, which has set us up for success. As we all know the Green machine must move forward and can't do so without the work of its RAEME soldiers, the vehicle section of 16 Regiment, RAA, is made up of:

CPL "Jimmy" Henriques

LCPL Wells

LCPL Greaves

CFN Hunkin

CFN Robbins

CFN Trevallion

Vehicle section with our manning down and equipment up, has continued to ensure that we continue to prove why we are the premier trade.

GE/REC Section

The 2018 year kicked off with three new march ins to GE/Recovery section. These included acting GE SGT - CPL Darryn Shaw, Recovery mechanics – LCPL Thomas Toohey and CFN Kyle Moore. Holding up the fort from the previous year was CPL George Envall and CFN Benson Sanders-Carter.

It was a busy start to the year with IMTs starting early February at everybody's favourite training location – Murray Bridge. The culminating activity was the SARP, utilising various live fire practices. This was followed by a CSS BTY size A2 shakeout, at Cultana training area a couple of weeks later.

Photo CFN Sander-Carter making Mick's sculpture

The Tow Rags were kept busy through the year with CFN Kyle "Gimme" Moore attending every exercise doing his best to support the new fleet with the ever reliable Mack HRV. While LCPL Tom Toohey showed off his old Crafty skills with some outside the box recoveries.

The highlight of the year for the Recce Mechs was supporting the SA community at The Beyond Blue 4x4 challenge, held at JAKEM Farm, showing the off-road capability of the MRV to all in attendance.

Beyond Blue MRV capability demonstration

Beyond Blue 4 x 4 challenge

2 RAR (AMPHIB) Technical Support Platoon (TSP)

Life in 2 RAR continues to develop as the Battalion starts to look at developing into a highly capable and flexible reconnaissance battalion. It is yet to be established how this will effect TSP, but all will become apparent soon enough.

A few new members were welcomed into the ranks of TSP. The two new SGTs slotted in quickly. SGT Leatherbarrow assumed his role in Veh Sect and quickly disappeared to conduct Subj 4 WO; his tech appreciation paper on the Evinrude 55hp MFE proving that he has a hidden skill in the marine tech space. Meanwhile SGT Thompson not only became the new GE SGT but decided to take half the PLCOMD's admin off him, citing a lack of trust in his ability. From RPS, CPL Laird came in to pick up the slack from his predecessor, but ended up fleeing to the Q-store to work in the RIS cell. Our new boffin, CFN Parsons arrived inconspicuously, while the Tech Elec CPL, CPL Sharples, to our surprise, turned up as a CFN – although he did bow neatly to the Battalion when he was promoted. Two new fitters swaggered into the workshop, including the resident Russian and former grunt, CFN Besedin and the new GE CPL, CPL Bosworth, coming into a previously vacant position. CPL Ashley Murphy became the new Veh CPL but is always trying his hand at attempting to be the TSP commander. He was joined in Veh Sect by CFN Drabble, making up for CFN Wikaira's departure in the banter department and CFN Zimmermann, who would be the TSP 'grey-man' had his name not started with a Z.

The year began badly with the floods hitting Townsville hard. At least the lads got the opportunity to wade through flood waters to take cool selfies and be exposed to plenty of sewerage. It was still an eye-opening experience for the lads, being the first DACC task for most. TSP were very patient and professional in their conduct throughout Op NQ Flood Assist.

Shortly after the floods, CFN Attwill, still unwilling to admit he cannot drive a car, dashed off on Indo Pacific Endeavour (IPE) to party in Sri Lanka and India. Meanwhile, back in Townville, the 2 RAR Black series exercises kept TSP involved with the Infantry activities, with a scattering of fitter armourer contributions here and there and a couple of occasions requiring marine techs. As is often the case, it was often a case of waiting for the grunts to return to the Unit with broken equipment hoping we could save them from an NFW (rusty barrels, drained radio hub batteries, snapped Zodiac thrust boards and the disregard of outboard de-servicing after submersion in saltwater).

TSP were afforded the opportunity to improve its combat shooting through a series of range days at Mount Stuart Training Area (MSTA). The training culminated in a live fire FRT scenario at Townsville Field training Area (TFTA), involving a counter-ambush and casualty extraction. Here the lads conveyed the skills of experienced grunts, instead of RAAOC or RACT soldiers struggling to even action a weapon. CFN McNaughton even took a moment to stop talking and pick up a weapon to show everyone how it's done. LCPL Boehm proved to be highly adept during the live fire scenario. The Infantry instructors present were very impressed.

Shortly after, CPL Bosworth, CFN Attwill and CFN Woods (only on exercise for the maritime allowance) made up the FRT for Joint Warfighting Series (JWS). Meanwhile, LT Lloyd and LCPL Enderby, put their truckie hats on as they were attached to the LCE's Distribution Troop, where the section was distribution in name only – at least they made competent traffic wardens.

Meanwhile, back in barracks it was business as usual at a slightly reduced tempo. The ASM, albeit reeling at a missed opportunity to go on Sea Series as an OPSWO, kept the lads busy. SGT Thompson continued to refine and re-refine processes and SGT Leatherbarrow left the Veh Sect slack to CPL Murphy. 2 RAR's latest acquisition in moving forward as a reconnaissance battalion were a dozen SUPACAT SOVs. This afforded CFN Zimmermann and CFN Drabble the opportunity to fly down to Melbourne for the SOVs maintainer course. CFN Drabble and CFN Parsons even had the pleasure of learning how to drive SOVs. Meanwhile, LCPL Hodgetts, still failing to improve his volleyball skills, did an excellent job at investigating ways to improve the comms capability in the Unit's 40Ms; PTE Baleilakeba managed to save CPL Laird from disaster during the RPS cleanout; and CFN Cronin, our former truckie, finally got on his long-awaited small boats maintainer course. CFN Willcockson was the lucky recipient of a deployment, having earnt the opportunity to deploy on Op Augury.

We will soon lose both the PL COMD (to 3 CER) and ASM (to 11 CSSB), although only one of those will actually be missed. CPL Bosworth will disappear having barely turned up – maybe 4 REGT will teach him how to use MILIS. Also, CFN Willcockson will leave for 10 FSB to play with big boats and LCPL Enderby will finally be promoted and hopefully do something about the unreliability of our armoured vehicle fleet at 2 CAV.

TSP for 2019:

LT Dominic Lloyd, ASM WO2 Ian Downey, SGT Aaron Leatherbarrow, SGT Ian Thompson, CPL David Sharples, CPL Ashley Murphy, CPL Brendon Bosworth, CPL Ben Laird, LCPL Dean Enderby. LCPL Ash Boehm, LCPL Brett Hodgetts, CFN Deiter McNaughton, CFN Tim Wikaira (discharged), CFN Michael Drabble, CFN Jordan Zimmermann, CFN Jackson Attwill, CFN Reece Willcockson, CFN Dmitri Besedin, CFN Joel Cronin, CFN Thomas Woods, CFN Scott Parsons, PTE Keren Baleilakeba.

Indo Pacific Endeavour 2019 – by CFN Jackson Attwill

IPE 2019 saw 2 RAR deploy to Sri Lanka, India, and for a few, Malaysia. Deploying via Perth, I was the only RAEME member with the 2 RAR contingent. The trip started well with the lads frequenting a few good drinking and clubbing areas. Then it was time for the long Uber (Navy) journey aboard HMAS Canberra to Sri Lanka.

In Sri Lanka we were welcomed with a cultural ceremony, containing local traditions such as fire dancing and acrobatic displays. After a few days leave, I was attached to A Coy to travel to the Layan resort in the hills of Sri Lanka to learn about the UN roles during past conflicts and Australian-Sri Lankan relations into the future. Concurrent to A Coy's endeavours, Recon Pl went to SFTS to witness the Sri Lankan Special Forces in action. Here they conducted survival training, IED lessons and mobile live fire practice from motorbikes. Small Boats Pl conducted a beach landing drill to show the Sri Lankans how we conduct our operations and demonstrate our Evinrude 55hp Multi Fuel Engine (MFE) outboards and Zodiac F470s.

Next on the agenda was a transit to India. En route, the MFE and Zodiacs used for the beach landing needed repairs. As the beach landings had occurred on rocky terrain, the Zodiacs needed heavy patching and other general repairs. The MFE ran very reliably (for a change). Nevertheless, India mainly consisted of tourist activities such as travelling to the hills to view the monkey temples and scattered small rural communities.

The 14th of April marked the end of IPE 2019 as we flew with RAAF air back to Townsville revelling in the experiences we enjoyed.

JWS 19 – by CPL Brendon Bosworth

Recently 2 RAR (Amphib), with attachments from the Navy, US Marines and Royal Marine Commandos, formed a Joint Pre-Landing Force (JPLF) to conduct a series of exercises aboard HMAS Canberra for JWS 19. The JPLF was able to conduct multiple reconnaissance and raid tasks along the northern coast of Queensland during Sea Explorer and Sea Raider. They then participated in Sea Master (part of Talisman Sabre) alongside the Americans and Japanese, playing an important role in setting the conditions for the GCE to conduct their landings ashore.

The JPLF frequently used their Zodiac F470s with the recently acquired Evinrude 55hp MFE outboards. This was a real bonus for the fitters attached to the JPLF, otherwise we would have spent the whole time reading up on tab data and current best practice for repair and modification of in-service equipment. Due to the relative infancy of the MFE and the possibility of multiple FRT requirements, it was decided to deploy three fitters as the FRT, with no other trade personal, other than a VM deployed as a traffic control warden and an LT to watch over the traffic control warden – both attached to the LCE.

Aboard HMAS Canberra, the fitters settled into the Navy way of life perfecting the art of the espresso and sampling many fine teas, whilst it's presumed the VM and LT moved some witches hats around. When there was work to conduct aboard the ship, the Navy were fairly accommodating, allowing the use of 4-deck to run up the MFE outside of dock cycles – fresh water supply and use of extraction fans permitting. The MFE, running on JP5 fuel, performed to an expected standard with only a few faults occurring. This was mainly due to the lack of a suitable area to test the MFE under load (we recommend taking a test tank next time) and difficulties in determining the faults whilst away. The Zodiacs performed to a similar standard with only two classified XX and one requiring a RODUM. As for weapons, we had minimal faults, most of which stemmed from Q-staff bringing faulty weapons aboard to test the Navy LNIDS ordering system. LNIDS didn't quite work for us, however, but I guess two months is a bit of a push to get an EF88 side rail.

The trip was an eye opener for all who participated, especially when it came to the quality of food – having to choose between crispy skinned pork belly or a selection of slow cooked ribs for lunch and dinner was tough. Based on our experiences this trip and IPE, the workshop should now be able to produce SOPs for equipment and tooling required to meet the needs of any future JPLF tasks conducted from Navy ships.

FRT: CPL Bosworth, CFN Attwill, CFN Woods.

Distro Troop Members: LT Lloyd, LCPL Enderby.

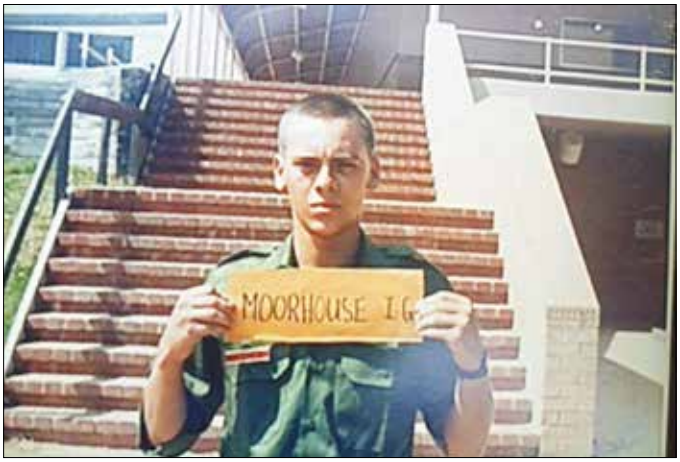
3 CER Workshop

It was a cloudy rainy day at the 3 CER Workshop as the tradies once again began 2019 full of high morale and energy. Spanners swinging in the wind as the never ending task of maintenance commenced. We said good bye to a few good blokes including CFN J Zeibarth, CPL A Warsing, CFN S Beoutis, CPL D Cupit, CFN S Ancell, CPL B Barnett, but also welcomed a few new faces into our little family including CFN F Cripps, CFN M Harrison, CFN E Leahy, CFN T Dole, LCPL J Bull, CFN L Hanson, CFN K Ramage, and CPL L Ahlstedt.

The year started with a bang and the majority of the Workshop was involved in the clean-up effort after the North Queensland Floods. Our team put in extensive hours establishing evacuation centres, assisting with the clean-up of damaged homes and repairing Legacy fleet vehicles with no thought of rest. It was hard work but it most certainly bonded the team in a way that annual mandatory training could not.

After that it was back to our usual day to day work until the Army bell rang once more and the tasking's commenced. We were the jack of all trades and the masters of none. We were truck drivers, motorbike riders, inspirational speakers and everything in between. The resilience is strong in this workshop as we held our heads high and carried on with all voluntold tasks!

ASMs Golf Day



A young ASM WO1 Ian Moorhouse

Speaking of resilience then came Ex Resilient Brolga where once again our fears were tested with abseiling and white water kayaking. Those who attended the exercise came back changed men, braver and more fearless with the bruises and grazes to match.

In May, the time came to farewell some of our own, our ASM, WO1 Ian Moorhouse and CFN Joel Wilkinson were off to greener pastures, and what better way to say good bye than an ASM's golf day. Novelty events included pool putt, tyre tube tee off and oxy goggle putting to level the playing field. Unfortunately all good things do come to an end which left us with a Lay down Sally by CFN Hutton-Morel.

EX Atlas Rage crew

Our first field phase for the year came in the form of Ex Atlas Rage as our Ex Dingo Fury was cancelled due to the floods. The rank still jealous of how RAEME enjoy their hot jaffles and cold goffers, not forgetting the bread maker in the Hydraulic Shelter which made the harbour smell like Bakers Delight. The loss of our EMEOPS G-Wagon to a 4 Regt driver on an earlier driver's course had the workshop scrambling which really set the tempo for the exercise. Out matching the Q store with RAEME DPs and driving further than transport once again showed how workshops' flexibility made us the senior troop in the Squadron. Outfield CPL Leino "Harambe" Ahlstedt struggled to let Kapooka go with enemy party tasking's giving him great opportunity to showcase his more developed skills, including his combat mindset and danger-close sim grenade throwing technique.

On return from field SGT Tim "Call me Ace" Penna steered the WKSP towards the end of the year before jumping ship early to join the Latte Brigade in Brisbane. The annual fishing competition quickly became a troop function and more memories were made than fish caught. Of particular note our oversized CFN Kyle "Gym is Life" Ramage caught his first ever fish and ate it too, unlike CFN Lora

"Don't-Eat-Boned-Stuff" Hanson. PTE Jessica "Double BBQ Winner" Earnshaw being the only lucky door prize winner with her second Webber BBQ in 12 months.

As the year finally draws to a close, it has been a typical 3 BDE Reset with more tasking's than you can poke a stick at. We try valiantly to keep our Legacy fleet semi-functional with RPS being scrounged from every unit who will listen to us as 3 CER refuses to let go of the past and embrace L121. We, however, remain optimistic about the future and the road to Ready, prepared to make Townsville Field training Area (TFTA) our second home if required.

Workshop Fishing Competition

5 Avn Regt Ground Equipment Repair TP

LT Jonathon Mackenzie

In 2019 the Ground Equipment Repair (GER) Troop, 5th Aviation Regiment, 16th Aviation Brigade conducted a broad range of activities in support of the Regiment, the Corps and the community while simultaneously achieving our training objectives.

The small GER Tp ran for the majority of the year without a Troop Commander with WO2 Peter Whiting given the opportunity to step into this position dual-hatting as the Ground ASM.

GER had a high tempo start the year as a result of support to OP North Queensland Flood Assist. CFN Jake Van Peype was tasked to provide recovery support to our new L121 fleet In Support of (ISO) tasks in Julia Creek, Cloncurry and Winton dropping off supplies to farmers. We were lucky to have minimal members of the Troop affected by the floods.

As the support to the floods began to calm down CFN Matthew Trotter stepped off with B SQN over to the Solomon Islands as a part of OP SIEA, earning himself a Soldier's Medallion for his efforts.

This year is to be last time we called the M134D Minigun uniquely 5 AV's with the expansion of the weapon system out to other Units, but at least we scored a cool Troop Emblem to put on our shirts.

GER deployed an FRT to support the Unit's contingent to EX TALISMAN SABRE 19. The road convoy commanded by LT Jonathon Mackenzie and included CPL Thomas Hawkins, CPL Denis Wade, CFN Matthew Hall, CFN Matthew Trotter and CFN Josiah Rooke.

The FRT managed to get the Legacy land-rover and Unimogs to and from Shoalwater Bay, although begrudgingly on the vehicles behalf.

The remainder of the year involved the usual support to the rest of the Regiment with putting out fires, finding more things to fix, and making sure all of the jobs the Avo's don't want to do are done, such as picking up broken Fuel bladders,

On the 16 Aug 19 LCPL Cameron Burzacott supported Mates4Mates by organising a charity event: The Mile Burpee Challenge. The event saw teams from LSS, TSS and C SQN TST conduct 1.6km of burpees, raising $2616.48 for the awareness of mental health issues of current and ex-service members of the Australian Defence Force. Notable mentions go to LCPL Cameron Burzacott and CFN Adam Winter for completing the challenge solo.

On the 21 Jun 19 GER attended the ASM's Golf Day at Tropics Golf Club, Kirwan. The day featured CFN David Harborne cooling off from the heat of the game in the serene course lake, CPL Thomas Hawkins failing multiple attempts at a combat ejection from one of the carts and a guest visit from Reggie.

This year has been an excellent opportunity for the Troop to get on courses and experience aviation specific tasks that could only be possible when supporting a flying regiment.

5 RAR Technical Support Platoon

Proving to be yet another busy year, 2019 saw 5 RAR Technical Support Platoon undertake training and certification in preparation for potential deployments later in the year, provide support for a range of courses and activities around the Brigade, successfully take part in multiple back-to-back exercises and dramatically reduce the maintenance backlog from 2018.

Leaning in to the first part of the year, TSP undertook IMTs, AFA recertification, CBRN, ACP and familiarised ourselves with the new suite of Night Fighting Equipment. TSP hosted the Small Arms Update Course for 1BDE and got to grips with the updated EF88 and the Blaser Tac 2 maintenance and modification processes. All in attendance came away with a new appreciation for Army's efforts to modernise our equipment.

Everyone would then mobilise to the glamourous Mount Bundey Training Area in May to undertake Exercise Tigers Run in order to attain ATLS2B. One lucky Fitter-heavy FRT got to provide support to Mortar PL while they conducted a HE Fire Mission by day and by night, with an expend-all Illumination Serial providing the perfect

Technical Support Platoon conduct critical testing and evaluation of new equipment in the field. – MBTA 2019

ending to a magical night that really fired-for-effect on the soul. Definitely a legitimate FRT tasking, not just an excuse to get out of the position and watch things explode for a few hours.

Additionally, TSP sent an FRT to support Exercise Diamond Strike at Bradshaw which provided an opportunity to work alongside Special Operations elements and support RAAF activities. While mostly uneventful maintenance-wise, it was enlightening to see that it is possible to get a lunch-time knock-off on a Wednesday while on Exercise – if you're in the RAAF.

Settling back into workshop life, Vehicle Section worked hard to get the PMV and 40M fleet repaired, refit and ready to fight in the lead-up to Joint Warfighter Series and Exercise Talisman Sabre that would take place over the June-July period. EIR hooked in to reduce a maintenance backlog resulting from undermanning in the Boffin space in 2018 and laid the ground-work to ensure Comms and BMS would be functional and in-date across the Exercise period.

Elements of TSP headed for Shoalwater Bay Training Area early to provide two FRTs in support of Bravo and Charlie Company as they undertook combined operations with the 1st Armoured Regiment during the Joint Warfighter Series. The remainder of TSP converged in the Bay four weeks later for Exercise Talisman Sabre, to enable Battlegroup Tiger to achieve objectives and fulfil their mission. A crate of pineapples mysteriously appeared around the third day of Talisman Sabre, setting the tone somewhat for things to come.

A magical evening of high explosive, hot brews and fending off mosquito-borne disease. – MBTA 2019

Keeping the Battalion's fleet of PMVs on the move continued to prove challenging during the exercises - with the widespread quarantine of PMV jacks. Jacking of vehicles for tyre replacements became restricted to qualified tradespeople only. Coupled with a higher-than-average incidence of PMV tyre and storage bin damage across the AO, Vehicle Section in particular had their work cut out for them.

Individual members were lucky enough to be selected for deployment this year as a part of FPE12 in out-of-trade roles such as drivers and Guardian Angels, and joined Delta Company for Pre-Deployment Training concurrent to the Exercise period through August before settling down for some well-deserved pre-deployment Leave at the beginning of September.

Left out of battle but not forgotten, a Rear Details element remained in Darwin during the exercise period and worked tirelessly (mostly) to clear the maintenance backlog, introduce and improve processes around the workshop, fill the numerous gaps in the Duty roster and generally just prevent the place from burning down for two months.

Looking towards the future, TSP is currently preparing to make a significant contribution of personnel to Task Group Taji X should they be required later in the year. It is potentially a fantastic opportunity for those involved, particularly as the majority will be dusting off the toolbags for employment within their trade roles.

Maintenance Week for the Brigade - which at the time of writing had just concluded - saw superb cooperation between the various trade sections and a tremendous effort from Vehicle Section particularly, left with the unenviable task of conducting a TI on every vehicle that saw use during the exercise period. GE Section of course had to deal with plenty of weapons broken in new and exciting ways, leaving EIR to sort out the generators, A/C faults and BMS inspections since nobody else understands (nor wants to understand) BMS.

Yeah Sarge, absolutely there is somebody up top manning the gun. Don't worry about it. – SWBTA 2019

Emotions also ran high at times during the year for TSP, as we farewelled several well-loved and long-serving members from our EIR and Vehicle Sections, spirited away by the allure of civilian life. In the end, even Service Allowance could not convince them to stay. Willie, Hutch, Josh and Robbo – your contribution to TSP over the years is immeasurable and you will be sorely missed. Moving forward however, the various sections within TSP are seeking to settle back into a routine, get on top of the post-field maintenance and see out the end of 2019 just as successfully as the beginning.

Log Coy, 5th Battalion assembles after a Battle PT session – ROB BKS 2019

6 RAR Technical Support Platoon

2019 has been an eventful and busy year for Technical Support Platoon (TSP), 6 RAR. We welcomed a few new march-ins, CPL McCarthy, PTE Giles, CFN Metcalf and CFN Robinson, including the workshops new ASM, WO2 Sean Weber. Previous experience of our new members ranged from time at the School of Armour, 2 CAV and technical advisor at CASG. TSP had one month to get back into the routine of working for our money before the support tasks started rolling in.

Being only the second year the battalion has had M113AS4s, and due to deployments all throughout the previous year, A and D Coy still needed to go through their transition and initial mechanised training. This was achieved through EX ALPHA CRAWL and EX DELTA CRAWL. Both exercises saw M113AS4 qualified tradesman from each trade provide a small FRT to Wide Bay Training Area in support.

In March we farewelled members for FPE-11, SGT Schoevers, CFN Bush, CFN Nash and CFN Sarquis. Not long after we also welcomed back members from FPE-10, CPL Hundric, CPL Smith, LCPL Moran, CFN Snoeks and CFN Spann.

March saw multiple members leave for subject courses, maintainer courses, as well as a UATL course to mix it up. This left the remainder of TSP to prepare for the upcoming ACAU audit in April. In addition to ensuring we were complying on the technical house side of things, TSP needed to make sure sub-units were up to scratch on the non-technical side. The Ace was working overtime to ensure everything would be done in time. A few of the crafties swear they even saw his sleeping bag set up in his office a few times.

CFN Hallet EMEOPS

ACAU came and went and overall workshop compliancy was to a very high standard, the hard work and dedication from all sections had paid off. After a few days off over Easter to catch our breath, the next exercises were around the corner. Two members went in support of EX KUKRI which was a 6 RAR and Brigade of Gurkhas combined activity, while the majority of the workshop deployed on EX DIAMOND SPRINT at SWBTA to support the rifle companies in platoon and company sized training.

The tempo was not about to die down anytime soon, EX WAR FIGHTER required a two vehicle armoured FRT to support A Coy playing enemy for 1 ARMD. Not long after that the Bde's major exercise, EX TALISMAN SABRE kicked off and every able bodied tradesman (including OJTs) were sent out. After a victorious win it was time to wind the tempo down… or was it?

CFN Welch Boffin

Post EX TS came 100% battalion CES checks, more support tasks and operator courses, just to make sure we're all getting that work/life balance the nice man in pollies promised us at DFR. While all of us who wear green are out being soldiers first, our civilian contractors 'Broadspectrum' were able to maintain their high workload and keep up with the demand for the maintenance of the A Veh fleet. With the leadership of their leading hand Brad Proellochs, Philip Campbell, Rick Callaghan and Aaron Pervis were able to conduct work to a high standard.

With so many members in and out of the workshop this year, people have had to play musical chairs with workshop roles. This has put a lot of people under all types of stress levels and late hours put in from the digger level up to ensure the work gets done, which is what Bluebell is known for. As of 22 AUG 19, TSP has conducted 6849.24 hr of productive maintenance with much more to come before the end of year.

The final months of the year will see TSP qualifying members to drive/crew our ARVL/Fitter tracks, focusing on organising the maintenance plan for over the RTP, RAEME birthday and organising the ASM's golf day/TSP end of year function.

RPS

RPS section is just as much part of the workshop as any other section. They provide the lifeline of parts the trade sections need to get the job done. RPS section had a steady start to the year of 2019 with the out scaling of Army's legacy Fleet parts, also 6 RAR transitioning to a mechanised Battalion from a motorised Battalion. Due to the platform being introduced to the Battalion, the RPS had to out scale a significant amount of PMV parts and start developing our Mission Essential Items List (MEIL), for the M113AS4 platform as well as developing our A2 Echelon. During this process PLAN CENTAUR was also being implemented into the RPS. With this all happening the Battalion was audited. Further through the year the RPS supported exercised Diamond Sprint, War Fighter, Southern Jackaroo and Talisman Sabre 2019. The RPS has experienced a High Tempo Year so far. With the 7th Brigade going into the rest cycle the RPS is looking forward to catching its breath and continuing with PLAN CENTAUR and supporting the Battalion.

TSP's nominal role for 2019:

PHQ: LT P Primavera (Pl comd), WO2 S Weber (ASM).

EMEOPS: SGT D Schoevers (FPE-11), CPL R Wiggins, LCPL J Fewings.

VEH: CPL K Smith (FPE-10), LCPL A Moran, LCPL M Wiley, CFN M Bond, CFN A Bush (FPE-11), CFN J Lee, CFN R Pentland, CFN B Pezzelato, CFN D Sarquis (FPE-11),

CFN N Spann (FPE-10).

GE: CPL A Wendt, LCPL T Walbank, CFN N Cervellin, CFN J Hallett, CFN N Jurgs, CFN B Nash (FPE-11), CFN D Nothdurft, CFN J Panozzo, CFN H Peardon, CFN W Snoeks (FPE-10).

EIR: CPL B McCarthy, CFN M Baker, CFN A Campbell, CFN L Metcalf, CFN J Robinson, CFN N Welch.

REC: LCPL D Rogerson, CFN M Scollen.

RPS: SGT A Leverton (Pl SGT), CPL V Hundric, LCPL J Goodman-Jones, PTE T Emmerton, PTE J Giles.

Arte et Marte.

CFN Wendt FittArmt

Technical Support Platoon – 8th/9th Battalion the Royal Australian Regiment (Motorised) CPL AJ Woolley

2019 began with a high tempo for TSP as we were in the middle of our Ready Battle Group (RBG) cycle. As soon as we got back from Christmas leave we had jobs on, starting with replacing PMV batteries that had 'mysteriously' died over the break. We have now started to fit some PMVs with gel batteries to reduce the operator maintenance and increase battery life. All the members of TSP have worked hard this year, although maintenance has been difficult to achieve at times due to RBG requirements and related tasks. The Vehicle Mechanics have been working especially hard managing to keep the Battalions PMV fleet at around 80% availability. The focus for this year has been enforcing equipment husbandry and educating the operators on their responsibilities and maintenance tasks; we helped facilitate this by sending the FRT's down to the rifle company's every Thursday to provide advice and support to the operators.

The Tyre Maintenance Shelter has been a sensitive issue for SGT Russell this year as it has kept breaking down, if you ask him about it you will get an earful of expletive language. We also hosted members from the US Marines and Filipino Army; The Tech Elec's had the fun task of setting up power for two 'tent cities'.

OP Augury – LCPL Kapernick went to the Philippines for 6 months on OP Augury in January, he even managed to get some Fitter Armourer work done when he wasn't sipping mojitos on the beach.

Rifle Company Butterworth (RCB) – We sent 4 members from TSP to RCB this year; CFN Stoja and CFN Pollard deployed with Alpha Coy in March, and LCPL Woronjansky and CFN Horn deployed with Bravo Coy in May. LCPL Woronjansky's welcome to country at the local pub was not what he expected when things became heated and the grunts mistook him for a local.

Ex CUTA/Carabaroo – Admin Company spent two weeks at Shoalwater Bay in the Dismal sector developing the Company's SOPs. By all accounts from the diggers, the Dismal sector lived up to its name. They did however manage to develop some good SOP's, focusing on a mobile A2.

8/9 RAR Admin Coy

Ex Talisman Sabre (Ex TS) – 7 Brigade played the role of enemy for Ex TS this year, this was a good opportunity for us to broaden our skills from a different perspective. The FRT's that were attached to the rifle companies were able to observe firsthand the defensive and delaying tactics used by Battle Group RAM and the attached engineer elements to hinder 1 Brigades movement through the AO. The rest of TSP in the A2 were, let's say, less impressed with their position. They were setup well behind the Rifle companies in the only grid square in the Impact Area where they were allowed to dig, and guess what they did, they dug. They spent the majority of their time digging and patrolling, they were also instructed to use their 'bush laugh' when in the field; this is apparently a Muttley style laugh, nobody in the A2 was laughing. When members from the A2 visited the A1s they were visibly and verbally envious of their position; a letter was carried from the A1 back to SGT Russell in the A2 highlighting the differences between the two:

"Dear Paul and the lads, life on the front line is nothing we could have trained for. Up here the rules are a forgotten relic of the past. Not only do we have two bonfires, we also have ample jack rats, no cooking restrictions, music and a civilian population in our location who are eager to play card games with us. We have not sighted the enemy yet, probably because the A2 is winning the war from the rear, thank you for your service, we salute the Royal Australian Electrical and Mechanical Infanteers. The lads and I hope your situation at the A2 improves, we have heard stories of horrific human rights violations. Tell the boys to stay strong, it won't be long until we are together again. The Padre visits us every day and we say a prayer for you and the boys whilst enjoying a brew in God's country (i.e. no enemy, no cam cream and no chest rig). Oh, I told you a lie when I said we don't have any rules, we have one; don't burn the place down. – Yours truly, Woolley and the Boys".

ASMs golf day – We were planning to have an ASM's golf day in April but due to the high tempo it looked like we were not going to get approval. Just when we lost hope, St. Eligius sent us a messenger in the form of the head of Corps, BRIG Freeman, who wrote a letter to our Commanding Officer highlighting the importance of the day and the esprit-de-corps. We received approval from the CO and the golf day went ahead and was enjoyed by all. Needless to say we were extremely grateful for BRIG Freeman's assistance; his letter is now on display in the workshop framed for all to see.

It has been a busy year for us but now that we are handing over the RBG to 1 Brigade we look forward to taking some well-deserved leave over the Christmas break and starting again next year, refreshed and renewed, ready to tackle whatever is thrown our way.

A relaxed Relaxo the PMGMV

7 CSSB

Crafty on 1 Dec I know where my next ten paychecks are going...

Extreme negative camber on the 7 CSSB go kart - 1 December.

G wagon maintenance on the Great Endeavour Rally

Tyre changing on exercise

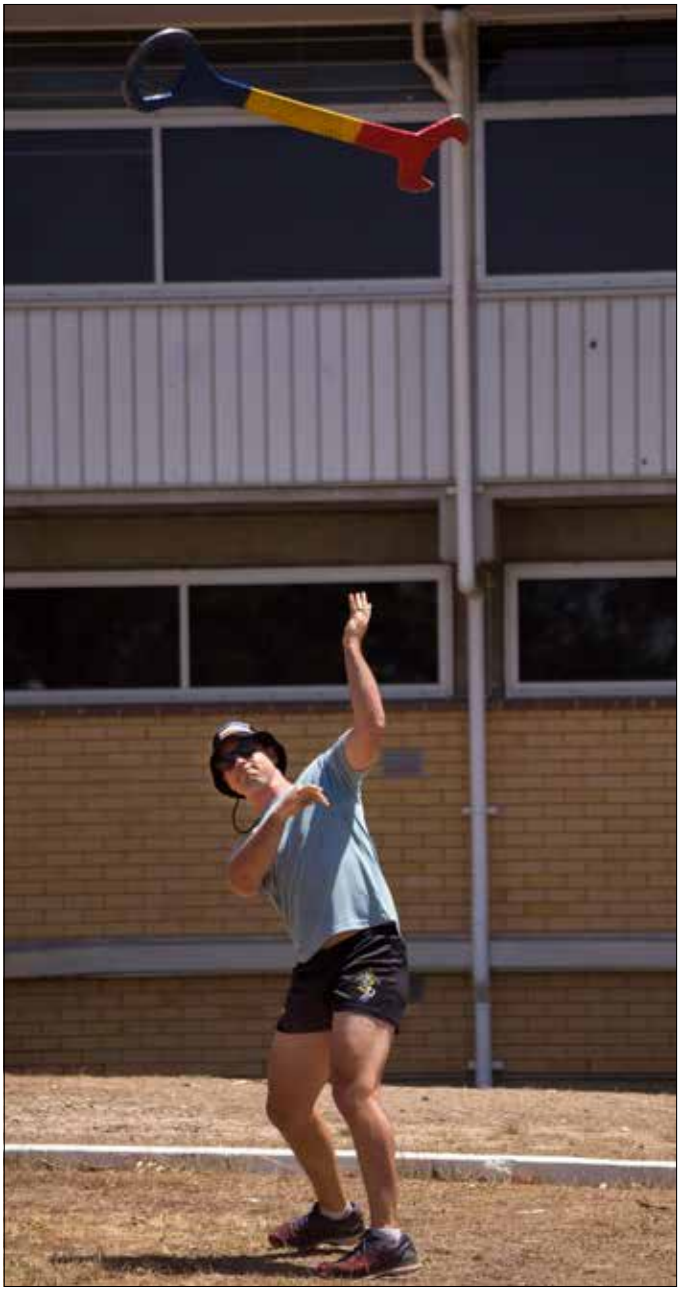
Vehicle Mechanics at Work

The welder at work

The welder still at work

Vehicle Repair

RAEME Birthday - COMD 7 Bde cutting the cake



The Spanner Throw - Spanner or RAEME sized bottle opener

106 Field Workshop - 2019

RAEME Corps Awards 2019

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 2019 Corps Awards.

ARA Craftsman of the Year
CFN CFN H O'callaghan, 10 FSB

NT ARA Craftsman of the Year
CFN CFN L Clapson, 5 RAR

Qld ARA Craftsman of the Year
CFN C Sanders, 3 CSSB

SA ARA Craftsman of the Year
CFN Z Hunkin, 16 Regt

WA ARA Craftsman of the Year
CFN M Simcocks, SASR

Vic/Tas ARes Craftsman of the Year
CFN A D'Addona, 4 CSSB

BRIG Martins, OBE Award (Sub4 SGT)
CPL K Barber, 51 FNQR

Artificer of the Year (Sub4 WO)
WO2 A Ireson, 4 CSSB

Junior Regimental Award (Sub2 SGT)
CPL S Ward, SASR

Regimental Award (Sub2 WOCSS)
SGT P Purchase, SOArmd

LT Peter Jennings Award
LT A Rajanathan, RAMS

National Artificer of the Year Presentation - LTCOL P.McArthur CO 4CSSB, WO1 A Hawkins ASM 105 WKSP Coy, WO2 A Ireson TRGWO 105 WKSP Coy & MAK B Kohler OC 105 WKSP Coy

2019 LT Peter Jennings Award

The RAMS 77th RAEME Birthday Dining in Night show-cased the achievements of one of the newest members of the Corps. LT Anil Rajanathan was awarded the Peter Jennings Award as the highest achieving RAEME Officer on the Logistic Officer's Basic Course. A huge achievement for a member who only joined full time service in January 2019.

LT Anil Rajanathan RAEME Student of Merit – LOBC receiving the LT Peter Jennings award from CO RAMS, LTCOL Miles Irving

Reserve National Craftsman of the Year

CFN Anthony D'Addona 4 CSSB was presented with the Reserve National Craftsman of the Year (COTY) award at the RAEME Birthday luncheon put on by the RAEME Association of Victoria.

COL Martin Griffiths - COL COMDT Vic/Tas presenting the 2019 Reserve National COTY award to CFN Anthony D'Addona 105 WKSP Coy

Army Aviation Training Centre (AAvnTC) nomination for 2019 Hawker Pacific Award

Communications, Education and Learning Technologies Section (CELTS)

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, Headquarters Army Aviation Training Centre, Trades and Training Branch nominates the Communications, Education and Learning Technology Section – CELTS for their dedication, innovation and diligence in designing, developing and implementing training support for the Rotary Wing Aircraft Maintenance School (RAMS) throughout 2018/19.

The CELTS staff in consultation and cooperation of RAMS Personnel were instrumental in creating the new training packages for the introduction of CH-47F maintenance training within Australia. The packages delivered rely on a blended learning solution integrating both computer based classroom technology as well as the typical instructor lead programs. This includes interactive screen adaption of maintenance panel functionality combing a touch and response capability. A range of other learning support tools such as wall mounted graphic depictions of component layout and operation as well as tabulated data was included.

The CELTS staff are now expanding the blended learning support to the MHR-90 Taipan, seeking training efficiencies through improved software, contemporary delivery techniques and emphasis on audience participation and engagement. Through recognition of audience learning abilities training packages can be targeted to deliver information in the most palatable fashion with the goal to reduce training times whilst improving results.

The CELTS staff are conducting research and development for the production of training aids using 3D printing with possibilities of integrated levels of either virtual or augmented reality to produce the optimum simulated training environment of the future.

The exemplary performance of the CELTS staff in maintaining relevance of training through innovation, technology adaptation, systems performance enhancement and audience requirements has ensured RAMS training delivery is at the cutting edge of technical training in Defence. The CELTS staff functional embody the core values of Hawker Pacific and is considered a worthy recipient of the 2019 Hawker Pacific Award.

Hawker Pacific RAEME Innovative Solutions Award – from left to right (recipient) LTCOL Tim Baker, Hawker Pacific rep MR Tyson Colli and LTCOL Miles Irving (DHOC-A)

Shannon Nicholas Award Winner

8633233 CFN Jonkers MRH90 AE

Awarded to the trainee who is judged as the ITT Student having the highest grading from courses conducted at RAMS during the training year. Trainees are to be judged using a combination of academic results, OJT results and attitude to training and overall performance throughout the course.

CFN Jarrod Jonker was a student posted to RAMS from 29 January 2019 to 19 June 2019 for the Aviation Technician Aircraft MRH90 Technical Type course, Session 0023.

During his time at RAMS, CFN Jonker undertook both theory and practical components and carried out daily trades person tasks to a high level. CFN Jonker showed very high levels of motivation and his skills and application of trade knowledge were far above a level expected during training.

CFN Jonker demonstrated an excellent attitude to training often going above and beyond to help both staff and fellow students. His excellent work ethic and Army ethos were demonstrated regularly during his Mod 2 phase with both his practical knowledge application and hand skills being far beyond what is expected of a trade's person.

CFN Jonker's positive attitude and desire to excel within the Army Aviation Trades is a testament to his character.

Overall, CFN Jonker achieved a very high standard and attitude throughout the MRH90 IET course and will be an asset to 5th Avn Regt MRH90 and wider Aviation capability.

For his performance, integrity and general military professionalism during the MRH IET course, CFN Jonker is awarded the Shannon Nicholas Award.

Shannon Nicholas award – from left to right (recipient) CFN Jarrod Jonker, Mrs Janet Nicholas and LTCOL Miles Irving.

Rotary Wing Aircraft Maintenance School (RAMS) 30th Birthday celebration 26 Jul 19

Never let the truth get in the way of a good story

The day commenced with the obligatory morning coffee and pastry from the local bakery in Oakey, a long standing tradition that dates back to earlier on the 25 Jul 19 when the SSM was slightly peckish and a tad thirsty. We had all received the sad news that we were not to participate in the Army Aviation Training Centre (AAVNTC) Commandants' run, but to commence celebrations at the earliest convenience. There were heartfelt sighs of relief from some, mainly WO2 Mitchell and SGT Persic and sounds of disappointment from our competitive members, WO2 Jones and CFN Hasell.

The weather had been cold, wet and windy earlier in the week but by some excellent planning, miracle of the Gods or just good luck, the clouds dispersed and the temperature remained at a tolerable 19 deg C for the day. The first test of stamina and agility was the safety and conduct brief that was provided by our friendly yoga instructor or should we just say the ADJT.

After being given the run down on the order of march we all headed for the oval to commence the Tug o War. Although CH47 put up a good fight it was MRH that were to win the initial weigh-in with both teams out doing the competition. Not even HQ could come close to the target. With the stagger released it was up to the wings to fight out who would be crowned king. A magnificent effort was displayed by ARH but unfortunately they were not able to withstand the onslaught from the heavy weights or even the bantam weight CH47. MRH were to come away victorious with a proud WO2 Mitchell letting everyone know the result.

After a short break where coffees could be refreshed and tasty colas purchased, it was off to watch the spanner toss. This great event would bring out the best and well the not so best in all of us. It was clear that some were not familiar with the tactic behind the event and we all waited with baited breath as our MRH instructor, Petty Officer Weir, decided that it would be best to release the spanner only after confirmation that one of his fingers had been dislocated from the ring end. The result was a magnificent scream of eagerness and a trip to the ice machine.

With the spanner being the winner here, we moved to the flight competition. The rules were simple, the aircraft was to be launched by hand and was not to be powered by any electrical or fuel source. An estimated distance was to be provided prior to the flight with the winner being calculated off distance flown vs estimated range. This would be a test of ingenuity, planning, research on ebay, and of course aerodynamics. The laws of flight were tested on the day with some teams managing to launch there winged machines only to see them invert and fly over their heads, in the wrong direction, resulting in a negative metres gained. With TMW providing the most man hours and R&D, along with plenty of enthusiasm it was a certainty they would be crowned the winner with a flight distance of 52 metres.

The culminating event, not counting the BBQ and cake, was the endurance event. This consisted of teams of 8 conducting a beep test followed by a continual period of ten minutes on a spin bike and rowing machine. The winner was determined by the collective distance travelled. HQ led the way from the beginning however were quickly overtaken by ARH. With just minutes to spare it became a tight race between ARH and MRH until MRH got a puncture on their bike and it appears their rowing machine sunk. ARH coming out the victor with a combined distance of 18.27Km.

After a quick change of clothes we all headed to the BBQ area for a well-deserved feed courtesy of our in house chef (SGT Morgan) and his tribe of merry Sailors and Soldiers. On the completion of announcing the overall winner (Yes Zappa, MRH won) the cake was cut by the CO and our youngest member, CFN Greene. Overall a great day was had by all members and their families to celebrate the 30th year of RAMS.

RAEME 77th Birthday – RAMS 30th Birthday

On the 29th of November 2019, RAMS hosted a Dining-In night to celebrate the 77th Birthday of RAEME within the CH-47 hangar, RAMS, AAvnTC. This evening also celebrated 30 Years of RAMS.

The all ranks mixed dinner offered an ideal opportunity for members of the RAEME Corps and RAMS to be recognised for their efforts and achievements through-out the year, not just amongst their peers but also their families.

All Ranks Mixed Dining-In Group Photo

Part of the evening's proceedings were the promotions of those members who have successfully completed the Artificer's (ARTs) course. This course involved many months away from family studying and completing various elements of the year long course to graduate RMIT with a Diploma level qualification and a promotion to the rank of Warrant Officer Class Two.

ARTs Course graduates and their partners.

COL Brett Nelson's Promotion to Colonel by BRIG Scott Benbow

The evening invited all past RAMS COs, 2ICs, ASMs and SSMs to celebrate the history of the Corps and the role RAMS has played, in the last 30 Years. This included the promotion of COL Brett Nelson who was the Commanding Officer of RAMS from 2017-18.

COL Stephen Evans A/DGAAS Keynote Speaker

COL Stephen Evans, A/DGAAS was invited as the evenings keynote speaker. Speaking about the achievements of aviation and the role RAEME has played. COL Evans spoke about the future of the capability and how RAEME and specifically RAMS will fit into that picture as new platforms and training is introduced into Army, to service the rise in versatility and capability we will have.

LTCOL Miles Irving, CO RAMS gave the responding address talking about the Aeroskills Technical Specialist scheme and its significance for RAEME, Army and Defence. He spoke about what makes RAEME special and Espirit de Corps, he also articulated the importance and value of the military family for each and every one of us.

LTCOL Miles Irving, CO RAMS giving the Response to the Keynote Speaker

RAMS was able to host the evening with the RAEME banner present (pictured below). On the 20th May 1986 Prince Philip bestowed this banner upon the Corps of RAEME. The home of the banner is ASEME. It was an honour to be able to host this evening with one of the Corps most historically significant artefacts.

The formal proceedings of the evening were concluded with the traditional cake cutting by the CO RAMS and the youngest member of the unit in front of the Prince Philip Banner.

RAEME Birthday Luncheon
RAEME Association of Victoria

A lovely lunch was put on by RAEME Association of Victoria with COL Martin Griffiths on overwatch. Several members of the Workshop attended and some continued later into the afternoon in the fine spirit of the Corps.

COL Martin Griffiths COL COMDT Vic/Tas, LTCOL Paul McArthur CO 4 CSSB, CFN Anthony D'Addona 105 WKSP Coy 2019 National COTY

BRIG Konrad Ermet - Patron RAEME Association VIC and CPL Josh Colombo (youngest) 105 WKSP Coy cutting the RAEME Birthday Cake

A hand over of ASM 105 WKSP COY responsibilities was conducted between WO1 Allan Hawkins and newly crowned WO1 Sean Halley.

MAJ Bart Kohler OC 105 WKSP Coy, CFN Anthony D'Addona (Both looking at the perpetual COTY Trophy), WO1 Allan Hawkins out going ASM 105 WKSP Coy & President RAV, WO1 Sean Halley in coming ASM 105 WKSP Coy joking about the use of a wheel chair for the old ASM.

Current serving members of RAEME - From L-R: CFN Sam Heppell, WO2 Kevin Powell, CPL Brenton Audet, MAJ Bart Kohler, CFN Anthony D'Addona, SGT Jock O'Çonnor, WO1 Allan Hawkins, CPL Brendon Ryan, WO2 Adam Ireson, CPL Josh Colombo and WO1 Sean Halley

It was great to get the members together to celebrate the day, especially due to having two award winners in the COY.

106 FD Wksp SVN look back in history

March 27, 1969 – A blowout with a bang that hurts THE 106 Fd Wksp, RAEME had its first battle casualty in SVN (South Vietnam) recently when a heavy wrecker vehicle detonated a VC landmine. The mine blew a gaping hole in one of the wrecker's tyres but the vehicle was still able to limp the two miles up Route Two to the 1ATF base at Nui Dat. None of the crewmen, CFN John O'Rourke, CFN Peter Grenenger and CFN Tony Surman, were hurt. Engineers from 1 Fd Sqn, RAE, located a further five mines sown in Route Two when they swept to two miles south of Nui Dat.

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Retirement COL Nick Stanton

COL Stanton presented his Recognition of Service Parchment by BRIG Ed Smeaton and MR Colin Galvin

L to R LTCOL A Kelly, BRIG E Smeaton, COL N Stanton, LTCOL W Whibley, LTCOL A Heron and MR C Galvin

Farewell Captain Stephen Beck

End of an Era

Sunday 30th June 2019 marked the end of an amazing career for Captain Stephen Beck.

Stephen Corp enlisted to RAEME 21 March 1972. After a stint at Kapooka, he completed the 69/72 Adult Tradesman Electronic Course at Bandiana and the Number 4 Army Aviation Elect/Inst course at RSTT Wagga

Stephen has had many interesting postings, all with Army Aviation;

1973 – 5 Base Workshops for training on Sioux, Cessna, Porter & Kiowa

1974 – 162 Recce Sqn, Townsville, working on Sioux & Kiowa

1976 – Promoted to Corporal

1978 – 5 Base Workshops and type training on Nomad

1981 – Promoted to sergeant

1982 – Posted to Papua New Guinea working on DC3 & Nomad

1985 – 5 Base Workshops

1987 – Completed Artificer Electronics Systems Air course

1988 – Promoted to Staff Sergeant (one of the last in this rank)

1989 – Selected for Exercise Long Look

1990 – 5 Aviation Workshops type training and working on Blackhawks

1991 – Promoted to WO2 fulfilling roles as Artificer Avionics, Artificer Aircraft Repair Troop and occasional CSM

1995 – Discharged From ARA to Inactive Reserve

Stephen attended James Cook University in 1996 to study Museum Practices, Anthropology & Archaeology. After completing his Bachelor of Science Degree, with First Class Honours and University Medal, he embarked on a PhD in Philosophy in Archaeology. Stephen says that the Army taught him to dig holes and Archaeology taught him to record them

In 2007 he transferred to the Active Reserve and was posted to the Australian Army History Unit as Collection Manager and then Assistant Manager with the Army Museum North Queensland (AMNQ)

In 2009 Stephen was awarded his Doctorate of Philosophy.

He was also promoted to Captain in 2009.

Stephen was involved in the AMNQ's move into its current location at Kissing Point, Townsville. He was also involved in supplying props for the movie "Below Hill 60".

In 2015 Stephen transferred to the Army Museum South Queensland as Curator where he has overseen the 6 monthly displays set up in the All Ranks Mess at Victoria Barracks Brisbane, which form part of the tours conducted at the Barracks. Stephen was always ready to teach the volunteers best museum practice in the care and conservation of artefacts.

It just goes to show that a career with RAEME can lead to many interesting scenarios.

Wishing Stephen and his wife Chris all the best in the future and hope that retirement is fulfilling.

At a ceremony at Victoria Barracks on Wednesday 22nd May, Stephen was presented with a Head of Corp RAEME Medallion by Colonel Stephen Evans, Colonel Commandant RAEME Queensland. Stephen was also presented with framed drawing by the Mr Neil Dailey, Manager Army Heritage, Australian Army History Unit (see photos).

Vale 2019

10 December 2018 – Trevor Norling

20 December 2018 – Frank Owen

26 December 2018 – Edward (Ted) Avery

26 December 2018 – Arthur Dreverman

30 December 2018 – Keith Blanch

4 January – 2019 – Ian (Finchy) Finch

15 January 2019 – Kim Chang

17 January 2019 – Anthony Sutton

8 February 2019 – Robert (Bobby) Fry

11 February 2019 – Bryan Nicholls

11 February 2019 – Wayne (Yogi) Rankin

22 March 2019 – Bevan Smith, MG, MID

7 May 2019 – George Krishna

10 May 2019 – Trevor Lobegeiger

17 May 2019 – Ray (Fuzz) Brown

19 May 2019 – Mick Francetich

Exact Date Unknown – Steve Senior

3 June 2019 – Trevor (TT) Smith

6 June 2019 – Ken (Sandy) Tocock

12 June 2019 – Thomas (Tom) Welsh

25 June 2019 – Fred Newby

2 July 2019 – Roger Stafford

19 July 2019 – Douglas Tink

22 July 2019 – Kelly Knott

25 July 2019 – Terry Hayes

27 July 2019 – Darryn Collings

1 August 2019 – Clive Bryant

10 August 2019 – Robert (Bob) Fuller

17 August 2019 – Robert (Wallaby Bob) Foster, OAM

25 August 2019 – Darrell Holden

16 September 2019 – James Findlay

22 September 2019 – Clive De Jussing

22 September 2019 – Darren Edwards

15 October 2019 – Robert (Bob) Long

Exact Date Unknown – Neville Dockray

25 November 2019 – Neil Zander

26 November 2019 – Wiliam (Blue) Brechin

15 December 2019 – Frank Stuart Curnow

'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.


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