



RAEME

# CRAFTSMAN

The Corps of Royal Australian Electrical and Mechanical Engineers

75th Anniversary

Issue No. 68 2017



# 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.

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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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1 September 2018

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# RAEME CRAFTSMAN

The Corps of Royal Australian Electrical and Mechanical Engineers

Issue No. 68 2017

Main photo: Soldiers of ASEME, RAMS and RAAF STT on parade at the AWM on 1 December.

Left Photo: RAEME Birthday at 7 CSSB.

Right Photo: 1 AVN REGT Ground Support Troop.

## contents

### regular items

Head of Corps .....	2
Outgoing Head of Corps.....	3
Deputy Head of Corps (Ground) .....	4
Deputy Head of Corps (Aero) .....	5
Corps RSM .....	6
Outgoing Corps RSM .....	6
S02 Corps .....	7
From The Editor.....	8
Operations.....	50
Unit Jottings.....	54
History .....	82



### articles

The CO's Buffalo .....	9
3D Printing for Rapid Prototyping .....	10
RAEME Top Guns .....	12
ASEME & ALTC Massive Murray Paddle ...	13
ASEME Flag, Insignica, Patch change ....	14
Condition Based Maintenance .....	15
Drone Racing .....	16
Plan CENTAUR – Phase 3, Stage 2 .....	18
New RAEME Officers .....	18
Farewells.....	19
RAEME Birthday Dinner.....	19
Land 121 Phase 4 Hawkei .....	20
Reliability Engineering within the US .....	26
RAEME 75th Anniversary Parade .....	30
Michael Ward's speech.....	32
RAMS Regimental & Corps Dinner.....	35
2017 RAEME Awards.....	36
NQ RAEME 75th Birthday Dinner .....	38
75th RAEME Birthday, Darwin.....	39
Albury Wodonga 75th Celebrations.....	40
SASR WKSP 75th Celebrations .....	42
RAMS & RAAF STT .....	43
ANZAC Day 2017 at Culcairn.....	44
Brisbane ANZAC Day 2017.....	45
RAQ Sunshine Coast Lunch .....	46
RAQ All Ranks Luncheon.....	46
Gold Coast RAEME 75th Celebration.....	47
RAV Reserve Forces Parade .....	47
BRIG Ed Smeaton's Address.....	48
Vale.....	87
Vale Andrew 'Max' Holt.....	87
APS Instructor Retirement .....	88



# Head of Corps

**BRIG Andrew Freeman – COMD 17 CSS Bde**

It has always been one of my career goals to be the Head of Corps of the Royal Australian Electrical and Mechanical Engineers – second largest Corps in the Australian Army. Hence; I feel very privileged and honoured writing this article.

Firstly, I would like to thank the previous Head of Corps, BRIG Haydn Kohl, for his hard work and leadership. His passion for the Corps was clearly evident as he worked tirelessly behind the scenes while also managing his CASG responsibilities of sustaining Army’s heavy fighting capability. I wish him all the best in his deployment as Deputy Director Sustainment, NATO Headquarters in Afghanistan.

This year marked another significant milestone in our Corps’ history – the Corps has provided 75 years of maintenance and technical support to the Australian Army. I believe the 75th Anniversary Celebrations that were held around Australian and overseas in deployed locations appropriately recognised the professionalism of our Corps and the significance of this milestone.

The theme for our 75th Anniversary was “Reflecting on the Past to Maintain the Future”. It is important that we don’t just remember *what* the Corps has achieved, but also *how* we as a Corps have evolved to achieve it – the Corps has a different structure today compared to 75 years ago. History has shown that as we have constantly changed equipment, we have changed our maintenance policies, concepts and structures accordingly.

Already, we are seeing the opportunity to update our maintenance policies and procedures with the introduction of new equipment, improved equipment management and monitoring systems, and the

changing maintenance concepts of equipment manufacturers. Who has repaired, or had repaired, their TV, or phone, or laptop computer beyond basic tasks?

When Apple ‘repair’ your broken phone, most of the time it involves Apple employees cloning your device and handing you a brand new one. The item that gets ‘repaired’ is the software. The hardware is usually disposed of, sent back to the assembly line for reconditioning, or disassembled to learn more about that failure. Rarely would Apple repair the electronics and return the same phone to you – it is not worth their time. How will Army adjust its maintenance system in response to the changing technology in order to achieve the best availability from our equipment?

I offer the Corps three conceptual pillars to start the discussion on modernisation; a Unified Maintenance Concept, Professional Military Education, and Reform and Reassessment of the RAEME base trades. It will require a whole-of-Corps effort to define these pillars. A fuller treatment of the three pillars for the modernisation of RAEME can be found in the address (page 58 of this magazine) delivered at the Craftsman Memorial Service on 11 August of this year.

Over the next six months, the Corps needs to discuss these pillars and more; with the results presented at the 2018 Corps Conference. These are important issues and some of us may feel uncomfortable with the outcomes of our deliberations; however, we must look forward to ensure RAEME continues to evolve in the ever changing world of maintenance.

Arte et Marte

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# Outgoing Head of Corps

## BRIG Haydn Kohl – DGLMS

Greetings men and women of the Corps.

First and foremost I would like to thank you all for the opportunity to have been your Head of Corps over the last few years, and particularly in this, our 75th Anniversary Year. I would also like to take this chance to publically thank the Deputy Heads of Corps and Corps RSMs who supported me through my tenure, in all cases taking on their Corps roles with great enthusiasm in addition to their “day jobs” as Commanding Officers and RSMs of the Corps schools.

In 2015 when I had the privilege of being appointed Head of Corps for RAEME I was excited to be selected for a role that has been held by so many auspicious and outstanding officers since the Corps was founded in 1942. I was also keen to see exactly how the current officers and soldiers of the Corps are performing compared to their predecessors and, equally importantly, how they are regarded by the broader Army community.

The technology that we support may have changed but I can honestly report to past members of the Corps that the current crop of men and women in RAEME are true and faithful custodians of the Corps legacy; equal to anyone that has served before them.

In the future, we can expect the military will continue to change as it evolves to meet 21st Century threats and the equipment we support becomes increasingly high tech. As a result, the roles that the men and women of the Corps will continue to evolve but I am confident the Corps is up to the challenge.

Earlier this year I handed over the role of Head of Corps to Brigadier Andrew Freeman when I was informed that I had been selected to join Australia’s contribution to the fight against terrorism in Afghanistan. It was a bittersweet moment as I was looking forward to the privilege of leading the Corps through the remainder of the 75th anniversary, but equally it was an opportunity to return to operations alongside many of our coalition partners.

This deployment to the NATO led Resolute Support mission has provided me with a unique situation for an army officer as I have been directly involved in the development of a logistics capability for a national army and police force. It has also provided the opportunity to see firsthand the bravery and initiative of the Afghan soldier and policeman as they fight for their country against an insurgent who has little regard for civilian life or the sanctity of hospitals or places of worship.

The Australians on Operation Resolute Support fill a range of functions. As a member of Essential Function 5 (sustainability of Afghan security forces), I am one of a number of Australian army, navy and air force personnel (including a few RAEME officers) involved in the train, advise, assist (TAA) of logistic, medical and ICT personnel at the ministerial level and in the strategic army and police units, such as the Central Workshop and National Transportation Brigade.

We also regularly engage with the TAA Commands around the country who provide a similar function at the Corps and Police Zone level. Shortly we will benefit from the arrival of the newly created US Security Force Assistance Brigade, which will provide us with the opportunity to engage below the Corps and Police Zones on a regular basis, in a similar manner to what we did when NATO led the International Security Assistance Force (ISAF).

As a logistician I have found that the Afghan National Army (ANA) and Afghan National Police (ANP) are facing many of the same challenges as RAEME and the other logistic corps in Australia as they evolve to meet the demands of modern warfare. Indeed, the ANA is going through the equivalent of Plan Centaur as it transitions from a Soviet style system to one more akin to what you would find in a western army.



As an example, the Central Workshop has traditionally conducted heavy grade repairs of the older Soviet era equipment (such as the D-30 howitzer) in-house. They are now facing the reality that as they transition to the new equipment being provided by the Coalition, it is significantly more complex and the specialist test equipment and training is cost prohibitive. As a result, the majority of heavy grade repair is now conducted under CLS contracts in Theatre with the military manpower focusing on Level 1 and Level 2 repairs.

In addition to the Central Workshop, my role involves closely working with the National Transport Brigade (NTB), which is a heavy transport unit that provides routine resupply across the country. The NTB are equipped with US heavy trucks and HMMWV as well as a mix of Warsaw Pact and NATO standard weapons. As a national asset, the NTB has a challenging role and regularly deploys convoys in excess of 100 vehicles in support of the ANA. These convoys can travel up to 14 hours a day to reach their destinations and are often forced to fight to get their cargo through to the destination. These are challenges that many of the older serving members of the Corps will remember from when we had a Battlegroup of our own in Afghanistan and had to conduct resupplies from Kabul down to places like Kandahar and Tarin Kot.

In conclusion, I am extremely privileged to have been your Head of Corps for three years and I thank you for the opportunity. Regrettably, I didn’t get out to visit units as much as I would have liked but it was a role that I will always remember with great pride as I enjoyed every visit I was able to conduct.

I wish all past and present members all the best in this 75th Anniversary Year and please stay safe as you celebrate the remainder of the year and continue to serve the Army with distinction.

Arte and Marte



# Deputy Head of Corps (Ground)

LTCOL John Bouloukos, CSM – CO/CI ASEME

I write my first address as DHOC-Ground for the Craftsman magazine as the Corps enters its 76th year of providing Army its maintenance capability.

I have been very fortunate and privileged to be able to serve the Corps in my two capacities, as the Deputy Head of Corps Ground and the Commanding Officer/Chief Instructor of the Army School of Electrical and Mechanical Engineering, in the Diamond Jubilee year.

The theme for 2017 has been 'reflect on the past to maintain the future' and this 75th anniversary year has offered me a unique opportunity to reflect on the history of the Corps, where the common theme is as a Corps we have constantly evolved and adapted to ensure we continue to provide the recovery and maintenance effect essential to maintain Army's combat punch.

Across the Corps in 2017 we have undertaken many social gatherings and events around the country remembering past mates, reflecting on our past and generally celebrating the greatness that is RAEME. As we move into 2018, our focus must now shift from reflection to the future.

Army will always need the recovery and maintenance capability we provide; however, as a Corps we need to use the three pillars as defined by the HOC to shape our future and ensure our trade structures, school curriculums and doctrine are suitable for the technologically advanced equipment entering into Service now and into the future. As our Diamond Jubilee ends our focus must shift from reflection to the Corps of the future; this will be the theme for 2018.

On 11 August 2017, ASEME emblems were renewed to reflect its historical lineage of both the Army Apprentice School and the RAEME Training Centre. This ensures that the past organisations will always be apart of the Corps, but in modern forms. This achievement was started by LTCOL Colin Blyth and achieved through the efforts of the outgoing Corps RSM, WO1 Robert Turnbull. I wish to thank WO1 Turnbull for his efforts as the Crops RSM and wish him all the best as he takes up his appointment as RSM 1 CSSB.

I would like to welcome the new Corps RSM WO1 Rick Colefax, who assumed the role on 01 December 2017; his first official duty was as the Parade RSM for the 75th Anniversary Birthday Parade. I must also acknowledge the efforts of WO2 Mark Taylor, who performed the role of Acting Corps RSM during the deployment of WO1 Turnbull. WO2 Taylor did much of the planning that ensured our 75th Anniversary Birthday Parade at the AWM was a success.

Finally as I personally reflect on my first year as the DHOC Ground, I know our future is as bright as our past has been. This is most evident judging by the quality of new soldiers I see at ASEME, and those who represented the Corps on the 75th Birthday Parade from the three trade schools (ASEME, RAMS, RAAF STT) that train the modern Craftsman for Army.

As a Corps we need to continue to evolve to ensure we provide Army with the skills essential to maintain the fighting. I look forward to meeting as many of you as possible when we conduct HOC tours in 2018, commencing in March.

Arte et Marte.

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# Deputy Head of Corps (Aero)

LTCOL Brett Nelson, CSM - CO/CI RAMS

In this 75th year of our Corps, I will forego the overview of major activities and notable farewells that are the traditional subject matter of Deputy Head of Corps' articles. Instead I will expand on the themes raised by our Head of Corps during his address to the Rotary Wing Aircraft Maintenance School (RAMS) All Ranks Dinner of 24 November 2017.

The theme for the RAEME 75th anniversary is 'reflecting on the past to maintain the future'. As we apply that theme to RAEME aviation and reflect on just the last quarter century, there are two clear themes: Constant Change and Continuous Operational Commitments.

## Constant Change

We are close to completing the wholesale change out of the Army's fleet of helicopters. Iroquois and delta model Chinook have already been withdrawn with Kiowa following late next year. Our trusted war horse, the Black Hawk, is in its final years of operation at 6 Aviation Regiment. In their place we have some of the most advanced military helicopters in the world with the ARH Tiger, MRH-90 Taipan and CH-47F Chinook. These aircraft bring with them significant technical advancements in terms of glass cockpits, composite structures, fly by wire systems – to name but a few.

This 'changing of the guard' is the result of countless hours of work over the last two decades. These programs have had their challenges, but as the performance of the Aviation Battlegroup on Exercise Talisman Sabre this year would suggest, we have turned a corner. So, for those who have fought in the trenches – sustaining legacy systems or acquiring new helicopters – you should be proud of where we are at now.

The other area of significant change is with our technical workforce. The last RAEME workshop – the Aviation Support Group Workshop – was disbanded on 01 December 2006. Our uniform maintenance personnel have become increasingly specialised in operational maintenance with contract partners accounting for the majority of deeper level and component maintenance.

The 'demise' of technical mastery has been a common talking point at past Corps conferences. I am, however, optimistic that some recent initiatives are attempting to arrest this decline. We are actively breaking down barriers between operational and deeper maintenance; expanding the 'cross-trade' space; and will soon provide placement opportunities for our technicians within contracted maintenance organisations.

Looking to the future, constant change is here to stay. In fact the pace of technological change is increasing. We are witnessing an exponential growth in the prevalence of UAVs. Work is already under way for the introduction of Light Utility Helicopters and the replacement of the ARH. Future vertical lift (FVL) will also be upon us in the next quarter century.

We need to start asking questions about what a FVL maintenance workforce looks like. Do we have the right trades and skills today for a FVL future? We also need to maintain a healthy amount of scepticism when faced with promises of low maintenance hours per

flying hour and simplistic 'box in box out' maintenance philosophies. Our recent history has shown that modern helicopters have their fair share of maintenance complexity and require highly trained technicians and engineers to deliver capability.

## Continuous operational commitments

Those who lived the 'long peace' during the 1980s would not have imagined the operational tempo achieved by Army Aviation in the last 20-years. From Chinook to tactical UAVs, almost all of our platforms have deployed overseas on operations. Major coalition combat operations in Iraq and Afghanistan have been supported alongside regional stability and security operations in Cambodia, Bougainville, Timor Leste and the Solomon Islands.

These have been interspersed with shorter duration (and often even shorter notice) Humanitarian Assistance and Disaster Relief and Defence Aid to the Civil Community operations following earthquakes in Pakistan and cyclones and flooding throughout our near region and at home.

For each of these operations you would have found a RAEME technical support element – either in barracks, deployed in the field or aboard an amphibious ship – toiling within the constraints of the environment, equipment and supply chain to achieve the mission. But, it was not just limited to the deployed 'Craftie' with the spanner in their hand. Our RAEME personnel in higher headquarters, systems program offices and training establishments equally contributed to achieving the challenges of continuous operational commitments.

While we look to the future, we must remember that 'you go to war with the people and equipment you have today.' Considering the current natural and geopolitical environment we should assume that the last 20 years of Army Aviation operational tempo is here to stay. Therefore, while it is relatively easy to develop highly efficient in-barracks procedures, they must be tested in a deployed setting with the friction of extended supply chains and interrupted communications.

We must hold fast to the fundamental tenet that a Craftsman is a 'soldier technician' and continue to emphasise military skills, physical fitness and resilience in addition to developing technical proficiency. It is only with the 'full package' of soldier and technical skills that we can achieve the tasks, such as downed aircraft recoveries, which will be asked of RAEME Aviation in the future.

In conclusion, I reflect on writing my first article for 'The Craftsman' in 2001 as a Technical Support Troop Commander for the Black Hawk detachment in East Timor. In the 16-years since then life as a member of RAEME has had its fair share of challenges, but these have been far outweighed by the rewards and the friendships made. Given my time again, I would without hesitation do it all over again.

I hope that many of you share this sentiment as you reflect on your own careers during this 75th year of the Royal Australian Electrical and Mechanical Engineers.

Arte et Marte



## Corps RSM

### W01 Rick Colefax – RSM ASEME

I am proud to be appointed as the RSM of ASEME from January 2018 and honoured that this position also allows me to be the Corps RSM.

I joined Army in Apr 1981 as an assault trooper with RAAC prior to transferring to RAEME in 1993 as a recovery mechanic. During this time I have thoroughly enjoyed being part of RAEME and look forward to representing The Corps and talking to you all during the HOC visits in the future.

I wish to thank W01 Rob Turnbull for his efforts over the previous two years as the RSM of ASEME and Corps RSM, and wish him well in his new position at 1 CSSB.

Enjoy your break and stay safe over the festive season.

Arte et Marte



## Outgoing Corps RSM

### W01 Rob Turnbull – RSM ASEME

Officers, technicians, members of the Corps

I thoroughly enjoyed and appreciated my time serving as the Corps RSM RAEME. As I write this article for the Craftsman Magazine, I am deployed to the Middle East, and therefore have completed my tour as your Corps RSM. It was at a personal expense to step down from my Corps RSM duties and deploy, especially during the 75th Anniversary year of the Corps.

When I visited various RAEME functions, Spanner Clubs and promotion courses, it was pleasing to see the strength and esprit de corps displayed by Corps members. Continuing on from my message in the first Corps Newsletter this year, the health of corps funds and membership displays the true strength of a Corps. We have had some positive gains in this area, but still require more RAEME officers and soldiers to become members and contribute to Corps funds.

The Corps has many challenges ahead, which we need to embrace if we are to stay relevant and an asset to the Defence Force in the future. Corps members need to accept that Plan Beersheba and Plan Centaur are in affect and will continue to change how we operate.

As a Corps, we need to keep abreast of the requirements and constraints of these plans and maintain a positive influence on our tradespeople.

I encourage you to be involved in the celebrations being conducted to mark the 75th Anniversary of the Corps; it is a significant anniversary and again the success of these events, through maximum participation, displays the pride we have in our proud Corps of RAEME.

I trust the RAEME Parade at the Australian War Memorial, the unveiling of the RAEME plaque (to later be mounted at the War Memorial surrounds) and the function following the parade, will be a great success for the Corps.

I wish you all the best in your future career, or your new pathway if you are leaving the service, I wish you and your family all the best in the upcoming festive season, and I look forward to meeting corps members in Darwin when I take up my position as RSM 1 CSSB in 2018.



## S02 Corps

MAJ Perri Hobbs

Well, as I write these words the 75th Anniversary of the founding of our Corps is almost over, save the publishing of this magazine. And to start preparing for next year.

The last year has been an opportunity for RAEME to reflect on our history, to remember the challenges of past equipment, and to recall the lessons that were 'inflicted' upon RAEME maintainers of yesteryear.

Of all the things that characterise RAEME, the most common that I have found, is how so often we go through the process of change. It might be new equipment, new management systems, or new training methods and curriculum. Individually, we might look on Hawkei, the Land400 Combat Reconnaissance and Infantry Fighting Vehicles, and many other projects as a revolution in the technology and equipment that we use, but even the Unimog and the ASLAV were once new technology.

The pages of "Craftsman" past are full of the words of Heads of Corps and their Deputies explaining the new and the shiny; from F88 to ASLAV and systems such as 'Fleet Management' and 'SDSS'. The new equipment due into service over the next five years are just current examples of the change that has been ever present in RAEME since 1 December 1942.

One of the biggest changes across all trades is the number and variety of things that are controlled by computer and the software run on them – software is an area that will affect all trades, not just Boffins.

Engines have changed drastically since 1942, with carburettors being replaced by Electronic Fuel Injection in the late 60s and early 70s, then by computer controlled EFI in 1980 and with variable displacement, camless and variable compression engines in the near future all offering increased fuel efficiency.

The Combat Reconnaissance and the Infantry Fighting Vehicles of Land 400 resemble a system of computers wrapped in a metal shell. The crew control and armament systems are all white box digital computers with even the main armament being able to program the individual shells as they enter the barrel. Not only is each vehicle a computerised system, it is part of a system of vehicles with another crew able to remotely engage targets with a physically separate Battle Management System.

All of these technological developments are made possible by the ever increasing speed and miniaturisation of computing power. Mechanical control gave way to electronic control and electronic control is now giving way to software control.

Currently, our training courses do not cover software in any depth; only the basics of the electronics that run it. Moreover, RAEME only has four software engineer positions, all captain's positions, of which DOCM-A can fill none. RAEME only has one software engineer, and he or she is a Lieutenant Colonel in a non-Corps position. Obviously this is an area that the Corps will need to investigate in the near future.

As you may gather from the paragraphs above, the Corps will have much to discuss at the next RAEME Corps Conference in October 2018. More information on the Conference will be released early next year to give everyone enough time to prepare.

I had the pleasure of spectating at the 75th Anniversary Parade and dining with quite a few of RAEME's notable personalities underneath 'G for George' in ANZAC Hall afterwards. It was fantastic seeing the months of planning and a week of drill practice come together at our Nation's foremost site of military remembrance. Thank you to all the personnel who participated; with special thanks to WO2 Mark Taylor for planning and organising the Parade and to MAJ Steve Howells for organising the Dinner.

I cannot resist the urge to include a plug for membership of the Corps Fund. The RAEME Corps Fund is run for the welfare and benefit of the members – you. The Corps Funds provides money to Corps members around the country to run Spanner Clubs, RAEME Birthday Parades, and other events in order to help our soldiers build esprit-de-corps within the Corps. The Corps Fund also pays for this magazine so that you do not have to.

In our 75th year, the Corps Fund has disbursed around \$39,500 to various RAEME regional events to help cover the costs and ensure you pay as little as possible on the day. Some great examples can be seen in the photos of the 75th events. The Corps Fund cannot support your events if you do not purchase Corps memorabilia or Fund membership. See the Corps Newsletter for information on how to join.

Thank you to all the writers of the articles and the unit jottings. The first RAEME Newsletter of 2018 will publish the winners of the prizes for best articles, and the best unit jottings.

2017 has been a year to remember, but 2018 is a time to look forward and develop our Corps, secure in the knowledge of how we have evolved in the past.

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# From the Editor

## W01 Dave Clarke

Happy 75th Anniversary RAEME. With the manning shortage in the RAEME HOC Cell continuing, I've been drafted back again to assist with compiling the 2017 RAEME Craftsman. There was no Craftsman magazine last year, so this year is a combined 2016/2017 edition.

I was at the parade and dinner at The Australian War Memorial (AWM) on 1 December and I congratulate all those involved in the planning and conduct of these events. The members on the parade did The Corps proud and the dinner in the Great Hall at the AWM was a unique experience and a very special night. I'm sure it will be remembered by all involved for a long time to come.

A highlight of the dinner for me was watching the Chief of Army talking to about 20 Craftsmen at their table and seeing how intently they were hanging on to his every word. There will be a photo spread of the parade, dinner & Corps awards in the magazine.

We have made a big effort to get members and units to contribute to our 75th Anniversary edition and have been overwhelmed with Unit Jottings which is fantastic. I really enjoy reading these articles in my editorial role.

It's always great to read about diggers working hard fixing stuff, but still having time for the obligatory ASM golf/bowls days. We managed to cover off on Ground, Aviation, Amphibious, Reserve and the Training Establishments. Thanks to everyone that contributed.

In line with The Corps 75th motto 'Reflecting on the Past to Maintain the Future' we have included a very interesting article about 106 Field Workshop's M2A2 Rebuild activity in South Vietnam; as well as an article on the progress and engineering rigour that is being applied to the new Protected Mobility Vehicle - Light (PMV-L) Hawkei.

To show how The Corps is really progressing into the 21st Century there are also articles on how 3D printers are being used in the aviation space to fast track the prototyping of new components for Chinooks and how Condition Based Maintenance is being trialled on

the M113AS4 FOV. Not to mention drone racing, which it seems may replace tug of war as the new Corps sport?

We have had our share of members out there doing the Corps proud and there is a story on two RAEME sharp shooters and their efforts at AASAM. There is also an interesting story about a buffalo at 1 CSSB. It is a work of art and a testament to the artisans that made it.

On the operational front, I'm pleased to announce that we have several articles on how our members are performing in the MEAO. It's always pleasing to read comments that state the RAEME tradies are the pick of the maintainers on operations, as they are always willing to turn their hands to whatever it takes to achieve the mission.

There is an interesting article by MAJ Paul Nation on Reliability Engineering in the US detailing his long term schooling experience and his experiences working with the US Army Test and Evaluation Command. US universities sound very interesting to say the least!

We've also included 75th celebrations, parades, awards, association messages, retirements and unfortunately some deaths. 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 S02 Corps MAJ Perri Hobbs.

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 vale notices to the members name and date they passed. If you're sending this information please provide enough information so that we can do the member's memory justice.

I hope you enjoy the 75th Anniversary edition of the RAEME Craftsman Magazine.

Arte et Marte

# The CO's Buffalo

## Metalsmiths of 1 CSSB

One late afternoon I received word to report 'post haste' to the OC and ASM of 101 WKSP COY. With a hundred and one thoughts rushing through my head I raced up to Company HQ. When I arrived, their jovial mood served to put me at ease. "Can you make us a presentation piece for the CO", the boss said. I thought yep, no worries, I can knock something up. Then they explained what they wanted. "We want a buffalo\*, pulling a cart, with a port barrel on the cart, and it must be big and heavy and awkward and hard to move around posting time". Well I must admit; their enthusiasm was contagious and it wasn't until I walked back to the workshop that I thought, "Oh boy what did I just say yes to".



As soon as I got back to the workshop I got the other two metalsmiths together for a toolbox meeting and explained what we had to achieve. There was the usual outburst of "How are we supposed to achieve this in the time we have, what about all the other jobs, where is the material going to come from, etc. etc. etc." I think a nuclear explosion would have been more subtle.

Then the planning started. Contrary to the normal three to five days allocated to complete a task of this magnitude, we actually got twelve weeks. Sourcing the material was the first obstacle. We required some copper and brass as well as a block of aluminium to sculpt the buffalo out of. No small task considering that it had to come from interstate, we are in Darwin and NT stands for "next truck". A big thanks to Sandi from our local steel supplier who managed to perform a small miracle. The system being what it is we received the material by the end of week four. Leaving us eight weeks to complete the project. The day of presentation to the CO was 10 Nov 16 and there was no time to waste.

I started making the buffalo and the other two metalsmiths started on the cart. To reduce cost the largest size aluminium that we could find was 65mm x 65mm square stock. This meant I had to make dowels and weld the blocks together in order to form a solid block large enough to sculpt. We had no plans to work from (and this was my first ever sculpting attempt) so we had to use google images and our own imagination.

The block for the buffalo measured 500mm x 260mm x 195mm. After marking it out, I started cutting with a plasma torch. By lunch time on the first day of cutting and gouging, my welders pants have burst into flames about six times and were burnt so full of holes they went straight into the bin and my boots looked like something you pulled out of a camp fire. Luckily I managed to obtain a pair of flame retardant coveralls which just made it through the next few weeks. When the rough cut with the plasma was completed I changed over to different size grinders, an air die-grinder and files for finer detail.



Metalsmiths (Artisans) CPL Kyran Blandford, LCPL Arnie Kroezen, CFN Chris Alcock.

Meanwhile the work on the cart was progressing well. As soon as the ordered port barrel arrived, the framework for the cart bed and barrel rest started to take shape. Using copper, brass and wood inserts (from a sanded down cam-pole) it was soon turning into a thing of beauty. Making the wheels for the cart was a challenge in itself. We decided to get it as close to authentic as we could. Turning up the hub, drilling and tapping it for the spokes, cutting and edging the wood, measuring and drilling the brass band for the outside of the wheels and then bolting it through the wood into each individual spoke soon had the guys pulling their hair out. Luckily we could at times get some of the fitters to take over polishing duty, which freed us up for the actual construction part. We even at one stage dragged in an electrician to make the wood inserts on the cart and got one of the recce-mechs to cut, sand and varnish the wood for the table. The clock was ticking.

Once the buffalo stopped looking like a lopsided wombat and started to take shape, I decided to make the horns and tail out of brass, in order to break up the dull grey from the aluminium a bit. The horns I made as one piece and recessed it into the head, welding back over the top of it. The tail was made from handful of brazing rods, cut to different lengths. The ears I made out of separate aluminium bits and welded to the head. In order to give the buffalo a stable platform to mount onto the table, I shaped a piece of aluminium to resemble a mud puddle and plug welded the feet onto it from underneath. Naturally we had to add our RAEME badge into the project and burned it into the back end of the port barrel, enhancing its value of course.

In order to hitch the cart onto the buffalo, we fashioned a harness made from copper strips and attached the draw-bars from the cart onto it. To make the whole piece more practical, we turned the 1000mm x 500mm x 60 mm solid timber bases into a coffee table by welding up stainless steel legs and screwing it onto the bottom. A plaque, with a message from the battalion to the Commanding Officer was added, as well as a small plaque with the names of the metalsmiths who made this work of art. We then added 10 corps badges, representing the different corps which makes up the members of 1CSSB.

In all honesty, a task that started as a painful endeavor very soon turned into a work of immense personal pride for us. I won't quote some of the comments from individuals who viewed the finished item so let's say it was something along the lines of "That's absolutely marvelous chaps, jolly good show".

\*The buffalo represents the 1CSSB mascot, a Northern Territory water buffalo (*Bubalus bubalis*).

# 3D Printing for Rapid Prototyping

## CAPT Nicholas Gover – Cargo Helicopter Management Unit

In 2015, the Cargo Helicopter Management Unit (CHMU) purchased a 3D printer to support the rapid prototyping of parts for aircraft modification projects. This capability has proven to be so successful that a second printer, this time deployable, was purchased in 2016. Using 3D printers within CHMU has resulted in significant time and cost savings which has enabled CHMU to direct resources and has promoted the upkeep of the CAD skills of engineers.

CHMU, along with Unmanned Aerial Surveillance Management Unit (UASMU) form Cargo Helicopter and Unmanned Surveillance Project Office (CHUSPO), based out of Gallipoli Barracks, Enoggera. CHMU supports the CH-47 capability and with Projects AIR 9000 Phase 5C and Land 4502 has recently been orchestrating the disposal of CH-47D and the acquisition of CH-47F. Whilst CH-47F has been an off-the-shelf purchase and essentially an upgrade to a known and proven capability, ADF requirements for this aircraft system are still unique and post-production modifications are required.

### Use of 3D printing in professional organisations

Aircraft modifications are costly in terms of time, manpower and money. Historically CHMU has approached such modifications by conceptually designing, then contracting industry to manufacture prototypes. For small, bespoke parts, CHMU has typically been looking at thousands of dollars and many weeks for manufacture, and this assumes that the initial manufacture is of the correct geometry and sufficient quality to be fitted onto aircraft.

3D printing is increasingly accessible. Printing options exist for the home hobbyist, professional, right through to large-scale commercial options<sup>1</sup>. Printers range from small, desktop solutions through to warehouse-sized facilities, printing in a range of materials including plastics, carbon fibre, steel and experimental organic compounds. Organisations like CHMU are looking for small, professional printing suites that introduce a new capability, and conflicts.

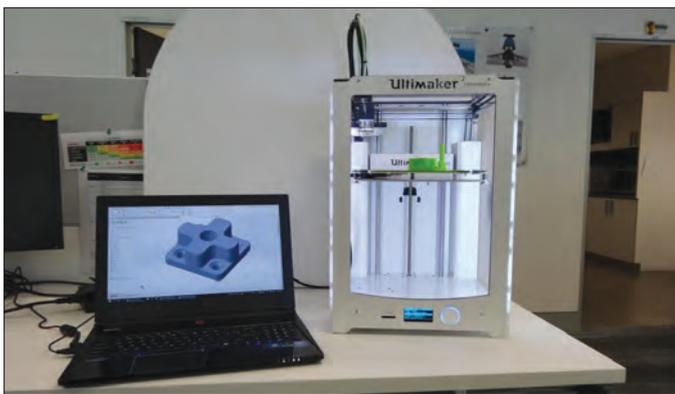


Figure 1. Ultimaker printer & Solidworks laptop.

The Enoggera-based printer quickly proved its worth to the unit in turning out prototype and test parts to be trialed. These modifications, however, had to be printed in Brisbane and transported to Townsville. While this was still more efficient than professional manufacture, the time and cost inherent to this travel frustrated the SPO. CHMU staff undertook a feasibility study to

develop a deployable printing system. This would require a printer, a computer, CAD software and an internet connection. This would all need to be transported safely. CHMU proposed and then accepted the procurement of this equipment to develop the Capability for 3D Printing On-the-move, also known as C3PO (Figure 2).

C3PO consists of an Ultimaker 2+ Extended printer, a laptop capable of running the CAD packages Catia, Solidworks and Cura and a 4G USB dongle to connect to the internet for software licensing. C3PO is housed in a rugged Pelican case, enabling the kit to be transported as a piece of luggage on commercial flights. This new capability will allow printing to be conducted in-situ with CHMU's customer, ensuring a rapid turnaround of modification prototypes and fit checks.



Figure 2. Capability for 3D Printing On-the-move (C3PO).

Beyond simply providing a cool toy for engineers to play with, 3D printing supports CHMU's business requirements. Prior to having this capability, prototypes would be sent out to industry for manufacture. High costs and long lead times were generally accepted as an inherent part of the process. Now CHMU has the ability to design and print a part as a proof-of-concept. The parts generally aren't load bearing designs, however for the purpose of confirming geometry this is an invaluable tool. 3D prototypes provide excellent talking points when dealing with internal and external stakeholders; being able to bring a physical piece to a meeting instead of engineering drawings has been shown to be a much more effective way of communicating ideas.

A typical one-day trip to Townsville for a CHMU engineer costs \$1569.11 in terms of travel and lost productivity during travel; typical five-day trip will cost \$2538.57, and these figures do not account for time lost on other CHMU projects while out of the office. Being able to transport the printer and reduce manufacturing costs to just the cost of the printing materials used, it is estimated that CHMU has recouped the \$4000 cost of the C3PO package once the second part has been printed and fitted in Townsville.

These printers have required engineers to be conversant with modern CAD packages. Most engineers learn basic CAD tools during

<sup>1</sup> Dutch architects Petr Novikov and Sasa Jokic from the Institute for Advanced Architecture of Catalonia, in consultation with the Joris Laarman Studio are printing a full-scale pedestrian bridge in Amsterdam's red light district. <http://www.dezeen.com/2015/10/19/joris-laarman-3d-printed-canal-bridge-amsterdam/>

their undergraduate degrees; however, this is a skill that can easily be forgotten without practice. Having these printers within CHMU has enabled engineers to hone their skills. Through the use of a Virtual Private Network established over wireless internet, CHMU shares the Catia licence of our full-time draftsman to C3PO, which can then be accessed wherever we can establish an internet connection. In the case where an engineer has deployed with C3PO, the engineer can use the design that was developed in Brisbane, make changes on the fly and conduct multiple fits.

On return to Brisbane, the parts can be developed by our draftsman for contracted manufacture. This lower-level prototyping allows our draftsman to focus on the final drawings and higher-level aircraft development, while the design engineers can actively progress aircraft modifications at a much quicker rate that previously experienced.

## CHMU Applications

### Cockpit Weapon Mount

16 Avn Bde submitted a requirement to fit personal weapons in the CH-47F cockpit. An iterative development approach was taken and prototypes printed, each time checking for interference with vision, flight controls and emergency egress, along with confirming weapon geometry. Quite a few iterations of this design were completed, two of which are shown in Figure 3. These CAD designs were printed and test fitted in the CH-47F with input from pilots regarding ergonomics being included in each iteration.

In August 2016, 5 Avn Regt introduced the EF88C as the in-service weapon. The constraints of this weapon mean that it cannot be fitted in the cockpit; however the engineering design and test procedure reached this conclusion. Being able to reach this conclusion through rapid prototyping potentially saved up to six months of manufacturing time along with associated costs. Furthermore once CHMU had determined that there was no feasible engineering solution to this requirement, resources were allocated to other projects, deepening the business case for rapid prototyping.

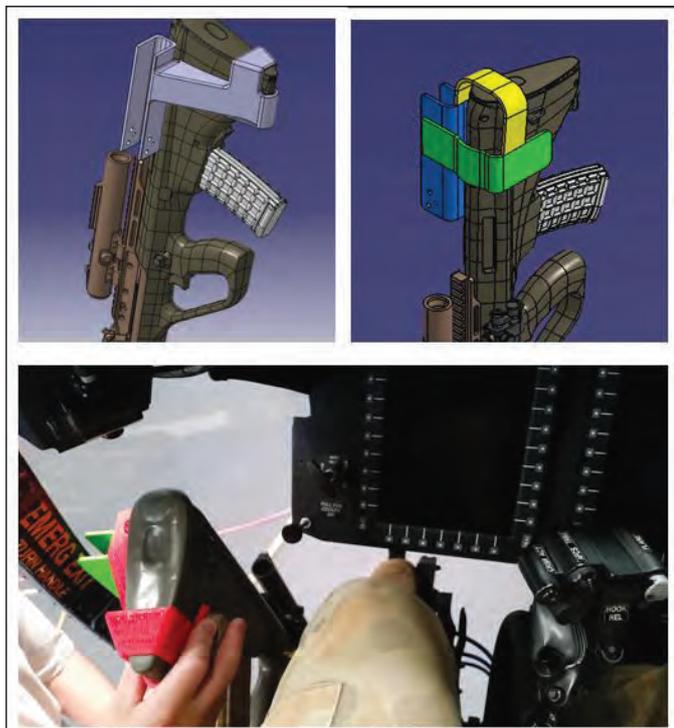


Figure 3. Cockpit Steyr Mount - Catia Models and the printed prototype in aircraft.

### Flight Test Instrumentation mounting brackets

In support of First of Class Flight Trials embarked on HMAS Adelaide, a suite of flight test instrumentation required fitment to the CH-47F. Mounting brackets were printed to prove geometry, and replicas of internal communications systems were also printed to check sizing. The design of this suite was subject to ergonomic requirements and the sheer volume of equipment required to be fitted. Printing mock-up parts and mounts allowed the engineers to visualise the changes before settling on the final configuration.

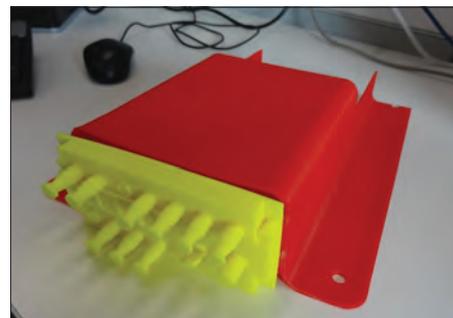


Figure 4. FTI ICS module bracket.

### Crashworthy aircrew seating

One of the modifications required of the CH-47F is to allow aircrew to man weapons systems facing outward. This requires a seating arrangement that is in line with current crashworthy standards. Current developments in fitting crashworthy aircrew seating require development of tie-down points. These are being printed to prove the interface between the seat and the aircraft prior to manufacture. It is anticipated that these parts will be used in a proof-of-concept setting and that the final bracket design will then be manufactured once the seat design is locked in. As with other projects, this iterative prototyping is significantly cheaper and more cost effective that repeated traditional manufacture.



Figure 5. Crashworthy aircrew seating mounting bracket.

### Conclusion

Rapid prototyping has assisted CHMU in achieving business aims quicker and expediting project goals. Not only has it proven effective in test-fitting prototypes in the office and therefore avoiding travel, but the deployable C3PO has allowed CHMU to print out of the office. This has resulted in significant cost savings in terms of lost productivity, reduced travel costs and the re-assigning of resources due to increased efficiency. The printers cannot print materials to an airworthy standard, however, their employment during concept design and project development cannot be denied.

The promotion of engineers' skills has long-term productivity improvements and the ability to produce talking points during stakeholder engagement has reduced the amount of information that is typically lost in engineering drawings. CHMU will continue to use these printers for rapid prototyping due to their continuous success.

# RAEME Top Guns

2017 saw two RAEME Fitter Armourers from 3 CSSB achieve excellent results at Australian Army Skill at Arms Meeting (AASAM) in Puckapunyal. CPL Jake McDermott and CFN Toby Woodward placed in a number of ADF & International events.

Their impressive results are detailed below:

**CPL Jake McDermott**  
**ADF Results**

- placed 1st ADF Machine gun
- placed 2nd ADF handgun
- placed 3rd ADF TOP 20
- Placed 1st ADF combat shooting

**International results**

- Ranked 3rd international top 20
- International close combat shooters award 1ST PLACE (Samurai Trophy)
- International 1st place machine gun trophy (Bren gun Trophy)
- Placed 7th international handgun



*1 CPL McDermott with Samurai Trophy.*

**CFN Toby Woodward**  
**ADF Results**

- placed 3rd in machine gun ADF
- placed 6th handgun ADF
- placed 14th overall ADF top 20
- placed in top 10 ADF Combat shooting

CPL McDermott and CFN Woodward were also part of the ADF 4 Man team to compete in the combined team pistol matches where they placed first winning the Smith and Wesson Trophy.



*CPL McDermott & CFN Woodward with Smith & Wesson Trophy.*

These results are just reward for the hard work both members have put in to constantly improve their skills.

CPL McDermott was rewarded for his excellent results by being selected to compete in the Australian Army Combat Shooting Team (AACST) at Bisley in England.

Congratulations to both members on their efforts.



*McDermott shooting section assault match on classification range.*



*CFN T Woodward shooting moving target match on the MTR.*

# ASEME and ALTC Massive Murray Paddle 2017

## SPR Stock – ALTC ASEME EESW



### Massive Murray paddle

Members of ASEME and ALTC recently participated in the Massive Murray Paddle (MMP) from the 20th - 24th November 2017. This was the second time ALTC has participated in the event in the category of Touring Kayak – Two person (TK2) relay with two teams.

The MMP is an event conducted on the Murray River where participants of various paddling experience from novice to professional paddling up to a maximum of 404 km, over five days, commencing IVO Yarrawonga weir and concluding in Swan Hill raising money for charity. ALTCs nominated charity is Legacy.

Prior to the event, participants were required to commit Wednesday and Sunday afternoons IOT condition themselves and become familiar and confidence paddling the kayak as a pair.

The Hume Dam was used for Wednesday training sessions which consisted of several lessons on proper paddling techniques, race starts, stopping at speed and basic kayaking techniques which involved being able to stay upright in the TK2, which was challenging until the participants confidence improved.

Sunday training sessions were predominantly conducted on the Murray River at Nouriel Park, Albury. These sessions enabled paddlers to familiarise themselves with the characteristics of the river currents, eddies and negotiating obstacles, such as fallen trees.

In order for paddlers to have a true appreciation of what was required during the conduct of the event, the ALTC team paddled day one of the MMP for endurance training. This leg was from Yarrawonga to Thompson's Beach at Cobram.



### Greeting the first kayak

The start times were staggered due to the number of kayakers competing in the event. Both of the ALTC kayakers were registered in the same start time for the duration of the event. The start was one of the more exciting times to be in the kayak as you were jostling for position on the river and trying to negotiate the wake of the other water craft. A good start was crucial to setting your team up for the remainder of the day. If your kayak was towards the rear of the field

you would spend most of your time battling wake and fighting for stability on the water.

Over the 404 km, each participant faced similar challenges that they were required to overcome; including fatigue from the previous stages paddled and the varying distance of the stages that lay ahead. Numerous sandy beaches on both sides of the border provided campers and spectators front row seats to watch various watercraft from stand-up paddle boards to four-seater touring kayaks making their way to the next checkpoint.

The relay change over points was where the excitement occurred. This involved the teams leap frogging the boats on the water, requiring the support vehicles to get to the next change over point before the kayakers arrived. The teams had to scour the river side to determine a suitable location for a change over point, which at times seemed impossible. Once the kayakers arrived all hands were on deck to set the kayak up for the next paddlers, get the paddlers in the boat, and back into the race. This occurred up to four times per day.

Due to the limited number of ALTC participants, some were required to conduct two stages per day, paddling up to 52 km in one day. All participants came out strong, with ALTC Team One taking first place in the relay division and placed fourth overall. ALTC Team Two took out third place in the same division and placed sixth overall.

The endurance and stamina required to complete the longer stages, was achieved by friendly rivalry and pushing each other to beat the other ALTC team to the next checkpoint.

Capsizing the kayak only occurred three times during the event, which was a substantially lower figure than anticipated from our previous performance during training sessions. This was a great feat for the teams as most of us during training had minimal experience and had a hard time balancing the TK2s.

This arduous event would not have been possible without the members of the support crew, who tirelessly worked in the background ensuring participants, had what they required for the next stage of the event.



ALTC MMP Team Photo.

# ASEME Flag, Insignia & Unit Shoulder Patch Change

Army and Air Force personnel at the Army School of Electrical and Mechanical Engineering assembled on the 11th August to conduct a Unit Insignia, Flag and Unit Shoulder Patch change ceremony. The changes from the RAEME insignia to the current unit symbology have been brought about to display the bi-service nature of school training RAEME, RAE and RAAF technicians.



*ASEME Flag Ceremony.*

The reference to the Army Apprentices School insignia; which was also used for the Army College of TAFE, reflects on the school's history and is symbolic of the values that are required of all military technicians, values of which still remain unchanged to date.

The insignia represents the following:

At the apex of the badge is the Crown of the Sovereign, expressing allegiance to the Sovereign, Superiors, Duty and Country. Superimposed on a cogwheel which represents trade and technical training, is the English Cross of St. George, depicting the virtues and development of character. The St. George's Cross is then overlaid with crossed, doubled-edged swords, representing military qualities of courage, discipline and physical fitness. Superimposed upon the swords and the Cross is a flaming torch of learning.



### Insignia

The RAEME Training Centre was the Corps school of RAEME, where all members of the Corps gathered throughout their career to develop their technical mastery essential to maintain Army's maintenance effect. Today ASEME conducts the initial trade training for the ground trades within RAEME as well as Ground Support Equipment fitters of the RAAF and the plumbing and carpentry trades of the RAE. The future for ASEME may even include elements of the junior officer training to establish ASEME as the Corps school preparing RAEME personnel across all ranks and trades to provide Army's maintenance capability.

The retirement of the old unit flag also coincided with the departure of Corps RSM, WO1 Robert Turnbull, from ASEME onto a deployment to the Middle East Region.



*RSM & CO ASEME.*

# Condition Based Maintenance

A number of Capability Acquisition and Sustainment Group (CASG) initiatives are coming together that aim to make the M113AS4 fleet the first Land fleet to significantly exploit Condition Based Maintenance (CBM). While Preventive Maintenance (PM) no doubt has its place, PM schedules are generally conservative and can lead to over-servicing.

M113AS4 oil change intervals have already been increased from 200 to 400 hours, but laboratory sampling has indicated that at 400 hours the viscosity of M113AS4 engine oil is still well within the specification limits for new oil. While there are a number of other oil condition parameters that are important, such as Total Acid Number and level of particulate contamination, viscosity is considered the key quality of oil that provides protection to the machine.

MCSPO in conjunction with the Land Engineering Agency (LEA) Directorate of Systems Engineering and Integration (DSEI) has fitted 149 M113AS4 with a Health and Usage Monitoring System (HUMS), including an oil viscosity sensor. This sensor has proved accurate when tested against laboratory data. Oil viscosity alarm limits are being determined and it has been proposed to move power pack servicing to align with oil condition.

This is how the proposal would work: HUMS equipped M113AS4 would use their oil viscosity sensor to measure oil condition and automatically send the data to the Capability Acquisition and Sustainment Data Warehouse (CAS-DW). The sensor takes a viscosity measurement every second irrespective of engine temperature. LEA is developing an algorithm to determine a daily measurement for the vehicle's oil quality by assessing it against limits on Kinematic Viscosity at 100 degrees Celsius (KV100).

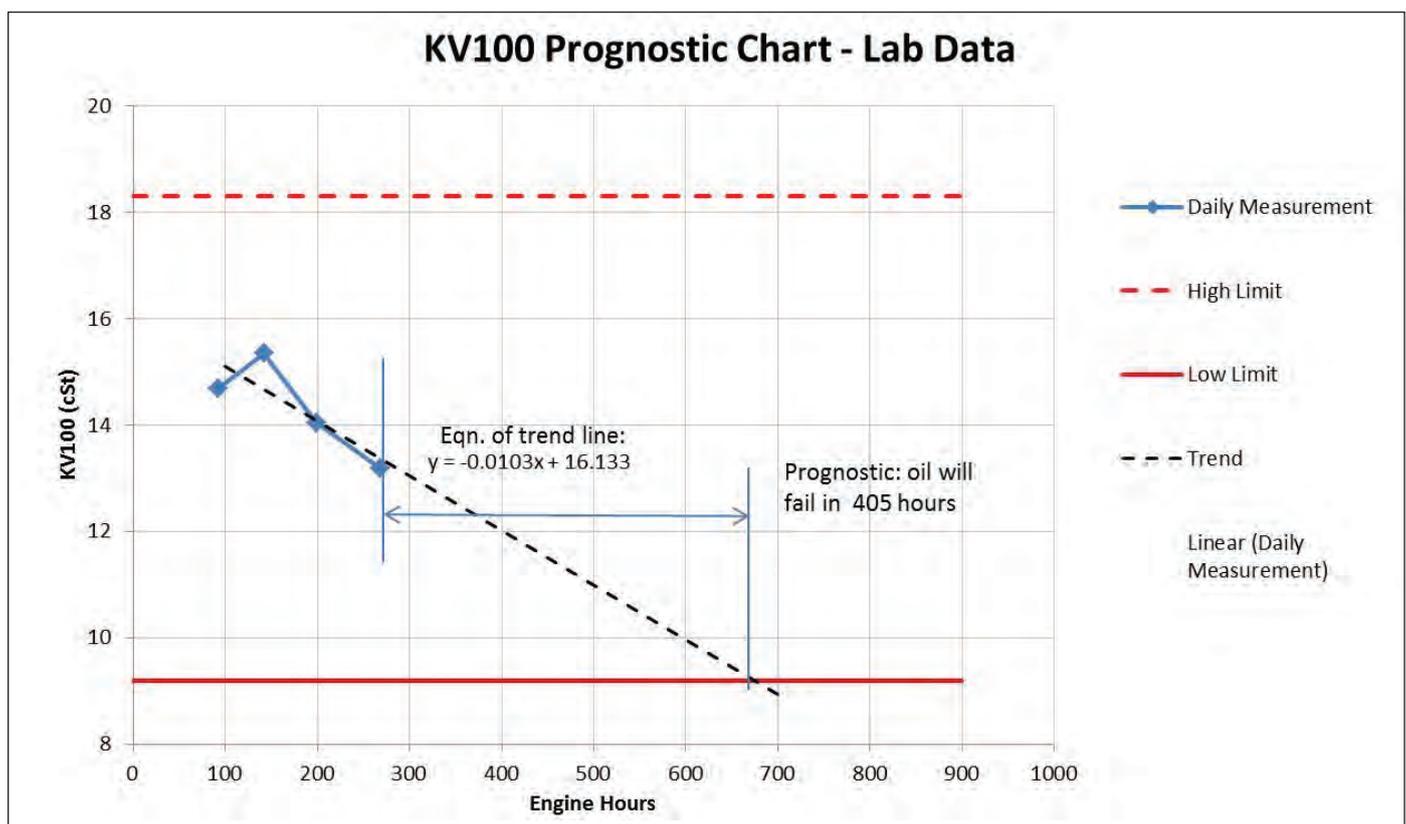
In almost all cases viscosity tends to decrease over time as the oil breaks down which is illustrated in the prognostic chart diagram (below). Once implemented, the readings will be automatically sent to MILIS as Condition Monitoring Measurements (ConMon). MILIS monitors these measurements and when they drop below the low limit (say 9.5 cSt) it can be configured to send a Work Order to the relevant Work Group to plan a Power pack service.

## Obtaining Oil Life Prognostic from Laboratory Viscosity Data

Non-HUMS M113AS4 would be subject to an oil sampling program in which samples are taken using the Q1000 FluidScan hand held oil analyser and the Q3000/3050 Spectro Viscometer. When the engine oil is replaced, a sample is taken and sent to the oil laboratory for testing for confirmation. The laboratory sampling program will be used to verify that engine oil viscosity is in fact the key driver of oil condition.

Transmission oil will also be sampled to make sure it is not failing before the engine oil, an unlikely event as transmission oil exists in a more benign environment to engine oil. The data provided by the oil test laboratory has an additional benefit in that it can be also used to indicate condition of the machinery the oil is protecting, an area that MCSPO and DSEI will develop in the future.

CBM is expected to lead to improved maintenance effectiveness through reduced effort and oil usage, and increased planning flexibility. By current estimates the use of CBM for the M113AS4 Power pack could extend the service interval by up to 100%.



*This Chart illustrates how the CAS-DW will analyse and trend the oil viscosity data.*

# Drone Racing

## CFN Cam Webster

In July the Army drone racing team competed against the best drone racers in the country at the Australian drone nationals at the Gold Coast, this has led to the introduction of brigade drone racing competitions starting in 2018. It is a perfect sport for RAEME personnel as the building of drones incorporates many of our trade skills.

What is drone racing? Drone racing is a sport where “pilots” remotely pilot a specially designed multirotor drone around a track using “gates” which the drone must pass through and flags which the drone must go around. A camera mounted on the drone transmits the view from the drone which is received by goggles which the pilot wears to fully immerse themselves in the experience of flying.



How do the races work? Typically, 4 pilots race at one time (due to limitations of the video frequency channels). The four pilots power up their drones and place them on the start line, then move away behind a protective net to avoid being potentially hit by a drone that might hit a gate and get thrown off course. Spotters are used for each drone to ensure they follow the correct track and don't miss any gates. The race controller verifies all the pilots and spotters have a good video signal, the call is given to “arm quads”, then the race begins with a horn blast.

The pilots take off and complete the laps required (usually 4 or 5) with the spotters ensuring they pass through the gates and go on the correct side of the flags. If a gate or flag is missed then the pilot must turn the drone around and go back to the missed gate to go through. Where there are more than 4 pilots in the same racing class then multiple heats will be run with a points system used to rank the pilots and order them for the final races.

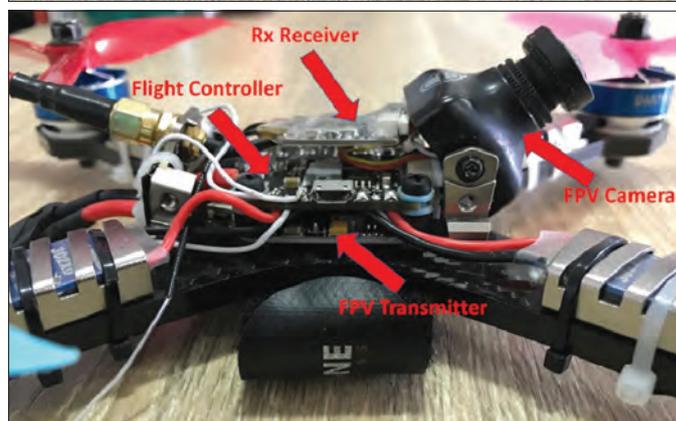
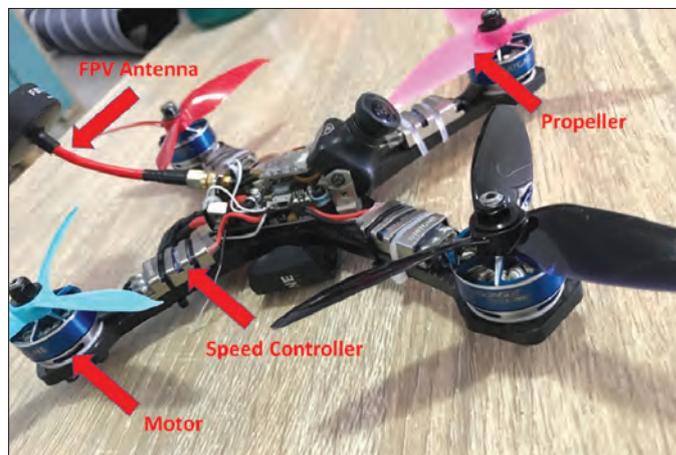
What is a racing drone? There are two main types of multi-rotor drones: aerial photography drones and racing/freestyle drones.

Aerial photography drones. are designed to be slow and smooth flyers with long battery life to maximise the flight time to get good aerial videos; these are not good for racing.

Racing/freestyle drones. are designed to be as fast and agile as possible. The batteries are as small as possible to only allow enough time to complete the race (normally no more than 3 minutes). These are the drones we will cover in this article.

### Parts of a racing drone

**Frame.** Frames have to hold all the components together and are made of carbon fibre to be as light and agile as possible, but strong enough to avoid breaking during a crash. Some frames have replaceable arms to be easily changed when broken and not requiring a whole new frame.



**Rx receiver.** Receives the control signals sent by the pilot's radio controller and tells the flight controller what the pilot wants the drone to do. Different controllers use different protocols to communicate, so the correct controller/receiver combo must be used. Most modern controllers and receivers use the 2.4 GHz radio band and use auto-frequency tuning to ensure a good signal and to avoid interfering with other R/C equipment using the same radio band.

**Flight controller.** The “brain” of the drone gets input signals from the RX receiver. The flight controller then uses its inbuilt gyro and accelerometers to read the drone's current attitude and work out what correction needs to be done to achieve the pilot's desired attitude. The amount of correction, and thus the drones flying characteristics, can be changed using a computer and USB cable. The flight controller changes the attitude of the drone by telling the speed controllers how fast to turn the motors.

**Speed controllers.** Normally mounted on the arms of the drone, the speed controllers get an input from the flight controller then create a 3 phase output to turn the motors at the required speed. Some speed controllers can flow up to 30Amps each which means the drone can be draining over 120Amps from the battery during maximum acceleration.

**Motors.** The 3 phase brushless motors used on racing drones turn the propellers to make the drone fly. There are high RPM low torque motors and low RPM high torque motors used for different flight characteristics. Racing drone motors can spin at up to 50,000RPM. Motors use codes to identify the characteristics of the motor. For a 2206 2450kv motor, the first two numbers represent the

electromagnets diameter in mm. The second two numbers represent the magnets height in mm. the last four numbers are the kv rating of the motor, which is the free spinning RPM per volt. Eg. 14.8 volts X 2450kv = 36,260RPM.



**Propellers.** Drone propellers have come a long way in the last few years from basic flat blades to modern racing propellers using special tip designs to reduce propeller tip vortices and produce the maximum thrust and responsiveness. Different propeller designs and pitch angles offer slightly different characteristics. Motors and propellers have to be matched to allow maximum performance. If a high torque propeller is used on a high rpm motor then the motor will struggle to turn the propeller and the acceleration will not be as fast. Whereas a high speed propeller on a high torque motor will reduce the top speed of the drone.

**Battery.** The heaviest individual component of the drone, Lithium Polymer batteries are used due to their high energy density and high amperage output. Most racing drones use a 4 cell (14.8Volt) LIPO battery with a capacity of about 1000-1500MAH. These batteries can produce the huge amperage required for the racing drone. Drone batteries have a "C" rating which describes the amperage that the battery can produce. The calculation for this is the battery capacity in Amps X the C rating for example a 1300mah battery with a "70C 90 burst" rating can produce 1.3Amps X 70 = 91Amps continuous, and 1.3A X 90 = 117Amps for a short burst.

**FPV camera.** A small, light-weight standard definition camera with camera viewing angles ranging from 90-150 degrees based on the pilots preferred view and mounted to the drone at an upward angle so when the drone is flying forward the camera is level. Low light cameras are also used for flying at night or in low light conditions.

**FPV Transmitter.** Transmits the FPV signal from the FPV camera to the goggles that the pilot uses to see what the drone is watching. The signal transmitted is an analogue standard definition signal due to the lower latency of analogue compared to digital high definition signals. Some of the wires used in the FPV transmitter are shielded to avoid RF interference from other components. The video signal is transmitted on the 5.8 GHz radio band with pilots manually changing the frequency they use to avoid interference with other pilots.

### Other equipment needed

**Goggles.** Goggles are used to receive and watch the live FPV signal from the drone while flying. They also block out everything else visually so you are fully immersed in the FPV experience. Some pilots use a separate screen instead of goggles. Some goggles can record the FPV footage which can be handy if there are any disagreements about whether or not a gate was missed etc.

**Radio controller.** The pilot controls the drone via the radio controller which sends the commands to the RX Receiver on the drone. Controllers can be setup for the pilot's personal preference of which gimbals and switches control the actions of the drone.



**Charger.** Charges the batteries of all the equipment including the drone, radio controller and goggles. A charger that can charge different voltages is recommended as goggles and controllers use lower voltage batteries than drones.

**Maintenance and construction.** Most drone racers build and maintain their own drones as this substantially reduces the cost especially in repairs after a crash. The advantages of building your own drone are the initial cost and getting to know how all the parts of the drone link together which helps during repairs and diagnostics. When you build a drone you will gain skills in soldering, electronics assembly and programming. Most drones are maintenance free as the motors use sealed bearings which do not require lubrication. Repairs are only required after a component failure or a crash.

**Getting started.** Simulators are a great cheap way to practice flying and learn the controls. They are available on computers and will require a radio controller that is compatible with a computer. Computer based simulators are great as they use a controller with real control sticks so the feel and feedback from the controller is accurate. Phone/tablet based simulators are great for portability and they can be used anywhere however they use the touch screen to control the drone so you don't get the same feel as a real controller.

Full sets including everything you need to get flying range from \$400-\$2000+.

The individual items required to start drone racing are...

- Drone \$200-\$1000+
- FPV Goggles \$50-800
- Radio controller \$80-400
- Battery \$20-50each
- Charger \$40-100
- Spare propellers \$2-8 per set of 4

Drone racing is a fast paced exciting motorsport for people of all ages and skill levels, it is relatively cheap to get started and it is a sport where your skill level is the biggest influence, not whoever has the most expensive drone. Drones will become more common in the future for many different purposes and the sport of drone racing will continue to grow. If you would like to know more about drone racing and the brigade competitions, please contact your local representative or like our Facebook page: Australian Army Drone Racing Team

- Team Captain / Canberra – LT Tom Gash
- Brisbane – CAPT Tirrell Morris
- Townsville – CFN Cam Webster
- Darwin – CFN Jayce Holland
- Sydney – LT Mark Sheppard

# Plan CENTAUR – Phase 3, Stage 2

## Enhancing operational effectiveness

Since Plan CENTAUR began in 2015, its focus has remained on increasing operational effectiveness above all else.

CENTAUR is currently in Stage 2 of its final Phase, and its primary goal continues to be ensuring that Army can deploy at short notice with the skilled, agile maintenance personnel it needs to fight and win.

So what is CENTAUR doing to help achieve this vision?

Eight projects are currently underway to address fundamental issues and constraints in the land maintenance system, including:

- Development of an Activity Based Equipment Management model, concentrating on Bushmaster PMV (initially), leading to accurate demand forecasting and reduced cost of ownership.
- Enhancement of Vulcan dashboards to include equipment demand data from ACMS to improve data-driven decision making by personnel from the unit level through to formation and above.
- Review of current M1A1 maintenance practices with recommendations to improve operational availability and realise Life of Type savings.

Other Stage 2 projects are supporting Army’s modernisation agenda with optimised workshop and planning practices, including productivity projects such as LEAN, which is finishing up an implementation at 1 CSST in Adelaide, and Productivity Enhancement Training, which will commence in February 2018.

CENTAUR Director General, BRIG Dave McGahey, said the program is making good progress, but that involvement of maintenance personnel was vital to its long-term success.



*Plan Centaur is developing an Activity Based Equipment Management model for PMV in order to improve operational effectiveness.*

“Not only is CENTAUR enabling smart, data-driven decision making through initiatives such as the Enhanced Maintenance Decisions project, the program is also optimising work practices and planning processes to save maintainers’ time and make their job easier.

“But we will only get this reform right and make sure it is enduring if Corps members are part of it – we need your input and involvement to continue,” BRIG McGahey said.

You can get in touch with the Plan CENTAUR team via [plan.centaur@defence.gov.au](mailto:plan.centaur@defence.gov.au) or search for CENTAUR on the DRN.

## New RAEME Officers



*Welcome to the newest RAEME officers. The December Royal Military College Lanyard Parade was held at the Royal Canberra Golf Club on 6 December. The Corps welcomes Lieutenants Benjamin Costello, Fergus Banks, Marcus Bechler, Christopher Worsley, Alex Tomlin, Morgan Payne, Nicholas Hood, Ryan Goding, Patrick O’Donoghue, Zachary Amos, Joshua Cantrill, Nicholas Clayton, Joshua Deringe, James Maclean, Daniel Mahon, Daniel Pedisic, James Pretty and David Wohlgemuth.*

# Farewells



LTCOL Peter Baxter was farewelled at the 75th Dinner at the AWM.



MAJ Scott Babington is taking some well-deserved Long Service Leave and will discharge in Jan 2019 after 34 years' service in the Corps. MAJ Babington was a fortieth class apprentice along with the current Head of Corps, BRIG Andrew Freeman.

# RAEME Birthday Dinner

RAEME Association Victoria (RAV), 2 Dec 2016



Brendan Ryan 105 Wksp Coy 4CSSB Craftsman of the year 2016 Presented by BRIG Dave McGahey (Ret'd) Representative COL/CMDT Association President MAJ Mike Newbond in background.

# Land 121 Phase 4 Protected Mobility Vehicle – Light (PMV-L) HAWKEI

## The vehicle

What is HAWKEI? It is a Protected Mobility Vehicle – Light (PMVL). What is it replacing? It is designed to replace the Land Rover. It does everything that a Land Rover did – but so much better; with the ability to deploy with awesome protection, state of the art communications and an impressive weapon capability! While most projects introduce a Military off the Shelf or Commercial off the Shelf system, the Hawkei mission system started as a clean sheet of paper in a draftsman's office just a few short years ago and the Mission System continues to evolve as the design is refined. The vehicle is designed and built in Australia at the Thales facility in Bendigo. The mission system contains a number of cutting edge innovations for this class of vehicle:



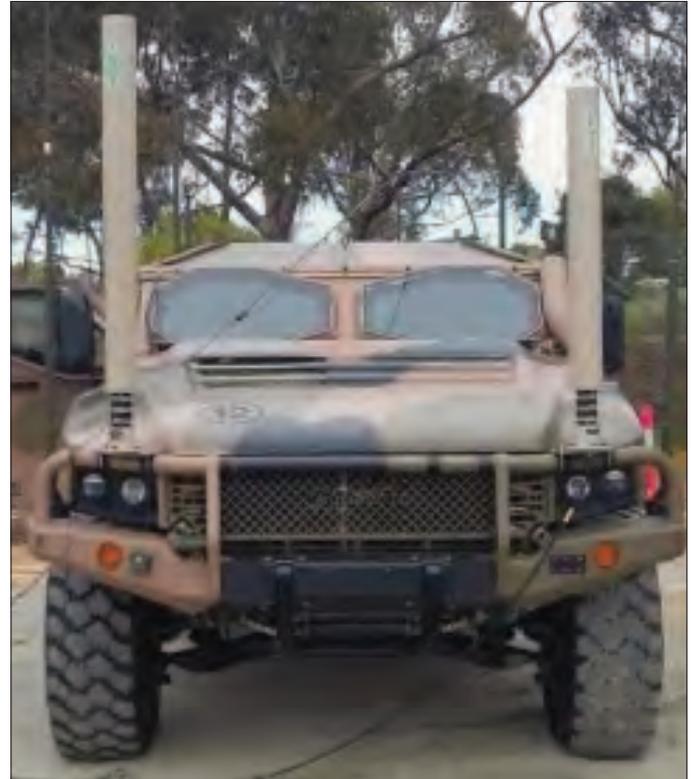
- Drive line configuration: the engine and transmission sit side by side in the engine bay (think M113) with the front of the engine facing the rear of the vehicle. Drive is transmitted via two right angle drives called cross drives. This design means that there is no large drive line mass under any crew position – really important in a blast event.
- Integral Computing System (ICS): the ICS is an interface that will allow the operator to access the SOTAS intercom, radios, Battle Management System, live vehicle system data and workshop manuals from one screen. Into the future we aim to integrate Unmanned Aerial Vehicles, Advanced Field Artillery Tactical Data System (AFTADS), Digital Terminal Control System (DTCS) and the next generation Force Protection Electronic Counter Measures (FPECM).
- Integrated Starter Generator (ISG): The ISG bolts directly to the rear of the engine and looks like a bell housing extension. It replaces the conventional alternator and starter motor and produces 15 Kw of on board power, with the capacity for further growth ensuring that the mission system is future proofed.

Our philosophy is to test early and often. The Land 121 Phase 4 Project Office has been working flat out to ensure that we deliver the best possible capability to Army and Air Force. What follows is just some of the Project Office highlights for 2017.

WO1 Steve Luke

## The Engineering Team

This year has been a momentous year for the LAND 121 Phase 4 Engineering Team. Balancing ongoing Verification and Validation (V&V) testing, closing out the design of the PMV-L, preparing for Low Rate Initial Production (LRIP), successfully undertaking User Trials in Townsville for Operational Test and Evaluation (OT&E), integrating the next generation ICS to manage all C4I systems in the vehicle, and establishing the support system for Introduction Into Service scheduled in 2018.



The Chief Engineer, LTCOL Chad Stonier, with support from the Design Acceptance Authority Representative, Mr Garry Moss, ran a tight ship and coordinated the dynamic year working closely with Thales Australia to hone the development of PMV-L in Bendigo, VIC. The Vehicle Team led by Mr Jason Wong, consisting of Mr Chen Du, CAPT Matthew Hay, CAPT Ray El Fakhry, and Mr Matthew Fraser. The ICS Team, led by MAJ Brendon Sweeney, consisted of CAPT Amanda Walton, WO2 Charles Gutiez, Mr Steve Carter, Mr Sunny Hatrote, Mr Steve Welsh and Mr Jonathan Harms.

MAJ Mark Singers led the V&V Team with support from WO1 Stephen Luke and oversaw the PMV-L successfully achieve many testing milestones throughout 2017 working long days battling the horrendous environmental conditions of Monegeetta Proving Ground (MPG). The V&V Team consisted of Mr Mark Spratling, WO2 Nick England, WO2 Andrew Everett, WO2 James Moss, Mr Tom Murphy, Mr Sam Smith, and Mr Kyle Zarb.

CAPT Mathew Hay

## Reliability Testing

*“One Test is worth a Thousand Expert Opinions”*

### Why do we test?

As modern Military Systems becomes more complex and in the majority of cases, that means more expensive, there is an ever-increasing requirement to test with pressure from those who control the schedule and purse strings, not to test. We test to give the consumer (Army) confidence in a product and the producer, normally known as the Original Equipment Manufacturer (OEM), a method of quality control in ensuring what is produced is both fit for purpose and safe. We must also remember that the PMV-L Hawkei is a

Developmental Project and so the need to test is by far greater than some of the other, 'Military Off the Shelf' Projects that are in progress at the moment.

However testing does come at a cost and time penalty. Project Management is based around Cost, Time and Quality and so the decision of testing has the ability to make a huge impact. Firstly Reliability in plain English is all about getting something to do what it says on the 'can' with the input of time or some other form of usage i.e. kilometres. Reliability is very much consumed by the study of failure(s) and what consequence it has, which leads to other cool abbreviations such as Mean Time Between Failure (MTBF) and hear comes the really important one, Mean Time Between Critical Failure (MTBCF).

### Hawkei reliability testing

With any Reliability activity, the first thing that has to be established is what is actually written on the 'can', we call this the Mission Profile. For Hawkei the Mission Profile was determined to be a three day activity which includes a mixture of loads; driving on first class, second class and cross country roads and tracks, negotiating a range of obstacles; as well as periods of silent and static watch.

2017 has been largely consumed observing the Hawkei and trailer (the Mission System) running around and around and around some more, change directions and then go the other way around, various tracks at Monegeetta Proving Ground. Looking out for failures and why, what, where and when they occur.

Another great question that needs to be asked is how many Mission Systems you need to test.

Many buttons were pressed on the calculator before we came up with six vehicles and trailers for our Reliability testing programme which no sooner than having been put on the table, was reduced to four vehicles and trailers with cost and availability of vehicles being the biggest factors.

For the PMV-L Hawkei this year alone we have travelled in excessive of 85,000 kilometres with our drivers spending many hours behind the wheel. The Mission Systems on completion of the Program will have travelled almost half a million kilometres under test conditions. We have recorded over 1750 incidents which include Kangaroo strike. 1750 reported incidents is a huge body of work to record, analyse and investigate. Shout out to the staff at Monegeetta Proving Ground that work hard driving the vehicles, reporting and recording the incidents as well as assisting the Project Office in investigating the root cause of failure.

Those incidents are collated and presented firstly in something called an Incident Review Board which is where the Original Equipment Manufacturer is allowed to have their input into what happened. This is then followed by an Incident Scoring Board or ISB. Once the ISB, made up of various stakeholders (including LTCOL David Barton, Army Head Quarters - Land 121 Phase 4), has been completed, a report is put together with recommendations which will include the scores. The number of MTBF's and those bad boys, MTBCF's in order to advise the Programme or Project decision maker. That person will make the decision as to accept or reject the Mission System being tested.

### Reliability testing in 2018

2018 will see the Project Office commence a Production Rate Acceptance Test, with four mission systems each completing the mission profile for 47,000 kilometres. This will help to ensure that the mission system is the most reliable for use in Army and Air Force.

WO2 Nick England



### Air Deployability

What an exciting year in the air deployability space for Land 121 Phase 4. The story starts back mid 2016 with MAJ Steve Venning departing the Project and silly me put my hand up to take on the task of air deployability.

I worked out the external lift fairly quickly but struggled with the Air/Land. It wasn't until early Aug 2016 that the Air Movements Liaison Officer (AMLO) and Air Mobility Training Development Unit (AMTDU) explained what it meant. So my tasks were set I had to coordinate the engineering assessment and loading tests for external lift (a key Army requirement) under CH47 and airlift by C130 and C17 between AMTDU, the Project Office and the Original Equipment Manufacturer.

I was fortunate enough to be teamed with one of the Project Office engineers, Matthew Fraser, who proved invaluable. So, it was full steam ahead with a new task request generated and approved to allow full engagement with AMTDU. Attended my first Air Mobility Load Decision Board (AMLDB) in October 2016 where RAAF resources were allocated to progress the two key tasks. All thumbs up with 2017 being the year of the Hawkei.

By November 2017 we were in Richmond, NSW, working with AMTDU and the Original Equipment Manufacturer to progress the loading development of the external lift and C130/C17 loading. Two cars and one trailer on a rotation activity between the C130 trainer (old airframe) and under the Tadano crane to assess the

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lifting configurations and asymmetric ratios for the next phase of the external lift test. Two weeks went past quickly with both vehicles and trailer assessed by AMTDU. Vehicle Centre of Gravity, load sheets, load distribution recorded and locked in.

More work from AMTDU, with a steady stream of requests coming. Finite Element Analysis validity and ultimate load paths were questioned. Test outcomes achieved and AMTDU were prepared to progress. Dangerous Goods were next on the list with Automatic Fire Suppression and lithium batteries to be dealt with. Good to go to the next phase on the external lift.

Task Order struck out of Army Head Quarters and planning progressed frantically between more organisations than I ever knew existed. 5AVN to provide the CH47s, Army Aviation Test and Evaluation (AATE's) provide the test pilot and under the new Defence Aviation Safety Regulations (DASR) were responsible for writing and approving the flight test plan. Once again, our Project was the first to go through this new process. Next phase underway, Vehicle loaded and sent for Townsville, Liaison continued with 5AVN and RAAF Mechanical Equipment Operations and Maintenance Section (MEOMS). Site reconnaissance conducted and all set to go. Airframes allocated, test pilot on site, Transport yard accessed to do preparation of the vehicles, induction completed, and RAAF MEOMs workshop floor secured for lift tasks.

It was over to the AMTDU team and the Test Pilot from here with Project Office and the Original Equipment Manufacturer staff responsible for reconfiguring the vehicles and moving them to the test site. Three test serials were planned for each vehicle and two on the trailer. Slow start with an airframe going down, onto number two, more challenges. Flight serials progressed slowly at first with the rate of serial completion accelerating as the Test Pilot became familiar with vehicle under the airframe. By the end of the week six of the eight serials were completed with mixed results. Time to pack debrief and back on the road.

All quiet for the month of July until AMTDU were in contact again to progress the C130 and C17 to close out the development of the Airforce Aviation Publications (AAPs). This continued until mid October with a draft being sent back and forth with me developing a draft User Hand Book (UHB) section to supplement the AAP.

Air clearance has been given to fly the Hawkei by CH47 (conditional), C130 and C17. But the work does not stop here with regression activities planned for the full rate production Mission System. The first C17 approved flight will be for two deployable Hawkei to the Middle East Region in 2017.

I need to pay special thanks to the Original Equipment Manufacturer, AMTDU and the support provided internally to achieve this capability outcome. Some special thanks to Phil Walker and Jaco Loubser and Nova Systems, Matthew Fraser and LTCOL Chad Stonier from the Project Office as none of this would have been achieved without these people working seamlessly together.

*Mr Mark Spratling*



## Integral Computing System (ICS) & C4I

### ICS

The Hawkei is being built with an ICS which will incorporate multiple software applications, like a military iPad, with the intent to reduce the amount of systems hardware components which are individually fitted on other platforms, i.e. Remote Weapon Station (RWS), Battle Management System (BMS). It is capable of hosting multiple virtual machines segmented into operating systems ensuring each application remains separated on a secure network. The current plans for hosting include; BMS, RWS, SOTAS, AFATDS, DTCS, FPECM and Situational Awareness cameras. The Interactive Electronic Technical Manual (IETM), UHB and other relevant interactive manuals will also be available on the ICS.

The ICS can be configured to a specific role or to the commander's requirements. It supports multiple operating systems including Linux, Windows 7, Windows 10 and has a storage capacity of up to eight tera byte. It has bezel (figure 1) or configurable software buttons (figure 2).

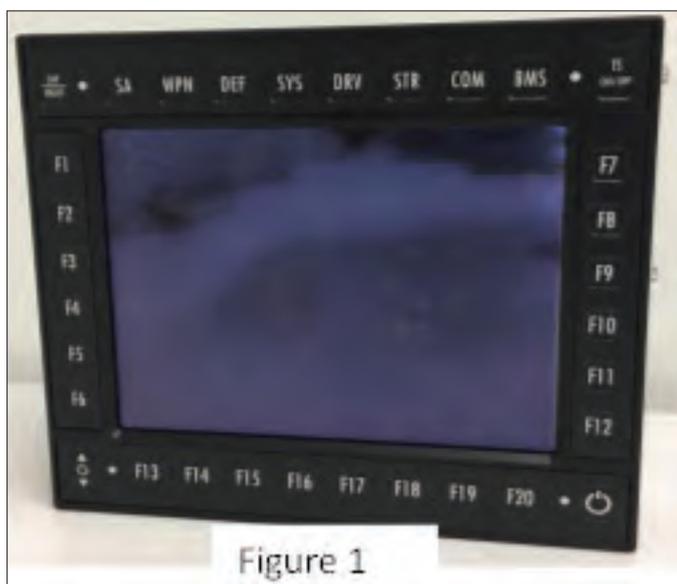


Figure 1



Figure 2

The ICS display is the main Human Machine Interface (HMI) and controls are common between the different physical positions in the vehicle platform. It is used to control a number of subsystems and provide operator input and as a means of presenting information to the operator such as the display screen, bezel buttons, any associated keyboards, hand controllers and hard control panel.

### C4I

Communications are provided using the SOTAS M3 harness and associated cabling, the harness provides internal and external radio control at each seated position through ICS or Crew Interface Units (CIU). Hawkei supports L200 Tranche 1 communications with a growth path identified for Tranche 2.

When it comes to communications, Hawkei is equipped with the full range of Battle Group and Below Command, Control and Communication (BGC3) equipment in the Command variant providing network access for a Command and Control node. Other variants of Hawkei include Reconnaissance, Liaison and Ute, all fitted with the required equipment for each role (figure 3) or Headset Interface Units (HIU) (figure 4).



Figure 3

Figure 4

Hawkei has undergone a rigorous Electromagnetic Interference and Compatibility testing program to optimise functionality between subsystems including ICS and C4I of which earthing of components and assemblies plays an important part. During the testing a number of components were modified or replaced to limit the electric and electromagnetic radiation affecting functionality and emanations (TEMPEST) of electronic equipment.

The ICS will aid in providing operators with battlefield and close situational awareness as well as 21st century cutting edge C4I enabling the Commander or Soldier to make timely informed decisions and disseminate information quickly and effectively on the modern battle field.

WO2 Charles Gutiez

### Maintenance Evaluation

The Maintenance Evaluation (ME) is an important part of the testing regime for the Hawkei mission system. The ME was conducted over three weeks in October 2017 at the Land 121 Maintenance Training Facility in Bandiana. The lead for the ME was Mr Shane (Sparrow) Layt, ably assisted by the Warrant Officers from the Engineering Section.

The purpose of the ME was to validate the new Interactive Electronic Technical Manuals (workshop manuals) and specialist tools required to maintain the Hawkei Mission System. It also records maintenance times to inform levels of repair. This was conducted with the assistance of uniformed maintainers from Army and Airforce, of various ranks and trades.

These maintainers had not worked on the vehicle before and were required to carry out a range of Light and Medium Grade maintenance tasks following the process detailed in the workshop manual. Project Office staff and the Original Equipment Manufacturer

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Field Service Representatives were on hand to guide and assist the maintainers and validate the workshop manuals.

The ME determined that the Specialist tools are appropriate and to a good standard. It further determined that the IETM requires additional work prior to issue to Army. The ME was focused on the vehicle with evaluation of the ICS to be completed in 2018.

WO1 Steve Luke



**Weapon Systems Integration**

As a part of the development of the PMV-L mission system, the vehicle is designed to have a Remote Weapon System (RWS) and Manned Weapon Mount (MWM), integrated into the vehicle platform. The RWS will be controlled and operated via the Integral Computing System (ICS).

This will allow the crew to operate a variety of weapons by use of a hand controller and the multi function ICS screen for the RWS and manual mount via a stand. In the present configuration the MWM and RWS will accept 5.56 mm Minimi, 7.62 mm Mag 58, 12.7 mm (0.50" Cal) Mark 2 Heavy Barrel Quick Change Barrel (QCB), 40 mm Mark 19 Grenade Launcher and 40 mm Mark 47 Automatic Grenade Launcher.

The additional options of twin weapon mounts have also been tested and explored. The additional support has been assessed with up to two QCBs on the MWM. The capability offered presents the Commander with long range and short range target suppression options.

The testing of the RWS will be conducted in two stages. The first stage will be conducted at Monegeetta Proving Ground and will involve static testing to verify by Demonstration that the basic requirements of both the 2-door and 4-door variants are met.

This stage will test that the RWS has a minimum engagement distance meeting the required depression and elevation angle requirements. The second stage of testing will be conducted at Proof & Experimental Establishment (P&EE) Greytown and will verify, by Demonstration, that the PMV-L system with RWS and fitted with the above weapons is capable of live fire operations. The range practice will include both static and mobile serials.

The conduct of this test event will also see multiple organisations providing input into the testing to ensure that the weapon system operates as required. The external stakeholders involved are Accredited Test Services Monegeetta, providing vehicle operators and armourer assistance; P&EE Greytown to conduct the live fire.

The completion of the RWS testing will mark a major milestone for the Project as we begin to see the Hawkei transition from a variety of vehicle and ICS sub-systems to a fully integrated vehicle system providing a major 21st century capability within the Australian Defence Force.

MAJ Mark Singers

**Weapon Systems Integration**

As 2017 draws to a close the Project Office is committed to further testing, including reliability. Planning for 2018 is well under way. Operator training will commence in the first half of 2018, closely followed by issue to 3 Brigade Units. So if you want to start learning and maintaining the Hawkei, on this game changing digitised next



The RWS Display and Hand Controller.



generation vehicle, check the posting plot out. All Land Rovers remaining in Units will be replaced by the PMV-L. Everyone gets one!

If you are a Section Commander or Artificer Sergeant Major or young Officer Engineer and would enjoy developing capability for Army, I would urge you to consider a posting to Capability Acquisition and Sustainment Group Land 121 Phase 4 where you will be able to use your skills and experience, learned from within Army, to design, develop and test the next generation platform – HAWKEI.

Merry Christmas from Land 121 Phase 4 and good soldiering.

W01 Steve Luke – Ph 4 Engineering Team

### ACCOMMODATION

The front seats are tethered from the roof and floor to provide enhanced personal protection during a blast. In the 4-door variant the rear crew seats are shack mounted off the rear cabin wall. The driver's seat is adjustable, and all seat positions have canvas covers with four point seat belts for enhanced safety and rapid egress. Dedicated personal weapons storage is provided on each door.

### MISSION SYSTEM

The racking system between the front seats is mounted to prevent the mission equipment becoming a secondary projectile during a blast event. The flat floor and no driveline component intrusion into the cabin improves blast protection and provides 0.35 m<sup>3</sup> of storage space. The 4-door variant has additional equipment mounting points on the back of the front seats and between the rear seats.

### PROTECTION CELL

The crew protection cell is a bolt together structure that provides a high level of blast protection. Ballistic protection is increased by applying a B-kit, which can be fitted in the field by the crew with minimal tools.

### MOBILITY

Hawkei has long travel coil, independent, wishbone suspension with outboard disc brakes and reduction hubs. Combined with driver operated differential locks on front, centre and rear differentials and central tyre inflation system, Hawkei has exceptional on road and off road mobility in all conditions.

### DRIVE LINE

The inline six cylinder M163CI Steyr twin turbo charged diesel engine produces 200 kW @ 4000 rpm and 610Nm of torque at 2000 rpm. It connects through a cross drive to a ZF 8HP90S 8 speed fully automatic transmission.

Engine Speed (rpm)	Torque (Nm)	Power (kW)
1000	~100	~100
2000	~610	~150
3000	~550	~200
4000	~500	~200

### DIMENSIONS

A Overall length	5,780 mm	J Departure angle	45°
B Width	2,395 mm	K Ramp angle	147°
C Overall height	2,300 mm	L Tray length (2dr)	2,080 mm
D Track	2,010 mm	M Tray length (4dr)	945 mm
E Wheelbase	3,650 mm	N Load height (2dr)	975 mm
F Front overhang	1,115 mm	O Load height (4dr)	1,150 mm
G Rear overhang (2dr)	1,250 mm	P Tray width (2dr)	2,430 mm
H Rear overhang (4dr)	1,015 mm	Q Tray width (4dr)	1,800 / 1,225 mm
I Approach angle	45°		

4 DOOR VARIANT

2 DOOR VARIANT

# Explosions & Test Circuits: Reliability Engineering within the US

MAJ Paul Nation, US Army Test & Evaluation Command, USA

## Introduction

In 2013 I was fortunate enough to be selected to undertake Long Term Schooling within the United States of America in the field of reliability engineering with another RAEME officer, CAPT Luke de Jager. This was something that I had developed an interest in after working and talking with reliability engineers during a previous posting to Land System Division.

What is reliability engineering? I always figured it was number crunching conducted by bespectacled gentlemen in dark rooms sporting the latest in pocket protector fashion who didn't often get out and mix with others. The future was to prove me very wrong (well, mostly anyway...).

Reliability engineering can be described as engineering that emphasizes dependability in the lifecycle management of military equipment. Reliability is often broken down into three sub-areas: reliability, availability and maintainability, or, as they are commonly termed when grouped together: RAM. Reliability describes the ability of a system to function under stated conditions for a specified period of time. Availability describes the ability of a system to function at a specified moment or interval of time.

Maintainability is a measure of the ease and rapidity with which a system can be restored to operational status following a failure. Reliability plays a key role in all of the systems that any military organization employs. Why? Because all good warfighters want all of their equipment working, when they want them, at any time! And if it breaks they want it fixed immediately...

My time within the US would be completed in two stages. Firstly, I would attend the University of Maryland for 16 months to learn the skills and knowledge required to work as a reliability engineer. After this period of formal training I would join the US Army Test and Evaluation Command where I would work with uniformed and civilian employees within the Army Evaluation Center. This final stage would essentially be OJT where my US counterparts would help me further my knowledge prior to return to Australia.

## University of Maryland Formal Study

The University of Maryland's Reliability Engineering Graduate Program is one of the world's largest and most comprehensive



*Sequenced photograph of a mine resistant vehicle undergoing dynamic rollover blast testing at Aberdeen Test Center.*

concentrations of education and research activities in risk, reliability, and safety of engineered systems and processes. A high level of academic achievement is expected in the course work completed by the student. Many students that apply to enter the program are unsuccessful, with the acceptance rate being low.

Typical areas of study include topics such as the mechanisms and physics of failure, methods of design for reliability, maintainability engineering, life cycle costing and equipment sparing analysis.

The study at UMD was enjoyable (in hindsight, my answer at the time probably differed slightly...), however, the hours were long and the work difficult. Luke and I immersed ourselves in study. I can't speak for Luke, but my wife would regularly remind me that I was not a particularly good/nice/reasonable/sane/pleasant (delete those not applicable) person to be around after several days with minimal sleep and assignments looming on the horizon.

The university experience was vastly different to anything I had ever suffered in Australia. With a student population of about 38,000 the periods between classes were insane with students on bicycles, skateboards, scooters, and walking or driving all trying to make it to class on time. Then 10 minutes after classes started there was silence with everyone settled at their next class destination.



*The main entrance to the University of Maryland showing the large floral letter 'M' garden bed within Maryland Circle and Symons Hall in the background.*



*Instrumented testing of a grenade at Aberdeen Test Center.*



*Main entrance to Letterkenny Army Depot, Pennsylvania, with various rocket systems displayed in the background.*



*A Letterkenny Munitions Center employee disassembles a US Army tactical missile in preparation for complete inspection of all components.*

The lecturers and teaching staff employed to teach the Reliability Engineering Graduate Program were from a wide range of countries with diverse backgrounds. We quickly discovered that the best lecturers had a wide range of industry experience with some having worked for or were still employed by NASA, the US Department of Defense, Boeing, SpaceX and a multitude of other private or government organisations.



*A refurbished Route Clearance Vehicle moves around a test track at Letterkenny Army Depot.*

Interestingly, I observed that there was some type of unwritten code amongst the civilian student body. It appeared to be entirely suitable to wear pajama pants to class with slippers (or alternatively thongs) if the student was late to class or if the class was particularly early in the morning. Any time before noon appeared to be particularly early.



*Army Evaluation Center engineering staff at Letterkenny Army Depot. Note: The author may appear in this grainy image to be wearing a beret with corps badge. This is in fact a slouch hat. It is not blue, it is just a darker shade of khaki. And it has a wide brim.*

**Aberdeen Proving Ground OJT**

Upon completion of the formal reliability engineering study component I was fortunate enough to undertake a further 12 months of OJT with the US Army’s Test and Evaluation Command at Aberdeen Proving Ground (APG), located in Maryland on the US east coast. Currently I have about six months remaining of my time allocated to training at APG, and in the time I have been here I have developed a large professional network including civilian and military members of the US Army and US Marine Corps. The projects I have been involved with are many and varied while the experience I have gained will undoubtedly be invaluable in the future.

APG is the US Army’s oldest active proving ground, established on October 20, 1917, six months after the US entered World War I. Its location at the time permitted design and testing of military materiel to take place near contemporary industrial and shipping centers. The proving ground was created as a successor to the Sandy Hook Proving Ground, which was too small for some of the larger weapons being tested.



*Army Evaluation Center engineering staff listen to a maintainer explain missile maintenance techniques.*

At the peak of World War II, APG employed 2,348 officers and 24,189 enlisted personnel from all branches of the US military. I have heard various figures, but my understanding is that APG now employs approximately 18,500 personnel which are predominantly US Army civilians. Over recent years many US Army uniformed personnel have been relocated to other establishments and bases through rationalisation programs not dissimilar to our own strategies.

APG is home to nearly 70 tenant organisations ranging from the US Army Research Laboratory to Aberdeen Test Center (ATC). While the

**Continued next page ...**

*Continued from previous page ...*

work I currently do does revolve around some number crunching (remember the bespectacled gentlemen in dark rooms analogy), one very enjoyable aspect is working with the staff at ATC.

The role of ATC is provide test and test support services for authorised customers, within the US Department of Defense (DoD) and outside DoD, including government and non-government organisations, domestic and foreign. Several past Australian acquisition programs have utilised the services provided by ATC. The core competencies of ATC include automotive testing, ballistics, survivability and soldier systems testing. That all sounds relatively boring, until you realise that one of their roles in assessing survivability is to blow stuff up!



*An aerial view of Munson Test Track, one of many test tracks available for vehicle testing.*



*A Bradley Fighting Vehicle airborne on one of the test circuits.*

Hundreds of underbody/under wheel mine and improvised explosive device tests have been conducted at ATC with the push to rapidly field more survivable vehicles like the Mine Resistant Ambush Protected (MRAP) vehicle. Underbody blast testing is traditionally completed with the vehicles in a static configuration, but in reality, vehicles are typically moving when they are exposed to mine and IED attacks.

Static tests produce valuable data to evaluate system and crew survivability from the initial blast loading, but how the vehicle's forward momentum contributes to vehicle and occupant responses remained largely unknown. ATC has been actively engaged in addressing this issue through developing its ability to conduct tests and collect data for dynamic vehicle vulnerability test events.

One method currently being used is to utilize a Pronto4 robotic system to drive an unmanned vehicle along a paved road and over a 24 foot square test pit filled with engineered soil compacted to a typical roadbed configuration. The robotic system provides remote operation of the vehicle's gear selector, throttle, steering, and braking. Software allows the remote operator to interface with the



*One of the initial contenders for the Joint Light Tactical Vehicle Project undergoing test.*

system to create a travel path, and path execution is achieved using GPS waypoint following.

A ground four laser system and a vehicle borne reflector are used to provide vehicle location and speed inputs to the Countdown Automation Procedure, Version 3 (CAP III) system that detonates the mine under the vehicle.

The system determines a go/no-go scenario based on the vehicle's speed and course, and, given a go scenario, arms the system and times the mine detonation to occur at the proper location under the vehicle. The outcomes truly show why mine and IED counter technologies will remain an important aspect of land system development well into the foreseeable future.

ATC is also actively putting military versions of important civilian vehicle systems such as adaptive cruise control, lane change alerts, assisted parking, emergency brake assist, collision avoidance, and pedestrian detection to the test.

Keeping soldiers safe is as critical during the most mundane peacetime activity as it is on any battlefield. Much of this testing relies on US Army military and civilian staff, with contractor support, driving, monitoring, using and abusing equipment for hours on end completing lap after lap on controlled test circuits.

**Letterkenny Army Depot visit**

In early May 2016, I was fortunate enough to visit Letterkenny Army Depot (LEAD) in Chambersburg, Pennsylvania as part of an Army Evaluation Center engineer professional development activity. Originally established as an ammunition depot during World War II, today Letterkenny is recognized as the US military's maintenance and refit excellence centre for air defence, tactical missile ground support equipment, ground mobility vehicles, and mobile electric power generation equipment maintenance.



*General Dynamics Stryker Mobile Gun System fire control system testing.*



*A self-propelled artillery system during instrumented live fire test.*



*Combat vehicle water testing.*

The production and reset of Route Clearance Vehicles (RCV) emerged as a primary focus of the Depot's workload during recent global conflicts. LEAD currently conducts depot maintenance on the Buffalo Mine-Protected Clearance Vehicle (MPCV), Vehicle Mounted Mine Detection System (VMMD) also known as the "Husky," RG-31 Medium Mine - Protected Vehicle (MMPV), Joint EOD Rapid Response Vehicle (JERRV) and Panther MMPV route clearance families of equipment.

During the visit and tour I was fortunate enough to witness repairs being complete to a PATRIOT missile battery radar system and aviation ground power units, "resetting" of High Mobility Artillery Rocket System (HIMARS) launcher components and "recapping" of PATRIOT missiles.

The most impressive aspect of the tour was the range and number of equipment being maintained at any single time. To be honest, I have never seen so many vehicles of all types in a single place at a single time (and that includes any Melbourne or Sydney peak-hour highway...).

## Conclusion

I have thoroughly enjoyed my time so far within the US which, unfortunately, is quickly coming to an end. For those RAEME engineering officers looking to become more than a generalist I highly recommend considering the US RAM training.

The formal training course is intellectually challenging with a workload that occasionally borders on insane and results in many caffeine induced late nights, including many face-palm moments (Why am I voluntarily doing this to myself?). The longer term benefits, however, far outweigh the short term costs. In terms of the OJT component of training I can safely say that the experience will live for me for the remainder of my life.

The projects I have contributed to, the test and evaluation events I have witnessed and the people I have met have all been phenomenal. The skills I have developed and the knowledge I have gained will (hopefully) ensure I can contribute in a meaningful way to the future procurement and sustainment of reliable land systems.



*An aerial view of the APG "Super Pond" used for the testing of surface and subsurface vessels and weapon systems.*

# RAEME 75th Anniversary Parade

## Australian War Memorial ,1 December 2017



The Corps paraded on the 1st of December 2017 at the Australian War Memorial in Canberra in commemoration and celebration of 75 Years of service to the Australian Army.

The personnel on parade represented the history and the future of the Corps, with the officers and senior NCOs representing our shared history, and the trainees of ASEME, RAMS and RAAF STT representing our future.

As part of the ceremony, a plaque dedicated to Craftsmen that had made the ultimate sacrifice. The plaque was dedicated by the Corps Padre, CHAP Peter Price, and unveiled by the Head of Corps, BRIG Andrew Freeman.

The plaque will be placed in the grounds of the AWM in 2018.

Those in attendance included: MAJGEN Burr, DSC, AM, MVO (Reviewing Officer), BRIG Freeman (Plaque Unveiling), LTCOL Nelson, CSM (Host to the Reviewing Officer), LTCOL Bouloukos, CSM (Parade Commander), MAJ Arnold, MAJ Hajenko, MAJ Jackson, CAPT Bird, CAPT Condon (Host to BRIG Freeman), CAPT MacDonald, LT Boneh, LT Gray (Banner Ensign), LT Kent, LT Lorenz, LT Penniford, WO1 Colefax (Parade Regimental Sergeant Major), WO2 Frost (Senior Banner Escort), WO2 Green, WO2 Mesken, WO2 Tynan, SGT Adnum, SGT Lette (Junior Banner Escort), SGT Neleman, SGT Sutherland, CPL Collins, CPL Dean, CPL Keillor, CPL Saunders, LCPL Colfs, CFN Adams, CFN Alexander, CFN Allen, CFN Bain, CFN Bartlett, CFN Barton, CFN Barton, CFN Baumann, CFN Beckx, CFN Beckett, CFN Bell, CFN Bohn, CFN Bolton, CFN Boyce, CFN Bridgeford, CFN Brook, CFN Buddeke, CFN Bygate, CFN Callow, CFN Carter, CFN Cox, CFN Dixon, CFN Downes, CFN Felton, CFN Finck, CFN Finneran, CFN Fisher, CFN Fogarty, CFN Foot, CFN Gadsden, CFN

Gallagher, CFN Garnier, CFN Gregory, CFN Hede, CFN Henry, CFN Hermitage, CFN Hicks, CFN Hollowood, CFN Hutchinson, CFN Jafari, CFN Jenkins, CFN Johnson, CFN Jones, CFN Jonker, CFN Justins, CFN Kennedy, CFN Kester, CFN Lanfranchi, CFN Lewis, CFN Li, CFN Lukins, TPR Lusher, CFN Macsweeney, CFN Matheson, CFN Matthew, CFN Matthews, CFN McIvor, CFN McKinnon, CFN McLennan, CFN McNair, CFN Monnik, CFN Moore, CFN Neil, CFN Peters, CFN Phan, CFN Pink, CFN Pollard, CFN Porter, CFN Potter, CFN Power, CFN Price, CFN Prigge, CFN Putnam, CFN Reiman-Wells, CFN Reinbott, CFN Retimana, CFN Rigoni, CFN Rix, CFN Robertson, SIG Roche, CFN Serbatoio, PTE Sheridan, CFN Shields, CFN Simpson, CFN Singh, CFN Smith, CFN Spray, CFN Stewart, PTE Stone, CFN Sweetman, CFN Thawanont, CFN Thomson Zeschke, CFN Traill, CFN Tran, CFN Tullberg, CFN Tymoshenko, SGT Vagg, CFN Wegner, CFN Whitbread, CFN Wood, CFN Worth, CFN Zhou.



Banner on Parade.



HOC BRIG A Freeman unveiling and viewing RAEME Plaque.



Chap Price dedicating RAEME Plaque.



RAEME Plaque.



BRIG McGahey & BRIG Grant with RAEME Plaque.



Officers on Parade.



DCA addresses the Parade.



Parade MC COL A Adams.



Wing Commander Sharon Bown, Member of the Council of the AWM, delivers welcome address.



DCA Speech.



RAEME Parade.



RAEME Banner Party.

# Michael Ward's speech

## 75th Anniversary Dinner – Australian War Memorial, 1 December 2017



### Introduction

Let me start by thanking LTGEN Campbell for his speech on the value of RAEME and his experiences with the Corps.

I am relishing this, my first opportunity to be a 'futurist.' (Which is just the fashionable description of the point at which the prophet comes into contact with the mug punter)

As someone not averse to a wager I have discovered that it is sometimes much harder to predict the next day than the next century so let's settle on somewhere in between. Let's call it 25 years from now as an appropriate point in time to speculate upon.

And given that those who forget the past that are doomed to relive it, I will reflect on my own experience in Corps some 25 years ago, to make my judgement of 25 years into the future by which time, incidentally we will either all be gone or none of us will remember tonight with any modicum of clarity.

As we all know, the role of the Royal Australian Electrical and Mechanical Engineers is to ensure maximum operational availability of equipment to enable the commander to be victorious in the land battle.

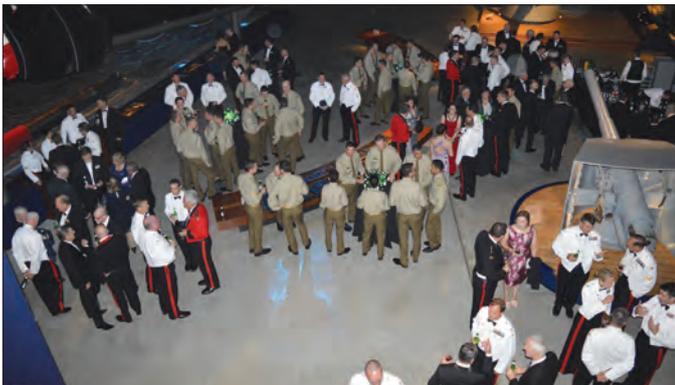


*Dining Hall under 'G' for George.*

This has never been more important than it is today, and it will become increasingly more relevant as technology becomes an even more important determinant of military success.

### The complexity of the future battlefield

The battlefield of the future will be full of technology. Warfighters have made this same prediction for two thousand years. But today we can envisage military systems that not only fly, drive or float, but also which sense, emit and detect with increasingly sophisticated



*Ante Room and pre dinner drinks.*



*BRIG Ross Grant (MC), HOC RAEME BRIG Andrew Freeman & MR Michael Ward Managing Director Raytheon Australia.*



*BRIG David McGahey speech to the dinner.*



*LTGEN Angus Campbell (CA) Speech to the dinner.*



*MAJ Dwyer, CO ASEME & RSM.*

electronics, robotics, autonomous systems, artificial intelligence and software, software, software.

Few pieces of significant equipment will be independent of other systems. Increasingly the battlefield will feature complex systems-of-systems, all of which must be aligned, synchronised and modulated together to allow commanders to make the right decisions, and to let soldiers execute their tasks dutifully, and as safely as possible.

It is apparent that such large systems-of-systems can be vulnerable if elements or nodes become unavailable. This means that an understanding of the architecture of complex systems is likely to become an increasingly important skill on the battlefield. For example, directing priority repair effort to a single vehicle that provides the vital link to a network or networks, could mean the difference between success and failure; life or death. And that vehicle may not be a command post or specialist communication platform, it could be a tank, an APC or a logistic vehicle that just happens to be performing that role at that time.

We should all expect that RAEME will need new systems and different philosophies to plan activities and allocate resources. Real time information fed from platforms engaged in action on the battlefield could well drive these systems.

In the same way that today's passenger airlines and some heavy vehicles transmit data on the health of their systems as they fly or drive, health monitoring in fighting platforms could well inform the priorities of RAEME's future tradespeople so they are ready with the right spares, tools and equipment when battle rhythm allows for repair.

This also means greater consideration of an agile, responsive supply chain and the increasing need to design for support. In this respect I see further convergence of maintenance planning with the management of spares.

On the topic of convergence, we will invariably see some new trades emerge with increasingly specialised skill sets. While there will always be a need for tradespeople to carry out mechanical



*RSM Ground WO1 Colefax and past RSM WO1 Burgess .*



*A/RSM Corps WO2 Taylor, WO1 Teale, CA, WO1 Goninan & WO1 Waters.*

repairs to vehicles, generators, small arms, artillery and so on, these people may be supported by specialist diagnosticians trained in the principles of systems engineering. People who understand complex system design and integration and know how to reconfigure or patch a crippled system.

In practice, diagnosticians could be required to decide whether to backload an item to a specialist facility for repair, or strip it of crucial sub-systems where it is, to provide spares to fix other equipment.

These specialists may be endowed with real time information on the status of overall fleet serviceability, availability of spares and changes in the commander's priorities.



*RAEME Craftsmen at the Dinner.*

I also think we will see the life-of-type for major systems diminish. While some platforms and systems will no doubt continue to have a 20, 30 or even 40 year life, many more systems will become disposable commodities. The emphasis for these items may shift from repair, to speedy and accurate diagnosis and replacement. Once again, RAEME will need to integrate seamlessly with the supply chain to make decisions that best meet the commander's need.

As I look around today, I see industry developing new systems and equipment for military use. This development is not always driven by the 'pull of doctrine', that is, that the military has identified a new requirement and industry is responding to that need. Instead, it is often driven by the 'pull of technology' – where someone in industry sees an opportunity to provide a capability or requirement in a new way, or to do something that no-one in the military yet envisaged.

When this happens, defence forces will want to take advantage of the new capability and stay ahead of the game, and this will surely compress the time for introducing new capabilities into service. That means RAEME must be aware of and ready to sustain new technologies with timely training and innovative repair and maintenance philosophies. Lines and grades of repair may have to be redefined and perhaps aligned with concepts like 'system-of-systems criticality' or 'time required to replace'.

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For support of an integrated fighting force, there is another aspect which must be considered for sustainment models. Defence forces must be able to manage the on-going aspects of spiral development of technology inserts and of obsolescence management.

Moreover, these aspects require a tight technical regulatory framework, particularly in an environment where defence's requirements will be continually morphing to meet changing threats and evolving operational approaches. This may mean the introduction of new sustainment support systems that track the configuration of systems in real time and use AI to flag potential misalignment or system vulnerabilities.

Coinciding with the development in technology underpinning the generation of warfighting capabilities has been the designation of industry as a fundamental input to capability.

RAEME will have a critical role to play in managing this new FIC. Deciding which skills the military requires, and which can be ceded to industry will be important.

Managing that balance and the generation of technical mastery through relationships will be key. Indeed, there is a vital role for the Corps in managing what Christopher Pyne calls the "workforce behind the defence force".

One other aspect of this industry relationship is also worthy of note. In this new world order where industry is a FIC, someone needs to provide sage advice to the Capability Manager on the capabilities and suitability of industry to support the generation of warfighting capabilities.

Again, this is a role for RAEME. To fulfil this function, the Corps will need to build trusted partnerships with industry; understanding their capabilities, their strengths and their weaknesses. Moreover, being able to both provide expert advice to the Capability Manager and manage industry contributions to capability generation will be of particular importance.

Cross-pollination between the Corps and industry will be essential, as will the sharing of information and personnel, and collaborating on the development of warfighting capability.

**Conclusion**

We would all agree that the Corps has been relevant for the last 75 years and will be even more so in the next 75.

Whilst the nature of the various trades we undertake may change, just as the systems and tools we use will use will be different, there will always be a need for tradespeople, technicians, artificers, engineers, maintenance planners and sustainment strategists who



*MAJ Babington & WO1 Clarke.*

can learn, adapt and find practical solutions when the maintenance manual lets us down.

The ability of a warfighter to fault find, diagnose and improvise will be as relevant to our future as it is for the present and has been for the past.

In making lofty predictions of the future whether as the futurist, speculator or even mug punter what is certain is that technology will be a driving influence for the Corps for many years to come and, while industry will continue as fundamental input to capability, it will never be a royal corps.

Truth be told, RAEME will remain the Army's only source of skilled professionals who genuinely understand the technology, are known for their innovation and guile, and above all, who are authentic and successful soldiers.



*CA & RAEME Soldiers.*



*CA with soldiers enthralled.*



*Table A.*

# RAMS Regimental & 75th RAEME Corps Birthday Dinner

## WO1 Tor Chudziak

On the occasion of the 75th RAEME Corps birthday, the Rotary Wing Aircraft Maintenance School (RAMS) celebrated with an All-Ranks Regimental dining-in night. For the majority of the trainees this was their first formal dining-in and as such provided the opportunity to experience the customs and traditions of a formal dinner.

As per previous birthday dinners, the RAMS maintenance hangar was transformed into the dining hall; with ARH, CH47 and S-70 maintenance training aircraft flanking the dining tables in order to add some atmosphere to the evening.

The official guest for the night was the newly appointed HOC BRIG Andrew Freeman, who was invited to promote the graduating Artificer course for 2017 and MAJ Steve Wardill from the Army Aircraft Systems Project Office.

The dinner was also the farewell for four members of the Corps: COL Rob Crowe, LTCOL Heath Smith, WO1 Craig Walker and WO2 Dave Smith; with a combined total in excess of 100 years dedicated service between them.

During the eventful night, two awards were also presented. The CFN Shannon Nicholas Award (bestowed to the most outstanding Initial Type Training student for the training year) was presented to CFN Thomas Blaszczyk from the 5th Aviation Regiment and the Hawker Pacific Innovative Solutions Award was presented to the technical support elements of 5th Aviation Regiment.

The dinner concluded with the traditional cutting of the cake by the youngest member of RAMS (CFN Tanneile Hicks). HOC rounded out the evening by addressing the diners with a keynote speech "Reflecting on the past to maintain the future".

Overall the RAMS regimental and RAEME 75th birthday dinner was a memorable occasion bringing together approximately 130 past and serving members of the Corps and allowing a rare opportunity for all ranks to converse and enjoy each other's fellowship in a friendly and semi relaxed environment. This opportunity was particularly appreciated by the junior ranks and RAMS looks forward to celebrating the 76th birthday in similar style.



# 2017 RAEME Awards

The 2017 RAEME Awards were awarded to the following members:

- ARA COTY: CFN Benjamin Wilkins, NORFORCE
  - ARes COTY: CFN Daniel Albano, 4 CSSB
  - ARA COTY(WA): CFN Luke Noble, SASR
  - ARA COTY(SA): CFN Morgan Simcocks, 7 RAR
  - ARA COTY(SQLD): CFN Alexander Wendt, 2/14 LHR QMI
  - ARA COTY(NQLD): CFN Matthew Eaton, 5 AVN REGT
  - ARA COTY(NT): LCPL Logan Curtis, 1 AVN REGT
  - ARA COTY(NSW): CFN Mitchell Turner, SOLS
  - ARes COTY(SA): CFN Justin Millard, 9 CSSB
  - Junior Regimental Award (Sub2SGT): CPL Christopher Brown, 7 CSSB
  - Regimental Award (Sub2WOCSS): SGT Adam Ireson, WONCO-SA Wing BRIG Martins, OBE Award (Sub4SGT): CPL Andrew Smallman, 1 AVN REGT
  - Artificer of the Year (Sub4WO): SGT Ricky Solanki, ASEME
  - LT Peter Jennings Award (LOBC STC): LT Evan Reeves, RMC-D
- The following personnel were presented their awards by HOC RAEME BRIG Andrew Freeman at the RAEME 75th Anniversary Dinner Australian War Memorial 1 December 2017.



*SGT Solanki – Artificer of the Year.*



*CFN Wendt – ARA COTY (SQLD).*



*SGT Ireson – Regimental Award.*



*CFN Noble – ARA COTY (WA).*



*CFN Eaton – ARA COTY (NQLD).*



CFN Turner – ARA COTY (NSW).



CFN Albano – ARes COTY.

Congratulations to all members who received Awards.

**Promotion**



BRIG Martins, OBE Award was awarded to CPL Andrew Smallman at 1 AVN REGT.



SGT Dean Hague was promoted to Warrant Officer Class Two at the dinner as well. The CA & HOC RAEME placed the slides on his Mess Dress.

# NQ RAEME 75th Birthday Dinner Townsville

LT M Crook

On Sat, 26 Aug 17 the 102nd Field Workshop Company hosted 155 current and former serving members of the Corps at the Townsville RSL Club to commemorate the Corps 75th Birthday. It was great to see so many members, including several from out of state in attendance.

Additionally, We were honoured to have the Mayor of Townsville, the Hon. Jenny Hill in attendance and the Colonel Commandant of QLD RAEME, COL Tony Borg as the guest speaker. RSM 11 CSSB, WO1 Scott Collard was Master of Ceremonies for the evening and ushered proceedings along smoothly ensuring that the valiant efforts SGT Gayle Walkom made in organising the evening paid off.

RAEME members young and old enjoyed the live music and

insurmountable bar tab, the younger generation more loudly so... The evening was one of the largest seen in the NQ region in some time and with the blue print in place, an annual dinner to catch-up and bring junior members into the fold could be on the cards.

A special thanks go to the Corps Fund via the HOC Cell and NQ RAEME Fund who without their significant contributions the evening would not have been able to happen.

Townsville is arguably one of the largest areas with current serving RAEME members, including three RAEME COs. It is therefore important to provide our soldiers opportunities like this to mix with former serving members and commemorate and celebrate our Corps.



# 75th RAEME Birthday, Darwin

On Friday the 1st of December, 1st Aviation Regiment hosted the 75th RAEME Birthday at Robertson Barracks in Darwin. 400 current and ex-serving RAEME members from across the Northern Territory attended the celebrations.

The day was filled with traditional RAEME events such as the Billy Kart Race, the Spanner Throw, the Chain of Command Relay and Tug-o-War, as well as more modern events such as the Show and Shine competition. Exciting new activities were also scheduled, including Archery Attack and Bubble Soccer.

Congratulations go to the winning units and personnel of each event:

Extreme Sports – Archery Attack: 1 CSSB

Extreme Sports – Bubble Soccer: 1 CSSB

Billy Kart Race: 161 SQN (1 Avn Regt)

Chain of Command Relay: 161 SQN (1 Avn Regt)

Tug-o-War: 1 CSSB

Spanner Throw: CPL Middleton (1 CSSB)

Show and Shine: CPL Tryhuba and CPL Lawler (1 Avn Regt),

WO1 Kite (JLU-N), and WO2 Wetherbee (JLU-N)

Each event contributed weighted points to a final score, resulting in the 1st Aviation Regiment claiming victory, and receiving the perpetual RAEME Birthday Trophy.

Northern Territory CareFlight Aeromedical Services added to the excitement of the day, landing a helicopter at the event and providing an opportunity for attendees to speak with aeromedical personnel and tour the helicopter.

The celebrations concluded with cutting of the cake, presentations, farewells, a raffle and a BBQ put on by the aircrew from the 1st Aviation Regiment.

The raffle on the day was made up of incredible prizes donated by local businesses and every dollar raised was donated to CareFlight. The raffle, in addition to donations and proceeds from the bar, resulted in a total of \$5973.20 being raised for CareFlight.

MAJ McDonald, the NT RAEME Representative, awarded the NT Craftsman of the Year to LCPL Logan Curtis from the 1st Aviation Regiment on the day. Congratulations LCPL Curtis.

RAEME Birthday also provided a perfect opportunity to farewell two dedicated RAEME members, WO1 Terrence Norman and WO2 Allen Croke, from the Australian Regular Army.

The day wouldn't have been possible without support from the RAEME Corps fund, Airbus Australia Pacific, Engineers Australia and the 1st Aviation Regiment. All personnel involved contributed to a great event, providing an opportunity for past and present RAEME members to participate and celebrate the Corps' 75th Birthday.



# Albury Wodonga Military Area 75th Birthday Celebrations

In 1942, the Corps founders bought together craftsmen from units far and wide to form AEME. 75 years later, the learned and esteemed members of the Corps in the AWMA celebrated this by bringing together the Wings of ASEME as well as those sprinkled throughout the greater area. Despite many RAEME members attending the central celebrations in Canberra, the turnout was good with at least 500 members present for the festivities.

Celebrations were set to be held at the ASEME purpose built Spanner Club location; however forecasted cataclysmic weather events were predicted and Noah like activity was almost required. In an effort to gain higher ground and seek adequate shelter, celebrations were moved to the Latchford Barracks Soldiers Club, which came with the best vantage of the rising Lake Chitty.

Ultimately, the relentless drizzle did not hamper the day with the outdoor events being enhanced by the deluge. The Billy Cart Derby was hotly contested, beginning firstly with the show and shine where the Electrical and Electronic Systems Wing (EESW) brining a technological spin to the design of their entry.



The Spanner Throw ran throughout the celebrations with a strong inter-wing rivalry ever present. Many and varied techniques were witnessed and despite the rain, the spanner managed to travel impressive distances. Best throw of the day went to CFN Field of EESW.



The Vehicle Technology Wing (VTW) entrant was performance enhanced by several 'after-market bolt-ons' – some of which did not make it to the finish line. The races came with the usual controversies, but when the dust (rain?) had settled the winner was EESW.

The Tug of War swiftly became a battle for traction. Throughout the heats, several teams succumbed to the inescapable slide in the mud. Terra Firma it was not, with the rain refusing to allow any purchase at the moment of need. The victory in the Tug of War went to VTW.



The final event of the day – the Ironman Relay – made for an entertaining spectator sport but for the contenders, the challenge was again made all that more difficult on account of the rain. All teams committed to the tasks with gusto, but the ultimate winner was Careers and Advanced Training Wing.



Rounding out the day was a static display of the new fleet of MHC and PMV-L Hawkie which held particular interest to the up and coming tradies of the Corps.



The cake was cut by the newest member of the Corps – CFN Gleeson, who was moments earlier reduced in rank (some would say promoted) to CFN. The remainder of the day was spent avoiding the rain, taking some time to exchange stories of past adventures and catching up with those we don't often get an opportunity to pause and reflect with. The day was a success – not only did it mark the 75th Birthday of the Corps but it also marked the end of yet another busy year at ALTC.

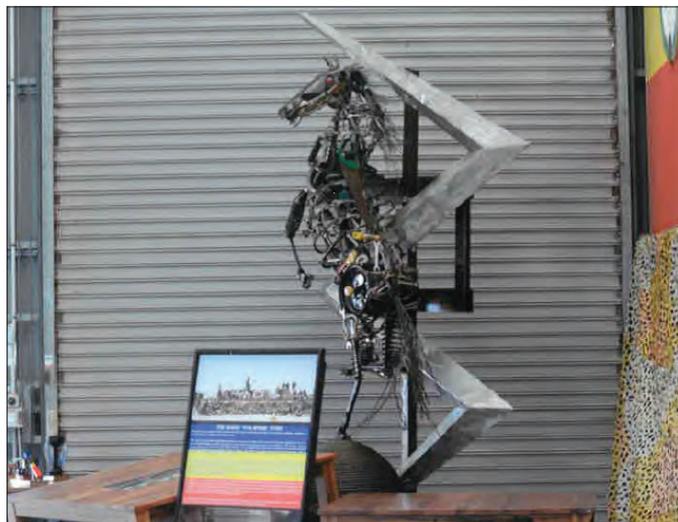


# SASR WKSP 75th RAEME Birthday celebrations

## WA W01 M – ASM SASR

### 'Harry' taking pride of place in SASR WKSP for the 75th RAEME Birthday celebrations

The WA 75th RAEME Birthday celebrations were held at Campbell Barracks, Swanbourne and involved serving ARA and ARes RAEME members from Pilbara Regt, 13CSSB and SASR. Members of JLU(W) were asked to be judges for the days events and kicked off with a kart build/race challenge: a 3 man team from each unit had 1hr to build a kart from supplied components followed by a two lap race around a designated track which included a driver change. Not much skin was lost (nothing that the risk assessment didn't highlight) with winning unit of the kart challenge being SASR by a fair margin.



Fabrication of one of the karts prior to the race commencing



### The calm before the storm

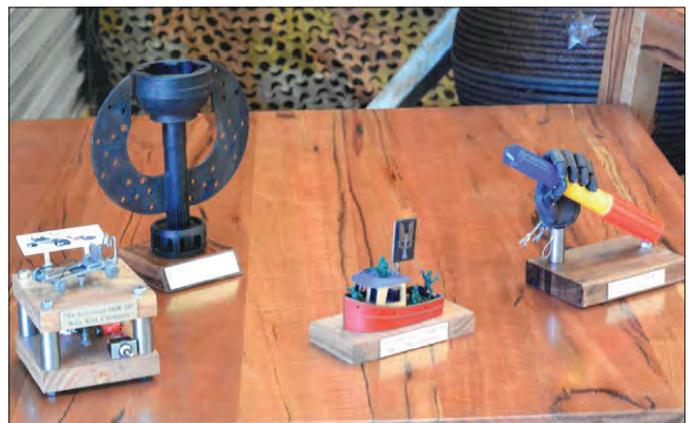
This was followed by a spanner toss (in this case it was an oversize Philips head screwdriver made from a single piece of billeted aluminium) which was judged both as an individual effort and as a team cumulative distance achieved. The individual event was won by CPL B from SASR with the overall cumulative distance to win the event was SASR. Rounding out the day's activities was tug-o-war to determine who out of the three competing units had the most pull. After the appropriate sledging from the sidelines combined with some appalling technique by all three units 13 CSSB were eventually crowned the winners.

Members and invited guests assembled in the RAEME workshop for the evening's festivities, beginning with presentations to the winners of the days events followed by a farewell to a long serving APS member of the workshop.



### Trophies for the winners in each category and the overall winners trophy (made from a SOV CV joint and brake disc)

Following on from that, CAPT Oakes, the WA RAEME Corp representative gave a short but rousing speech on what the Corp of RAEME means today. Then there was the unveiling of the SASR RAEME Craftsman in the Field, a limited run of prints by the artist Mr Ian Coates to recognise the work done by RAEME personnel over the years within SASR but also the wider SOCOMD.



### The SASR RAEME Craftsman in the Field print

Toward the end of the evening there was the cutting of the cake by the youngest member in attendance, CFN R.

The remainder of the evening, though short, provided an opportunity for those now not serving to catch up with mates from times gone by and provided an excellent opportunity for networking among current and former serving maintenance professionals. This event was aimed to not only celebrate the 75th birthday of The Corps of RAEME, but was also aimed at fostering esprit de corps, trade and professional development, physical fitness and a healthy competitive spirit across maintenance organisations in the WA region, all of which was achieved on the day.



### SASR TST stubby cooler with craft beer brewed and labelled for the day



## RAMS & RAAF STT

### Australian War Memorial

The RAMS & RAAFSTT members that were on the 75th Anniversary parade took the opportunity to have their photos taken in front of the Australian War Memorial (AWM).



Members of RAMS in front of AWM.



Members of RAAFSTT in front of AWM

# ANZAC Day 2017 at Culcairn

On the 102nd anniversary of ANZAC Day, a small contingent of soldiers stood guard around the Culcairn war memorial wall as the people of Culcairn bowed their heads and commemorated the services of Australians in war and on operations, past and present.

As often occurs at such occasions, the weather was cold and wet, adding to the sombre mood. Few RAEME members would be surprised to learn that the catafalque party was comprised of members from ALTC, in this case, ASLO staff, as it's become an ALTC tradition to support ANZAC Day activities across the Albury/Wodonga region, and this was one of several ASLO support tasks for the day.

At a brief glance, the catafalque party appeared similar to any other; however, for those with a keen eye, this catafalque party was unusual in that it was entirely comprised of RAEME sergeants and warrants, barring the catafalque commander, in recognition of RAEME's 75th birthday. In typical RAEME fashion, the day went-off without a hitch owing to some good old fashioned RAEME flexibility and a 'get it done' attitude.

There had been several challenges in the lead-up to the event, each one overcome one-by-one. There were the conflicts between catafalque rehearsals and ASLO instruction, dealt with through adaptability and some innovative schedule tinkering. Of course, at this stage it's fair to query the need for rehearsals given that the catafalque party's composition of seniors and their superior drill skill should have negated the need for practice; however, alas, no amount of rehearsals or practice can ever truly overcome an officer's drill.

Then there were the difficulties surrounding the issuing and tailoring of the new service dress that were skilfully overcome through WO1 Glen McFarlane's use of the old-boys-network, a demonstration of RAEME's age-old technical support network being put to good use. That said, special thanks go to the ladies of the AWMA Clothing Store for embracing the ANZAC spirit and jumping through the necessary hoops to ensure everyone was suitably attired.

Even on the day, hurdles presented themselves, the main one being the late addition of a marching component. Despite the guys having only planned and rehearsed for the catafalque party, after a quick 'soldier's five,' the guys were leading the Culcairn ANZAC Day march, followed by Culcairn community groups such as the Culcairn RSL contingent, local school groups, and Culcairn Police, to name a few. This was a terrific example of the adaptability we've come to expect from RAEME.

On completion of the ceremony, members of the Culcairn RSL Sub-Branch graciously invited the catafalque party and community members to attend the RSL for a light breakfast and some ANZAC biscuits. This was an opportunity for the community and visitors to get in out of the rain, relax, enjoy a nice meal and socialise. According to WO2 Graham Forbes, a catafalque party member, the ceremony was "a great opportunity for ASLO to support the community and to represent Defence," and that he felt "the guys did a good job."

In the end, Culcairn's ANZAC Day was a great success, a day for the community of Culcairn to gather and honour the sacrifices of veterans in protecting Australia and its people.



# Brisbane ANZAC Day 2017

## LT Benjamin Kluckhohn, 7 CSSB

2017 marks the 75th anniversary for the Royal Australian Electrical and Mechanical Engineers and it was only fitting, that the Corps celebrated this milestone accordingly, as part of the 2017 ANZAC Parade in Brisbane. Members of the Corps from across South-East Queensland, volunteered to march as part of the RAEME contingent and be part of a once in a lifetime opportunity to celebrate the rich history of the Corps.

Units involved in the march included RAMS, 6 ESR, 9 FSB, 1 Sig Regt, reservists from 11 CSSB, 7 Combat Brigade units and the Corps RSM and Head of Corps; Brigadier Haydn Kohl. The Corps RSM escorted the RAEME Banner from its home at the School of Logistics in Bandiana.

The march was a momentous occasion, with more than 120 members of the Corps volunteering to be part of the contingent and which also included many ex-serving members of RAEME. This was testament to the passion and loyalty that RAEME personnel past and present have for the Corps.

The parade was led by Brigadier Haydn Kohl and the Banner carried by the Banner Ensign LT Martin and escorted by WO2 Shepherd and SGT Hanley. The Banner Party were all members of 7 CSSB and 106th Field Workshop Company.

The end of the march saw hundreds of RAEME personnel descend at the Port Office Hotel for the annual RAEME ANZAC Day function. This was again organised by the RAEME Association QLD and an outstanding success. The environment at the Port Office allowed young and old, current and past RAEME members, the opportunity to reflect on not only the events of the day, but to relive personal experiences and look forward to the future of RAEME.

I personally felt a great sense of pride to march with the Banner as one of the newest members of the Corps. The passion and enthusiasm displayed by Craftsmen was extremely refreshing and served as a reminder that while we can get lost in the day-to-day challenges of military life, celebrations such as these epitomises our Esprit de Corps. I am intensely eager to be part of the future of the corps and like so many ex-crafties on the day, believe I will always have a place for Harry the Horse in my heart.

In conclusion, the march of the RAEME Banner on ANZAC Day to celebrate the 75th birthday of RAEME was an unforgettable experience for all involved. I strongly encourage all members to continue their affiliation with the RAEME Association now and in the future and thank everyone who was involved in making the celebration a memorable one



Brisbane ANZAC Day.

# RAQ Sunshine Coast Chapter 75th Anniversary Lunch

## Ross Grant & Mike Prain, Co-Convenors

This recent lunch, held at the Maroochy RSL for the Sunshine Coast RAQ Chapter on 2nd September 2017, celebrated the 75th Anniversary of the establishment of RAEME in style. 87 locals and folks from Brisbane and the Gold Coast were treated to a wonderful talk about Unmanned Aerial Systems (UAS) from LTCOL Keirin Joyce, CSC, RAEME, SO1 Unmanned Aerial Systems (UAS) from AHQ. LTCOL Joyce brought two examples of unmanned aerial vehicles for attendees to feel and touch – both of which came in his briefcase.

He went on to talk about the range of UAS available, their place on the battlefield in the hands of a trained user, the type of people and their skill-sets who operate them and the types of UAS being considered by the ADF to improve the versatility, lethality and effectiveness of its fighting systems. He also introduced attendees to the logistic uses of UAS that may eventuate in the next few years.

The attendees also heard from the COLCOMDT – QLD, COL Tony Borg, who explained the role he was now playing in the Corps most important project – Plan CENTAUR. He explained that CENTAUR is considering how best to restructure the Corps to meet the challenges resulting from changes to Army's operational scenarios and complex technologies accompanying new equipment acquisitions.

RAQ members and guests enjoyed a fine meal and service from the Maroochy RSL, whose staff once again organised a very enjoyable afternoon.

May I thank all attendees for their support – it does make the organisers' efforts worthwhile. May I also thank the HOC for subsidizing the event thus allowing us to celebrate in style with many good friends and colleagues. And finally, may I personally thank Mike Prain, for his efforts in many areas, but specifically, keeping the costs in check and ensuring we didn't run at a loss.

May I publicly thank the REP COL COMDT, COL COMDT-QLD and the Corps Committee for their support to the various events around Australia, but especially in Qld and on the Sunshine Coast.

Their vision and efforts have ensured many have been able to participate, celebrate and enjoy the commemorations surrounding our Corps 75th Anniversary year – they have been generous in their support, generous with their time, generous with their organisational skills and generous with funding, in an important event in the life of our Corps. It is appreciated very much.

## RAQ All Ranks Luncheon

On Sunday 6th November 2017, 94 RAEME Association Queensland (RAQ) Members and guests met to Celebrate RAEME's 75th Anniversary at our All Ranks Luncheon held at RAEME QLD's favourite "Waterhole" the Port Office Hotel Brisbane.

The lunch was a magnificent four course silver service meal, some wine and the ever present noise of people chatting, confirmed a good time had by all. Those in attendance spouses, family and Craftsman through to Major General – truly an "All Ranks" function.

This Year's Guest of Honour was Brigadier Ed Smeaton who provided a very timely and interesting "update" on the corps moving forward.

We were also honoured to have one of our original AEME members, Maurie Maunsell, attend as a guest of the RAQ. Maurie has been a part of RAEME from its creation and proud Corp member since Day 1 – 1st Dec 1942 and at 95 years of age and despite his challenges with health and mobility made the day all that much better just by being there.

The day also raised a little over \$1000 for Spanner Pack and the RAQ WW2 Jeep Project through RAEME memorabilia raffle.

A special thanks to the RAEME Corp Committee for their support to all RAEME Functions in our 75th Anniversary year.

# Gold Coast RAEME 75th Celebration

## Ed (Beans) Bevans

The second annual RAEME Gold Coast lunch get together was held on Saturday 1st July at the Mermaid Beach AEME SLSC. This was a special event to celebrate the 75th Anniversary of the establishment of the Corps of RAEME. On a brilliant SE Queensland day, the locals were able to enjoy the company of RAEME friends and family in one of the Corps most iconic venues – the Mermaid Beach Surf Club itself, built by AEME personnel in 1945. The club is very proud of its heritage and their key officials joined us in the celebrations.

Some 50-people joined the organisers for lunch. Our numbers were down a little from 2016 but that was probably due to the fact that no 'grey nomads' joined us at the last moment like last year. That said, the organisers were very happy with the roll up and were particularly chuffed by the people coming down from the Sunshine Coast and Brisbane. All in all, a good group got together for a good old-fashioned afternoon meet.

One notable attendee was retired Brigadier, Bert Barker who is 95, joined us for the afternoon. He provided a direct link to the foundation of our Corps, being a founding member of corps when it was formed as AEME. The organisers suspect that there would be few people today who can make the claim that they joined the Corps before it became RAEME. BRIG Barker, in an earlier life, was

the COL COMDT of QLD, so he was in good company with the current COL COMDT Tony Borg, who was also in attendance in the day.

To celebrate the RAEME 75th year, the RAQ Gold Coast Chapter presented the Surf Club a leather copy of the CHP and a framed RAEME pennant to reinforce the shared history of the Corp and the club. The book was received by Mr Phil Chipman, who is a former President and life member of the Mermaid Beach AEME SLSC, and a former RAE Army officer.

Phil provided some interesting words about where the club had come from, through to today, and advised attendees that the club takes its AEME/RAEME roots very seriously. As part of the 'nipper program' for example, the young boys and girls learn about the club's roots through stories the club's WW2 / AEME beginnings through to present day RAEME.

So, in summary, the Gold Coast lunch went very well and was very well attended, with a great spirit in the room, which allowed everyone to think of the significance of the occasion in a venue steeped in RAEME history. The 2018 lunch will be held around the same time in 2018, with a tentative date of Saturday 30th June 2018.

# RAV Reserve Forces Parade

## RAEME Association Victoria, 2nd July 2017

The 2017 Reserve Forces parade was Held at the Shrine of Remembrance, Melbourne. The Corps had approx 15 members on parade and was led by Association President MAJ Mike Newbond, Banner carriers WO1 Allan Hawkins & WO2 Stephen Woods, Standard Carrier Danny Hayes, ASM Dave Scott.



# Address to the RAEME 75th Anniversary Memorial Service

## Brigadier Ed Smeaton on behalf of the Head of Corps

Chief of Staff and RSM Army Logistic Training Center, Deputy Heads of Corps and Corps RSM, Commanding Officers, distinguished guests, ladies and gentlemen and members of the Corps of the Royal Australian Electrical and Mechanical Engineers. On behalf of the Head of Corps, Brigadier Andrew Freeman good afternoon and I welcome you to today's Memorial Service.

I would like to acknowledge the traditional custodians of the land on which we stand this afternoon, the Wiradjuri people, and pay my respects to their Elders, both past and present.

Welcome to this milestone occasion as we officially launch the Corps 75th Jubilee celebrations. As we gather with members past and present, along with friends and supporters of the Corps we can be immensely proud of the foundation that has been laid in the preceding three quarters of a century and be truly excited about the opportunities that lie ahead.

It is fitting that we gather here on the lawns of the Craftsman Memorial, a poignant reminder that people are the fabric of our Corps, and of the sacrifices many of our ranks have made. The theme for our 75th anniversary is, "Reflecting on the past to maintain the future".

Today I would like to reflect on how our history has developed the Corps into the professional, modern capability that we deliver today on operations both within Australia and around the world, before addressing how we will shape and prepare RAEME for the future – your future.

RAEME was formed during a time of war and was born out of necessity. Tradesman and artificers have been an essential component of Australian forces since the Boer war, serving initially as blacksmiths, armorers and soldiers. During the First World War, these trades expanded to include motor mechanics and electricians. However, it was the increasing logistical and organisational demands faced during World War 2 that saw the Corps of Australian Electrical and Mechanical Engineers, or AEME raised on 1st December 1942. At the time some 43 trades were transferred into the new corps. These trades included typewriter mechanics, vulcanisers, machinists, fitters and turners, welders and mechanics.

Many AEME units saw service in the New Guinea and South West Pacific Campaigns. Against a backdrop of appalling conditions, fatigue, disease and enemy action the Corps reputation for ingenuity and tenacity were cemented. As Sergeant Doug Brazier of the 113th Workshops serving in New Guinea explains, "we had two enemies, the Japanese and the environment. Heat and humidity sapped your energy and promoted disease, while torrential rain greatly impeded work.

The 113th workshops were required to counter Japanese infiltration and maintain their own security and on many occasions unit personnel came into contact with the enemy" for these reasons the importance of both technical skill and tactical proficiency has always been a bedrock of the corps. And it is this careful blend of soldier and tradesman that continues to set us apart today.

Also from these early days women from the Australian Women's Army Service joined the ranks of AEME, including service in operational areas such as Lae in PNG. This inclusiveness and a willingness to be guided by trade skills, competence and an individual's contribution to the team continue to be a strength of the corps and have built the diverse group of people that represents the Corps today.



Over this time the Corps has evolved and adapted, through successive wars, including Korea, Vietnam and the modern conflicts of Iraq and Afghanistan. While many of the foundations are enduring, the Corps has morphed to meet the changing demands of technology and the nature of war. Just like we no longer have typewriter mechanics, vulcanisers or saddlers, the Corps of tomorrow will not be the Corps as we currently know it.

For our junior members, this is an exciting time, not only will you partake in the Corps 75th year, but I hope many of you will still be associated come the Centenary. By that time some of you from among the LOBC will have likely served as CO of our Corps Schools and Deputy Head of Corps and possibly be in consideration for Head of Corps. It is likely someone in the ranks from ASEME undergoing your Adult Trade Training will be here at this very Memorial as the Corps RSM for the Centenary.

It is in this context that I ask you accept the challenge and be part of the Corps future journey. Over the next decade you will witness a generational change in Army's combat power from new wheeled and armored vehicles, upgraded aviation assets, modernised weapons and a proliferation of unmanned systems, all integrated across a digitised battlefield communications network.

Modernisation has been a perennial challenge RAEME has faced. Machine replacing horse, artillery replacing cannon, digitised replacing analogue. Over the next 25 years this will be no different and there will be substantial changes to our trades and maintenance practices to keep in step with new systems and equipment introduced into Army. To add to this complexity there will likely be a need to maintain legacy fleets.





As Director General EME, Brigadier A.D. Powell, wrote in edition 1 of the 1978 Craftsman, "No matter how successful are the planners, it will always be fact that the larger part of the inventory will be made up of old and used, often well-used, equipment. RAEME must span this technological gap – like the Colossus of Rhodes we must place one foot in the camp of the new whilst retaining the other firmly in the old". This observation still is true 39 years on.

In order to address this modernisation challenge, your Head of Corps would like to offer three conceptual pillars that will generate discussion for the basis of our adaptation for the next 25 years - A Unified Maintenance Concept, Professional Military Education and Reform and Reassessment of RAEME base trades. How these pillars are developed and taken into the next two decades is not yet defined. This is because we do not have all the answers and we rely on you as members of the Corps to collectively develop the path towards the future.

I will pose a number of questions to you that the Head of Corps would like you to consider over the next twelve months. I encourage you not to limit your thoughts but instead use these themes as a basis for deep and meaningful discussion.

A Unified Maintenance Concept addresses the reality that our maintenance responsibility is shared with civilians. BRIG Martins who was the fifth Head of Corps, noted that civilians constituted over 40% of the Commonwealth EME elements at the end of World War Two. Civilians repairing military equipment is not a new concept, but the formations and organisation under which they are employed may have changed. One of the key questions under this pillar that we need to address is who should do our maintenance and where the maintenance should be done.

What functions must be performed by a uniformed tradesman with the survivability skills to provide repair and recovery support in combat and what functions could be provided through other means. If we understand and define what our roles and responsibilities are under a Unified Maintenance Concept, this will guide a strong foundation for the following two pillars of Professional Military Education and the Reform and Reassessment of the RAEME base trades.

Professional Military Education is an important facet to ensure that our corps remains current and relevant. It is an ongoing process that needs to be embedded as part of the professional development for both officers and soldiers. For many of you your current attendance at ASEME or ASLO is the start of this journey.

A structured professional military education progression for officers and soldiers will ensure that RAEME personnel are up-to-date in modern maintenance and logistics practices and can influence decisions with robust technical and maintenance advice in support of tactical and operational outcomes. The question in relation to this pillar is what professional military education should be part of our career progression and how should it adapt to the Corps changing needs.



The final pillar is Reform and Reassessment of the RAEME base trades. The considerations under this pillar directly relate to the changing nature of the equipment that will be introduced to Army over the next 25 years. In order to support the introduction of these new capabilities a detailed and systematic analysis of future workforce requirements is essential. This analysis will inform the skills, qualifications and experience required to provide effective maintenance support. We, as corps members, need to be open in our thinking, not be bound by current paradigms and develop a unified direction for the future of the corps.

Over the last 75 years our Corps has demonstrated that we are able to adapt to meet the needs of Army. In our current state we are fortunate to have the focus and resourcing for continuous improvement through activities such as Plans Pelican and Centaur. However, these alone will not be enough to drive the change required in the coming decades.

By embracing the three conceptual pillars of Unified Maintenance, Professional Military Education and Reform and Reassessment of RAEME Base Trades, proposed by your Head of Corps we will develop a corps with soldiers and officers that are prepared and skilled to embrace the challenges that lie ahead.

I encourage you to think about how you can contribute to the Corps. Reflect on the past to maintain the future, that is the theme for our 75th Jubilee celebrations and I challenge you to understand our past, the lessons learned and consider how you would develop a pathway to take RAEME into the next 25 years. Importantly too enjoy the opportunity too, be a part of this milestone year for the Corps.



# Task Group Taji-2, Task Training Unit

## S4 CAPT Tom Cross

During 2016, as a RAEME Officer, I was fortunate enough to deploy as the S4 within the Task Training Unit Headquarters for Task Group Taji-2. One of the tasks within this position was to co ordinate the logistic effect between the task group training teams, ANZAC logistic and American coalition logistic elements based at the Taji Military Complex (TMC), a former Iraqi Republican Guard base under Saddam Hussein, 40 km north of Bagdad.

As Iraqi army units were withdrawn from fighting Da'esh forces, they underwent a refurbishment and re-equipment phase prior to conducting training at TMC. The equipment was supplied by the US Government through the Iraq Train and Equip Fund (ITEF), which supplied independent Battalion and Brigade, sized lots of military equipment and ammunition.

A combined ANZAC and US Army logistic element transported the ITEF equipment and then issued it to the Iraqi forces while providing security and governance requirements for the US Government. When the ANZAC training teams commenced the training program, the TG Taji-2's integral workshop provided RAEME personnel in composite ANZAC Forward Repair Teams to ensure the training was not hindered through poor equipment serviceability.

Some of the tasks requested of our RAEME Crafty's were to inspect small arms and vehicles prior to it being issued the Iraqi Army. Fitter Armourers conducted light repairs on M16's, AK series of weapons and various other small arms at range practices. Electricians conducted services and minor repairs on US supplied field power generators prior to providing operator training and Vehicle Mechanics provided training on operator servicing and rectification of minor fault finding on ITEF issued vehicles as part of the training package.

Australian RAEME and New Zealand maintenance personnel integrated smoothly during pre deployment training, which enabled them to provide an effective maintenance and training advisory assistance throughout the deployment to the Iraqi Army.

It was an honour to serve with our NZDF and American logistic counterparts and from my observations; our RAEME personnel are some of the best and most competent tradesmen in a coalition environment, that are able to provide either trade advice and assistance at short notice or instruct on foreign small arms and vehicles when required.

Arte et Marte



*CAPT Cross issuing CBA to Iraqi troops, Right – Iraqi field modifications to a US issued ITEF HMMWV, the Iraqi Army does not have an equivalent TRF system.*

# Jottings from the Middle East 2017

## W01 M. Patman EMEWO HQ JTF 633

The Middle East Region (MER) is home to approx 46 RAEME members, each one at varied stages of their deployment. We are spread across a number of force elements and occupy positions from the director of sustainment, to J4 cells in HQs, to instructors at the Officer Academy and in all workshop locations in between. Some work alone, some work with other RAEME members and some with our coalition partners.

### Our own worst enemies

Mission critical equipment relies on our technical expertise and hard work to ensure maximum equipment availability is afforded to force elements. Commanders want their equipment at 100% availability with minimal effort from the operator and maximum effort from the tradesperson. As quantities of vehicles and equipment in the MER change there is an ongoing analysis to ensure we have the right maintenance effect, in the right place at the right time.

Recently we introduced a new capability into the MER and with it, a request for extra tradesmen to assist with this equipment was raised. Analysis of MILIS (our reporting tool) did not provide an accurate representation of the actual hours our tradesmen/women had undertaken. As a Corps we really need to be diligent in recording all of our production hours so that when the numbers are looked at, our hard work and dedication is realistically represented.

### New Facilities

Recently the main supporting workshop in the MER moved in to new facilities. Many previous rotations provided input and design advice into the finished product which, I might add, is pretty good. It includes a high roofed four bay floor with 20T overhead crane, separate weld bay, generator repair bay, fitting bay, boffin tech room with massive safe, all fitted with aircon and exhaust facilities. The offices are in a separate demountable building which has a number of terminals and segregated work areas. The new workshop will increase output and make for a safer work environment for our CFN.

### Spanner Packs

Our morale received a boost last week with the arrival of Spanner Packs into the MER. Workshops were buzzing with the intake of lollies, biscuits and other goodies gratefully received. A big thank you goes out to the main organiser Mr Raymond Norman, an ex RSM, for all of his work, along with the RAEME Associations of Australia and the Head of Corp who chipped in from our Corp Funds. It is the little things that make our Corps stand out from the others, this being one of them.



*RAEME in office.*



*Spanner pack.*

### RAEME Birthday in the MER

It is always a good time of year when our birthday comes around, with Spanner clubs and ASM golf days during the year; my wife says that RAEME birthday happens four times a year. Over here in MER it was celebrated in a couple of places, here we had a BBQ breakfast, followed by a game of cricket against the REME guys. In other locations, a billy cart race, table tennis competition and cake cutting events took place. It was a day that I am sure the deployed members will remember for a long time to come.

From those of us lucky enough to be deployed, we hope all of our RAEME brothers and sisters back home enjoyed the celebrations where ever they were. I am sure the 75th Birthday parade and dinner went off with a bang. We will keep working through until our trip comes to an end and we return to Australia to catch up with our families and friends. Arte et Marte



*Mick and Babs with HQ.*

# OP Accordion – HQ JTF633 - J4 Maintenance Cell

WO1 Dean Goninan (28 Apr – 11 Nov 15) & CAPT Alex McDonald (18 Feb - 02 Sep 15)

## Introduction

The article will give a brief overview of the key roles and experiences of the Maintenance cell within the HQ Joint Task Force (JTF) 633 on Operation Accordion. It will cover the management of land materiel within the Middle Eastern Region (MER) and this function resides within the J4 Cell. The cell operates as part of the logistic element (J4 Cell) and is located within CAMP Baird in the United Arab Emirates (UAE). The maintenance cell consists of two members, a J4 Maintenance (Captain TRF engineer) and the EMEWO (WO1 Artificer).

The role of the J4 Maintenance cell is to provide engineering advice, materiel management (including RODUM management) and conduct TRF compliance across the entire MER. This included Operation Accordion, Highroad, Okra and where required, regional operations located in Africa. The job is highly varied and primarily consists of management of unplanned high priority activities. This can include modifications to vehicle fleets, insertion/extraction of land materiel during Operations, management of materiel during accidents (such as Battle Damage Assessments).



*Qargha Wksp – TG AFG, (with REME Flag and Maint Elements in front of the Brits Recovery asset) L-R 4th from left – CAPT McDonald, holding flag on the right – CPL Matt Lette (VM), CFN Paul Heinrich (VM), CPL Steven Ciup (Fitter). Kneeling 2nd from left – CFN Struan Law (Boffin), WO1 Dean Goninan and CFN Ashley Schulte (FSE 2 Tech Elec).*



*J4 Cell (May 15) – RAEME members: From the right LTCOL Andrew Kelly (incoming J4) MAJ Paul Rabbidge – Joint Logistics Command Liaison Officer, WO1 Dean Goninan and CAPT Alex McDonald.*

## Key roles and responsibilities

There are three key roles that the maintenance cell is responsible for. The first role is ensuring that the MER maintains TRF compliance IAW the TRAMM-L. This involves establishing and maintaining the hierarchal governance architecture that enables a Task Group (TG) to establish their TRF compliance framework. The complexity in this role is that the Task Groups are physically dislocated and spread from areas within the United Arab Emirates, Afghanistan (Kabul and Qargha) to Iraq (Baghdad and Taji). Photos at Figures 2 and 3 are of the Maintenance cell team with members of both the at Qargha (TG Afghanistan) and TG TAJI 1 Workshop elements, including coalition partner maintenance elements.

Some of the TGs include Royal Australian Air Force units who traditionally maintain land materiel utilising a variety of different processes than that of Army units. As the RAAF had not deployed with such a sizable force for some time, their maintenance support processes had not been tested for use outside of Australia. Many varied processes were required to keep equipment operational. An example was the use of Army Vehicle mechanics conducting services on pallet loaders and forklifts in Iraq (TAJI) due to the RAAF Maintainers not having the required diplomatic passport and VISA.



*TG TAJI 1 Wksp (Aug 15) with RNZEME members. L-R – WO2 Bob Mitchell (ASM), CAPT Alex McDonald, LCPL Michael Pinalla, CFN Troy Clarke, CPL Kelvin Arthur (NZ), CFN Craig Sampford, SGT Adam Danby, WO1 Dean Goninan, CPL Morris (NZ), CFN Mitch Herman, LCPL Jarrad Gordon, CFN Joel Talbot, SSGT Jason Houia (NZ), CPL Jimmy Dorward (NZ) and SGT Jason Cameron. Absent from pic: CPL Andy Leslie, LCPL Steven Richardson and CFN Kyle Jensen.*

The role also involves conducting TRF audits across the Task Groups to ensure that the governance procedures and policy is applied adequately. This enabled a great opportunity for the Maintenance Cell to get out of HQ and visit the maintenance elements on the ground and see first hand what the environment and issues were. Having never been given the opportunity to deploy in the previous decade of operations, it was a great experience to see both Afghanistan and Iraq.

The second role that the J4 Maint cell is responsible for is the management of land materiel within the MER. This includes Up-Armoured Sports Utility Vehicles (UASUV), Protected Mobility Vehicles (PMV) and the Force Protection Electronic Counter Measures (FPECM) that accompanies the vehicles. These vehicles are an integral part of the materiel in theatre that the TG commanders require to conduct their missions. The UASUVs are fleet managed by the maintenance cell in theatre which poses its own set of issues.

The fleet consists of vehicles of various ages that are either owned by ADF or leased through a sub-contractor. Spares and

maintenance are managed by personnel in the MER not using the CASG framework. The UASUV management takes up a considerable amount of time for the Maintenance cell, including the weekly reporting of their status and the management/ordering of parts from the OEM and also the organising of assessment after significant accident damage and the intra-theatre movement involved.



*FSE 3 Wksp and other RAEME members: Front row – L-R WO1 D Goninan, WO1 G. McFarlane (incoming EMEWO), CPL D. Marsh, CFN T. Gerste. Centre row – CAPT R. Brinkworth, WO1 T. Jones (FSE Ops), LTCOL A. Kelly (J4), CFN A Boehm, CFN D Hyde, CFN H Macarthur, WO2 Paul “Dog” Cooney (FSE 3 ASM). Back row – WO2 Ken Brown (ASM TG AFG), SGT A. Niesler, LCPL T. Trautwein, CFN I. Muggleton, LCPL A. Walkington, CPL C. Willian, CFN R. Atkinson, CFN L Dayes. On the PMV – LCPL B. Harris and LCPL S. Vloothuis.*

The FPECM is also a critical element for the commander. The FPECM due to new threats and technology and the regions of conflict require regular software and hardware upgrades. This requires CASG involvement in sending contractors overseas to protect our vehicles from the latest threats.

The closing of the Kandahar elements occurred during our rotation. This involved close liaison with the senior RAEME rep on the ground to ensure MILLIS requirements for the closure of a maintenance element were achieved. SGT Adam Niesler was in the hot seat, with supervision and final sign off from WO2 Ken Brown (TG Afghanistan ASM – located in Kabul).

The third key role is the engineering management of materiel in theatre. This includes RODUM management by the EMEWO and Local Engineering Change Proposals (LECP) by the TGs. Some of these engineering changes are simple, however some highly complex and involve stakeholders across CASG.

The Special Operations Task Group (SOTG) submitted the most engineering changes for their vehicles (mainly due to a large number having not been captured/saved or formal requests for permanent changes to vehicles developed post Afghan use) having to re-produced a number for their Iraq operations. One really good change which was designed and manufactured utilising the facilities at Special Operations Logistics Squadron’s (SOLS) Rapid Fabrication Cell was the 84mm Ammunition Storage – LECP. This LECP was also used later for fitment of the storage brackets to a number of TG TAJI vehicles.

Although each Task Group or Force Element generally has its own ASM, to ensure all issues are captured and the EMEWO is kept informed, one central register is kept and all MER RODUMs are released by the J4 Maint cell EMEWO. This also ensures the HQ Joint Operations Command (JOC) TRF WO is in the loop and can assist in resolution with a particular CASG element if required.

The day to day tasks were constant, with regular spot fires and different tasks that kept you busy. Some of the most frustrating times came from dealing with the issue of getting damaged UASUVs



*HQ JTF633 J4 Cell members – Sep 15 (RAEME members – three on the right with the flag) TRF Oftr -CAPT Roger Brinkworth, J4 -LTCOL Andrew Kelly and EMEWO –WO1 Dean Goninan.*

assessed and quoted by the Original Equipment Manufacturer (OEM) and then the need to have them transported out of the country back to the UK for heavy grade repair. The local repair options had been considered previously; however, were found to be below the standard required (we are talking welding ballistic plate etc). You wouldn’t think it to be much of an issue until you start dealing with the host nation and their local approval/clearance processes with the relative government agencies. Thankfully the local transport mover helped with this task and the vehicle finally sailed.

My replacement WO1 Glen McFarlane got to enjoy a short trip to the UK to inspect the first of the UASUV vehicle repairs whilst also accompanying the delivery of a second vehicle for heavy repair (apparently self recovery out of a storm water culvert when stuck on the concrete drain shouldn’t be conducted using a towing strap and an American M- RAP). The weakest point of the 200 Series Land Cruiser wasn’t the bolts securing the recovery point to the chassis, but the chassis itself (who’d of thought). We utilised a UK C-17 for this task, which once developed was a much easier process (due to one of the tie down points being compromised, some armour plating and external items were removed to get the vehicle under weight for their approval).

The requirement for an Army Headquarters TRF Audit team visit occurred in late Oct to early Nov. As with processes required to be followed within Australia, the requirement for the adherence of Army Technical Regulatory Framework policy and the TRAMM-L is also relevant whilst deployed. The team had members from a variety of audit teams in Australia. They also had a RAAF Officer deploy to assist in the auditing of the RAAF land material assets within the UAE. Figure 6 below shows the team.

I’d like to take this opportunity to give a massive thanks to Mr Ray Norman and his team from the RAEME National Association for all their on going efforts in sending “Spanner Packs” to all deployed RAEME personnel. Although in the majority of situations we seem to be in much better living conditions with more comforts than in the past, the packs from home are still greatly received and appreciated by those members deployed.

## Conclusion

The maintenance cell within the HQJTF633 has highly varied, interesting and complex roles. It involves working with various organisations across the MER all of whom have different procedures and their own set of nuances. The job is highly rewarding and working with such a great team and professional RAEME members out in the TGs made the deployment extremely enjoyable. The fact we were also deployed on operations during the centenary year of the ANZACs made the deployment even more special. Keep the flag flying “Arte et Marte”.

# Headquarters 16th Aviation Brigade – S4 Logistics

The year started with posting-in of the new Brigade Aviation Maintenance Officer, LTCOL Miles Irving. The S4 cell has provided technical maintenance, exercise logistics and operational planning advice and assistance to the Avn Regt's during the first half of the year under the direction of the indefatigable DQ, MAJ Brent Saltmarsh, Army AFL tragic, and proud RAEME Corps Life-Member, along with CAPT Tom Cross.

The Bde WOSUP, WO1 Bev Salter, has co-ordinated aviation RPS and Fly-Away-Kits, trials or introduction into service of various projects such as the new cold weather clothing, T-Link Headsets, and the incoming AMCU and AMCU Fire Retardant (FR) clothing.

A recent highlight within the Bde was the introduction of the first of type JP-157 Medium Capacity Trucks (MCT); which provides a Commercial Off The Shelf (COTS) on-tarmac, bulk aviation refuel capability to the Avn Regt's in barracks.

The tempo for logistic issues has not abated since EX Talisman Sabre 2017, in July. Logistically the exercise was a success with all three aviation regiments providing integral CSS support to BG Pegasus for the duration of the exercise. It was also a good opportunity for these CSS elements to work with US Army and Marine rotary wing elements stationed at the Williamson airfield and Rockhampton Airport.

Despite this year's campaign period slowly coming to a close, the initial round of planning conference have already begun for the EX Sea Series 18 and EX Talisman Sabre (Hamel) 18. There is also additional logistical planning to Whole of Government activities, such as support to the upcoming Commonwealth Games that Bde HQ has had logistic input into.

At the end of this year, the Bde Logistic Cell will see a changeover in some key SME personnel that have proved to be the bulwark of technical knowledge in Aviation maintenance. WO1 Steve Field will retire after 40 years plus service, of which he spent the first ten in the Infantry Corps before he saw the light and corps transferred to RAEME Aviation. We will miss his loud sage advice in the office as he directs the Unit RASM's, CASG Project Officers and random higher HQ Officers, always starting "With all due respect..." before launching.

## 2017 Complete manning

S4 Logistic Cell – LTCOL Miles Irving (BAMO), MAJ Brent Saltmarsh (DQ), MAJ Steve Catalano (SUP/OPS Plans), CAPT Tom Cross (SO3 TRF), WO1 Bev Salter (WOSUP), WO1 Steve Field (BASM).

Technical Air Worthiness Compliance Cell – Mr Dave Howard (HQ TACM), Mr Rod O'Connor and Mr Nik Olins Assistant TACM's.



Left – Retiring BASM WO1 Steve Field with farewell honour board, Right – Farewell coffee table constructed by C Sqn, 5 Avn Regt.

# 1st Aviation Regiment

## Logistic Support Squadron, Ground Support Troop – The Ground Support Troop

The 1st Aviation Regiment Ground Support Troop (GST) comprises of some of the highest quality RAEME operators within the Australian Army. These select individuals are chosen on their skill sets and abilities to adapt to changing circumstance.

Skills that range from exceptional fishing skills, rapid response to 'bodgies', a natural ability to customise metal fabrications to suit any caravan requirement, and of course a talent for all things sports. But jokes aside, the highly fluid environment that the 1st Aviation Regiment provides demands an eagerness to provide support in all ranges of tasks.

The workplace is never left to go 'stale' whilst the crafty's continually service a G-Wagon for the four thousandth time in a month. Repairs for diverse equipment such as TTF, Tow-motor's, forklifts, Manitou, and practically any G-wagon variant that comes across the workshop are only scratching the surface of jobs the team tackle.

Whether it is providing assisting CFL's to the Regiment training regime, supplementing driver instructor's for transport courses, or assisting in the care of SGT Penny, the Regiment Mascot; the GST thrives on the opportunities it is provided. The troop is a prime example of the workload shared across all RAEME trades in order to prove that RAEME doesn't 'just swing spanners'.

The year of 2017 brought about the 1st Aviation Regiment re-structure with the rapid tempo of Griffin Guns and encouraging external units to visit Darwin throughout the year, resulting in fewer deployments to interstate training areas. However, this meant we had more rotations to Mount Bundy Training Area (MBTA) to support the airside operations. This resonated well with the lads as they are always keen to get out and haul a G-wagon through that classic Bundy red dust.

Many crafty's were found in the brew room exclaiming their love to get out there in such a 'cool and breezy climate'. The requirement for pilot's to maintain a high standard of aircraft proficiency meant

that the work for GST can never stop. The team maintained a relentless rage for assisting the aircrew operations in both vehicle recovery and repair. Accompanying vehicle and aircraft support were miscellaneous requests to support development of the MBTA targetry.

Fitters were provided opportunity to reinvigorate their love for chainsaw use, followed by the chance to push vehicles to their limits across the vicious terrain in the training area. Unfortunately this would then lead to VM's and boffin's or eleccy's doing what they love the least, and troubleshooting the thousands of electrical problems that would eventually arise in the new fleet.

As we approached the end of the year, all eyes were on the trusty Tp SGT Rob Clarke to lead the senior's cricket team to victory. Countless hours spent in the cricket nets perfecting his fine batting form as the juniors squad watched on in awe. The day boasted the perfect weather, an exceptionally cooked mess catered BBQ, and the opportunity for the senior's captain to score an easy half century. This enthusiasm thrived within the GST workshop as witty banter was slung around like those missing leave apps

The day had arrived; the stage was set for one of the biggest thrashings in cricket history. Up stepped to the crease a wide eyed bushy tailed Rob Clarke as he stared down the barrel of a 200km/h medium paced out swinger. Naturally, this was all a hype because within a few short runs; no more than CFN Pratt can count without taking his shoes off, Ben Judd takes a miraculous catch behind the keeper to send the overly confident batsman walking. Destroying the seniors teams hope of victory.

With a majority of festivities coming to a halt, it will be back to the daily grind of service and repairs as the GST continues to provide it's all in support of the Regiment. As we are all aware within the Troop, Squadron, and Regiment; we will remain mission focussed, and conscious of our dedication to the complete team of 1st Aviation Regiment.



*Manning Photo 2017: Rear Row: Josh De Ruyter, Maxy Walker, James Paterson, Tom Johnson, Tim Blakey, Mitch Jacobson. 3rd Row: Ben Judd, Kyle Burnet, Russel Penn, Matt Gibson, Malcom Hayes (Mal-nutrition). 2nd Row: Pete Conroy, Chris Tulk, Sam Daniel, Helen Cole. Front Row: Mitchell Brimage, Stephen Bland. Absent: Rob (Bob) Revermann, Matt Fullarton, Sean Pratt, Daniel Rocca.*

# Rotary Wing Aircraft Maintenance School

MAJ Reg Perrin, 2IC

It's been another busy yet enjoyable year at the Rotary Wing Aircraft Maintenance School (RAMS). We have had a solid course program thanks to large graduating classes from the RAAF School of Technical Training and mostly full promotion course panels. RAMS relies on motivated and experienced technicians from across Army Aviation to deliver, alongside Navy and contracted staff, capability focussed training outcomes. The opportunity to influence the next generation of technicians coupled with a break from the Aviation Regiment tempo makes RAMS a great posting option.

A key achievement for 2017 was the commencement of CH-47F training at RAMS with three transition courses conducted throughout the year. The CH-47F training system includes modern maintenance simulators and also a re-purposed delta model – now the Cargo Helicopter Maintenance Training Aid (CHMTA).



*CH-47F Team and Aircraft Transition course.*

**As for the rest of 2017....**

January saw the march in of new staff including the CO/CI, LTCOL Brett Nelson taking over from LTCOL Rob Boughen. We continued the busy start to the year as February brought the start of the long awaited PESA training with the RAN members of the unit especially enjoying being introduced to the ways of battle PT and how endearing Army PTIs can be. We also had the dining-in of the new SADFO, COL James Brown (COMDT AAvnTC), as a combined mess function.

In March the staff challenged the students to T20 cricket, also known as the Oakey Big Bash. A great day of sunshine, skills and sportsmanship was had by all which resulted in the staff winning by a huge margin, as was expected. April was all about ANZAC Day. RAMS paraded in front of the township of Oakey with the CO reviewing the parade. A very successful event with an excellent turn out and march past. A good reflection on the amount of drill that we had been practicing under the watchful eye of the SSM, WO2 Brett Mesken.



*CHMTA.*



*RAMS Unit Photo 2017.*



*SI ARH/BH Wing, CAPT Harry More, with DFR visiting group on the ramp of a Chinook.*

In May RAMS hosted a Defence Force Recruiting (DFR) visit for candidates applying to become Army Engineering Officers. The candidates were given career presentations before being shown the RAMS facilities and training aids. The visit concluded with a demonstration of the Tiger Simulator.

Also in May the challenges continued with a Trail Run at Picnic Point, Toowoomba. About 80 members of RAMS ran the very hilly 5 Km course, except a small few who pushed themselves to do 10 Km to table Top Mountain and back. This was concluded with the obligatory BBQ lunch and congrats all round. The CO was honoured to be the Reviewing Officer at RAAF STT Graduation Parade for Aviation Technicians completing their IET course. RAMS also sent WO2 Simon Jones to Wide Bay to assist with the SHADOW 200 (UAV) training camp for 20 STA Regt for 3 weeks.



*CO RAMS with 2-16 ATECH Course Graduates.*

June through August had a steady flow of community support, PME and military skills activities. The RAMS Unit Birthday was held on



*Members of Spring Bluff Railway Station.*



*Members of RAMS marching down The Range.*

28th July. This was celebrated by a sports day challenge with teams from all wings competing in soccer, volleyball, touch football and a cycling and rowing endurance event. The challenge was won by ARH Wing, resplendent in Aggressive Salmon (pink) shirts. Energy was regained by having a big BBQ with a birthday cake the size of the barracks to munch on.

September started with PESA. We also reflected on some local military history by retracing the 25th Battalion's initial steps on the road to World War II. RAMS marched from Cabarlah to Spring Bluff, following the same route that ultimately led 25 Bn to the Battle of Milne Bay. We were also enlightened on the history of the Fleet Air Arm by CPO Doug Tebbitt, RAN.

During October the latest Artificer course graduated after nine months of hard work and long hours. They will be glad to get back to their day jobs. Also, two members of RAMS acted as observers for 5 Avn Regt EX PEGASUS RISING, providing input to a Downed Aircraft Recovery Team activity.

In November, the RAMS all-ranks dinner provided an excellent opportunity to celebrate the RAEME 75th birthday in an Aviation context. We also 'deployed' a significant contingent to RAEME 75th birthday parade and celebrations in Canberra on the 1st of December. Remaining staff and students attended the SADFO end of year dinner in Toowoomba, before finishing for a well-earned break.

As can be seen it has been a very full calendar with a plethora of events and tasks that have kept RAMS on its toes. Let's hope that next year we can keep up the same tempo and have such a great year as this one.

# 2nd Cavalry Regiment's 'Road to Hamel'

## W01 Paul Kitching – Regiment ASM

2017 has been a big year for the 2nd Cavalry Regiment maintenance teams as we adapted to the restructure associated with CSS CONOPS whilst travelling the Road to Hamel in becoming part of the 'Ready Brigade'. Before I discuss 2017 let me quickly outline the journey to get to the start line for the Road to Hamel. In 2015 the Regiment relocated from Darwin to Townsville and absorbed B SQN 3rd/4th Cavalry Regiment. To make an early impression on the 3rd Brigade the Regiment immediately began exercising as well as supporting any activity the Brigade or anyone else had going. This meant that workshops were heavily relied upon to patch up the equipment as best they could between activities. In December of 2015 the Tank Squadron was finally integrated from 1st Armoured Regiment into 2 Cav Regt which made logistics even more challenging.

2016, one year on and the first real opportunity arose for the workshops to actually set themselves up in Barracks since the move from Darwin. This was done with gusto and many items were relocated to where they belonged or returned to the Q Store or thrown out. Tradies could now actually see the workshop floor and find things a lot easier. It wasn't long before the year started to get busy with our first exercise and the impending audit by the 'toecutters' we like to call (MAS)ACAA arriving in April. At the same time the main workshop was the first to undergo Plan Centaur's LEAN activity. Both of these organisations were well received (well by myself anyway) and provided valuable feedback on how to improve maintenance. These changes helped set us up for success with the impending implementation of CSS CONOPS.

Back to the start of 2017. The workshop manning had changed considerably with approximately 30 positions being removed. This resulted in a change for not only workshops but for the 'war fighters' as well. We had a new look EMEOPS, an empty workshop and a fist full of maintenance requests and Exercise REODEMS for 3 CSSB. Our first six months were going to be full of exercises, planning conferences and hope. Hope that all our planning and preparation was going to work, hope that our REODEMs were going to be filled by 3 CSSB and hope that the new Squadron OCs would stop making grumbings about how they cannot have their equipment made available at the drop of a hat.

Our main goals for 2017 were to survive CSS CONOPS, do well on Exercise Talisman Sabre (HAMEL) and then focus on establishing a CONFE SQN for the Ready Phase of the FORCGEN Cycle and preparing



W02 Ken Roberts "GLOW WORM".



*The Caravan of Courage.*

the unit for its deployment to Taji. All of these goals were achieved with a high level of success due to the hard work of all involved.

Regiment ASM highlights/challenges of 2017 are as follows:

- Two brand new M88A2 HERCULES brought into the unit
- All 14 Tanks were serviceable at the same time. Well done W02 Hingston, GDLS-A and BRS.
- The WORM, W02 Ken Roberts entertaining the troops with his repertoire of quotes and colourful language. A book of quotes is currently with the publishers. It will be titled "PLAN ROBBO, I'm sick of dealing with Muppets".
- Having surplus Boffins and trying to keep them happy.
- Working in an open plan EMEOPS with a very capable TST Commander, CAPT Hoodcamp and EMEOPS SGT, SGT Purchase.
- Running out of VMs on Talisman Sabre and having to supervise OJTs to replace a steering box on an ASLAV.
- Running out of VMs and then OJTs on Talisman Sabre and trying to remember how to fix things myself.
- Realising that my bush mechanic skills are still pretty good after repairing an 8 Ton Trailer with a 7.62mm blank cartridge (don't tell the 'Toe cutters').
- Finally deploying the EMEOPS shelter, Aka 'The Caravan of Courage' into the field.
- Having an RPS that knows what they are doing.
- Submitting 58 RODUMS in 2017
- Dealing with 24 NFW investigations

In summary, the last two year have been very challenging adjusting to PLAN Beersheba and CSS CONOPS. I would like to personally thank all the tradies, RPS staff and supporting elements consisting of GDLSA, Broad Spectrum, Drake, 3 CSSB and JLU-NQ. Also thank you to the 2 Cav Regt Logistics Officers who have enabled the Regiment to achieve its training requirements and for leading us very well.

Good luck to those who have discharged, posted, promoted, deployed or who have remained at the Regiment.

Fortis in Arduis

# 2nd Combat Engineer Regiment

## CUT above the rest

After the jam packed year of maintenance which was 2016, 2017 has come through with an entirely new strain of tropical fruit. CSS CONOPS rolling through and 'reallocating' members to 7CSSB, reducing the manning of each of the four sections to one or two Diggers and a Corporal, so as you can imagine a lot of work has gone to CSSB this year. Throw in several, three to four week field exercises and FRTs on top of that and it makes for a 'fun' sandwich.

We have welcomed a lot of new kit this year, with the rollout of 121 trucks (MANN 40M and HX77 protected and unprotected) full unit SCE fit out, EF88 (with old weapons returned with at 6 months on the TI (thanks CASG)) and two new Oshkosh Striker fire trucks (pictured). We have also returned kit to the green machine, losing plenty of Mogs and Macks plus both our MV-10s (pictured). Much to our relief this reduced our maintenance burden and helped free up some room in the compound.

### Troop Commander (New ASM)

Welcoming our third Troop Commander in two years, LT Sudhanshu Sharma hit the ground running and ran straight into our workshop banter, quickly sorting out what is banter and what 'isnt'. The Boss has picked up a lot of technical knowledge in his first year leading the crème of the crop, knowledge that they can't teach you at RMC (mostly cleaning and repacking wheel bearings).

### ASM (Kevvie 'OAM' Bishop)

Whether it's handing out signals, yelling at diggers, denying courses due to tenure or feasting on fruit and nut bars the Ace is an undeniable force within the workshop. Slinking into the control office interrogating any digger at a computer terminal then questioning any valid excuse, making sure to bring everything up at points. With production as his main focus, the Ace has steered the workshop well away from where it was heading when he posted in. WO1 Kevin Bishop will be missed as he posts to 6 BDE HQ in Syd, we all hope that as the senior WO1 he will be able to carry twelve coffee's.

### Vehicle Mechanics (Alpha Trade)

Broken between three work groups, the kings of the workshop floor aren't often able to sit down, let alone talk.

2SQN – Garry 'May Day' May, Evan 'The Chin' Johnston.

7SQN – Keegan 'One Grit' Smith, Angus 'Teflon' Lamb.

24SPT – Glen 'Brake Chamber' Miles, James 'Missing Link' Copeman.

EMEOPS – Greg 'Captain Squats' Lewry, Kai 'Prod Clerk' Gordon,

Floaters - Ivan 'Battery pack' Gless, Clay 'HRV Mech' Windon, Daniel 'Dare Kevin Jr' Hayes.

Setting the standard for not only peak physical fitness: but also cutting edge technical knowledge, the Vehicle Mechanics of 2CER have gone above and beyond while on duty. All displaying extreme humility while doing so, 2017 has been a breeze for these operators.

### General Engineering (Not VM's thank God)

GE started the year with two men down due to CSS CONOPS and then sent their best asset Daniel 'talks under water' Vanderdrift to ADFA for a month to train the Army's future combat leaders. Steven 'smoko' Davidson kept the Travis 'One Swimmer' Grant and Tobias 'Not Trav' Stiller busy teaching reluctant engineers how to carry out



*Oshkosh Army Striker.*



*MV10 Flail Robot.*

operator maintenance on their equipment and how to send in the dreaded EMEFIX. The rest of the year is slowly tapering off, allowing an easy transition into the Christmas stand down.

### EIR (Champion section)

Comprised of three heavy hitters: Navjot Pal Singh 'No Greys' Bhambra, Mark 'Question Time' Cooper and Struan 'Left on the Hill' Law.

Providing an enhanced skill set to the workshop EIR is always on point. Adopting a 'there is nothing elec tape can't fix' attitude and applying it to every task. The majority of their work is fixing vehicle faults, plugging 'broken' radio cables into the correct ports so they magically work or explaining basic electrical principles to the 'Alpha Trade'.

### RPS (Yardiez – Not Queys)

A select team of highly qualified logisticians, not just picking parts but also picking hearts, reserving them a 'special' place within the workshop. The second half of the year welcomed three new additions to the elite squad, SGT Annette 'Mother Bear' Dakers, PTE Abbey 'Autobot' Hart and PTE Kiara 'Parmesan' Papiasian the gals have really brought a homie feel to the male dominated RPS. Dale 'No Carb' Caddy and Kalen 'I'm pretty much a SGT' Sharp are very professional but always willing to get in on the workshop banter.

### Recovery (Out of Office)

2 CER Recovery asset, LCPL Daniel 'On Course' Rogerson has had an arduous 2 weeks total within the confines of the 2 CER compound. When he has been at work Rogo has managed to keep TST off the TPTWO's regular fuel card and AD049 rage audits. Throughout Rogo's absences we have been ably supported by 7 CSSB who provided three back up Rec Mechs, one of which was CFN Matt Burke who is due to post to 2 CER in 2018. Since his arrival Burky has managed to bog the HRV (which is OK as he got recovered by a JD Grader) and break the HRV, twice, while on a recovery task, which necessitated recovery back to Bris by SLiner. I'm sure next year can only see improvement in Recovery Sections fortunes.

# Technical Support Platoon – 2 RAR

Technical Support Platoon (TSP) has had a pretty busy year supporting the Battalion with not just maintenance but also with wide range of other tasks. This year started with new members marching in with great enthusiasm of being a part of an Amphibious Unit. The new members quickly realised that Amphibious does not mean that we are always on the boat.

The first Battalion exercise saw all the members of TSP, as part of Admin Coy, deploying to High Range and conducting IMT's. This exercise for many members of TSP was professionally rewarding and it aided members of TSP to know each other better. Life at the barracks composed of highly demanding work load and with changing Battalion priorities and high tempo. TSP members did exceptionally well to provide the unit with maximum equipment availability.



2 RAR TSP Talisman Sabre 17.

The month of May and June saw members of TSP deploying to Cowley Beach (Ex Sea Explorer) and High Range (Ex Brolga Strike) to support the Battalion. TSP members gained valuable experience working with Amphibious Beach Team (ABT) at Cowley Beach. Apart from supporting the Battalion and ABT at Cowley Beach, TSP members took advantage of the locality and ran morning PT sessions and afternoon GYM. Morning PT sessions ran by TSP CFL's were a great hit amongst the members of the Battalion and were requested regularly.

During both of these exercise members of TSP went above and beyond to provide maintenance support to the Battalion. TSP members displayed flexibility, efficiency and professionalism in doing their jobs and achieved the best outcome for the Battalion even with limiting factors like repair parts and constant breakage of equipment.

Ex Talisman Sabre provided first Amphibious landing experience for most of the members of TSP. Our fearless PL COMD LT Mirza and CPL Haley embarked early on HMAS Canberra to fulfil duties of EF ADJT and Mess Deck NCO respectively. It was surely an experience which developed them both professionally and physically (climbing stairs).

Other TSP members, embarked on HMAS Canberra, gained new experiences like conducting repairs whilst on ship, driving on and off the LARC's and going to the GYM twice a day. Unfortunate members of TSP, who were not able to enjoy the LHD experience, drove to and from SWBTA.

Ex Talisman Sabre provided opportunity for the members of TSP and our trusty new ASM WO2 Downey to flex his TRF knowledge, get a tan, as well as broaden the teams professional experience and be a part of largest amphibious landing conducted by ADF on home soil.



Talisman Sabre 17.

After Ex Talisman Sabre, TSP switched their attention to prepare themselves and the Battalion for ACAA Audit and maintenance to ensure members deploying to Malaysia and PNG have all the equipment they need. It was TSP member's hard work and dedication which led to TSP not receiving any corrective action from ACAA, an outstanding achievement.

## VM's

Out with the old and in with the new, 2017 saw Vehicle section introduce new members. A clash of the Veh SGT's occurred on the first day, as two arrived with only one position to fill. After a short stare off, the weaker of the two reluctantly moved to the much less prestigious position of GE SGT. Unable to withstand this humiliation, he decided to become an officer instead.

We have been led by the fearless John 'news.com.au' Colvin who is always up to date with celebrity gossip. Under him we've had Mick 'Greener than Kermit' Haley who seems to have become a bit bigger this year. Shane 'Slavery' Avery has been our go to MILLIS guru and Dean 'If Mother cans come in E-cigarettes – I'd vape it' Enderby has taken over as SUEM. Having lost our prod clerk to 3CSSB, Troy 'More jaded than you' Williams was demoted to clerk and filled those shoes.

We welcomed some new crafties this year including Tim "I have army rugby" Wikaira, it was always majestic seeing the big Maori swinging spanners. Oliver 'I'll crush you with my conduct record' Cran was warmly welcomed by the RP's with some words of advice. And Deiter 'My dad is better than your dad' McNaughton who pulled some strings to bring his own father in as OC...not that he benefitted from that in any way.

Returning for another year with 2RAR we had Dylan 'They won't pay for my footy trip' Cordingley who took a much needed Contiki deployment with his missus, with this poor display he was awarded many PMV driver guards throughout the year. TSP's house DJ, Todd Johnson took off on a soul searching trip to the west to find inspirational tracks to be blasted from the workshop stereo. Without a doubt Todd was connected spiritually with America and Cancun and most certainly delivered for the boys. But it came at a cost for young Todd; his standout performance cemented him in to a spot on SUBJ 1 CPL.

Justin 'Who's that guy?' Morris is and always will be the greatest grey man in army history, he may be quiet but give him work and he'll hook in. Ashton "My virtual reality is better than actual reality" Walsh brought us into 2017 with some nice tech, but we all know he only uses VR to play games and Tyson "wet paper bag" Stamp was here some days too



*Cowley Beach NQ.*

## Fitters

The fitters spearheaded the year in usual style by dominating IMT's with ex infantry weapons CPL Cope and CFN Rule. New comers to the group were CFN Reece 'Wilko' Willcockson, CPL 'No show' Wakely who will disappear yet again to get his third hook and Ash 'potential golden boy' Boehm.

SGT Murray leads the fitters, but is eyeing off a spot as an Army EHO and uni student for a while. The section continued on with business as per normal for workshops i.e. Fitters disappearing to Ross Island for "emergency repairs/coffees" and weapons magically appearing when the ASM comes to fill his water bottle up.

Exercise Brolga Strike and Talisman Sabre, displayed the fitters ability to wait and wait some more for a stunning view of the paddocks at SWBTA. The much anticipated move to 1 Division was met with joy and mirth by the marine fitters at 2RAR.

This separation will see the rise of the fitters in the workshop, led by our commander and chief LCPL Billy Golden Boy Howes. Sadly this will be his last year, but he will be spoken of in reverent hushed whispers through the ages. We also farewell Pat 'Hook Chaser' Molloy as he heads West, also William '100% Nunny' Nunn if he ever returns from RCB.

## EIR

The year began with CPL Mathews and CFN Church joining CPL Bristow-Hamilton, LCPL Wieland, CFN Bonanno and CFN Sweeney in the EIR team. The first half of the year was taken up with exercises that had members spread out across a range of activities and courses.

At times we had members located in four different locations at the same time which is a good achievement for such a small section. The second half of the year has provided members with the chance to complete courses and catch up on the wave of maintenance from the year and spend time with family before another busy year next year.

Overall the year has been a productive one for all members within EIR. Personnel spent time at sea for the first time, enhanced their trade qualifications, handled weapons they haven't experienced before and completed courses in preparation for potential promotions next year. Members have juggled all this work and still had wonderful years at home.

LCPL Wieland was married October with a full honeymoon planned travelling throughout New Zealand. CPL Bristow-Hamilton welcomed his first Daughter Violet into the world and CPL Mathews welcomed his first son Ethan.

CFN Church had a successful year playing Rugby Union as well as completing his lead up training for selection in the new year, CFN Sweeney is traveling to New Zealand at the end of the year to

complete an ultra-marathon and CFN Bonanno has somehow put up with all of us whilst completing a whole year without alcohol, a big well done Josh, your liver is now ready for your next posting to Karratha.

## RPS

January 2017 saw the RPS section at 2 RAR grow to 4 members with PTE Bernauer and CPL Elwell marching in to join PTE 'Worms' Wormington and SGT 'Old Man' Roleff. The year was off to a busy start with RPS support needed to get the Battalion off on a range of activities in preparation for the Sea Series amphibious training and the Talisman Sabre certification.

We all worked together to have the right parts available with the best support team for each training activity and did our best to provide support even when the LHD ships were unable to join the Amphibious Foundation Training and Cyclone Debbie moved through the North Queensland region.

We are coming to end of a busy year with a great sense of achievement as we have been able to improve many processes used in barracks and on field activities such as Talisman Sabre which will see us continue to build the best parts support network for future activities.



*ASM W02 Downey left his office long enough to snap this wonderful photo of a LHD.*

With big plans in the works for 2RAR, 2018 will see workshops member's numbers reduced significantly. We wish the guys posting out all the best and thank them for their hard work.

## 2 RAR Farewell:

LT M. Mirza  
SGT O. Roleff  
CPL T. Stamp  
CPL M. Elwell (nee Riganno)  
CPL J. Wakely  
CPL S. Mathews  
LCPL S. Avery  
LCPL B. Howes  
LCPL N. Wieland  
CFN T. Williams  
CFN T. Johnson  
CFN J. Morris  
CFN Cordingly  
CFN A. Walsh  
CFN W. Nunn  
CFN P. Molloy  
CFN J. Bonnano  
CFN W. Church  
PTE Bernauer

# Realising Potential – Operationalising the 5th Aviation Regiment’s Technical Workforce

For 5 Avn Regt, 2017 started with several imposing challenges; a Chinook capability operationally limited by a Deeper Maintenance R4 wall, further exacerbated by a high turn-over of technical staff; an MRH Taipan capability culminating under excessive maintenance liability and ineffective production, planning and control; further amplified by the pending decision regarding transition of the platform into 6 Avn Regt to support the Special Operations capability. It was a set of challenges that required a rallied and focussed group of RAEME technicians, engineers, support staff and ultimately leaders to resolve.

With the challenge clear, we adopted a vision of being operationally focussed, professional, sustainable and ultimately dependable. Knowing that our efforts this year were designed to achieve return on investment for the remaining Life of Types of both platforms. Through effective leadership at all ranks, highly skilled technicians, RAEME ingenuity, and significant effort to fight through the friction, we have come through the year having significantly advanced the position of both capability systems.

For MRH, we have supported simultaneous DACC, Exercises and Operational deployments to PNG while achieving an unprecedented Rate of Effort, doubling the 2016 flying hours on the Taipans. For Chinooks, we have remediated the R4 wall, supported Exercises and conducted High Density Altitude Training in PNG, with Initial Operational Capability (IOC) for all 10 aircraft being recently declared. Overall, the MRH workforce has completed over 116,000 Maintenance Man Hours (MMHrs), with over 26,000 MMHrs being clocked on the Chinooks. Our efforts have allowed aircrew to practice fighting the aircraft systems as we prepare our forces for war.

As we reflect on what has been a hugely successful and pivotal year for both the MRH Taipan and CH-47F Chinook capabilities, it is important to tell the story what the Technical Workforce in 5 Avn Regt has done to realise the potential of these two great platforms. In this submission you will hear what the Technical Support Troops have been achieving and how they have made 2017 a year to remember. The below citation for the 2017 Hawker Pacific Innovation Award is a good overview of what we have collectively achieved. However, the work is far from complete as there is much consolidation and refinement that needs to occur to normalise the successes and ensure we continue to achieve the potential nested in our great Air Assault capabilities.

*MAJ Jason Long, OC Technical Support Squadron and MRH Taipan Responsible Manager*

## Hawker Pacific Innovation Award 2017 nomination from Headquarters 16th Aviation Brigade

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 fundamental criteria for selection of recipients. For this reason, Headquarters 16th Aviation Brigade nominates the Aviation Technical Support element of the 5th Aviation Regiment for their exemplary performance in 2017.

Aviation technical support elements from 5th Aviation Regiment have worked diligently to achieve innovative success through effective maintenance production planning and control, generation of maintenance tempo, formation of a stable battle rhythm and direct contract maintenance support. This drive for innovation and focus on

continuous improvement at all levels, has directly improved the rate of effort and enhanced safety.

The Australian Army’s fleet of MRH Taipans has increased aircraft availability by more than 30 % in 2017 with the overwhelming majority generated by a collaborative team of dedicated technicians and logisticians from the 5th Aviation Regiment. A commensurate 40% reduction in maintenance man-hours per flying hour has further enhanced the platform’s reputation as a more sustainable and reliable capability.

In 2017, MRH Taipan maintenance support crews have enabled the generation of unprecedented and sustained high levels of flying Rate of Effort (RoE), generating trust in the capability amongst the wider capability. Across various operations and exercises the MRH Taipan maintenance crews have achieved unprecedented availability rates whilst operating from demanding amphibious and land environments; successfully providing support to Operation Queensland Flood Assist following Tropical Cyclone Debbie and support to coalition training forces during Exercise Talisman Sabre 17. Concurrently, the Regiment’s MRH90 fleet maintained similar availability rates during support to the Papua New Guinea (PNG) Government’s national elections and high altitude density training.

In 2017, the Chinook platform has successfully transitioned and established the new Foxtrot capability, with Final Operational Capability being declared in July 17 for the first 7 aircraft, and Initial Operational Capability being declared shortly for the additional 3 aircraft.

All 10 aircraft are now generating unprecedented levels of support to amphibious, land based and special operation activities. The Chinook fleet is currently on track to fly 30% more ROE this FY compared to the last FY. Furthermore, the establishment of the Deeper Maintenance capability within the Maintenance Organisation has provided the fleet with significant additional bank hours for the future years.

The success achieved by MRH Taipan and CH-47F Chinook platforms has, in no small part, provided the impetus for Chief of Army’s Senior Advisory Committee to endorse MRH Taipan transition into 6th Aviation Regiment for the special operations role.

Overall, the commitment to MRH Taipan and CH-47F Chinook has seen continuous improvement in the system of maintenance for both platforms. This has been achieved by the strong support and unwavering dedication for production planning and maintenance burden reduction initiatives. This in turn has had a positive impact on the generation and sustainment of Army’s Air Assault capability in support of Joint Operations.

The exemplary performance of the Technical Support element from the 5th Aviation Regiment is underpinned by strong leadership at all levels, a focus on safety, and commitment to mission success. The Technical Support element of the 5th Aviation Regiment truly embodies the core values of Hawker Pacific, and are considered worthy recipients of the 2017 Hawker Pacific Award.

## A Sqn TST ‘Salty Dogs’ Yearly Overview

2017 was a milestone year for MRH and A Sqn led from the outset. There were many firsts: providing integral air mobile support to an amphibious battlegroup, squadron deployment

from sea to Shoalwater Bay, and proving the MRH self-protection countermeasures were the key highlights. Underpinning it all was unprecedented serviceability levels combined with high Rate of Effort.

The TST achieved near perfect serviceability throughout Ex Sea Master/Talisman Sabre (05-23 Jul) as part of a Combat Team deployment on HMAS Canberra. Sea-going life suited the TST, cruising the Australian east coast whilst demonstrating the ADF's Landing Helicopter Dock capability. The Squadron then deployed to Shoalwater Bay via sea, land and air assets. This occurred without incident, despite exchanging pork ribs and medium-rare steaks (thank you Navy) for the dust and ration packs of Shoalwater Bay (cheers Army).

A Squadron's Campaign Surfrider (Aug-Sep) required a 5 aircraft self-deployment to Woomera in order to put the MRH self-protection counter measures to the test. The data showed MRH to be the combat survivable helicopter Army needs it to be. The Squadron also had the opportunity to do community engagement activities in Woomera, including showcasing the aircraft at local schools. Local community engagements continued well into the early hours, although the TST failed to win any dance contests despite strong leadership from the Hangar Artificer.

A busy social calendar to conclude the year saw many awards and prizes to the troop. A special congratulation goes to SGT Satterly and his FRT for winning FRT of the year and to CPL Anthony Ashman, A TST 'Dog of the Year' winner for 2017. CPL Ashman gave a memorable speech to the Squadron following the award. As the only Combat Fitness Leader in the TST, he cleverly linked themes of balance and agility in a way that was relevant to the Craftsmen of the troop.

Finally, congratulations to the TST who's professionalism and hard work has been unwavering throughout the year.

*CAPT Elliot Geddes, A Sqn TST Commander*



*A Sqn FRT on HMAS Canberra supporting Ex Sea Master 17.*

### **B Sqn TST 'Buccaneers'** Yearly Overview

2017 has been a challenging but fulfilling year for 5 Avn Regt, B Sqn TST 'Buccaneers'. The year began with the Squadron ramping down from High Risk Weather Season preparations in time to jump into a late notice deployment to Papua New Guinea in order to conduct High Density Altitude (HDA) training and (Visitor VIP) VVIP tasks for Ex Helicon Luk. This involved the strategic lift of four MRH90 Taipans by C-17 Globemaster and proved a decisive milestone in the development of strategic lift capability within the TST. Once in location there were some technical challenges faced due to the discovery of unexpected CAMM2 lifing issues which would need to be resolved swiftly. The TST worked hard throughout the period to ensure that once the flying restriction was lifted, B Sqn could immediately resume HDA training in time to support the 75th anniversary of Kokoda.

The return journey proved equally challenging as the final day culminated in the discovery of a fuel issue on A40-009. Undeterred, the remainder of the Squadron redeployed and a Downed Aircraft Recovery Team (DART) remained to conduct extensive troubleshooting and recovery. The strategic lift capability of the aircraft was once again proven when the aircraft was returned to 5 Avn Regt for further complex fault finding and rectification.

Soon after returning the Squadron was once again deployed to PNG for Op HANNAH. Five MRH90s were Air Self Deployed to Port Moresby to assist with the PNG elections. The operation proved highly successful as MRH90 proved its capability to achieve 458 Air Frame Hours (AFHRs) (the highest deployed ROE recorded for the Australian Army). However, there were a number of technical challenges to overcome during the time. The most notable being the recovery of aircraft A40-034 from Mt Hagen due to an Engine Governor fault. A DART team was deployed three consecutive times over three days via the comfort of King Air to rectify a series of faults including a Main Avionics Bay fan failure and Internal Communications Systems degradation.

The operation also proved the simultaneous deployment and operation of a Troop and TST from both Port Moresby and Wewak with personnel and equipment split between the two locations. This all in conjunction with the Regiment committing significant assets to Ex Talisman Sabre 17! At the close of 2017 we can all agree that despite the challenges it has been a highly successful and fulfilling year to date.

*CAPT Christopher Garrett, B Sqn TST Commander*



*B Sqn TST in PNG, Aircraft Training Wing, Jackson Airport, Port Moresby.*

### **C Sqn TST 'Cavemen'** Yearly Overview

This has been a year of undeniable upward trajectory for the CH-47F capability. The aircraft itself stands on the shoulders of its veteran predecessor, the CH-47D, which rightly built a reputation of rock-solid reliability and versatility. After a relatively seamless transition from D to F, it is clear that the aircraft itself is ready and waiting to continue that legacy.

However, at the beginning of the year, the capability faced real challenges. The aircraft were banked into an R4 service wall, an 8-week service which is required every 400 AFHR. Additionally, there were modifications outstanding on several aircraft, with significant

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pressure to complete them, since they were tied to Final Material Release, a key milestone for Final Operational Capability. If that was not enough, there was a significant cracking issue emerging in the fleet on the LH STA520 former which at the time had not yet been confirmed to be secondary structure.

In the background of all of these issues which affected availability of the AIR 9000 Phase 5C aircraft (the first seven aircraft of the fleet), the remaining three aircraft purchased under rapid acquisition in the LAND 4502 Phase 1 project were not available, since they had not yet been added to the State Register, nor had they been released for FORCOMD use. Nonetheless they required maintenance to build them up post C-17 airlift from USA, in addition to ADF modifications and rectifications.

All of these issues were faced with faultless professionalism from the tradesmen of C Sqn TST, despite the troop having suffered a large exodus of maintainers at the end of 2016 due to posting and discharge, to the order of sixteen people. Working in degraded conditions while the new CH-47F maintenance facility has been constructed, the TST has cleared every problem set before it, ably supported by the new Boeing Defence Australia Contracted Maintenance Support personnel.

The bank hours now in the fleet against R4 servicing is now extremely healthy, with 30% more hours than required given the Rate of Effort allocated for this and next financial year. FOC has been declared for the AIR9000Ph5C aircraft and IOC has been declared for the L4502-1 aircraft. The Squadron is now flying at a prodigious rate – at the beginning of this year, it took more than four months to fly 200 AFHRs. In October alone, the Squadron flew 295.7 AFHRs.

To achieve all of this in a year of transition, with maintenance facilities still under construction and with degraded staffing, is testament to the experience and the relentless hard work of all of the maintainers within the CH-47F capability. That this was all achieved in a year where Exercise Talisman Sabre 17 was executed with faultless reliability, and the Squadron deployed to PNG with four aircrafts via ASD without any STRATAIR support, including a long overwater leg from Horn Island to Port Moresby, is further validation still of the superlative capability of the aircraft and of the impeccable support from its maintenance staff.

Looking into 2018, things are looking very healthy for the CH-47F capability, a stark contrast to the beginning of the year. The new maintenance facility is on the brink of completion, there are many hours in the R4 bank, new staffing is flowing into the TST from the RAEME Aircraft Maintenance School (RAMS) and the capability is all set for another busy year of unrivalled support to the wider Army and ADF.

*CCAPT Stephen Wardrop, C Sqn TST COMD*



*A15-307 landed at Isurava, PNG.*

### **TSS, ART 'Sharks' Countermeasures development**

The Rotary Wing Force Element (RW FE) consisting of A SQN and elements of ART provided aircraft and its associated support to Campaign SURFRIDER 17. This campaign was conducted at Woomera Test Range over the period of August to September 2017. It supported MRH90 in their countermeasures development process and it involved the implementation of the MRH Instrumentation System (MRHIS) kit. As a part of the flight trial activity, the kit was used to collect critical aircraft information whilst the aircraft responded to simulated threats.

This was the first time that the Australian Army had implemented the MRHIS kit onto its aircrafts. Given that only one MRHIS kit was available, the kit had to be continuously swapped across multiple aircrafts in order to achieve the combined effects of qualitative and quantitative sampling.

This maintenance effort was support by a five man FRT led by members of ART. Subsequently, the data collected using the MRHIS kit was critical to the successful outcome of Director Aviation Capability Management (DACM's) Radar Warning Receiver testing; furthermore it supported the collection of additional data for explosive ordnance testing under TRIAL KINGFISH and radio frequency testing under TRIAL POLARISE.

*CAPT Damian Mew, ART Commander*



*MRH Taipan conducting a dust landing in the vicinity of Woomera Test Range.*

### **TSS, MST Enabling the trades to enable the operator - Refining CL9 deployable spares for the MRH Taipans**

During 2017, 5 Avn Regt conducted an internal review into the Unit's stock holding procedures and a number of areas for improvement were found. A key area of improvement was the design of Fly Away Kits (FAK) for the MRH Taipan capability.

During the planning process for a short notice deployment on exercise to Papua New Guinee (PNG), supporting the PNG Defence Force and Commonwealth VVIPs (including the Governor-General and Prime Minister), 5 Avn Regt Supply staff conducted an analysis of the stores required to support 4 x MRH Taipans for a period of up to 30 days.

This analysis formed the basis of an enhanced FAK model, known as a Deployment Kit (DK), for the MRH Taipans. These stores were deployed with B SQN to PNG and significantly reduced the number of high priority demands for the duration of the Exercise. This posed a significant cost saving to Defence through the reduction in transportation costs associated with moving freight from Australia to PNG.

The DK model was analysed on return from the exercise, and changes were made to further validate the model. The DK was later

utilised on Exercise Talisman Sabre, Sea Series, and OP HANNAH throughout the year and further refined on return to Townsville from each of these tasks.

5 Avn Regt is now confident that the DK model holds the required spares to allow the Regt to achieve its allocated tasks under the Chief of Defence Force's Preparedness Directive. This should assist the Regt in meeting its required Notice to Move into the future.

*CAPT Kieran Petrie – MST Commander*

## Collective Activities

### Exercise Pegasus Rising – Downed Aircraft Repair Team (DART) Training

During Exercise PEGASUS RISING 17, the Regiment conducted a series of DART training activities at the High Range Training Area (HRTA). The training was designed to practice and evaluate MRH Taipan FRTs, C2 elements and other supporting elements in the conduct of tactical aircraft recoveries in a medium threat environment; where they must make challenging decisions requiring tactical and technical considerations.

Each DART activity was supported by a PMV security detachment from Spt Coy, 2 RAR, providing a great opportunity for interoperability prior to Sea Series 2018. The activity was also supported by visiting staff from RAMS acting as Technical Evaluators. The support provided by external elements generated a more realistic training environment and provided impartial advice to enable effective evaluation of FRTs.

The participating FRTs from A TST, B TST and ART faced a variety of unique tactical scenarios that tested their knowledge in rules of engagement, defensive TTPs for deployment to and security of a downed aircraft. From a technical perspective, the FRTs faced simulated aircraft battle damage that required application of the Aircraft Battle Damage Repair (ABDR) procedures in the IETP and application of the SPA10 Command Clearance process recently released under DASA Advisory Circular 005/2017 – Application of flight for non-standard changes to configuration, role and environment.

The FRTs were tasked to conduct aircraft recoveries in both day and night conditions and deployed by air and by road. This tested the preparedness posture of the FRTs with many lessons learnt to improve the current status. As the FRT COMDs, maintenance managers were the single biggest contributors to the success or failure of the aircraft recoveries. The FRTs SGTs were ultimately responsible for the coordination of maintenance on the ground, integration of the defensive plan with the security attachment, and relaying accurate information for C2 elements to make informed decisions. The performance of the FRT SGTs and their teams has revealed several target areas for SQN and TST training programs leading into 2018.

The FRTs particularly relished the opportunity to tackle complex DART challenges involving enemy threats, integration opportunities with 2



*FRT COMD SGT John Newton briefing his troops.*



*FRT road deployment with 2 RAR security attachment.*

RAR, and opportunity to practice aircraft battle damage assessment and repair IAW the IETP. Based on the feedback from evaluators, the FRTs adapted well to the challenging conditions and relished the opportunity to focus on core military skills expected of their trade. The last DART serial concluded with the conduct of an actual recovery at the HRTA with poor weather fast approaching, the FRT lead by SGT Newton switched seamlessly from scenario to live maintenance to get A40-038 home to close out the Exercise.

*CAPT Damian Mew, ART Commander*

### RAEME Birthday

5 Avn Regt celebrated the 75th RAEME Birthday in style this year under the Aircraft Repair Troop hangar at Hamel Lines.

RAEME members of 5 Avn Regt were joined by their brethren from 3 BDE along with the CO 5 Avn and CO 11 CSSB. Serving members were also fortunate to be joined by 5 Avn contracting staff and ex-servicemen from the original A TST. This TST was first raised in 1989 to provide operational maintenance support for the newly introduced S-70 Black Hawk at the time. These ex-servicemen had returned to 5 Avn to celebrate the 28 years of A TST history that has including support to S-70 Black Hawk and recently the MRH Taipan operations in Fiji, PNG and East Timor.

The night kicked off with the official naming of one of the MRH Taipans. The name 'Forcene' was bestowed upon aircraft A40-042, with the name representing a horse rearing and enraged with power. It was the second aircraft in the fleet to be named, joining 'Pegasus' who was so named at the 5 Avn Regt 30th Birthday celebrations earlier in the year. Forcene was unveiled by the CO 5AVN, RASM 5AVN and BASM 16 BDE, before being blessed by the 5AVN padre.

Following the naming of Forcene, a number of outstanding craftsmen along with the 5 Avn premier FRT were presented with awards highlighting their exemplary service. The Airbus Innovation Trophy was awarded to CFN Brock Murphy, the Boeing Tradesmen of the Year Trophy was awarded to CPL Tristan Creasey and the Sikorsky Support Trophy was awarded to PTE Jake Wilson. The FRT of the year was awarded to an A SQN FRT led by SGT Brad Satterly. All of these award winners have demonstrated outstanding devotion to duty and professionalism throughout the year.

The invited keynote speaker, Mr Steve Baxter was unable to attend the event due to an unfortunate incident. In his absence, the CO 5 Avn subsequently presented an address, discussing the need for innovation in the aviation industry and reiterating the crucial role that maintainers play in pushing forward the Army Aviation Capability. Following the address, the most generous raffle draw in the history of raffle draws was completed, with a suspiciously large number of prizes awarded to OC TSS (he did graciously put around half of them back in the draw). All the proceeds from the raffle draw and entry cost were donated to Mates4Mates, where the money will no doubt be put to good use.

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During the night, entertainment was provided by the Black Velvet music band, whose performance was excellent and helped create the relaxed vibes enjoyed by all.

Overall the RAEME Birthday presented the opportunity to unwind in a social environment at the end of another busy year and a chance to celebrate 75 years of experience and generally being fortunate enough to belong to the best Corps in Army.

LT Harry Palfrey-Sneddon, LEO



*Forcene following the unveiling flanked by CO 5AVN, BASM 16 BDE, OC TSS, 5AVN key technical staff and 5AVN Padre.*

### Ground Equipment Repair (GER) Troop

The new year saw the arrival of the new Tp Comd, LT Dale Lumsden with a glint of 'hope and wisdom' in his eyes which only lasted a few weeks before he departed for LOBC. The 'ol' boys also welcomed the arrival of nine new faces to the team in the form of SGT Russ (O.B.) O'Brien, CPL Todd (Jamesy) James, CPL Darren (Bourkey) Bourke, CPL Chris (Barks) Barker, CFN Dave (I'm the loudest) Hanley, CFN Cam (No, I'm the loudest / Burza) Burzacott, CFN Tim (Liam) O'Connell, CFN Tyson (laughs like a Hyena, hehehehe) Reid and CFN Ryan (Molly / Fenton) Moulton.

The year started with the Logistics Support Squadron (LSS) shake out; EX Draft-Horse Crawl (DHC). It was decided to pull up stumps after two days and return to barracks before we injured anyone, due to the extreme heat wave encountered during mid Feb. We were all surprised to find rain arriving early on the third morning as we were packing up. Rumour has it that LSS left EX DHC early due to the rain. Sources for the rumour are unconfirmed but the EMEOPS SGT, SGT Jeff (Ryno) Ryan was heard telling the RSM & Regt 2IC "yeah, I heard they all had a vote and it was unanimous to come back 'cause it was startin' to rain heaps" with a wry smile on his face.

The daily grind of PT, EMEFIX, Work Order and parades continued for some time until the 'ramp up' for EX TS17 in June. The boys and CFN Jessica (JJ) Land, hooked in to ensure the Regt's vehicles, weapons, Comms and Field Power Generation Equipment was available and ready for the big show. The drive down occurred with little dramas, only one fuel fault breakdown for 70 odd legacy fleet vehicles ... well done to O'B and the VMs.

CFN Nathan (Carts) Carter recovered one breakdown L/R 6x6 back to Townsville and bought forward the 1250 kg trailer carrying the Mission Essential Equipment List (MEEL) 16 kVa left behind by 'not to be named' elements of 1 Avn.

During EX TS 17, the harsh living and 'working' environment of three hot meals a day, hot showers, no gun piquet, very little breakdown maintenance and the noisy 'air frames' took its toll on the troops. It was so arduous, some personnel needing daytime naps to make it through the EX. We also had the opportunity to go for 'familiarisation



flights' in the Aussie, NZ and USA airframes when the opportunity arose.

The hard work and dedication of the three electricians; CPL David (Davo) Krause, CFN Matt (Harry) Harrison and CFN Tim Blakey from 1 Avn, saw them each presented with a US coin from the Battalion Commander 2-25 Aviation Regiment LTC Martin. Well done lads, your contributions ensured the BG TOC and flight lines were able to function with minimal interruption to their power supply.

The FITARMS were so stressed, they made a chess board and practiced long and hard to take on the undefeated and self-pronounced 'Grand Master' of chess, the ASM Ground WO2 Marko Benazic. All comers failed to defeat the 'Grand Master' although JJ did secure one stale mate. The OPSWO was even seen running away with his tail between his legs after half a game.

Upon RTU post EX TS 17, we once again continued with the daily grind of PT, EMEFIX, Work Order and parades until the much anticipated 'ASM's Golf Day' which saw a variety of costumes for the event. The winning costume was a split decision between CFN Matt (Hally) Hall and CFN Jake Wicker, dressed in wedding gowns.

The remainder of the year will be busy as usual, maintaining the Regt's Land Materiel in support of flying operations. As the CO says, we are a "team of teams" and we all contribute to the Regt's capability.

### 2017 GER TP manning

GER Tp Comd – LT Dale Lumsden, ASM Gnd – WO2 Marko Benazic, EMEOPS SGT – Jeff (Ryno) Ryan

VMs – SGT Russ (O.B.) O'Brien, CPL Chris (Barks) Barker, LCPL Jake (Brad) Bradstreet, CFN Dave (I'm the loudest) Hanley, CFN Cam (Burza) Burzacott, CFN Jessica (JJ) Land, CFN Matt (Hally) Hall & CFN Jake Wicker.

GE – CPL John (Harvs) Harvey, CPL Todd (Jamesy) James, CFN David (Dave) Harborne, CFN Tim (Liam) O'Connell & CFN Joseph (Joe) Pollock

EIR – CPL David (Davo / Krausey) Krause, CFN Matt (Harry) Harrison, CFN Tyson (laughs like a girl, heheheh) Reid & CFN Ryan (Molly / Fenton) Moulton.

Rec Mech – CPL Darrin (Bourkey) Bourke & CFN Nathan (Carts) Carter.

RPS – CPL Phil (Doakey) Doak & PTE Ian (Dobby) Dobbie.

Civilian Prod Clerk – Mr Dale Lee

Note: Lurking in the back ground is the SSM LSS (The Rooster)

# 6th Aviation Regiment

The 6th Aviation Regiment's mission is to generate Special Operations Aviation force elements for the conduct of recovery, interdiction, assault and support operations either independently or in support of land, joint and Special Forces in order to meet the Army's capability and preparedness requirements.

6 Avn Regt operates 18 x S-70A-9 Black Hawks from Holsworthy Barracks, with a rate of effort (ROE) allocation of 4200 airframe hours. With an Operational Maintenance burden of 15 man hours per flying hour the aeroskills technical workforce operates at a consistently high tempo, providing support to 171 Special Operations Aviation Squadron (SOAS), 173 SOAS as well as Black Hawk Individual Training Troop (BHITT).

Supporting a spectrum of aviation from individual training through to rotary wing enabled Special Recovery Operations, the implications on the maintenance workforce are:

- The requirement to provide high-readiness, expeditionary support in order to enable the rapid force projection to, and operation from, austere environments
- The requirement for both a day and night maintenance shift to support flying both in barracks and deployed
- The requirement to conduct a full spectrum of maintenance from flight servicing through to major rectifications and structural repair
- The requirement to reconfigure aircraft to suit mission requirements, including preparing Black Hawks for C-17 transport
- Frequent interaction with CASG, and the collaborative development of repair procedures
- The requirement for ground RAEME trades to maintain high levels of serviceability on Bulk Fuel Tankers, cargo vehicles and weapon systems.

The Ground RAEME Section in 6 Avn Regt faces a number of unique challenges. As an enabling Brigade, 16 Avn Bde lacks the dedicated close support provided by a CSSB which widens the scope of maintenance that its ground technicians have to accomplish. With its relative geographic isolation in Sydney, the 13 tradesmen in the Ground RAEME section support a large and diverse fleet of vehicles and weapons.

The 6 Avn Regt maintenance workforce is focussed, professional and diligent in its ongoing support to the Special Operations Rotary Wing capability, and has deployed to every mainland state in the last two years.



*171 SOAS Force Projection.*

The 6 Avn Regt maintenance workforce is preparing to support Plan Palisade – the transition from Black Hawk to MRH90 from 2019.



*173 SQN Deployed Maintenance.*

# 6 RAR TSP

Technical Support Platoon (TSP) is 6 RAR's lifeline of equipment serviceability within the Battalion, and provides SME advice to the less knowledgeable about maintaining and servicing equipment. The workshop is comprised of EMEOPs, and four sections: General Engineering Section (GE), Electrical Instruments & Radio Section (EIR), Vehicle Section (VEH) and the Repair Parts Store (RPS).

EMEOPs is the backbone of the workshop, providing experience and leadership through the PLCOMD LT Daniel Howard, ASM WO2 Wayne Davis and PROD Section SGT Denis Schoevers and CPL Ben Hungerford-Morgan. This element of the WKSP ensures the Battalion's equipment is maintained to a high level of readiness, and provides advice to BHQ regarding maintenance planning.

GE is led by CPL Andrew Casey and his crew, comprised of LCPL Justin Marsh, CFN Nigel Cervellin, CFN Nathan Jurgs, CFN Will Snoeks, CFN Tom Walbank and a new arrival on OJT CFN Brent Nash. They are responsible for maintaining and servicing the weapons, marine equipment and small engines of the Battalion. They also assist the WKSP with fabrication where required. GE is known for their ferocity on the ping pong table and their mentoring of EIR to conduct handy-man tasks such as hanging picture frames.

EIR is made up of CFN Luke Gallagher, CFN Ian Gilzean and their new arrival CFN Nathan Welch. They are the quite achievers of the PL, this section is responsible for the inspection and maintenance of the communications and delicate equipment of the Bn. They are also avid sportsmen, with individuals being selected for roles in Bde team trials and even competing in the Combative Tournament and lasting until the bell against the war fighters. Although quiet, these larrikins have provided targets for many a tool nomination.

Elec has been a one man show for most of 2017. CFN Matt Baker is responsible for the distribution of power when in the field environment, and the repair and reporting on the many generator sets within the Bn. He has now been joined by CFN Aaron Campbell as his sidekick.

VEH section is responsible for the maintenance and repair of the vehicles of 6 RAR. They have been the busiest section in 2017 with many vehicle repairs and the smallest section, consisting of CPL Andy Canavan, CFN Simon Kermode, CFN Ryan Pentland and CFN Blake Pezzelato. The VMs have been known to be boisterous in their efforts to bant other members, usually failing and receiving as much back.

The RPS was also one man strong for most of 2017 with PTE Liam Ryan providing this service independently but much to his relief there has been a recent influx of personnel with the arrival SGT Adam Leverton and PTE Toni Emmerton to assist with the distribution of parts.

2017 has seen TSP deploy to a field environment and develop and employ SOPs and TTPs to deliver Maintenance support to the Infantry Sub-Units of the Bn to a high standard, usually coming up with bush fixes... for what can be fixed. TSP has a reputation for their intelligence when it comes to field preparation and deployment of the home on wheels, the GMV. These ancient beasts are the Crafty's home away from home, with everything one needs to survive in the field environment, a fridge, sandwich press and kettle as standard. Deploying to a tactical setting has seen some members of the TSP develop their culinary skills, which raised morale as much as a reduced backlog report.

TSP has played a large part in the changes that have occurred



*TSP 2017 (Left to Right): ASM WO2 W Davis, CFN S Kermode, CFN N Cervellin, CFN I Gilzean, CPL B Hungerford-Morgan, CFN B Pezzelato, SGT D Schoevers, CFN R Pentland, CFN N Jurgs, CPL A Canavan, PTE L Ryan, LCPL J Marsh, CPL D Wright, CPL A Casey, CFN M Baker, PLCOMD LT D Howard. Absent: CFN Gallagher, CFN W Snoeks, CFN B Nash, CFN N Welch, PTE T Emmerton, CFN A Campbell, SGT A Leverton. Photographer: CFN T Walbank.*

throughout the Bn this year, with the introduction of M113AS4s, L121 (40Ms and HX77s) and the new in service weapons systems. TSP has had to manage this maintenance, repairing of old legacy fleet whilst adapting to new ones at the same time. However we also managed to find time to have fun along the way with the re-launching of 'the ASM's Golf Day Perpetual Trophy' this year's event happened to be Lawns Bowls with GE ending up, as winners on the day.



*ASMs Bowls Day.*

Now with the end of CSS CON OPS, 6 RAR TSP is ready to grow in 2018, with the numbers increasing to 38 members as the Battalion undertakes a mounted capability in accordance with Plan Keogh while concurrently deploying on Operations in 2018/19. The WKSP is primed and ready to swing spanners wherever and at whatever comes its way.



*6 RAR Workshops & AS4s.*

# 7th Battalion, RAR – Technical Support Platoon

As most may be aware 1 Bde is split into two geographically – 1 Bde (North), based in Darwin, where the HQ element, CSSB main, 8/12 REGT, 5 RAR, 1 ARMD REGT, 1 CER and 1 CSR are based and then about 3000km south, in Adelaide, you will find 1 Bde (South), which is where 7 RAR, 1 ARMD REGT (A SQN) and 1 CSST are based. Fundamentally, this makes the operation of the southern units unique.

We are isolated from the Bde Headquarters both physically and temporally (due to day lights saving), which often foster a degree of independence and autonomy in our progression through the FORGEN Cycle. Moreover, as 1 Bde HQ do not have a strong presence here it is critical that the processes and relationships within 1 Bde (South) Direct Command Units (DCUs) is robust but resilient, which through constant interaction and coordination between all levels of command it would be safe to say, they are.

In 2016, these relationships and processes were constantly tested with Ex HAMEL 16 being held in Cultana Training Area (CUTA) and during the first few months of this year during the implementation of CSS CONOPS. No one could have quite predicted that these two factors would be the most critical to mission success for 7 RAR and 1 CSST when PLAN KEOGH was released early in 2017.

From a FORCOMD perspective, PLAN KEOGH saw the relocation of 1 ARMD REGT complete to Adelaide and the re-integration of an armoured mobility platform within 7 RAR, being the M113AS4. Naturally, those of us in the 7 RAR Workshops were concerned about how the re-integration of M113AS4 would occur. At the time of the announcement, the Workshop had 14 personnel, none of who were M113AS4 maintainer qualified. These concerns would not be uncommon for 7 RAR Workshops, as we were faced a similar dilemma, although on a smaller scale, with the IIS of the LWAGL MK47.

Fortuitously, 1 Bde was to transition to the RESET Phase, within the FORGEN Cycle, providing the opportunity to focus on individual training requirements to both operate and maintain the new M113AS4 FOV. A training program was developed synchronising unit, external and individual courses. Soon enough, we will have achieved and initial operating capabilities to both operate and maintain the M113AS4 at 7 RAR.

PLAN KEOGH would also create additional complications for 7 RAR Workshops than merely gaining personnel and expanding their qualifications and skills sets. Probably, the greatest hurdle for the

Workshop would be the requirement to adapt to the re-location of 1 CSST to Horseshoe Lines (HSL) and the subsequent co-location of the 7 RAR and 1 CSST Workshops.

The 7 RAR workshops, from this point forward will be referred to as the 7 RAR and 1 CSST Shared Workshop. The shared workshop is an excellent facility. It was built for the purpose of maintaining M113AS4 and is new, clean and serviceable, however, it was identified early that it is not big enough for the predicted 130 Craftsman planned to be working from it under PLAN KEOGH.

7 RAR Craftsman were required to be innovative in the concept for maintenance operations within the garrison, which saw them look to the Rifle Company operator servicing bays, much to the concern of the infantryman and their CHQs. An MOU was drafted up between 7 RAR and 1 CSST and the trucks began to trickle the 400m across the road packed full of tool boxes, jacks, stands, fridges and spare parts.

The major issues of the co-location wouldn't be the segregation of RPS or the allocation of servicing bays – we had this sorted early in the planning process, with 7 RAR even managing to retain the sacred ground of the 7 RAR repair armoury.

The difficulties would be focused mainly on parking spaces, DP1 storage cages, locker space and of course access to computers. We are heavily reliant on access to computers in everyday life and this has become increasingly the case within the Workshop environment, particularly after the orders came down to maintain a paperless workplace.

With digital signatures and archiving we have finally developed workable SOP's for digital work order management from start to finish, however, without access to a computer these SOP's cannot be enforced. This could slow our processes or even force us back to paper based SOP's. This issue may just be the motivation we need to see tablet style IS introduced to the Workshop, which we believe would suit 7 RAR Workshops current operating conditions perfectly.

Despite the small issues, the relocation of 1 CSST to HSL will see a second line logistics unit working amongst a first line unit. For us at 7 RAR Workshops, we hope to see those relationships and processes become refined, simpler and quicker, all resulting in a better maintenance effect. As we continue to integrate we will address our current issues and of course be faced with new challenges, most of which we hope can be resolved by the 7 RAR ASM looking across the office to the 1 CSST ASM and suggesting a discussion over a coffee.

# 9 Logistic Support Company

## Ready – Relevant – Regarded

During 2017, 9 Logistics Support Company (LSC) RAEME personnel, as part of 9 Force Support Battalion (FSB) were tasked to support multiple exercises throughout the year and were trialling the brand new fleet of Land 121 Vehicles; HX77 and 40M that have been introduced to Defence. Having not been used in the field environment before, the vehicles were tasked to support various sustainment activities in order to write SOP's and test their capability within our Organisation.

The exercises were designed to test the equipment's functionality, reliability and integrity in the field environment, through close, integral, and mounted level service support to the Brigade and their dependencies within their AO. Having equipment that is over 20 ton, gallivanting all over the South East Queensland country side was proving to be a challenge not only for the operators, but also as maintainers.



### 37 FST

As the Composite Force Support Battalion (CFSB) (consisting of 17 BDE units) postured to provide logistic support to numerous locations, it was divided into Force Support Teams (FSTs). A Close Maintenance Platoon (CMP) plus comprising of members from Amberley, Townsville and Darwin was assigned to be a part of 37 FST and were situated in a charming transit area IVO Camp Glen. These individuals were responsible for EME support within 37 FST and were also used to provide assistance when requested by the minor units that were all over Shoalwater Bay. Within 37 FST there were a variety of trades all making an essential contribution enabling the smooth operation of our tasks, which were to provide support to several customers within the training area as a white force element.



One particular tradesman found out the hard way about the illogical affiliation between acquiring the C-Vehicle course competency and instantaneously being the SME for MHE, he was quoted to have said "we don't touch a single piece of MHE on the course". He was constantly busy rectifying faults and this relentless work earned the recognition of the command team with the flow on effect of being awarded a 9 FSB coin for his efforts, unconfirmed reports state he was mildly ridiculed for the accolade however no correspondence with the equity hotline has been recorded.

### 26 FST

During Exercise Talisman Sabre 2017 (TS17), TSP of 9 FSB came under

the CFSB construct and operated under 26 TPT Squadron. We also had members of 2 FSB and 10 FSB operate within

26 FST. We were postured within E&IG Rockhampton from the start of June through to early August and began setting ourselves up to be an efficient Workshop for this Exercise. We were able to support many other organisations that were not under our direct support, for example helping the USMC with recovery tasks.

Our support also extended into helping the RAAF and the NZDF and we were able to create further networks within the ADF and external to the ADF. With the introduction of the new MAN HX77 Fleet, we were able to adjust to the transition from the Mack GS fleet with minimal maintenance burdens. The new test equipment enabled maintainers to troubleshoot faults in a timely manner. The exercise has allowed valuable experience to be gained on the new fleet and its ancillary equipment which will help for further exercises.

During lower tempo periods, the Workshop enjoyed games of "Extreme Hacky Sack" and had members from the US Army join in. We maintained high levels of fitness and the Workshop was able to school the TPT elements on how to play touch footy.

### 8 FST

Attached to 8 FST during Ex Talisman Sabre; were two WKSP members located at Williamson Airfield in the northern region of SWBTA. Due to the work load that was assigned to the work shop the daily routine was modified so that it consisted of sleeping in till 0830 - 0900 daily and staying in the tent, under cam nets to avoid putting on cams and webbing so that the days felt like they were going quicker. Trade work was very vast that can't recall anything significant in the RAEME point of view but being appointed as a driver to get three hotbox meals a day and having to shower every second day after intense vigorous rounds of Frisbee with the Americans contingent for PT are the most significant memories that could be recollected. A large amount of time was spent hurling abuse at the choppers and ospreys for kicking up dust and blowing the cards away when they required refuelling. But it always seems to happen every time a good hand was had, which was a rarity in this case

### 9 FST

7 BDE CATA saw an FST from 9 FSB deploy into Estate Infrastructure Group (E&IG) Rockhampton (RKN) under the 9 FST command construct for the first time in 2017 with the CMP also joining the main WKSP element for the majority of the exercise; "support for the support". With very minimal dependencies requiring support, fifteen RAEME personnel and a total fleet of twelve vehicles, there was a far greater amount of free time for all whilst stationed at E&IG RKN with plenty of time for PT challenges and games.

Highlights include the cheese platter put together one morning, the fiercely fought out Table Tennis Tournaments at night and a rowing/burpee challenge; which saw two RAEME members going head to head, who nearly killed themselves trying to beat the other for the title, in which one burpee only separated them.



A challenge set out to the entire sub unit by a naive CFL whom not only came up with the challenge but was also the only one not to compete "Probably because he hadn't had his 21 hours of sleep the previous day, unlike the ten days prior to that". Other notable achievements were when a young Boffin crafty was tasked for an ADMIN trip. Whilst sent out to acquire a loaf of bread and some basic general items, he returned with a pizza base instead; "what the".

Whilst on exercise we taught preventive maintenance to the operators; during which a certain CFN managed to bring the entire TPT section to tears with his lessons and demonstrations on how to do their job more to his liking. Witness accounts stated that one particular truckie was beaten over the back of the head for missing



a single grease nipple on the new HX77, of which there's something like 96 of them. Others say he chased them down on foot and pulled one out of a moving cab for driving wrong, then decided to complete the drive to Brisbane and back to show the younger members how to do it right.

During the great HX77 XX seatbelts debacle of 2017, a certain CMP member took the initiative whilst attached to the main workshop and decided to play a joke on the other crafties by removing all the seatbelts from all the vehicles, to allow the boys to conduct some real time installation training in the graveyard hours, in the mosquito breeding grounds. This of course, after spending half the day trying to jump start a vehicle with the ISO left off.



OPS had a fun time as well, ultimately brainwashing a certain RAEME SGT into forgetting about his own CORPS. When breaking down sections and naming people for activities he would consistently neglect the workshop element, even creating a sporting competition for each section and leaving RAEME out altogether. It was noted he would also rather spend time with the termites instead of the workshop boys at any chance available; if anyone was looking for him he definitely wasn't with the boys. Rumours are in that he has actually already transferred over.

On a serious note though there were a few jobs that we actually did do. Services in the field on the HX77 vehicles, obviously as long as it didn't interrupt a certain CFN and CPL's bikini tanning sessions in their so called "decontamination zone". This made for a number of challenges and in doing so no less than seven critical design faults/flaws were identified, surely to have great effects in the future for the fleet.



In closing, RAEME personnel from 9 FSB have been very busy supporting numerous exercises throughout 2017. All in all it seemed to go well, either as part of 37 FST, 26 FST, 9 FST, 8 FST and CMP. Success not only for RAEME integral support but the close support to the Brigade and their dependencies was commended at the higher level. One can only attribute the painless experience with the distance kept from any CSST elements.

# Close Maintenance Platoon – 9FSB

## SGT Patrick Marshall, CMP-T – ‘We made it our own and we made it work’

### In the Beginning...

The Close Maintenance Platoon (CMP) started from humble beginnings; albeit as a reaction to identified maintenance and recovery support deficiencies to 6 CS, 16 Avn and 17 CSS Bde units in the advent of Plan Beersheba and CSS CONOPS. As a result, a diverse bunch of RAEME tradesman from all trades was assembled with some RAAOC support and posted out to three corners of the country with effect from 16 Jan 17.

The CMP is a Force level asset under command of 9FSB with FRGs at three locations-Darwin, Townsville and Amberley. CMP provides 1st line support up to medium grade repair on common use equipment and Prescribed Specialist Equipment (PSE) to enabling brigade force elements that do not have an integral workshop.

The facilities allocated in Darwin, Townsville and Amberley were either old or pre-occupied by others; however, through open expression of RAEME esprit de corps and adaptation, ‘we made it our own’. Other limitations included available ST&TE and scarce vehicle allocation; however, through Crafty ingenuity and resourcefulness ‘we made it work’. Many thanks should go out to the many individuals within 9 FSB, as well as the respective Combat Bde maintenance elements, which have helped enable the CMP.



*Bar made out of recycled materials at CMP Townsville.*

Our dependencies have openly stated on numerous occasions that they appreciate the service CMP provides in response to maintenance requests. CMP Amberley FRTs frequently depart RAAF Amberley for Gallipoli and Borneo Barracks in order to service dependencies such as D Coy 1 MP Bn, 11 CHC, 2 GHB, 20 STA and 7 Sig Regt. CMP Townsville service A Coy 1 MP Bn, 2 CHC, 10 FSB and 5 Avn Regt. B Coy 1 MP Bn, 8 CHC, 1 Avn Regt and 10 FSB elements within Darwin are serviced by CMP Darwin.

10 FSB have also been supported through provision of specialist labour to increase equipment capability. Credit is given to all CMP members for the work that they have conducted to date given the limitations in resources.

Methodical should be the term used with respect to how 9 FSB is working through CMPs requirements and processes in order to effectively deploy as a forward maintenance element to the force. The tooling, equipment, camp stores and vehicles are arriving; enough of it just in time for CMPs maiden deployment on Ex Talisman Sabre 17.

### Off to War (Ex Talisman Sabre 17)

Ex Talisman Sabre 17 marked the first occasion in which members from all three elements of CMP combined together to form a CMP minus. CMP was attached to the 37th Force support Team

(37 FST) of the 9th Combined Force Support Battalion (9 CFSB) which in turn draws its capability from the three FSBs. Being deployed in the vicinity of The Glen, SWBTA, CMP very quickly found themselves providing integral maintenance support to 37 FST, in particular its MHE assets and the new HX77 Trucks.

Some of the current fleet of MHE are old and starting to show signs of wear and tear; their high usage which has been seen in the relative proportion of maintenance requests that were raised over the period of the exercise. Maintenance requests for the HX77s were raised as a result of their inaugural introduction to the field environment. Other work included ad-hoc servicing, recovery support to partnering forces and multiple FRTs to Williamson Airfield and E&IG Rockhampton.



*CPL 'Eccy' Eichholzer assisting with G-Wagon servicing in the field.*

CMP FRTs to E&IG Rockhampton absorbed a secondary role in pulling and pushing RPS and RSG respectively; sometimes in support of the surrounding maintenance elements from 7 CSSB and 1 Sig Regt. This had a flow on effect of enhancing esprit de corps, particularly when the trade of RAEME tri-colour items began taking place.



*CMP deployed on Ex Talisman Sabre 17.*

Down time was sufficiently filled with activities in RAEME specific military training and construction of corps items. A total of 20 tri-colour beanies were constructed; as these items are not considered tactical, the wearing of them was restricted to under cam net. Five tri-colour flags were also constructed, the design of which is suitable for mounting on cam net poles. A flag was made for each of the three CMP elements, a further two were constructed at the request of 7 CSSB and 2/14 LHR (QMI) respectively.

We had our four strongest men sent from Darwin to break up rations for the brigade at DSG Rockhampton. Their initial trade training prepared the tradesmen for the enduring and tiresome task of counting and distributing rations for EX Talisman Sabre, it was "the biggest ration break since East Timor". It was a hard and long three weeks, but the knowledge and trade skill provided was unparalleled and inspiring for the rest of the unit.

Recent support to the 7 Bde CATA, Ex Diamond Run 17, at Shoalwater Bay further exemplifies how a CMP FRT can further integrate within a Brigade Maintenance Area in support of enabling units. Response to the support provided has been positive to date.

### Looking to the Future

CMP prides itself on providing 6 CS, 16 Avn and 17 CSS Bde dependencies with efficient yet reactive integral and close maintenance and recovery support. As our unit entitlement for equipment and facilities become further established, the scope of our maintenance and repair activities will become broader; further enabling CMP to take on close maintenance for more dependencies.

As Plan Beersheba begins to wrap up and Plan Keogh takes fruition with the subsequent re-rolling of some first line units; the concept of CMP may become more relevant in order to reduce the future maintenance liabilities of the CSSBs and JLUs. CMP will continue to develop in order to adjust to these future challenges.



*RAEME tri-colour proudly flying at The Glen SWBTA.*

All the achievements have not been without challenges due to the dislocation of CMP elements across multiple locations and multiple MILIS districts. The glorious character building has been felt from the crafty to the top level trying to assist with the developments. No one has been spared the character building from RPS, Q, tradies, senior management and even the MILIS gods.

The RPS worked tirelessly and had many frustrating days where it felt like they were getting nowhere. But like the ANZAC's, they pushed through and succeeded, again providing the CMP with more capability. The capability has come along in leaps and bounds since the CMP inception, with even more to offer into the future.

# 16 Air Land Regiment – Technical Support Troop

CFN 'Cash Money' Conroy, CFN 'Salty Llama' Bickerdike & CFN 'El Diablo' French (definitely not VMs).

2017, what a year to be alive! Mornings below 0 degrees, afternoons above 30, you guessed right we are in good old 16 ALR Woodside, SA. This in no way, shape, or form affected the highest of standards to be produced daily from this impeccable unit #tipofthespear.

## EIR

What a busy year it has been for the EIR crew. With the fleet of Protected Mobility Air Defence Variant (PMADV) getting digitised, the giraffe's always undergoing some form of maintenance, members 'having to go' to Hawaii for a 'capability display', and the ongoing workshop Frisbee competition that takes precedence over their only actual job - restocking the social club brew fridges.

## GE

With Sustainers Crawl early on in the year it was all fitters on deck to follow the BC's order of getting hundreds of magazines Tech Inspected two days before going field (that poor OJT has carpal tunnel now). Just before step off CFN Benson 'Science' Carter had another 5 to inspect courtesy of the BC not inspecting his own....

## Rec Mech

#TalSab17 kicked off with torrential rain and the decision to move 3BDE 1km down the road just to move back to the same location through a swamp. CFN Daniel 'Boggenhagen' Bollenhagen our leading recovery mechanic got the HRV and 20T bogged and was recovered by our friendly neighbourhood air defenders.

## VM

Heroic music playing, smoke rising from the ground, the heroic VM's enter! Where do we start..? From saving Adelaide locals from a burning vehicle, to abusing dogging quals by ratchet strapping a certain BSM in his office. Even though we have had many challenges this year, one thing has been certain; we continue to provide first class capability to the Australian Defence Force.

## The Others (TST HQ/RPS)

This year saw Ma'am 'Khaleesi' Davies reign of terror begin. After taking questionable advice from the WO1 Jase 'the ACE' Jarrett, there



Boys 'working hard' whilst the 6th brigade commander comes for a visit.

were no more beers until after orders and we are now expected to take notes, maybe time to give the union a call. The ACE also running MILIS reports at random times on the weekends has us a bit worried, but maybe that's what happens when you work mine rosters ... 2 weeks on 2 weeks off. Within the RPS, they are working out ways to function without stairs due to WOCON 'How was your trip' Grant's inability to navigate up and down them. He will hopefully be able to start chewing his food again soon.



Boys 'working hard' whilst the 6th brigade commander comes for a visit.

In all seriousness we have all had a productive year – at least that's what MILIS reports, more importantly it also involved completing a 56km trail run through the Hills, restoring two old anti-aircraft guns, a successful ASM's golf day, the reinvigoration of the Woody Workers Club, and again hosting the SA RAEME birthday which included a memorable 'performance exhibition' and After Party.



TST 2017 taking over CSS Battery HQ.

# 16 ALR ECN 421 & 418 – A Unique & Challenging Role

A Boffin's work is rather elusive; they work in a place hidden away from the rest of the workshops and are often seen as people who simply tag items and send them off. At 16 ALR this isn't the case and you will often see Boffins with grease, oil and fuel stains covering their PD's or Cams. This is because a Boffin's work here varies greatly; stepping outside of what is usually expected of a Boffin.

Equipment in 16 ALR is unique to this unit, which for the uninitiated, is for the purpose of ground-based air defence and detection of aircraft, rockets, artillery and mortars. Equipment Boffins work on include: Lightweight Counter Mortar Radar (LCMR), RBS-70, Portable Search and Target Acquisition Radar – Extended Range (PSTAR-ER), Giraffe Agile Multi Beam (GAMB) and your usual run of the mill systems such as Harris radios, DAGR etc.

The crown jewel of all this equipment is the GAMB radar as it provides the greatest depth of maintenance and is a relatively new piece of equipment.

Boffins service the included 32kVa generator (power plant), hydraulic system, replace circuit cards and cables, re-image software, and conduct transmitter alignments and a lot more. The next level of repair is the OEM SAAB, this gives us the opportunity to repair as much as possible before SAAB steps in and all maintenance whether performed by us or SAAB is conducted at 16 ALR which affords us the chance to get involved in repair usually conducted off site and away from Boffins.

ECN 418 also has a part to play in maintaining the GAMB; they service the air conditioning system and assist the Boffins with fixing the generator (power plant).

Boffins remain very busy because of all this equipment to maintain. The GAMB has monthly servicing (along with other scheduled periods of maintenance), there are also pre-firing checks for RBS-70 prior to live fire exercises, breakdown maintenance as it rears its ugly head and other scheduled maintenance/inspections.

The majority of field time for Boffin's is spent in support of these specialist systems, usually a single Boffin is allocated to a GAMB and remains with it for the whole exercise along with others supporting any LCMR and RBS-70 within the proximity.

We can also be involved in some unique experiences such as a Boffin and an ECN 418 that went over to the United States in October 17 to participate in Ex Bold Quest involving a GAMB and RBS-70's.

16 ALR probably offers some of the deepest level of repair and technically challenging equipment to work on for both 421 and 418's as they work hand in hand to repair some of this unique and critical equipment.



# 113 Workshop Coy – What, not you again?

## MAJ Perry Bear

“Well, third time lucky”, I thought to myself as I once again walked back into 113 as the OC. My expectations about the standard of welcome I would receive were confirmed when I ran across one of the old lads who dated back to the time I was a new 2LT on my first posting.

“Heard you were back, reckon you’ll get it right this time?”

Yup, dear old 113, denizen of the old, cranky and thoroughly objectionable.

“##\$%&\*~” I replied

“Heh heh, good to see you, Boss”

It all started out innocently a few years back when I was present at the parade where the 113 was handed over to MAJ Shaun Fenn – who had marched in as a new 2LT the last time I was OC (or was it the time before that?).

Four ex-OCs were lined up on the right flank of the Parade as Jesse Newman handed over to Shaun and joined us to the side, in a scene reminiscent of the end of Star Wars Episode VI. At the time Shaun had the good fortune (?) of having seven ex-113 OCs serving with him in the WADF.

As a fully-fledged member of the 13 Bde RAEME mafia, Shaun now took ownership of the prayer group held every Tuesday night under the patio of the Irwin Barracks Officers Mess (often with more members than in the comfy chairs inside). All of you would recognize it instantly, a miasma of cigarette smoke, empty glasses, a strong smell of rum and discussions which ranged from the advantages of the MG42 over the M60 to “Did the Steak and Egg in the old 10 manners constitute a Biohazard?”

Anyway on one of these occasions Shaun mentioned that he was being tapped on the shoulder to act as DQ for a while and needed to find a fill in for a few weeks. Breaking the first rule of RAEME (never volunteer for anything) and more than half in jest, I of course offered to help out.

Next thing I knew I was attending CSSB OGRPS, MOUs were flying around with my current unit and I was locked in for three months. Strangely enough, I was not overly concerned about this (having a silly grin permanently plastered on my face was one observation).

Back at 113 it was like finding an old pair of footy shorts in the bottom of your drawer. They are really really comfortable but don’t quite fit like they used to. Luckily Shaun had done a top job and the team either knew me or was prepared to give me the benefit of the doubt so slotting in wasn’t too hard.

Since my last go I had been involved with a lot of the lads with the Association and, of course, on first name basis. It was with great glee therefore that they all took any and every opportunity to throw a boxer and call me sir with facial expressions of such beautiful innocence that they could have been used as models for angels in a renaissance painting. Needless to say, I rapidly regressed to grumpy old RAEME major archetype.

Initially it was all go for HAMEL to the exclusion of all else. And it wasn’t until about two months in that I got to hit the weeds with everyone for a range shoot. Ah – nothing quite like the smell of cordite in the morning. First impressions are always important, especially to the other officers in the CSSB, so the pepperoni and jarslsberg made an appearance for lunch and the battered old tea pot with DPCU cosy for brews during the day.



*Fitters at work.*

There was a BBQ dinner that night for the full CSSB, so to keep in the with the RAEME image I brought along the hottest chilli sauce commercially available in Perth (approx. 750,000 schovilles) and passed it around as “Workshop Strength”. The lads cottoned on very quickly and took pains to truthfully warn the tyre biters and scab lifters that “the boss doesn’t exaggerate – this stuff will blow your head off” and then taking great delight in seeing them ignore the advice and suffering the consequences.

The RSM, WORM by trade, even took a good dollop and pronounced it “impressive”. While his iron control prevented any other reaction, we did note one eyebrow sweating.

We then had a win with a direction to run our own sub unit training weekend (evil chuckle). Finally, a chance to swing spanners rather than wait for grunts to break something. I got the head shed together and asked them to come up with something – with proviso that it wasn’t to be Bindoon, Lancelin or Muchea. The CSM found some really obscure places on TASMIS and we eventually picked an abandoned veterans hospital in Dalkeith (for those not from WA, the equivalent of Vaucluse or Toorak)

Absolute gold – prime riverfront land, secure access and fully fenced off from the public. The place had been mothballed since the last patient moved out in the 1980s and we managed to get an old standalone ward with abandoned offices and lots of hard standing – perfect and IAW practice to occupy existing infrastructure rather than



*VMs doing what they do.*

set up in the bush. OK so it was haunted, but as it was originally a Vets hospital, all we needed to do was reactive the inhabitants.

“CFN Spook, I don’t care if you are dead, this is a defined place of parade and if you wish to moan and rattle chains, the recce mechs need their chains done as part of their CES checks and you will fit right in, so go and make yourself useful”

We did however put paranormal activity in the RAS+ which confused the Padre somewhat.

“Now let me get this straight, you want me on call and to be prepared to Exercise?”

“No Padre, we want you on call and to be prepared to Exorcise”

The activity itself went like a dream. We hit the front gate only 40 sec later than planned (and that was due to me stuffing up my position in the convoy) and taking a full workshop deployment down one of Perth’s most exclusive cappuccino strips was a real hoot – the kids excitedly pointing at the “army trucks” to the latte sipping parents really brought smiles to our faces.

I deliberately kept any orders to a minimum to just see how much we had lost our FRG deployment skills. I need not have worried, we had track plans, power, comms, lighting, CP, brew point, bedding BBQ etc. set up and running in only a shade below doctrinal timing and settled in for the night. Also enough jack rats to put the cafes we passed on the way in to shame. Gees I didn’t realise how much I’d bloody missed this.

After a delightful cooked breakfast we cranked everything up and FRTs were being dispatched hither and thither. The CO rolled up and even he seemed impressed over just how slick the operation looked with full task boards, current maps with the correct mil symbols and decent coffee. The RSM being a WORM knew better but we got the nod!

That night the “workshop strength” sauce came out again which now appears to have become a rite of passage. In honour of our newest member CFN Smith (ex WO2 Smith REME) who proved a very dab hand on the BBQ, we showed the REME “Craftsman” movie and the obligatory “Odd Angry Shot” in an impromptu cinema. Surprisingly enough a lot of the current lads had never seen it. The Padre’s present scene never gets old.



*Movie night.*

One of the first issues I discovered when I lobbed back to 113 was the lack of junior officers. By the time honoured method of tapping the old mate net I temporarily borrowed a couple of more mature LTs from pay corps. As they had been diggers in previous lives, they jumped at the chance and took to the PLCOMD roles with a vengeance, freeing up their SNCOs to concentrate on production. We must have been doing something right because after the shoot and a weekend of old fashioned RAEME in-the-field they both want Corps transfers.

All this good RAEME stuff was rounded off a few weeks later when we celebrated 113’s 69th birthday since it was re-formed in 1948 at Karrakatta as 2 Medium Workshop and its 99th since the AIF’s 2nd Mobile Workshop (Medium) was formed in France in 1918 from Australian personnel in the British 17th Mobile Workshop (Light).



*113 69th Birthday Celebration.*

This also provided an ideal opportunity to present former OC MAJ Steve Sinclair a Corps Certificate of service for more than 46 years of undetected crime. Steve started off as a boffin at XLH in 1970 (when it was still a full regiment) and cross trained as a toerag on a Diamond T. From there he went on to serve in most of the units of the WADF ending his days as an honest man as ASM of Perth Water Transport. It was during this stint that he went over to the dark side to command 113 (twice) 109.

Sig Sqn, 13 Brigade Recruiting Company, the Officer Training Company at WAUR and even did a stint as 2IC of 13 CSSB. With his father Jim who was one of the original 1948 members, the Sinclairs served RAEME in WA continuously for almost 70 years.



*MAJ Steve Sinclair presented Corps Recognition of Service Certificate after 46 years service.*

My stint keeps getting extended further and further into the future, so I will end it there for now but in closing I’ll recount a conversation I had in the boozier after my first weekend back

“So are you officially our boss yet”

“Yes, once again I am the Officer Commanding 113 Field Workshop. We’re just back from weekend in the weeds; I am sitting in our boozier and have a Bundy and Coke in my hand. It doesn’t get much better than this”

And you know what – it doesn’t.

# Army School of Transport

It has been a demanding 2017 for the RAEME members at the Army School of Transport (AST). Tradespeople are located in Townsville, Amberley, Bandiana, and Melbourne have been busy developing and delivering specialist maintenance training, as well as supporting the maintenance of unit equipment to support training within AST.

As with all training establishments, there is a requirement to meet Directed Training Requirement (DTR). Without the support from integral maintenance elements and contracted maintenance staff within the Wings (Land 121 Amberley, Maritime Wing and Road Transport Wing), these activities could not be achieved; this includes support provided by the Joint Logistic Command Business Units.

If you are not aware, there are RAEME instructor positions within AST (not just in ASEME) which are both personally and professionally rewarding. If you are interested in these specialist training areas, keep AST in mind when filling out your EPAR and when talking with your career manager.

With the delivery of the new light, medium, heavy and protected Land 121 vehicle fleets tradesman have never been under more pressure to ensure this capability is correctly maintained and available for tasking; this includes Army watercraft and marine equipment (LCM8, LARC V replacement Projects).

The Chain of Command / Supervisors need to ensure unit tradespeople are suitably qualified by releasing personnel to attend specialist maintenance courses to maintain these complex equipments. In order to inform their Chain of Command appropriately, it behoves RAEME tradespeople have a good understanding of the Manual of Army Employment (MAE) requirements for their trade so that you can self-identify professional career development opportunities.

This is an interesting time for RAEME with new and complex equipment being introduced into service. The future is bright for the RAEME Craftsman.

## LAND 121 PH3B MHC – Introduction Into Service Maintenance Training

As the Medium heavy Capability (MHC) is rolled out to units, the LAND 121 Training Wing is delivering Introduction Into Service (IIS) Training for Army, Air Force, JLUs and Civilian Contractors. The LAND 121 Training Wing is divided into three teams. The Driver Training Team (DTT) is located at RAAF Base Amberley, the Recovery and Maintenance Team (RMT) is located at North Bandiana, and the Training Development Cell located in Melbourne.

LAND 121 DTT is responsible for the delivery of the MHC Operator Conversion Course, which delivers training for operators that already hold a Military B Vehicle Licence of MR2/HR2 or above. The Operator Conversion Courses are panelled with priority to Units that will be issued MHC FOV in the immediate future.

LAND 121 RMT is co-located at Gaza Ridge Barracks in the

Albury-Wodonga Military Area and is responsible for the MHC IIS maintenance training, as well as operator training on the new 45M Heavy Recovery Vehicle. The MHC Vehicle Mechanic Maintenance Course and MHC Technician Electrical Maintenance Course are currently being delivered. In 2018 RMT will be delivering maintenance training on the HX81 and Hawkei.



*PMV-L (Hawkie) on display in Canberra.*

The MHC Vehicle Mechanic Maintenance Course (215358) is for Army ECN 229 Vehicle Mechanic, Ground Support Equipment Fitter/Tech (RAAF) and Defence civilian contractors. The aim of the course is to deliver maintenance training for qualified Vehicle Mechanics to cover the technology gap between the current in-service B Vehicles and the MHC FOV. As at the end of 2017 the RMT had trained approximately 294 VM's.

The MHC Technician Electrical Maintenance Course (215357) is for ECN 418 Technician Electrical and Defence civilian contractors. The aim of the course is to deliver maintenance training for qualified Technician Electrical to cover the technology gap between the current in-service B Vehicles and the MHC FOV. The course is currently delivered over five days at Gaza Ridge Barracks North Bandiana. As at the end of 2017 the RMT had trained approximately 107 Tech Elec's.

In April 2017, RMT staff members also conducted two weeks of Gap Training in SE Qld, for those tradies who attended the MHC Maintenance Pilot courses delivered in the last quarter 2016. This ensured those trades received all the training IAW the final approved LMP.

There are several specialist tools and equipment being utilised for the delivery of training at Bandiana. These include:

- MAN-cats diagnostic tools, introduced for fault diagnosis of the MAN FOV
- MAN Breakout boxes for fault diagnosis by familiarising students with engine sensor testing



*Comparing legacy fleet with the L121 replacements.*

- Fluke 125B Oscilloscope, being introduced for fault diagnosis and CANBUS and sensor testing
- BOSCH DCU 100 diagnostic tool, introduced for fault diagnosis on the vehicles and trailers
- JOSAM Wheel Alignment Kit, students are shown how to set up for twin steer alignment
- WABCO Diagnostic interface for trailer fault diagnosis
- Trailer pneumatic and TEBS power supply, used to simulate a tow vehicle and facilitate trailer testing without a tow vehicle

The LAND 121 Recovery and Maintenance Team in 2018 will be made up of the following pers:

- ASM – WO2 Jeff Bruhn (Veh Mech)
- CM – SGT Beau Di Maio (Tech Elec)
- CM – SGT Paul Shaw (Recce Mech)
- CM – SGT Alison Cooper (RAAF GSETECH)
- CM – SGT Paul Fleming (RAAF GSETECH)
- Storeman – Mr Mick Spencer (Broadspectrum)
- RDA ILS Trg Coord – Mr Nigel Harris
- SMA Inst – Mr Ian Moncrieff
- SMA Inst – Mr Andrew Pawsey
- SMA Inst – Mr Mich Pyle
- SMA Inst – Mr Leigh Tornquist
- SMA Inst – Mr Bob Brodie
- SMA Inst – Mr Clive Norie
- SMA Inst – Mr Ian McDonald
- SMA Inst – Mr Tim Knowles
- SMA Inst – Mr Paul Channon

Farewell to CAPT Sheldon Toto and SGT Glen Tully (GSETECH), who have provided two and three years of dedicated service to L121 and AST.

Please see refer to the LAND 121 Training Wing SharePoint site below for further information: <http://drnet.defence.gov.au/Army/L121/Pages/Home.aspx>

### Maritime Wing

Army School of Transport - Maritime Wing (AST-MW) is located at Ross Island, Townsville. It is responsible for the delivery of the training continuum from IET through to Subj4 SGT courses for the Cargo and Marine Specialist trades, as well as the full suite of Marine Engineer courses, in addition to the Postal Clerk and Operator courses. The unit conducts an average of 40 courses a year with the focus on conducting and developing allocated courses to meet ADF Maritime capability.

In 2018, Maritime Wing will be celebrating 20 years of training on Ross Island Barracks since leaving Chowder Bay, Sydney. It should also be noted the LARC V and LCM8 have or having milestone birthdays, with the LCM8 entering into service 1967 and the LARC V in 1969.

### Marine Engineering Training Section

It has been another busy year for the Marine Engineering Training Section (METS) staff. Challenges such as the introduction of new staff, conducting overlapping short courses, and providing instructional support to other sections within AST-MW, have ensured that all staff have remained very focused and productive. The excellent effort, dedication, and persistence of all the METS staff have ensured a substantial amount of work has been achieved this year. Promotion courses, illness, representation in Defence and non-Defence sporting activities, as well as instructor and course development has been achieved without impacting METS instructional duties.

Comprising of one WO2, three SGTs (Fitter Armament), three CPLs (Fitter Armament and one Technician Electrical), METS has been able to delivery training on the following courses for 2017:

- one x Air Breathing Apparatus Maintainer Course – five students,

- one x LARC V Maintenance course – seven students,
- two x Marine Equipment Maintainer course – 20 students,
- two x Outboard Motor Maintenance course – 20 students,
- three x Watercraft Maintainer course - 25 students and
- one x Watercraft Specialist course – eight students.

These courses enable students to further develop their technical trade skills, as well as being able to provide Army with very capable marine equipment maintainers.

There are two new courses going into trial in 2018 to improve unit capability, being the Marine Safety Equipment Maintenance course and Small Watercraft Maintenance course. Further information on the course can be found on the Marine Wing SharePoint page. These will replace the Outboard Motor Maintenance and Marine Equipment Maintainer courses.

The SMA Marine Engineering, WO1 Ian Moorhouse, is not technically a METS staff member; however, he has provided a large amount of technical trade advice in regard to training requirements especially guidance on all aspects of Technical Regulatory Framework. Farewell to WO1 Moorhouse and SGT Robinson who have both provided three years of dedicated service to METS and AST-MW.

Congratulations goes to SGT Nicholas who was acknowledged for his tireless efforts in course development, technical trade skills and his instructional ability by being awarded the AST-MW and the AST Instructor of the year. Consequently, he will be competing for the ALTC instructor of the year. Well done SGT Nicholas!

The Marine Engineering Team in 2018 will be made up of the following personnel:

- METS Section Head – WO2 Craig Kibble
- SGT Instructor – SGT Sean Beven
- SGT Instructor – SGT Jake Nicholas
- SGT Instructor – SGT Michael Fenton
- SGT Instructor – CPL Nathan Hoddy
- CPL Instructor – Brian Duynhoven
- CPL Instructor – Russell Juillerat
- CPL Elec Instructor – Clinton Luxford
- WO1 Dean Ellis (Reservist)
- WO1 Ken Arnold (Reservist)

### Watercraft Support Section

Watercraft Support Section (WSS) marine engineers have again had a busy year engineering LCM8 in support of Maritime Wing courses and Seaworthiness activities. The support provided includes the provision of vessels and crews to support course programs, supervise tasks on unit watercraft, assist unit instructors with training on weapons and small craft, craft maintenance IAW current directives, as well as the provision of vessels and crews to external requests and Seaworthiness requirements.

At the beginning of 2017 a Seaworthiness Board compliance activity was conducted to ensure safety requirements were met under directed governance policy in the Maritime space. Seaworthiness Boards certify that Vessel Masters, marine engineers, and crews operate vessels safely and adhere to SOPs within AST-MW. Seaworthiness covers craft handling and emergency drill such as “Man Over Board” scenarios as well as basic fire drills that crew may be exposed to whilst operating Army watercraft. This ensures all vessel’s crew and equipment are competent, legally compliant, and suitable for the conduct of training.

The WSS engineering team in 2018 will be made up of the following pers:

- LCM8 Marine Engineer – CPL Brendon Bosworth
- LCM8 Marine Engineer – CFN Cameron Naylor
- Small Craft Maintainer – CFN Shane Court

# 106 Fd Wksp Coy

## MAJ Julian Fleming

2017 commenced with the introduction of a new workshop structure and new maintenance philosophy designed to best respond to changes to the Brigade maintenance concept implemented under CSS CONOPS. Concurrently, 106 Fd Wksp Coy prepared for the acceptance of the new MAN 40M and HX77 vehicles into the 7th Combat Brigade. This required a very deliberate effort to qualify maintainers and operators on mass to ensure that 7 CSSB was best positioned to support this exciting new fleet of heavy and medium vehicles. While it is difficult to imagine when a better time would have been, pursuing these priorities was made all the more challenging with the demolition of much of the workshop infrastructure to make way for the new facility that is currently being built.

Quite auspiciously, WO1 Dave Poulsen commenced his tenure as ASM 106 Fd Wksp Coy this year. His blend of varied experience and his innovative approach has been a welcome addition to the team and made a significant impact to date. There was little time to ease into the year though, as it was only a short time until the Battalion embarked on the first field exercise of the year, Ex ECHIDNA CRAWL. While ECHIDNA CRAWL was structured around foundation warfighting, of note it was the first time that the new 40M and HX77 vehicles would be rolled out as the primary vehicle type.

Mother Nature was to ensure that lessons would be learnt the hard way, with the prelude weather system of Tropical Cyclone Debbie saturating the Wide Bay Training Area on arrival. The conditions ensured that the 106 Fd Wksp Coy Recovery Mechanics were working around the clock, but most importantly the true capability of the vehicles was put to the test, with impressive results to say the least. Both the 40M and HX77 proved to be highly capable on and off road, though the radically increased weight of each type will continue to influence how the fleet is employed in the field and in determining what the future field workshop will look like in a tactical setting.



Following Ex ECHIDNA CRAWL, the 106 Fd Wksp Coy focus reverted to ensuring that the remainder of the RESET period was invested in maximising individual trade training opportunities in preparation for the myriad of new equipment being introduced across the Brigade, including M113 AS4 and the M1A1 Abrams tank. This period also afforded the opportunity to collaborate with the PLAN CENTAUR team through a series of Lean Maintenance initiatives and reviews. From a command perspective, it was imperative that the end-to-end maintenance system was efficient and effective if the Brigade units were to be supported to best affect during this vulnerable period while the physical capacity of the workshop remained significantly reduced and while we navigated through the cultural challenges that

presented under CSS CONOPS. Owing full credit to all involved, 106 Fd Wksp Coy exceeded expectations with maintenance output and equipment availability rates remained consistently high across the Brigade.

TALISMAN SABRE '17 was soon to arrive, and while the 7th Combat Brigade was committed largely in an exercise support role, 106 Fd Wksp Coy deployed a highly capable Forward Repair Group to support a diverse dependency of both 'white' and 'red' forces. LT Ben Kluckhohn and WO2 Terry Lemmon led the push to Shoal Water Bay and the contingent proved on every occasion that there was rarely a technical issue that could not be resolved or a task that could not be complete regardless of the complexity, the time of day or otherwise. At every juncture, the ingenuity and the resilience of the RAEME soldier was on display, motivated only by the innate desire to keep the Brigade fighting and in the knowledge that a tri-colour flag would be proudly flying somewhere across every echelon.

The conclusion of TALISMAN SABRE marked the transition from RESET to READY for the 7th Combat Brigade, prompting 106 Fd Wksp Coy to re-posture to generate two deployable Forward Repair Groups in support of the Ready Battle Group and the remainder of the deployed Brigade. These organisations were to be tested throughout October in what was the Brigade's major training activity of the year, Ex DIAMOND RUN. Ex DIAMOND RUN, while challenged again by extremes in weather, was an excellent hit-out and provided a valuable opportunity for the online FRG to integrate with the 8/9 RAR Ready Battle Group.



With the major Brigade exercises behind us for 2017, focus was quick to switch to organising the South East Queensland RAEME Birthday celebration. Being the 75th, we were highly motivated to make this RAEME birthday activity a memorable one. Thanks to the outstanding commitment and effort from CPL Steven Gill in leading the planning and coordination of the day, this activity surpassed all expectation and all in attendance will attest to the fact that it was one of the best celebrations of the Corps that they had attended. Although the billy cart race will go down in the annals of history as being one of the most fiercely contested races of its kind, other highlights included a plethora of military and trade displays from across the maintenance community; a bevy of food trucks and mobile bars; and, a carnival-like atmosphere that bled pride and esprit de corps. The day also served as an excellent opportunity to recognise some outstanding personal achievements, most notably SGT Chris Brown who was awarded the Corps Regimental Award and also promoted to his current rank.



In signing off from my appointment as OC 106 Fd Wksp Coy, I will say that it has been an absolute privilege and pleasure. While it almost sounds cliché, it has been the people within the organisation that has made the journey as enjoyable as it has been.

I cannot speak highly enough of the soldiers and officers of 106 Fd Wksp Coy and I will cherish the memories for many years to come. I will also offer the most sincere of farewells to the outgoing CSM,

WO2 Kevin 'Buck' Rogers. As Buck will commence his transition next year, I would like to acknowledge his near 35 years of service to the Corps and wish him all the best for the future.

PS.: ASM 106 Field Workshop provided the following photos. 106 Field Workshop of the 1st Unit to do a PMV pack change using the crane on the new MAN 40M. Whilst the PMV was in the Workshop it got a name change as well! Good work boys!



# Rebuild of 105mm M2AW Howitzers by 106 FD WKSP RAEME in South Vietnam 1971

LTCOL David Miller RAEME (Retd)

## Preamble

106 Fd Wksp RAEME was raised at Nui Dat in South Vietnam (SVN) in November 1968.

The workshop remained deployed at Nui Dat until it was withdrawn to Australia in late 1971. Its role in SVN was to provide repair and recovery support for equipment in use by the units of the 1st Australian Task Force (1ATF).

What may not be well known is that during its tenure in SVN 106 successfully completed several complex tasks for which it was not properly established but which were completed expeditiously and successfully.

One of these being; the successful rebuild of the guns supporting 1ATF operations (howitzers of 12 Fd Regt RAA and the Force reserve guns, 22 guns in total) - by a small and dedicated team of regular and national service soldier/tradesmen. The necessity to fix the guns arose because of the need to maintain ongoing fire support accuracy and safety for troops on field operations.

Taking on the gun rebuild was a risky endeavour from both an operational and a technical perspective as 1ATF was concurrently completing preparations to return to Australia but still needed to have a high level of accurate fire support available at call; the successful rebuild results were well beyond the expectations of the technical gurus in Australia at that time and more than met the Commander (COMD) 1ATF's requirements.

The following article by David Miller, the officer who led the rebuild team, tells the story of how it was done, subsequently enhancing 106's performance reputation in the SVN theatre.

*LTCOL John Strachan RAAOC (Retd) President 106 Fd Wksp RAEME*

## The Problem with the Guns

In March 1971 the Officer Commanding (OC) of 106 Fd Wksp (the late then MAJ John Sinclair) returned from a 1 ATF Commander's Conference with urgent orders - apparently the Commanding Officer (CO) 12 Fd Regt RAA (the late then LTCOL Bruce Topfer) had advised the COMD 1 ATF that his regiment could no longer fire "Danger Close" missions safely (first round no closer than 1,000m to leading elements of ground troops) because of the poor state of his guns. The OC of 106 told me that the COMD 1 ATF had directed that the workshop was to attend to the guns as a top priority and I was to undertake a quick inspection to scope the problem.

I, with SGT John Loch (Artificer Gun) in tow, proceeded to the 12 Fd Regt gun positions and quickly looked over the troop of guns that was available. There was no need to strip anything to determine serviceability - when you could lift the gun muzzle 60 mm and rock it left and right 75 mm it was obvious that the wear was in excess of



*105 mm M2A2 Howitzer rebuilt by 106 Fd Wksp RAEME Nui Dat South Vietnam 1971. "A Veh" hangar in background. Photo by CAPT David Miller.*

the EMEI limits and firing inaccuracy would result. With the gunners' approval we took one gun back to the workshop for more detailed inspection. We showed the OC the obvious wear.

More detailed inspection of the gun showed that the wear was through all systems of the gun with :

- solidified grease and water in the wheel bearings,
- axle shafts hammered oval
- grit and water in gear boxes, and
- grit and dust within the recoil slides etc.

Later discussion with the Fd Regt Light Aid Detachment (LAD) brought the comment that regimental officers complained if grease was oozing out of slides etc "as it collected dust". They obviously didn't understand that regular greasing forced the dust and water out.

This all indicated a lack of operator maintenance, but just as worrying, a failure by the EME system to provide the necessary technical inspection and advice to the users. John Sinclair later advised me that the proposed in-country Equipment Inspection Service (EIS) manpower had been used for the establishment of 106 Fd Wksp and consequently the function was never implemented.

Just prior to my posting to SVN, I undertook an "Officers' Small Arms Repair Course" at the RAEME Training Centre (RTC). It was quickly arranged because of continuing serviceability problems with small arms in SVN; the condition of the guns indicated that these problems obviously extended to more than just small arms.

There was a lot more equipment that should have been scrapped instead of preserved and shipped home. e.g. on return to Australia at 3Base Wksp I was faced with over 20 seized VW powered generators (obviously ran out of oil!) that had been preserved and shipped home to be condemned BER and sent to auction.

I found the Vietnamese tradesmen at 102 Fd Wksp stripping paint and rust from hand tools and wooden benches so they could be painted and returned to Australia was too much. A telephone call to MAJ Pat Ferguson at HQ AFV soon got us some technical direction on what equipment/stores should be preserved and returned to Australia.

## Determining the Extent of the Problem and the Capacity of 106 to Rebuild

In early April we continued on with the inspection of the guns and found that they were all nearly in the same condition. The two reserve guns from the 2nd Advanced Ordnance Depot (2AOD) located in Vung Tau were in similar, if not worse, condition and were unfit for issue. Why these guns had never been returned to Australia earlier for overhaul I never found out. We were informed by John Sinclair that replacement guns were not available from Australia as there were severe serviceability problems with guns in Australian because of a lack of key parts. The US Army had apparently also advised Headquarters Australian Force Vietnam (HQ AFV) that they had no guns available but, as US M2A2s had been declared obsolete, Australia could source whatever spares they had.

(Only later were we to discover that a quantity of obsolete self-propelled (tracked) M2A2s were held in the US Long Binh Stores Depot; the US computer system didn't report this because of their obsolete status).

The pressure was then on RAEME and RAAOC to find a solution quickly. After quick detailed inspection of one gun and confirmatory inspection of several others I reported to John Sinclair that we could overhaul the guns provided parts were available and that the problem of machining the long recoil slides could be solved (brass strips riveted onto the cradle and then machined to suit the barrel/recoil sleigh). One item that was critical was the axle assemblies; the stub axles (maintainable item) were shrunk and welded into the axle trees and we had no means of replacing the stub axle or repairing the ovality. As it turned out, the US system had stocks of axle assemblies allowing the worn items to be returned to Australia as Repairable.

102 Fd Wksp at Vung Tau was contacted and asked to investigate machining options as we believed that the helicopter repair ship USS Corpus Christi had a heavy machining capability. This turned out not to be an option; however 102 Fd Wksp found that the US Air Base in Vung Tau had a large milling machine and the workshop could access it "after-hours". The US machine didn't have the required bed length so the workshop developed a "work-around" by machining the lengths in two serial operations and then hand finishing the strips with body files to suit the particular cradle.

I was asked to develop a rebuild project, including an estimate of the duration and manpower required. This I did. John Sinclair took up the options with HQ 1ATF, HQ AFV, MGO Branch and DEME (technical elements in Melbourne). From what I understood at the time, the concerns that Australian based experts had regarding 106's ability to carry out the project didn't seem to worry the COMD 1 ATF as Australia couldn't do anything about replacing/repairing his guns and there was an urgent need to regain accurate gunfire support. The COMD 1ATF's confidence in his workshop was edifying to us but also very worrying because of the technical concerns we had.



*Gauge Minimum Cradle Width.*



*Gauge Sleigh Width.*

John Sinclair questioned me very thoroughly on how we would carry out the project. I identified the risk areas and explained how we intended to overcome them and what support we would need from stores supply and 102 Fd Wksp even though they initially seemed reluctant to take on the machining task.

I was very aware then from conversations with John Sinclair that MGO Branch and DEME were very concerned that 106 Fd Wksp were not capable of undertaking a base repair level type project but the ADEME and ADOS from HQ AFV had visited us and offered all the support possible. John Sinclair then advised the COMD 1 ATF 106 could do the project. In later years I was to find out that John's decision clearly put his career on the line as he received a "please explain" from MGO Branch where apparently it was not believed that a Fd Wksp could succeed where our Base workshops had failed.

*In coming to my advice that we could undertake the project, not only was I supported by some good artificers and tradesmen, the in-country RAAOC stores officers (the OC of the Wksp Stores Section LT Tony Stafford was a 17th intake Army Apprentice) and NCO's that chased up parts listed and not-listed in the US*

**Continued next page ...**

My career has taught me that the old EME saying of "you f...! it and we fix it" can have bad results for RAEME if our members (all ranks too!) forget that a most important EME function is Technical Advice. If a user wishes to degrade equipment by overloading etc it then it is his responsibility but!! he must be made aware of the implications of his decision and we have that responsibility. Once having to sign off on the conversion of a million dollar plus lightweight aluminium bridge from an operational asset to a training aid (because of poor user maintenance) brought that home to me (and particularly to the owner CO!).

Obtaining volunteers for a bartering trip to the US Long Binh Depot (28 km perimeter) was not a problem as personal trading could also be conducted. We set off after being amply supplied by the QM with GP Boots; Socks; Slouch Hats; Camouflage Raincoats and slabs of Aussie Beer paid for by ourselves. Being an honest officer and not wishing to get too involved in my soldiers sometimes dubious activities; I stayed with our hosts, the US Maintenance Coy in case higher rank help was needed to get one of our guys out of trouble. We left for the trip home with lots of gun parts; tyres for our M543 Wreckers (supposedly none in depot) etc and stopped outside the depot after the US MP's checked us through. SGT Tony Tratt RAAOC (Driving) stopped the stores truck complaining of a lack of power and found that he had a "borrowed" 1 Ton US trailer on tow because the diggers couldn't fit any more stores on the truck. We also had the offer of an M2A2 SP Gun for our perimeter defence but John Sinclair didn't think our neighbours or HQ 1ATF would approve.

**Continued from previous page ...**

stores system but also by the excellent and broad based training that I received on the Junior Officers' Course at the RAEME Training Centre - We spent twelve months there after leaving OCS Portsea spending time in each training Wing under the tutelage of experienced WO and SGT instructors who saw it as their privileged duty to guide us 2LT 'upstarts' in the ways of the technical world. It was there that we partially stripped guns such as the M2A2 and learnt about their characteristics and problems. Such knowledge and experience allowed us in later years to converse with and gain the confidence of our Artificers. I pity the young officers of the modern era who don't get such a valuable introduction to the technical world of RAEME.

**Proceeding with the Rebuild**

The COMD 1 ATF, with agreement from HQ AFV, ordered the workshop to overhaul 12 Fd Regt's guns and gave us fifty days to do it. With the withdrawal of the New Zealand 161 Fd Battery we had a pool of guns to draw on in mid-April which allowed 12 Fd Regt to continue providing fire support to the Task Force. At about this time gun tools and the majority of the initial order of repair parts had arrived.

The two guns from 2AOD Vung Tau were delivered to the workshop to start the project and stripping began. We were offered additional manpower if we needed it but I rejected this based on initial planning; except for WO2 John "Tex" Ritters (Armourer HQ 1ATF, ex 4 Fd Regt RAA) as a valued adviser on technical aspects.

He was very helpful in the design of gauges for the fitting of the brass recoil slides.



*Gauge Maximum Sleigh Rail Depth.*



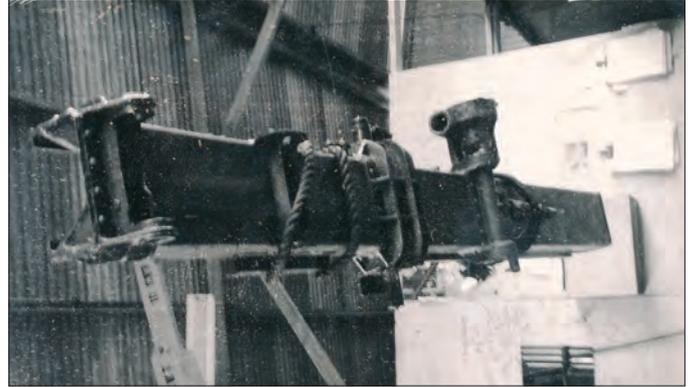
*Cradle Brg Strip Gauge.*

As we progressed with the project and stripped more guns we identified more work to be done. We discovered more parts needed to be replaced and therefore started to run the supply system out of parts. This meant more bushes etc needed to be manufactured and therefore acquiring phosphor-bronze stock became a priority. This became a problem in our remote location and so, after some

textbook research, several bushes were manufactured in brass and the Gun History Books annotated for these guns to have regular inspections and the bushes replaced with the correct specification items when they became available.

Not only was the gun rebuild team working long hours - six and a half days per week - but the 106 unit lathe was working each night until the RAE power generator shut down at 2200 hrs.

The cradle bearing strips machining method and the hand finishing gave rise to some very tight cradle/sleigh fits as stresses were released during transport of matched cradles and sleighs by truck from Vung Tau to Nui Dat.



*M2A2 Cradle for Transporting to 102 Fd Wksp Vung Tau.*

I was faced with a decision on one very tight fit on a gun urgently needed. One round fired on Charge One found the recoil OK but the gun wouldn't fully run back into "battery". Two more rounds on successively higher charges, with greasing in between, solved the problem and the gun was released for use.



*M2A2 Ready for delivery.*



*Minister for Army Andrew Peacock speaking to CPL Bob Bradford.*

**Gun Performance**

We delivered the first battery's worth of guns and then a gunner's problem arose; they were trying to "calibrate" the guns using the "fall-of-shot" method but were having no success.

An offer of RAEME assistance was rejected and the loan of a velocity measuring Doppler radar and operator from the US Army was arranged by the gunners. This equipment failed when deployed and we suspected internal connection problems but the US wouldn't allow our electronics' tradesmen to touch the system so it was returned.

An urgent request went to Australia for the very new EVA (Electronic Velocity Analyser) equipment. It arrived with an EVA team of 2LT Tony Ayerbe, SGT Keith Ayliffe and BDR Mick Kinang. The electronic measurements appeared to go OK, including some measurements taken on guns at a Fire Support Base (FSB), but the conversion of these velocity measurements to gun correction factors posed some problems that had to be solved by the EVA team.

I was present when the resident Nui Dat gun battery fired its first battery salvo to check the correlation of the individual guns' impact points. The target was 8,000 m out with a Forward Observer (FO) in a 161 Recce Flt helicopter undertaking visual fall of shot performance. When the FO returned I questioned him as to the results and he told me that there was a problem; the entire battery's rounds had impacted in a 25 metre circle which he said was too tight! I informed him that this was now an Artillery problem not a RAEME problem.

It is interesting now at this late date to read the history of the "104th Fd Bty RAA VIETNAM 1968 – 1969 and 1971" to read:

*"During this tour (1971) the infantrymen of 4RAR/NZ came to have such confidence in the 104th Field Battery that the Task Force Standing Order, stating that the 1st round of a Fire Mission had to be directed 1,000m in front of the leading elements, was waived for the first time. And, as a mark of affection, the infantrymen of 4RAR/NZ began to refer to the battery as '104 Company'."*

We knew that the guns were performing well but I do not recall us ever getting such superlative feedback whilst in SVN. Certainly the COMD 1ATF was pleased and so was the CO 12 Fd Regt LTCOL Topfer.

We did get some feedback from the 12 Fd Regt LAD; after the rebuild, LTCOL Topfer had assembled his Gun Sergeants and gave them a lecture on the maintenance of 'his' guns with words to the effect that he would have new Gun Sergeants if they failed to heed the advice of their Gun Fitters. Much appreciated by the LAD and 106 Fd Wksp!

### Wrapping Up

The project concluded later than the fifty days allocated by the COMD 1ATF but

106 Fd Wksp delivered sixteen guns (sufficient for the Regiment) by the end of June 1971 and the remaining six guns on 17 July. There was a break in production in late June/early July caused by lack of parts. The two key elements in the rate of output of the guns were the availability of cradles from 102 Fd Wksp (with new brass sliding strips fitted) and the supply of repair parts.

The rebuilt guns were delivered with worn barrels, but all were within specified tolerances. Nearly every other sub-system was rebuilt to original specifications. The guns were repainted and, as per EMEIs, a brass plate was affixed to each gun detailing the rebuild by 106 Fd Wksp.

In about mid 2008 I received a phone call regarding research into the guns defending FSB Coral where one gun was overrun by the enemy and one had been hit by enemy fire and the recoil system damaged. The research had revealed the 106 brass plates on the guns suspected of being at FSB Coral. It was therefore thought that



*Last rebuilt M2A2 being prepared for delivery.*

the rebuild was associated directly with the FSB Coral action. I was able to tell the researcher that, although the rapid firing at FSB Coral (and later the Long Tan battle) would have contributed to the need for the rebuild, the rebuild occurred in 1971, much later than the battle events in 1968. One of these FSB Coral guns now stands at the School of Artillery Bridges Barracks Puckapunyal and another at the Australian War Memorial in Canberra.

### Members involved

106 Fd Wksp RAEME

- MAJ John Sinclair OC 106 Fd Wksp (RMC 1956)
- CAPT David Miller OC GE PI (11th Intake Electrical Mechanic/Fitter, Appschool)
- LT Tony Stafford OC Stores Section RAAOC (17th Intake Fitter & Turner, Appschool)
- WO2 Matt Tynan, Art Armt (1st Intake Fitter & Turner Appschool)
- SGT John Loch, Art Armt (20th Intake Fitter & Turner Appschool)
- CPL Patrick Harris, Armourer (20th Intake Fitter & Turner Appschool)
- CPL Noel Newton, Armourer (20th Intake Fitter & Turner Appschool)
- CPL Robert Bradford, Armourer (Adult Trades, RTC 1966/67)
- CFN Richard (Sledge) Ammer, Armt Fitter (National Serviceman)
- CFN Brian Carter, Armt Fitter (National Serviceman)
- CFN Kevin Cuneo, Armt Fitter (National Serviceman)
- CFN John Kimberley, Armt Fitter (National Serviceman)
- CFN Jeff (Rembrandt) Costello, Painter (National Serviceman)

HQ 1 ATF

- WO2 John (Tex) Ritters, Art Armt, (Civilian Apprenticeship)



*The last of 16 105 mm M2A2 Howitzers ready for delivery to 12 Fd Regt RAA pictured with the rebuild team June 1971. Soldiers L to R: CFN Brian Carter, CFN Richard (Sledge) Ammer, WO2 Matt Tynan, CPL Pat Harris; CAPT David Miller, CPL Bob Bradford. Squatting, CFN John Kimberley. Missing: SGT John Loch, CPL Noel Newton, and CFN Kevin Cuneo. Photo by CAPT David Miller.*

For a given charge and shell, each individual gun will have a different muzzle velocity due to machining tolerances and wear. If the individual muzzle velocities are known then corrections can be calculated for each gun. [http://12fieldregiment.com/history\\_104fdbty.htm](http://12fieldregiment.com/history_104fdbty.htm)

# 106 Fd Wksp RAEME

106 Fd Wksp RAEME was established on the 1st November 1968 as a response to improve the battle worthiness and damage recovery of the fighting equipment of the 1st Australian Task Force operating from their forward operational base at Nui Dat in Phuoc Tuy Province of South Vietnam (SVN).

The workshop earned a high reputation in the SVN operational theatre between 1968 and 1971. This reputation was founded in the strength, conviction, sacrifice and successful performance of the regular soldiers and national servicemen who manned the unit during those years.

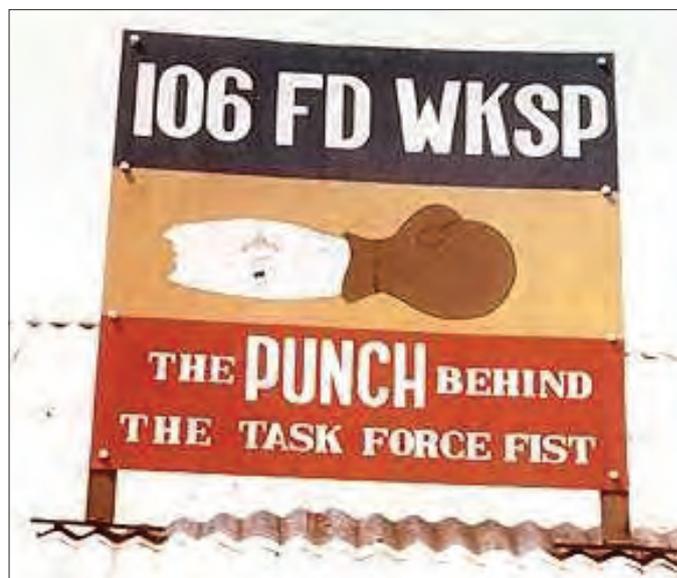
The following points describe the composite elements of the workshop:

- Most of the unit's soldiers were from the Royal Corps of Australian Electrical and Mechanical Engineers (RAEME) - these included tradesmen, recovery mechanics and Corps administrative support staff.
- The RAEME soldiers were supported by soldiers from the Royal Australian Army Ordnance Corps (RAAOC) for the supply of repair parts and other trade ancillaries.
- The Royal Australian Army Medical Corps (RAAMC) provided an in-house medical orderly,
- The Australian Army Catering Corps (AACC) provided the cooks to service the workshop's needs in base or in the field, and
- Other miscellaneous Army Corps personnel aided from time to time.

The normal service period for a soldier was for a tour of 12 months.

In Australian Army historical terms, 106 Fd Wksp was the only Australian unit to be raised in an active theatre since World War II. This historical fact has not changed in the ensuing years.

Over its more recent history within Australia, the unit has had to endure disbandment then reinstatement, as well as substantial organisational and role changes. Regardless, it remains proud of



what it achieved in its short history in SVN. The 106 Association supports that stance.

Post SVN, 106's successor elements located in Australia initially had limited repair and support responsibilities but these were always executed with a lot of heart and sweat to meet past reputational standards.

Today, the high performance traits of 106 developed in its foundation years in SVN have been adopted as the standard guidelines for the workshop now formally established as 106 Fd Wksp - a titled sub-unit of 7 Combat Services Support Battalion (7CSSB) located at Enoggera in Brisbane. 7CSSB supports 7 Bde, a three Infantry Battalion ARA/ARES motorised formation located at Enoggera.

2018 will mark the 50th Anniversary of 106 Field Workshop and this will be celebrated in Brisbane over the period 25 - 28 April. Information on how to get involved is in this magazine or visit the 106 Association's website at [www.106fdwksp.com](http://www.106fdwksp.com)

# Vale

## 2016

James (Jim) Owen GREVILLE passed away 7 Feb  
Doug BRAZIER passed Feb  
Malcolm CAMPBELL passed away 28 Apr  
Brian STAPLETON passed away 2 Jun  
Andrew (Max) HOLT passed away 13 Jun  
Eric DEAN passed away Nov  
Stuart BROWN passed away 29 Nov  
Alan William WILSON passed away 28 Dec

## 2017

Bruce Keith RILEY passed away 04 February  
Rodney MORRIS passed away 22 February  
James "Jimmy" McNulty ROONEY passed away 24 February  
Barry ANDERSON passed away 6 March  
Peter (Boonga) COLEMAN passed away 12 March  
Jim JONES passed away 26 March

Andrew Stephen DRAYTON passed away 2 April  
Peter SNOWDON passed away 23 April  
Peter Francis LAIDLAW passed away 25 April  
Ronald Vincent JERVIS passed away 16 June  
James William MCKEOWN passed away 17 June  
Des KEIHNE passed away 28 June  
Mick ROSS passed away 17 July  
Leigh LEWIS passed away 28 July  
Ed JONES passed away 15 August  
Jurgen 'Zac' ZACNY passed away 24 September  
Andrew John (Jack) BALSILLIE passed away 30 October  
Arthur James 'Lofty' Hayes, OAM passed away 23 November  
'REST IN PEACE'

Your Corps thanks you for your service.

Editor's Note: Apologies for any inaccuracies or omissions. These notices are compiled based on emails sent to the RAEME HOC Cell. The detail supplied varies greatly.

## Vale W02 Andrew 'Max' Holt



Tragically Andrew John 'Max' Holt lost his life in a motor cycle accident on 13 Jun 2016. He was out riding with friends, doing something he loved at the time. On that sad day RAEME lost a lovable larrikin who was very popular amongst his peers, superiors & subordinates alike. Max was never backwards in coming forward and always willing to voice his opinions, whether you wanted them or not.

Max's memorial ceremony at the Craftsman Memorial was very moving and at the same time a joyous occasion as people got up and told their funniest Max stories. There were tears and also laughter, which I'm sure Max would have appreciated.

Max was born on 22nd September 1965. A 37th Intake Apprentice, he enlisted into the Army as an Electrical Fitter in the Royal Australian Electrical and Mechanical Engineers in 1982, graduating in 1983. Upon graduation, Max was posted to 2 Base Workshop Battalion and then in 1986 he was posted to 5 Base Workshop Battalion.

Further postings included 1 Field Hospital, Oakey Workshop Battalion, 3 Brigade Administrative Support Battalion, and 10 Force Support Battalion amongst others. In 1998, Max deployed on Operation BELISI as part of the Peace Monitoring Group in Bougainville.

In 2002, Max transferred to the Army Reserve, where he continued to serve as Warrant Officer Class 2, Artificer Electronic, and Warrant Officer Class 1, Artificer Ground, at 11 Combat Service Support Battalion.

In 2013, Max re-enlisted in the Regular Army was posted to the Army Logistic Training Centre and ultimately the Army School of Electrical and Mechanical Engineering as the Training Warrant Officer.

The Army Logistic Training Centre and the Army School of Electrical and Mechanical Engineering chose to honour Max's memory by naming the theatre at Latchford Barracks after him. This was done on 13 Jun 2017, with Max's family present at the ceremony.

RIP Andrew 'Max' Holt.

# ASEME Australian Public Service (APS) Instructor Retirements

2016/17 has seen the retirement of a number of APS Vehicle Mechanic and Fitter Instructors from ASEME. Vehicle Mechanics Lloyd Millican, Frank Romano and Ian Emslie all retired in 2016, whilst Richard 'Rick' Ejlak retired in 2017.

Fitter Michael 'Mick' Donohue retired from the Small Arms Cell in 2016.

Lloyd has continued in Defence doing Reserve work at Puckapunyal.

Frank has been spending his time doing renovations and his down time cruising around the world with his wife.

Ian is believed to have got his dream job, working part time at Bunnings and spends the rest of the time with his family and wondering why he goes for Carlton.

Rick can still be found lurking around ASEME in a contractor uniform as he now works part time for Scientific Management Associates (SMA) and intends to start doing the grey nomad thing as well.

Whilst Mick has been spending his spare time re-building his Mustangs. When he's not swinging spanners, he and his wife are travelling the world, and touring Australia in the Mustangs.

Between all of them, these members have in excess of 200 years' service in the Army in both their ARA and APS roles. There would be very few currently serving RAEME Vehicle Mechanics and Fitter Armourers that have not benefited from their knowledge.

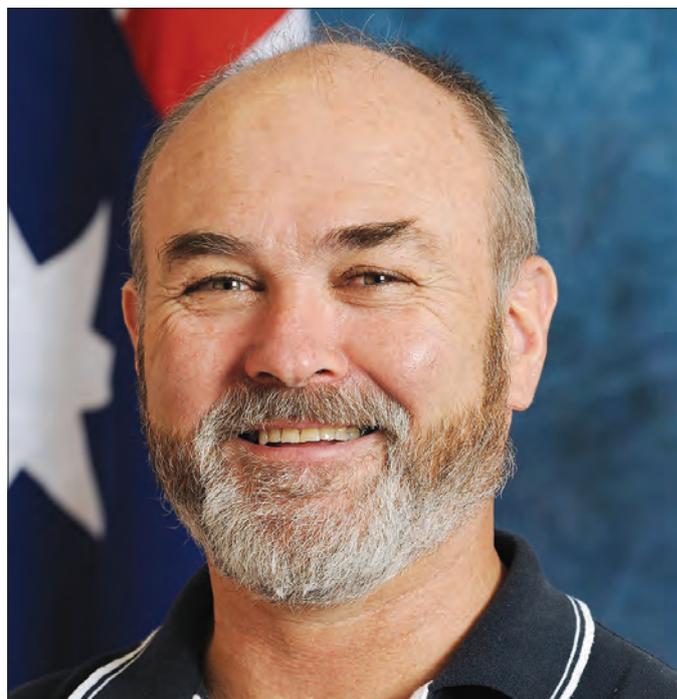
All members were known for their professionalism and passion to ensure they produced the best RAEME tradespeople they could. We thank them for their service and wish them all the best in their retirement.



*MR Ian Emslie.*



*MR Mick Donohue.*



*MR Rick Ejlak.*

# 75th Birthday Parade – RAEME Welcome Address

Wing Commander (Ret'd) Sharon Bown

Friday, 1 December, 2017 – Parade Ground, Australian War Memorial

MAJGEN Burr, Deputy Chief Army, Distinguished guests.

To the men, women and families, past and present, of the Royal Australian Electrical and Mechanical Engineers.

On behalf of the Director, Dr Brendan Nelson and the Chairman of the Council, Mr Kerry Stokes, Welcome to the AWM on this momentous occasion – the 75th Birthday Parade of the Corps of the Royal Australian Electrical and Mechanical Engineers.

In conducting my research to deliver speeches such as this, I have the very privileged access to Australia's finest military historians. Men and women who work tirelessly to aid the Memorial in its mission to assist Australians to remember, interpret and understand the Australian experience of war and its enduring impact upon Australian society. Men and women who work to ensure that your record of service is recorded, and preserved in perpetuity.

Despite that incredible privilege, I decided that I would speak with those whose work was dependent upon the skill of RAEME tradesmen. I didn't have to search too hard.

Over a family dinner one evening, I mentioned to my husband – an Army helicopter pilot and veteran of 27 years' service, that I would be delivering the welcome address for the upcoming RAEME 75th Birthday Parade.

I kid you not, but his face lit up as he began to tell me stories of his time as a Chinook pilot and his close work with RAEME. He told me that:

"RAEME is outstanding. If you are looking for Bluebell out in the field, look for the red, yellow and blue tri-colour above the largest taj mahoochie around. Even if the temperature is 40 degrees in the shade, there you'll see a bunch of proud soldiers, who somehow have ice-cold goffas and gumpy. They are some of the Army's

smartest soldiers, who work hard but don't believe in doing it hard if they can help it."

As a former Nursing Officer of the Royal Australian Air Force, I began to think that a soldier with an ability to create such a level of comfort in the field, should have joined the Air Force!

As if reading my mind, he went on to add:

RAEME tradies are the first up in the mornings, to get the vehicles, equipment, or helicopters working ... and they work late into the night to ensure they are serviceable for the next day. RAEME personnel drive trucks, armoured vehicles, crew aircraft, man machine guns and can fix them all when they stop working. If you bog your Bushmaster in a river, they will turn up with a Heavy Recovery Vehicle. If your APC needs a powerpack change, they will turn up in an Armoured Recovery Vehicle with a new one and do a change-out in the field. If your aircraft radio has nothing but hash coming through, they'll chase squiggly amps until it is fixed. Those guys can walk on water."

His final piece of advice was that I must finish my welcome to you today, with the RAEME motto:

'Arte et Marte.' – Latin he tells me for 'Twist to Open'.

So to our friends who are here today – on behalf of the Australian War Memorial – Welcome to the spiritual home of Australia's fighting men and women. Welcome to your home.

To those amongst you who claim a proud association with RAEME let me finish with the true translation of the RAEME motto: With Skill and Fighting.

Thank you and welcome to the Australian War Memorial.

