

WINGS

SUMMER 2019
VOLUME 71 NO.4

EDINBURGH

AIR SHOW

ADELAIDE'S SKY COMES ALIVE



MOSQUITO
TALES

WWII STORIES FROM
BURMA & FRANCE

BATTLE
OF BRITAIN

FLYING INTO CINEMATIC
HISTORY

BIG IDEAS

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FROM THE MANAGING DIRECTOR

TO ALL OUR READERS,

It's that time of year when we reflect on the year gone by and wonder where it went. For RAAFA Publications, 2019 has been an exceptionally busy and challenging year, with the addition of the quarterly *Wings* magazine to our 'stable' of *Welcome to handbooks*. The response to this challenge by our core group of regular part-time staff – editor Sandy, designer Katie and sales executive Sue, has been simply magnificent, particularly considering that we published our three *Welcome to handbooks* in-between two consecutive editions of *Wings* – that's five magazines in three months! They've earned their short break over the Christmas-New Year period.

With respect to *Wings*, there can be no doubt we've produced a high-quality publication. On behalf of the RAAFA Publications Board and our owners, the Air Force Association, I would like to express my deep appreciation to all our staff and supporters: our (previously mentioned) part-timers, our regular and occasional contributors, our advertisers, particularly major sponsors Rolls Royce and Defence Bank, and of course to you our readers. We wish you all a very happy and safe Festive Season and look forward to another year together in 2020.

NEIL SMITH AM, MBE

Air Vice-Marshal (retd)

Managing Director

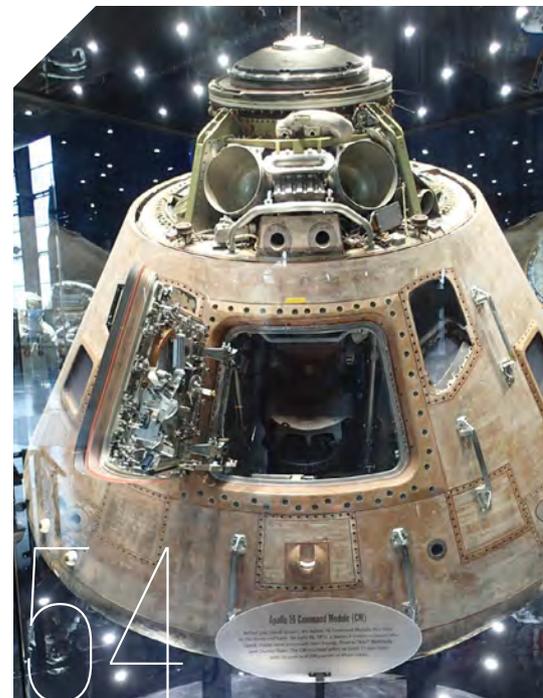
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FROM AIR COMMANDER AUSTRALIA

WINGS MAGAZINE PROVIDES

an opportunity for Air Force to engage with the wider public in an informal forum, in particular, with the many former members of the Air Force within the Air Force Association. In doing so, it endeavours to keep the community aware of the activities being undertaken by Air Force at the direction of government.

The Australian Defence Force (ADF) is currently committed to a number of humanitarian and conflict resolution missions, both regionally and further afield, through which the Air Force has been deployed. And as part of the Australian Government's Pacific Step-Up we will see an increased deployment of personnel and capability through enhanced regional engagement.

Such activities have included a recent exercise in Japan with the Japanese Self Defence Force, maritime surveillance operations

to support South Pacific Island nations police regional fisheries; and our ongoing support to the Australian Antarctic Division with the C-17A Globemaster. While our contribution to foreign operations has been reduced, the support that we continue to provide is effective and appreciated.

During this period, we also celebrated 20 years of very successful operations of the C-130J Hercules with a flypast along the NSW coast. We also conducted our first Australia based training course for F-35 pilots – the first of many to come.

As this edition of Wings will hit the streets in early December, I would like to take the opportunity to wish all our readers a safe and joyous festive season, may it be spent with family and friends. I wish you all the very best in the new decade.

*Air Vice-Marshal Joe Iervasi AM
Air Commander Australia*



 Air Vice-Marshal Joe Iervasi, AM, addresses the crowd during the Air Commander Australia Change of Command Ceremony at RAAF Base Glenbrook. Photo: CPL Casey Forster.



ON THE COVER

A RAAF P-8A Poseidon supports sea trials for the NUSHIP Hobart in the Gulf St Vincent off the coast of Adelaide.
Photo: CPL Craig Barrett.

THE NEW-LOOK WINGS TEAM

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AIR FORCE ASSOCIATION

THE AIR FORCE ASSOCIATION'S National Board, at its October meeting, made a watershed decision to modernise the Association by harmonising Division strategies, governance and operations to ensure efficient and effective business processes and achieve its National Vision and Strategy. Like several other major ex-service organisations in this country, the Air Force Association operates as a coalition of autonomous state/territory entities with an overarching national organisation.

Project High Eagle will manage the harmonisation process. A Joint Boards Steering Group (JBSG), reporting to the National Board, will oversee the project. The JBSG will comprise representatives of each state/territory division and will have the opportunity to co-opt expert advice and other resources to achieve the project's objectives. The project will

be transparent and require membership-wide consultation. It will have a 'fail-safe' process, which means there can be no operational detriment to any division or disadvantage to a member. Any changes recommended by the JBSG must be supported by a cost-benefit argument.

Three years ago, the Association's national entity, Australian Flying Corps and Royal Australian Air Force Association, decided to restructure from an incorporated association to a Company Limited by Guarantee with the title Air Force Association. The name change was to accord with the RAAF's branding as Air Force. To distinguish itself from other air force associations with a similar title, the Air Force Association applied and was granted permission to use the Air Force roundel with the red kangaroo 'in motion' inserted in the first letter 'o' of the word Association. The RAAF roundel is a highly respected and protected symbol, and the Air Force

Association is very honoured to be granted the privilege to use it.

I am pleased to advise the Australian Veterans' Recognition (Putting Veterans and their Families First) Bill 2019 was

recently passed by Federal Parliament. The legislation formally establishes the Australian Defence Veterans' Covenant that includes an oath, lapel pin and Veteran Card.

Recently, I had the honour and privilege to attend the Australian Air Force Cadets (AAFC) National Rifle Competition at RAAF Base Edinburgh and the National Field Craft Competition 'Green Eagle' at Camp Blake, Majura Training Area outside Canberra. The Air Force Association proudly sponsors those competitions.

The AAFC recently reached a record strength of 8,000 cadets, a remarkable achievement in today's environment of competing youth activities. I was particularly heartened by the enthusiasm of Cadet Instructors and the commitment expressed by AVM Kym Osley (Chair of the AAFC Foundation) and AIRCDRE Gary Martin (DGCADETS-AF) who are anxious to extend cadet opportunities and broaden the range of experiences.

The Festive Season is about to begin. It should be an opportunity for us to enjoy time with our loved ones. Please take care over the holiday period, especially if you

are travelling. I wish you and your family a very Happy Christmas and New Year.



**Carl Schiller,
OAM, CSM
National
President**

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JOIN THE AIR FORCE ASSOCIATION

Membership is open to serving and former members of the Australian Defence Force and Allied Armed Forces, their family members, current and former Air Force Cadets, Air League Cadets and members of the public who have an interest in aviation and who support the mission and objectives of the Air Force Association. See page 22 for State Division contacts.



THE AIR FORCE ASSOCIATION AND
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SERVING THOSE WHO SERVE



ALBEMARLE CONNECTION

I WAS INTERESTED to see the obituary of FO Colin Barclay in the Spring issue of *Wings*. There appears to be no public record of him beyond the AWM listing and its internet page. I was particularly interested in the photo accompanying the obituary as it appears to be the Albemarle he actually flew in. The Albemarle is an interesting aircraft and I have never before seen any Australian connection with it, although it would not surprise me if there were others. In addition to my Albemarle enthusiasm, I have a personal interest in 295Sqn. Our company is always interested in personal histories of RAAF fliers where they can be related to actual aircraft.

Edward G Russell
Red Roo Models

I READ WITH interest Edward's letter to *Wings* (above) about the Albemarle, Squadron 295 and Colin Harvey, who was my dad. I'm not sure that we have many more photos but I'll be back up to visit Mum soon and will have a look. He had a bit of memorabilia that I've seen but can't remember seeing specific photos of the Albemarle. I have a feeling that some of the other crew members might still be alive. I will see if I can get in contact with them. They might have more info, plus maybe some photos.

Robert Harvey
via email

EDITOR'S NOTE: Rob kindly forwarded a cache of historical documents and records related to his father's wartime activities.



FOND MEMORIES

JUST FINISHED READING the Spring edition – great read, it just keeps getting better and better. Very interesting articles from the past that had a lot of personal memories for me, especially the Mirage article and RAAF Richmond – I arrived there in July 1966 and the flight line was very much as the picture showed. Well balanced with other very interesting reads.

Bob Weight
River Heads, Qld

AIR LEAGUE EXPERIENCE

I READ WITH INTEREST your article on the Australian Air League (AAL). I was a member of this organisation for some years as a child. It was run by a couple of local chaps. We learned aeronautics, and we were lucky enough to have a joy flight from Bankstown Airport in what I believe was a Piper Cherokee. Yes, I did a bit of marching and participated in a ceremony at Bankstown Oval. It is difficult to make out the certificate I have but it reads: *Australian Air League to Keith Smith Wing Members in recognition of their participation on presentation of Keith Smith memorial flag 1964.*

Although AAL did not have any bearing on my career, I find myself retired and working as a volunteer host at RAAF Wagga Wagga Heritage Centre, which I greatly enjoy. Looks like the AAL had some effect.

Tony Newman
Coolamon, NSW

WAAF SERVICE

I SERVED IN THE WAAF from 6 May 1942 until May 1946. I was a clerk and spent all my time at No.1 Recruiting Centre in Melbourne. The CO at the recruiting centre would never approve the application which any one of our WAAF girls made to work elsewhere – he always said we were special staff members.

After my husband died in 1968 I became a very regular member of the WAAF Branch and became secretary. Thirty five years of membership later I resigned for health reasons. I was presented with a recognition of loyal membership certificate by the then-president Mr Carl Schiller, whom I knew when he was stationed at RAAF Recruiting Melbourne. I was amazed by Mr Schiller presenting the certificate to me at a gathering of other members of staff who were also recognised for WAAF service.

I am now 96 years of age and write to say thank you for *Wings* – a very interesting read.

Gloria Welch
Croydon North, Vic

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EDITED BY Bob Treloar

EDGY AIR FORCE

ignites game-changing ideas

EXCITEMENT WAS IN the air as airmen came together to explore the technology stations set up at Australian Defence Force Academy, RAAF Bases Wagga and East Sale during an EDGY Air Force tour of air bases and training facilities.

EDGY Air Force Ignite is a Plan Jericho festival of ideas and technology designed to inspire Air Force personnel with the art of the possible – and to offer education and the funding needed to turn their own great ideas into reality.

Plan Jericho’s purpose is to give Air Force the edge to protect Australia from technologically sophisticated and rapidly morphing threats. It aims to do that by driving creativity and agile thinking across the Air Force, and through rapid adoption of technology and research within a diverse range of partners.

There was plenty of laughter as airmen seized control of each other’s arms using adapted TENS (transcutaneous electrical nerve stimulation) machines, and more serious contemplation as they got a glimpse into Air Force’s fifth-generation future through virtual-reality goggles.

The more combat-minded honed their skills using Nerf guns coded with near-

field communication chips, and there was great interest, particularly from medical personnel, who were able to explore the human body via a virtual-reality experience.

Some attendees came with ideas and even prototypes, and were able to brainstorm and explore those initiatives in further detail with the EDGY Air Force team. Others used it as an opportunity to explore new technologies and were encouraged to consider how those, and other innovations, could be used to give the Air Force an edge.

Head of Air Force Capability Air Vice-Marshal Cath Roberts said EDGY Air Force is all about inspiring Air Force members to think differently.

“It will help our airmen and airwomen envision, create and prototype next generation capability in our joint force, game-changing ideas come from every level,” she said.

“The people with the best understanding of our capability needs are the men and women who fly our aircraft, maintain our platforms and technology, secure our bases, and provide support and enabling services.”

The EDGY team is partnering with



ABOVE SGT William Gill, LAC Chad Bray and LAC MD Jewel operate 3SECFOR drone.

industry experts and academic institutions to attain the latest in technology and provide support and education to airmen with game-changing ideas.

“By connecting our talented personnel with experts across Defence Science and Technology, industry and academia we can turn great ideas into viable products that can give us game changing effects to enhance Australia’s security,” AVM Roberts said.

EDGY Air Force is visiting RAAF bases nationwide over the next 12 months. It’s one of the initiatives developed by Plan Jericho, which was launched in 2015 as a catalyst for the Air Force’s transformation into a fifth-generation force.

Defence personnel and Industry are encouraged to submit their ideas to plan.jericho@defence.gov.au or visit airforce.gov.au/EDGY for more information.

Source: Air Force



RAAFSTT recruits check out VR display.



PLAN JERICHO – AT THE EDGE

The Air Force needs to think differently to achieve and maintain its combat advantage in a fifth-generation paradigm. The Air Force needs to operate at the edge, with a dedicated effort to push the boundaries of its fifth-generation force to explore and exploit the potential that lies within it.

Edgy Air Force is a Jericho acceleration program to develop agility, creativity and innovation at every level of the Air Force. It engages the people who know its capability needs best- those who fly its aircraft, maintain its technology, secure its bases and work across the breadth of the Air Force.

Locally trained F-35A PILOTS TAKE FLIGHT



LEFT Two RAAF Lightning IIs in formation north of Newcastle, NSW.



transition course to be run in Australia.

Run by 3SQN at Williamstown near Newcastle, the course was tailored for experienced fast jet pilots who had previously flown fighters.

There is no two-seat variant to aid airborne instruction and the pilots underwent a two-month academic and simulator training program at the RAAF's new F-35 ITC at Williamstown, before the first flight.

Although the RAAF continues to send pilots to the US for training, Australia is quickly becoming self-sufficient, contributing to its F-35A Squadrons reaching combat readiness as planned.

The RAAF planned to maintain 10 F-35As embedded with the USAF 61st Fighter Squadron at Luke Air Force Base until at least the end of 2021.

RAAF F-35A training will be taken over by 20CU from 2020 after it relocates to Luke Air Force Base to transition to the jet, and then returns home in preparation to an initial operational capability forecast for late 2020.

Source: Australian Aviation

THE FIRST TWO RAAF F-35A pilots to be trained locally flew the aircraft for the first time on 15 July.

While all RAAF F-35A pilots to date have been trained at the United States

Air Force 61st Fighter Squadron's International "schoolhouse" at Luke Air Force Base, Arizona or at the Integrated Training Centre (ITC) at Eglin Air Force Base in Florida, this is the first



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RAAF deploys P-8A Poseidon to STRAIT OF HORMUZ

A SERIES OF INCIDENTS in the Strait of Hormuz has led to the formation of an Internal Maritime Security Coalition (IMSC) to enhance maritime security in the region. The initiative is led by the United States and members include Saudi Arabia, Bahrain, the UK and Australia. Headquartered in Bahrain, IMSC is aimed at safeguarding freedom of navigation and ensuring the safe passage of shipping assets through the Gulf.

Source: Air Force Technology



RAAF P-8A on its arrival at the ADF's main operating base in the Middle East Region.

Air Force HELPS COMBAT ILLEGAL FISHING

THE RAAF PAIRED a C-27J Spartan from No.35 Squadron and a King Air 350 from No.32 Squadron to conduct maritime surveillance mission under Operation SOLANIA, a standing commitment to support Pacific Island countries economic development.

The two aircraft were deployed to the South West Pacific last month to fly maritime surveillance and patrol missions, aiming to detect and deter illegal, unregulated and unreported fishing activity, and was co-ordinated by the Pacific Island Forum Fisheries Agency.

Historically, AP-3C Orion aircraft and various Royal Australian Navy

vessels have undertaken the periodic deployments of Operation SOLANIA, with this just the second time the Spartan has supported the Operation.

The usual role of the C-27J is battlefield airlift, conducting tactical transport of personnel and stores and by default that generally means operations over or close to land, so maritime surveillance adds a fresh dimension to the aircraft roles.

Source: Defence Connect



ABOVE RAAF C-27J on patrol in the South West Pacific.



BELOW The RAAF celebrated 20 years of C-130J Hercules transport aircraft operation with a flypast from RAAF Base Richmond.



RAAF celebrates 20 YEARS WITH C-130J HERCULES

THE FIRST OF 12 C-130J model Hercules transport aircraft was delivered to Australia in September 1999. The fleet, operated by No 37 Squadron at RAAF Base Richmond, has since flown 137,000 hours and to celebrate the 20th anniversary the Squadron conducted a formation flypast along the NSW coast.

C-130J tasking is short-notice and dynamic, requiring the Squadron and crews to be flexible and responsive to complex challenges. The C-130J has been continuously deployed to the Middle East region since June 2008 and, closer to home, it has been an essential Defence contribution to humanitarian assistance, disaster relief and search and rescue support.

In recent years, the C-130J aircraft has been upgraded with satellite communications, aircraft self-protection systems, and improved battle space awareness.

Australia has a legacy of operating different models of Hercules aircraft, and the C-130J generation has more than earned its place in history.

Source: Sarah Falson/Hawksbury Gazette

Wedgetail returns to THE MIDDLE EAST

A RAAF E-7A WEDGETAIL aircraft has arrived in the Middle East as part of Australia's contribution to the US-led global coalition against Daesh.

Defence Minister Linda Reynolds said the Wedgetail deployment will support the Iraqi Security Forces (ISF) in their ongoing fight against terrorism in Iraq. "The ISF is leading operations to prevent the re-emergence of Daesh and in repelling incursions by Daesh into Iraq's sovereign territory," she said.

"Australia has made a significant and continuous contribution to the global coalition against Daesh in Iraq and Syria and continues to provide support to Iraq to ensure progress is sustained."

The aircraft has been deployed to the Air Task Group several times since October 2014. As an airborne early warning and control platform, the E-7A Wedgetail can gather information from a variety of sources, analyse and communicate that information to friendly air and surface assets.

The E-7A Wedgetail will join the KC-30A Multi Role Tanker Transport aircraft currently providing air-to-air refuelling capability to a variety of coalition aircraft supporting operations in Iraq and Syria as part of the ADF's Operation Okra.

Source: Australian Department of Defence



RAAF & USAF TECHNICIANS ON THE TOOLS TOGETHER

FOR THE FIRST time, No.36 Squadron (36SQN) has worked to get US Air Force C-17A Globemasters back in the air under a new cross-servicing arrangement. Technicians from 36SQN were able to assist the crews of two USAF C-17As deployed on separate tasks in Australia. The USAF aircraft repairs related to a Secondary Flight Control Computer, and throughout the repair, RAAF and USAF technicians worked side-by-side.

The work came following enactment of the C-17A Aircraft Repair and Maintenance Service – Implementing Arrangement (ARMS-IA) on 4Jul19 which allows RAAF and U.S. Air Force technicians to work on each other's aircraft. ARMS-IA recognizes the close relationship between RAAF and USAF C-17A communities, and the reality that we operate this aircraft a long way from home.

Source: Aerotech News





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New Top Guns COMPLETE TRAINING ON PC-21 AIRCRAFT

AUSTRALIA'S NEXT GENERATION

of Mavericks successfully completed the first phase of the Royal Australian Air Force's ab initio flying training at RAAF Base East Sale in Victoria. Each student completed five months of pilot training, including approximately 250 hours of theory instruction, 30 hours simulator instruction and 40 hours of flying in the PC-21 aircraft.

They are the first students to graduate from the newly recommissioned No. 1 Flying Training School, and the first RAAF pilots to conduct ab-initio training in the PC-21. The students now advance to the next phase of their training at No.2 Flying



Next Generation of Mavericks with the PC-21.

Training School at RAAF Base Pearce in Western Australia.

Air Force is currently transitioning pilot training from the PC-9/A to the PC-21 trainer as part of the most significant technological upgrade in Air Force's 98-year history. The Pilatus PC-21 is the world's most advanced pilot training aircraft, capable of sustained, low-level speeds over 320 knots, and hydraulically assisted ailerons and roll spoilers can

produce fighter-like rates of roll in excess of 200 degrees per second. The aircraft will be based at RAAF Base East Sale in Victoria and RAAF Base Pearce in Western Australia.

The new Pilot Training System will be able to train more people faster and to a higher standard, with an: advanced aircraft; state-of-the-art simulation; and an electronic learning environment.

Source Defence Connect

RAAF MUSEUM POINT COOK

The RAAF Museum, located at Point Cook, is home to an amazing range of historic military aircraft. A great chance to view these rare machines is at the interactive flying displays which are held every Tuesday, Thursday and Sunday at 1pm (weather permitting).

The Museum has a vast collection of historical material on show, including several hangars with static aircraft.

It offers visitors an exciting experience and insight into the history of the Air Force. Models, books, patches, clothing and mementos can be purchased at the Museum shop.



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EXERCISE MOBILITY GUARDIAN 19

A **KEY FIVE EYES** group of air force advisers is testing interoperability across combat support, aeromedical evacuation and air mobility functions as part of Exercise Mobility Guardian 19 (MG19).

The Five Eyes Air Force Interoperability Council has existed for more than 70 years, under different names, with a representative from each coalition nation based at the Pentagon in Washington, DC.

The aim of the Council is to share information, training, procedures and tactics to enhance the ability of Australian, Canadian, New Zealand, United Kingdom and United States air forces to work together.

The creation of mutually agreed air standards and equipment sharing

between nations for test and evaluation purposes, confirms a compatibility to deal with real-world threats and respond to crises.

At MG19, the RAAF loaned a recently acquired deployable airfield ground lighting system for the Royal Canadian Air Force to trial in the field.

MG19 also provided an opportunity for our NZ allies to explore the issues associated with the carriage of aeromedical evacuation equipment and air drop load rigging for both container delivery and heavy equipment systems.

MG19 was conducted by the US Air Force in the US from September 9-28. The RAAF deployed a C-17A Globemaster III and KC-30A Multi-Role Tanker Transport, along with enabling

elements from Combat Support Group and the Australian Army's 176 Air Dispatch Squadron to participate.

Source: *SLDInfo.com*



ABOVE Aeromedical Crews Practice Procedures during MG19.

UPLIFTING AEROSPACE



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EDITED BY John Kindler

SOLAR-POWERING DARWIN BASES

CAPELLA CAPITAL, in partnership with Lendlease, has secured a contract with the Department of Defence to deliver two new solar farms at Robertson Barracks and RAAF Base Darwin in the Northern Territory. "The NT Solar Power Purchase Agreement project is the first solar PPA undertaken by Defence and will provide up to 40% of Robertson Barracks and RAAF Darwin's electricity requirements via approximately 14MW of solar across the two sites," said Allan O'Connor, Defence renewable energy and energy security program manager. Work is scheduled to begin in the next two months and completion is expected in the first quarter of 2020 and continues to strengthen the Lendlease and Capella Capital position in delivering on a range of renewable and energy solutions.



 Royal Thai Air Force JAS 39 Gripens parked on the Military Hard Stand at RAAF Base Darwin.



 Hawk Mk127 Aircraft Lead-in Fighter Trainer.

CAE HAS ANNOUNCED the successful completion of a trial implementation of advanced synthetic training capabilities as part of the Introductory Fighter Course (IFC) at RAAF Base Williamtown for the RAAF.

The first class of pilots taking part in the IFC leveraging an increased use of synthetic training, including networked simulators, graduated recently and are now proceeding to training on their assigned operational aircraft.

Utilising the two CAE-built Hawk Mk127 Full-Mission Simulators (FMS) at RAAF Williamtown, CAE and RAAF training personnel developed new virtual-training scenarios focused on a range of advanced mission profiles, including air combat manoeuvring and multi-ship intercept techniques to prepare aspiring fighter pilots for the next phase of training.

CAE added realism to the advanced final stages of lead-in fighter training by networking the two FMSs, allowing multiple students and instructors to fly the same mission or to fly against an adversary in the opposing FMS.

For its support in developing and implementing the enhancements to the IFC, CAE Australia received a certificate of appreciation from Air Vice-Marshal Catherine Roberts, Head of the Aerospace Systems Division, RAAF. *Source: Defence Connect*

Consolidating F-35A SUPPORT

LOCKHEED MARTIN AUSTRALIA

has signed an Integration, Maintenance and Administration Support (IMAS) contract with Defence to consolidate existing F-35A support arrangements into a single Australian-managed relationship.

The contract will deliver Autonomic Logistics Information System (ALIS) support for the country's F-35 program. ALIS is an off-board information system that turns data from multiple sources into actionable intelligence. It provides capabilities such as fault diagnosis, maintenance management, supply support, mission planning and training management.

The IMAS contract will support 60 new skilled jobs cementing the F-35 Logistic Support Centre at RAAF Base Williamtown as the core F-35 sustainment capability in the region. The company claims the value of contracts awarded under the Australian F-35 program is likely to reach about \$5 billion by the mid-2020s.

Source: Air Force Technology

Growler Electronic WARFARE ENHANCEMENT



RAYTHEON HAS DELIVERED

the first Next Generation Jammer Mid-Band (NGJ-MB) engineering and manufacturing development pod to the US Navy to begin ground and aircraft integration testing for future employment on the Boeing E/A-18G Growler Electronic Warfare aircraft.

Boeing accelerates

UNMANNED FLIGHT TESTS

BOEING AUSTRALIA IS rapidly evolving its autonomous systems technology capabilities in the lab and in the field as it prepares for the first flight of the RAAF's Loyal Wingman prototype in 2020.

The Boeing team is using its world-class Systems Analysis Laboratory in Brisbane to simulate and model critical mission capabilities and the aircraft product life cycle. The team has taken the evidence from the lab and is advancing field testing of the mission system with surrogate aircraft. Boeing has fielded 15 autonomous test bed aircraft to refine autonomous control algorithms, data fusion, object detection systems and collision avoidance behaviours.

The combined lab and field tests are important steps in meeting the goals of the Loyal Wingman – Advanced Development Program. Announced by the Australian Government in February, the program will result in a prototype aircraft that will test the potential of this disruptive new technology to protect and extend airpower by teaming multiple unmanned platforms with manned assets.

Digital engineering has enabled Boeing to develop, simulate and test mission system behaviours that ultimately will increase mission utility – such as situational awareness and Intelligence Surveillance and Reconnaissance. The team is working closely with the RAAF to refine the manned-unmanned teaming solution to address specific operational needs and ensure pilots can trust and easily interface with the unmanned platforms.

The work being done in Australia also serves as the foundation for a global unmanned smart teaming system Boeing launched at the Avalon Airshow called the Boeing Airpower Teaming System (ATS). Designed and developed by Boeing Australia and powered by AI, the ATS is a modular and highly customisable aircraft with fighter-like capabilities.

Source: Defence Connect



NGJ-MB is an advanced electronic attack system that denies, disrupts and degrades enemy technology, including communication tools and air-defense systems. It can operate at a significantly enhanced range, attack multiple targets simultaneously and apply advanced jamming techniques.

Australia purchased 12 Growlers as part of a larger US Navy buy of 44 Super Hornets and Growlers in July 2014. The first Australian EA-18G made its first

flight in July 2015. All 12 Growlers were formally welcomed to their home base at RAAF Amberley in 2017.

Growler Full Operating Capability (FOC) will require additional testing and broad integration with key ADF assets, particularly the Navy's new Air Warfare Destroyers, Air Force's E-7 Wedgetail AEWG aircraft and later F-35s and key ground assets of the Army. FOC for Australia's Growlers is expected in 2022.

Source: Defence Connect

Jobs to flow from Defence Export Facility loan

DEFENCE INDUSTRY MINISTER

Melissa Price has welcomed the first contract awarded as part of the Commonwealth government's Defence Export Facility to help small defence businesses get ahead in a competitive global market.

Canberra-based defence company CEA Technologies has signed the \$90 million loan agreement, which will create 200 local jobs including further high-tech jobs in its Australian supply chain.

"CEA is a fantastic example of Australian industry providing advanced technology to protect our national security, as well as generating local jobs with high-value technological skills," the minister said.

"This loan is a win, not only for CEA Technologies, but for the many Australian small businesses in their supply chain – it will support the delivery of innovative defence capability now and into the future."

CEA Technologies will use the loan to finance the construction of a new engineering and manufacturing facility in Canberra to help grow their exports and meet Australian Defence Force demand for their world-class phased array radars.

ACT Senator Zed Seselja said: "This funding will not only create 200 local jobs, supporting skills and knowledge in Canberra, but will continue to keep our local defence industry engaged in developing the latest technologies for Australia's defence."

The Defence Export Facility, administered by Export Finance Australia, is a key initiative of the government's 2018 Defence Export Strategy. The Defence Export Strategy recognises Australian industry is not sustainable on the needs of the ADF alone. Accordingly, new markets and opportunities to diversify are required to help unlock the full potential for the Australian defence industry to grow, innovate and support Defence's future needs.

Source: *Defence Connect*

Change of leadership at NEWCASTLE AIRPORT



 Peter Gesling (left) with CEO Peter Cock (centre) and new Chairman Kirby Clark.

AT A WELL-ATTENDED leadership forum sponsored and organised by Newcastle Airport Pty Ltd (NAPL) on 1 November, Peter Gesling took the opportunity to deliver his last address as Chairman of the board. Reflecting on his 31-year membership of the NAPL Board, first as a director, and then as Chairman, Peter noted he had served as a director under the first two chairmen, Air Vice Marshals Richard Bomball AO and John Kindler AO, before being appointed himself. He also noted with some pride the major airlines that had arrived to provide services to the Newcastle area and the five-fold growth in passenger numbers in as many years.

Peter introduced his successor, Kirby Clark, a member of the NAPL Board since 2015, after 15 years' experience as Deputy CEO and CFO at Australia Pacific Airports which operated Melbourne and Launceston airports.

\$28m in contracts for small businesses

THE FEDERAL GOVERNMENT has awarded 15 contracts, valued at more than \$28 million, to Australian small businesses to develop cutting-edge technologies aimed at providing the ADF with a capability edge. Part of the Defence Innovation Hub's \$640 million program, the investment includes initial concept exploration and technology demonstration, through to prototyping and integrated capability demonstration and evaluation. The Defence Innovation Hub invests in local companies to help them develop world-class capabilities.

Victorian-based Carbon Revolution was awarded a \$2.4 million contract to develop the world's first lightweight carbon fibre wheels for the Boeing

CH-47F Chinook helicopter. A \$5.8 million contract was awarded to Brisbane-based company EM Solutions to develop and test a satellite communications system for maritime vessels, and a \$5.7 million contract went to Adelaide-based Inovor Technologies to deliver a prototype nanosatellite to enhance space situational awareness.

 CH-47F Chinook.



Aussie and US UNIVERSITIES COLLABORATE

DEFENCE INDUSTRY MINISTER

Melissa Price has announced a \$3 million collaboration agreement between the University of Melbourne, Macquarie University, the University of New South Wales and Queensland University of Technology, and United State's Boston University and the Massachusetts Institute of Technology to develop the next generation of autonomous vehicles.

The collaborative project is aimed at developing a truly autonomous vehicle capable of learning, adapting to unexpected situations and pursuing complex goals in dynamic and



 Artists impression of Loyal Wingman in formation with RAAF E7-A Wedgetail AEW aircraft.

challenging environments. The universities will explore whether the cognitive processes living creatures use to synthesise environmental and contextual information can be applied to robots to improve their perception, navigation and spatial awareness.

Funding was awarded under the Australian Multidisciplinary University

Research Initiative (AUSMURI) program, designed to encourage collaboration between Australian and US universities. It provides up to \$1 million per year for three years, supporting research in high-priority areas for Defence and supports Australian universities that submit successful bids in the US MURI process. *Source: Defence Connect*

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Contenders line up to PRESENT TIGER REPLACEMENT

THE AUSTRALIAN ARMY is planning to replace its fleet of EC665 Tiger armed reconnaissance helicopters (ARH) from the mid-2020s as identified in the 2016 Defence White Paper. The LAND 4503 acquisition strategy aims to reduce operational and in-service risk and allow the Army to rapidly achieve operational milestones for the replacement armed reconnaissance capability, while achieving value for money; Initial Operational Capacity in 2026 and Final Operational Capacity in 2028.

BELL'S VIPER PREPARED TO STRIKE

Bell, a subsidiary of Textron, is presenting the AH-1Z Viper, currently in service with the US Marine Corps, designed and built to support the expeditionary and maritime-centric focus of US Marine operations.

A Bell spokesperson told Defence Connect, "The AH-1Z Viper is the only marinised attack helicopter that offers an increase in capability, can execute both air-to-air and air-to-ground roles on the same sortie, and can operate equally well afloat or ashore without any degradation in capabilities. The Viper will improve safety and reduce technical risk as it is specifically designed for overwater missions and for shipboard and expeditionary environments and it will offer significantly lower total life cycle cost as it has no requirement for expensive contractor maintenance."

Marinisation includes all-new, advanced composite rotor blades

and yoke style main rotor hubs that significantly outperform legacy "strap-pack" type systems, which are prone to corrosion and failure. It also incorporates semi-automatic blade folding for quick stowage either on-board ship or for rapid C-17 deployment, rotor brakes, ease of maintenance, electromagnetic environmental effects (E3) hardening, which protects against the ship's powerful radars and other sensors that could interfere with aircraft weapons and mission systems. "The combat proven Bell AH-1Z Viper is the only marinised attack helicopter in the world that is specifically designed and built for expeditionary and maritime operations. Marinisation is more than just corrosion protection against salt. Unlike unproven and costly add-ons, Bell's marinisation begins at aircraft design and is built into the aircraft at point of manufacture to ensure conformity to shipboard operations," explained Javier Ball, international campaign manager, Asia, global military sales and strategy.

THE WORK HORSE – BOEING'S APACHE

Boeing has confirmed the AH-64E Apache as its offering for LAND 4503. Apache is operated by the US and 15 other countries, has recorded more than 4.5 million flight hours with the US Army alone. There are currently 1,180 Apaches in service today.

Terry Jamison, global sales and marketing, defence, space and security

at Boeing said, "Boeing's AH-64E Apache is known for its survivability, sustainability, interoperability and reconnaissance capability. As an Apache operator, Australia would join coalition countries, including the US and UK, and regional partners Singapore, Indonesia, Japan and the Republic of Korea." Boeing plans to deliver support services in-country and engage local suppliers to maximise Australian industry involvement for the ARH replacement program."

THE INCUMBENT - ARH TIGER

Airbus is the manufacturer of the tandem seat Tiger helicopters introduced to the Australian Army in 2004. Eighteen of the 22 units were assembled at the Airbus site in Brisbane.

The Airbus Helicopters proposal offers more than \$3 billion in savings against the expected budget for LAND 4503. Andrew Mathewson, Airbus Australia Pacific managing director, explained, "Airbus proudly delivers a strong Australian industry capability, including the more than 260 local staff currently supporting Tiger."

Globally, 181 Tigers have been delivered to Australia, France, Germany and Spain. First deployed by the French Army in Afghanistan in 2009, Tiger continues to demonstrate its essential role in theatres of operation as a highly versatile, stealthy and manoeuvrable attack helicopter.

Source: Defence Connect



Boeing Apache.



Bell Viper.



ARH Tiger.

A personal account of engagement WITH THE AEROSPACE INDUSTRY

AFTER YEARS IN the military you begin to learn that the best opportunities often come at what seem to be the most inconvenient times. Such was the case in mid-2017. I was a Flight Lieutenant Aeronautical Engineering Officer working as a Project Engineer in Surveillance and Response Systems Program Office. I had applied for a position overseas early in 2017, and six months on, on the day I was returning from my honeymoon, I received a call from my Commanding Officer informing me I would be moving from Adelaide to the UK for two years – within two months! I looked at my wife and said, "Welcome to the military, let's get packing!".

The position was sponsored by the Defence Aviation Safety Authority (DASA) and split into three parts to best develop future aviation safety authority experience. The first part was a year studying for a Master of Science in Thermal Power at Cranfield University. The second, a year of industry placement with Rolls-Royce plc (RR) in Bristol to learn from a world leader in the field of aircraft propulsion system design. The final part, a post to Melbourne within the Propulsion Systems Integrity section of DASA to put what I'd learnt to good use.

Studying at Cranfield was a fantastic opportunity. Not only were the lecturers experienced and the work challenging, there were more than 20 different nationalities represented on the course. I came away with new skills, new perspectives and a bunch of new friends from around the world. Most notably, I was able to hone my experience in gas turbine performance and turbomachinery mechanical design and gain an in depth understanding of aircraft control systems. The academic year culminated in my thesis, *Preliminary Viability Analysis of a Turboshaft Ground Power Unit for Emergency and Rescue Applications*. I looked at whether ex-helicopter and light aircraft turboshaft engines could be used to provide an affordable power solution in short response humanitarian aid emergencies like those the ADF respond to as part

of their Humanitarian Assistance and Disaster Relief responsibilities.

Following my study, we moved to Bristol where I was embedded within RR to further develop and consolidate my skills. RR provides a number of products to the ADF including the Adour for the Hawk 127, T-56 for the AP-3C Orion, AE2100 for both the C-130J Hercules and C-27 Spartan fleets and MT30 for the Royal Australian Navy's Hunter Class Frigates. My initial placement was in the TP400 service engineering team. That was followed by placement within the Adour section as well as involvement in other sections to gain experience in as many specialist disciplines as possible. RR were actively engaged in my personal growth and provided opportunities whenever available. Highlights included being an active part of the TP400 and Adour teams where I provided solutions to urgent in-service technical issues faced by the operators and coordinating service life reviews of in service military engines. I found my previous ADF experience provided a unique perspective that enhanced the support provided by RR to their customers. The experience allowed for the creation of strong relationships with mentors who are considered to be at the top of their field in the design and manufacture of jet engines.

In addition to these experiences, Mia and I were proud to have the opportunity to represent Australia at commemorative military events. Those included ANZAC day attendances in France and the UK and the unveiling of a memorial plaque honouring FLGOFF Hector S K Ross (RAAF) and FLGOFF Jack R Green (RAF) of 107 Squadron (RAF) lost with their Mosquito at Normandy in 1944. We even had the opportunity to meet the Queen at a Buckingham Palace garden party.

Reflecting on those two years it has become patently apparent that while the timing may have seemed inconvenient, the experience was well worth it, especially considering the unique opportunities we had during the program. The year spent studying

at Cranfield provided an extremely valuable baseline for the following year at RR and my time in DASA. In addition, working in a world class organisation like RR provided invaluable experience and perspective for myself and aided in building the relationships between RR and the ADF. I have learnt much and we have experienced even more, all of which would not have been possible without that opportunity from the RAAF and RR. I can honestly say the exchange to the UK was one of the most challenging and rewarding opportunities I have experienced.

• **FLTLT James Duckworth**
BE Aero (Hons), MSc



✦ **FROM TOP** Meeting Queen Elizabeth at a Royal Garden Party; Memorial to FLGOFF HSK Ross and FLGOFF JR Green; LT Duckworth (centre) with the TP400 Service Engineering Team.



WWII

TO FIFTH GENERATION IN

100 YEARS



ABOVE A unique and historic formation of the Hudson and a pair of Boomerangs. Photo: Nigel Hitchman.



ABOVE RIGHT Aerial view of the static and industry display. Photo: SGT Guy Young.



RIGHT Battle of Britain pair. Photo: James Rolevink Photography.

THE 2019
EDINBURGH AIR
SHOW ATTRACTED
MORE THAN 65,000
VISITORS OVER
TWO DAYS AND
DEMONSTRATED
HOW MUCH
THE RAAF HAS
EVOLVED, WRITES
NEIL SMITH.

OVER THE WEEKEND
8-9 November, RAAF Base
Edinburgh staged its first
airshow since 2007. The
long-anticipated event was three years
in the planning by the Air Force Events
Air Shows team, led by experienced
campaigner Air Commodore Christopher
(Noddy) Sawade.

Comparison of this and the 2007
Edinburgh Air Show provides a clear
illustration of the extent of change the
RAAF has undergone in the past 12
years: the only aircraft on display at this
year's Edinburgh Air Show that also
participated in 2007 were the C130J
Hercules, F/A-18A/B Classic Hornet and
AP-3C Orion. The Classic Hornets are
currently being replaced by the F-35A
Lightning II and the Orion has recently

been replaced by the P-8 Poseidon.
The Orion was exhibited by the Historical
Aircraft Restoration Society (HARS).

The 65,000 plus members of the
general public who attended were
entertained and informed by more
than 60 aircraft, either as flying or static
displays, including all the current RAAF
inventory of manned aircraft together a
marvellous selection of vintage military
aircraft and some civil types.

With South Australia such a Defence-
focused state, it came as no surprise
that the VIP attendance list included
the Governor of SA Hieu Van Le AC,
SA Premier Steven Marshall, a number
of Federal and State politicians, and
the Mayors of Salisbury and Playford
Councils, hosted in the VIP marquee on
the first day by Chief of the Air Force,
Air Marshal Mel Hupfeld.

The weather gods smiled benevolently
on the event. Although dry and dusty
underfoot, the strong Westerlies that
blew in the days preceding the weekend
magically abated to provide excellent
flying conditions over the weekend,
especially on Sunday.

All attendees were treated to a first-
class continuous flying display that ran
from 10am to 4pm, breaking for only an
hour over the lunch period. There was
also much to see in the static aircraft
displays and exhibition marquees.
Indeed, serious airshow buffs needed
the two days to cover all that was
presented.

FLYING DISPLAY – MORNING SHOW

The morning flying program commenced
with the arrival of the RAAF Roulettes
display team overflying the airfield before
landing to refuel for their main display in
the afternoon. Morning events featured
mainly vintage aircraft and included a
rare treat for show attendees in the form
of a Lockheed Hudson Bomber and two
CAC-19 Boomerangs in close formation –
the only flying examples of these two
aircraft types in the world.

Also, in the morning we saw the
Battle of Britain pair, Spitfire and
Hurricane, as well as the Mustang,
all announcing their arrival with that



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AIRMAN FOR LIFE

characteristic Rolls Royce Merlin note that captures the imagination of every aviator and airshow buff.

An additional wow factor was provided by Matt Hall's display in his ultra-high performance MXS-R, the US-designed and built aircraft in which he won the last Red Bull championship (see report on page 61). Cleared down to ground level, his precision display included hi-G vertical and horizontal manoeuvres, ultra hi roll rates and slow speed handling that seemed to defy the laws of aerodynamics. An amazingly capable aircraft flown to its limits by an equally amazingly capable pilot.

The Russian Roolettes in their Nanchang CJ6 and Yak 52 aircraft finished the morning session with a fine four ship formation aerobatics display.

FLYING DISPLAY – AFTERNOON SHOW

The afternoon show was opened by the Roulettes from Central Flying School (CFS), RAAF Base East Sale – the first time they had performed their 'high show' in the new PC-21 aircraft. Roulette 7 doing the commentary (as usual), pointed out that the new aircraft was easier to fly than its predecessor (PC-9) in a precision display because of its higher power and more friendly gust response characteristics. But easier or not, the show provided an ample illustration of the skills of those 'part-time' display pilots and was very much appreciated by the large crowd.

The afternoon then saw all the current RAAF types flying, together with some of their predecessors.

- Transport: the current C130J Hercules and C27 Spartan were accompanied by the delightful appearance 'on stage' of the Catalina and Caribou, both from the HARS collection.
- Fighters included a Mustang, Meteor, Kittyhawk and crowd-pleasing displays by a 3 SQN F-35A and 77 SQN F/A-18A/B Hornet. Included in this section was also an air-to-air refuelling demonstration by two Hornets connecting to a 33 SQN KC-30 Multi-role tanker/transport, and an E-7A Wedgetail early warning and control aircraft from 2 SQN.



- Maritime aircraft included the veteran submarine hunting Lockheed Neptune along with the recently superseded AP-3C (both from the HARS collection) and the new P-8A Poseidon – looking very much like its mother, the B737-800. Of course, no maritime display would be complete without the Navy, which demonstrated a MH-60R Seahawk.

The C-17 Globemaster and a noisy, impressive display by the F/A-18F Super Hornet provided a suitable end to the day's flying.


Matt Hall at the top of a wing-over.
Photo: James Rolevink Photography.


BELOW Roulette entry to a formation loop.
Photo: James Rolevink Photography.



STATIC DISPLAYS

Numerous aircraft were on static display, with some of the larger transports open to the public. Most popular was the cavernous and versatile C-17 Globemaster that was set up in a partial medivac configuration.

Indoors, the large corporate marquee called the Astro STEM Zone was well supported by the numerous SA-based defence industries and TAFE SA 'STEM partners' (Airbus, BAE Systems, Boeing, CAE, Cobham, DXC Technology, General Atomics Leonardo, Lockheed Martin, Saab and Shoal). All adopted the STEM (science, technology, engineering and mathematics) theme with displays of virtual-reality equipment and/or simple demonstrations of some fundamental aerodynamic principles. Even more popular was the RAAF's nearby Jericho marquee. More than 650 high school students, Army Cadets and Air Force Cadets from around SA attended a special STEM day on Friday before the airshow.

The Edinburgh Air Show coincided with the centenary of the beginning of that remarkable flight by those heroic sons of South Australia, Sir Ross and Keith Smith, whose epic flight from London to Australia departed Heathrow 12 November 1919 (see page 40 for the third instalment of this wonderful Australian aviation story). A special Epic Flight Foundation display showcased the Smiths' achievements and memorabilia together with a wonderful 1:20 scale model of their Vickers Vimy.



LOGISTICS

The logistics involved in moving and feeding 65,000-plus people is no simple matter.

- More than 10,000 cars were marshalled into designated car parking sites each day.
 - A continuous stream of 35 articulated buses moved people from the car parks and the Elizabeth South train station from 8:30am to 6:30pm each day. Each bus carried approximately 100 people.
 - Every 15 minutes trains from either Gawler or Adelaide were stopping at Elizabeth South. Trains ferried 3,500 patrons on Saturday and another 4,800 on Sunday.
 - The catering arrangement was the best I have seen at an airshow, with an extensive food court that provided ample seating for diners or those who need a rest with a cool drink.
- Such meticulous organisation resulted in a wonderful day for those in attendance, and a great public relations exhibition for the RAAF. Score: 10/10. [W](#)



TOP Enjoying a virtual reality experience in the Astro STEM Zone. Photo: SGT Brett Sherriff.

ABOVE Vimy to fifth-generation models – Epic Flight Centenary Tent – 28SQN RAAF.



BELOW 33 Squadron KC-30 MRTT trolling for customers. Photo: Nigel Hitchman.





ABOVE F-35A bearing its claws.
 Photo: Nigel Hitchman.

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SMOKEY

BEAR
IN THE
AIR

WORDS Rob Power

WITH A DEVASTATING BUSHFIRE SEASON ALREADY UNDERWAY, A HIGH-TECH EYE IN THE SKY IS PROVIDING CRITICAL FIRE IMAGERY AND MAPPING DATA TO FIRE AGENCIES.



THIS SUMMER, FIREFIGHTING agencies across the country are bracing themselves for a dramatic increase in the severity and frequency of bushfires due to the impact of the ongoing drought and adverse forecast weather conditions.

Australia is facing, in every state and territory, the very real potential of the longest, most dangerous bushfire season for 20 years.

By mid-November, in NSW alone, hundreds of volunteer fire crews, as well as air operations personnel, planners, managers, aircrew and support staff had already battled hundreds of bushfires ravaging the north of the state, killing four people and destroying tens of thousands of hectares and hundreds of homes.

Readers may be surprised to learn that on any given day or night, high above the raging fires, a unique, high-tech 'eye in the sky' keeps watch, working round the clock to provide critical fire imagery and mapping data to fire agencies. That data provides essential intelligence to assist incident management teams plan and deploy tactical firefighting assets, 24 hours a day.

Nowra-based aviation company Air Affairs Australia is celebrating the 25th year of this important service and has recently seen a significant increase in demand for the wide area, tactical surveillance product our service delivers.

From humble beginnings involving one aircraft, Air Affairs Australia's Firescan capability has grown to become a true national service, operating four dedicated aircraft from its nominated operating base in Nowra, NSW, under contract to the National Aerial Firefighting Centre (NAFC).

Last fire season, Air Affairs Australia's Firescan teams conducted operations

in every state and territory, except the Northern Territory, delivering almost 500 operational sorties and more than 2,500 images from its specially designed thermal imaging systems.

It is an operation that involves over 40 highly skilled personnel, including specially trained aircrew, aircraft maintenance engineers, imaging and remote sensing specialists, design engineers, machinists and a team of hard working support staff. The operation is managed by a dedicated operations team at Air Affairs state-of-the-art National Flight Operations Centre in Nowra.

This year the service has increased to five aircraft and will for the first time, operate from dedicated Fire Intelligence Units (FIU) in three states, greatly enhancing access to critical imagery for firefighting agencies.

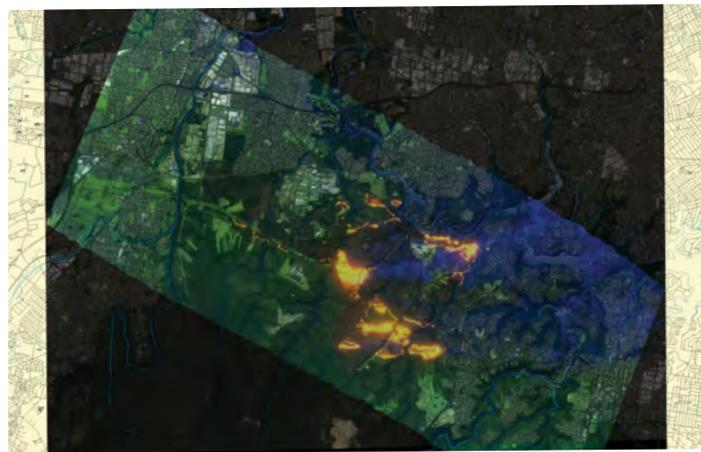
As part of its continuous improvement program, Air Affairs is committing significant investment this year into refining and further improving the Firescan product, with new mission systems, sensors and communications infrastructure, to better integrate

with our customers' evolving tactical requirements and to help them meet the challenges of the future.

Air Affairs Australia CEO Chris Sievers said: "It is personally inspiring to see the significant efforts our crew and staff undertake every year to provide and deliver this important service in a challenging environment.

"We are proud to support our firefighting agency customers in their critically important efforts to protect life and property. Firescan is an important part of our business, which we committed to 25 years ago with a vision of one day achieving a national and international service.

"The Air Affairs team was established using aerial bushfire surveillance experts which I am extremely proud of. We must now grow together with the fire agencies to meet evolving environmental challenges, to make certain we continue to contribute to the community that relies so much on us. We are committed to work with governments, both state and federal, to contribute our part to an evolving national aerial firefighting fleet." **WA**



LEFT An example of multi-band infrared imagery of the Moorebank, Sydney fire April 2018.



BELOW 2 Learjet 35 aircraft and a Kingair B200 configured with fire scanning equipment. Photo: Rob Power, Air Affairs Australia.





BATTLE MAKING THE MOVIE DURING THE OF BRITAIN

We often imagine that the production of epic historic wartime movies is a compilation of archived film and special effects interspersed with choreographed scenes to set the social and emotional effects of the time. Not so in the case of the 1969 movie *Battle of Britain*. The aerial combat scenes were lightly choreographed dogfights involving Spitfires, Hurricanes, Messerschmitt Bf-109s and Heinkel 111 aircraft flown by pilots of various nationality and filmed from a B-25 camera ship. The following is a personal account of the action by one of the RAF pilots conscripted to the project, **Ron Lloyd**.

SCENES TO DEPICT THE German perspective had been shot in Spain with a version of the Messerschmitt based on the Bf-109 manufactured under licence designated HA-1112-M1L Buchón. Thirty-two Heinkel 111s, also built under licence, with the designation CASA 2.111, represented Luftwaffe bombers in the battle. Seventeen Buchóns and a handful of the Heinkels flew to the UK amid much press attention to film the British side of the battle. All gathered at RAF Duxford to begin filming in the spring with hopes of good weather, knowing how capricious English weather can be.

Twelve airworthy Spitfires were available to the film. Some were loaned, some were already with the RAF Historic Flight (now renamed Battle of Britain Memorial Flight) and some came off poles outside RAF Station gates to be renovated at RAF Henlow.

The daily routine began with a weather briefing and a summary by the aerial director of the shots he wanted that day to fit the storyline. The leader of the Spanish pilots, an experienced colonel who exerted impressively strict discipline over his pilots, got together with our leader, a colleague, to discuss how to turn the director's wishes into workable flying manoeuvres. Each then briefed the pilots who were to fly them. This worked well enough for the smaller formations or solo shots but not so well for the air combat scenes. For one thing, the aerial director on board the B-25 camera aircraft suffered from air sickness and could usually manage no more than a muffled croak of "action" after which little was heard from him.

The briefing was therefore important as perhaps a dozen Messerschmitts and a similar number of Spitfires and Hurricanes (we had three for filming), plus the B-25 camera ship, took off with the ultimate intention of manoeuvring wildly in the same small piece of sky. The Spanish pilots, unsurprisingly, spoke Spanish and could manage "mine's a pint" and "would you care to dance" and not much else. They used a discrete radio frequency for transit to

the filming area, chatting happily in their native tongue, and then came on to our frequency – if they had noted it correctly.

We would form up two thousand feet above the B-25 camera ship flying in parallel a mile displaced, with the B-25 visible off our port wing. The Messerschmitts would form up in the same way on the opposite side of the camera ship. In long line astern with the B-25 were a Heinkel, a Messerschmitt and a Spitfire. Someone on the B-25 – the director, if he were capable – would announce “action” whereupon we would peel off into line astern towards the B-25 in a diving turn, reversing to position as if to attack the Heinkel in a manoeuvre known in the trade as a quarter attack. The Messerschmitts would do the same from the opposite side and the singleton Spitfire and Messerschmitt would jiggle to look as if they were opening fire on each other with the Heinkel feigning evasion.

You will appreciate the impending problem. Many aircraft were rushing towards each other in a piece of sky small enough for a Panavision letterbox camera frame to capture the action. Vigorous turning of the head and energetic manoeuvres were needed to avoid a mid-air collision in this chaotic

swarm of aircraft and the result, after many takes over six weeks on the few good weather days, looked remarkably like air combat as we fled to the edge of the area and reformed to do it again. The B-25 pilots did foresee the implications of having excitable pilots with unknown flying skills hurtle towards them to get “that shot”, the Day-Glo paintwork choices were not accidental.

Cameras were mounted on virtually anything that flew. The B-25 had camera positions in the nose, tail, fuselage gun position, and could lower a camera from the bomb bay on a boom. Filming was done from the Heinkels and from a helicopter by the famous Johnnie Jordan who had worked on several James Bond films, dangling fifteen feet in a harness below the aircraft.

Most novel perhaps was a camera mounted on the front seat of a two seat Spitfire looking into a prism which provided a pilot’s eye view via a superimposed gunsight reticule to bring some sense of being in the cockpit. Shots of collisions or aircraft exploding were curiously unpopular with pilots and were filmed with radio-controlled scale models which we saw being assembled with great skill at



BELOW Messerschmitt Bf-109 – Buchón and Heinkel 111 -CASA 2.111.



BOTTOM Artists impression of a “scramble” with Heinkels bombing the field.





LEFT Nose position for courageous cameraman to capture head-on shots.



BELOW Spitfires formatting for battle.



Pineview Studios in Buckinghamshire.

After extensive editing and cutting, few of the many formation shots could be identified as a shot you took part in, but I did get my moment of glory. We were lounging on the grass at RAF Hawkinge on England's south coast, where we had taken Spitfires to replicate operations from the many grass airfields used in 1940. A young member of the aerial director's team drew up and announced breezily that they needed a low-level roll shot "like a victory roll" and who would do it. Our leader was somewhere else, and I quickly said, "Yes I'll do it if I can have a practice". Apprehensively I glanced sideways to see if anyone else was showing signs of wanting to do the shot, but they were basic Jet Provost or Chipmunk instructors and perhaps not current in low level aerobatics, which I regularly flew in the Gnat, and happily looked the other way.

I called RAF Manston, 20 miles away, to ask if they would mind if I brought a Spitfire up to do victory rolls over the field. The ATC controller was ecstatic and phoned all his friends who headed for the field with their cameras. Starting at 1,500 feet to confirm predictable behaviours during a conventional roll I ended up at runway caravan height cranking the nose up slightly at about

300 knots to do a gently climbing roll. If you have seen *The Battle of Britain* movie, you may recall the incident when Jamie, a new pilot, returned to base elated after what he thought was his first kill and executed a spirited victory roll. He gets a third of a kill and a humbling debrief by his boss with words like 'irresponsibility', 'indiscipline' 'self-indulgence' and 'career prospects' occurring or implied in the far from friendly chat. The shot was rather tamer than I had hoped. Hawkinge sits up on a ridge facing the sea and as I approached low level from the east, the cameras were not set up to adequately film the shot and I was asked to come in progressively higher for each take. Nevertheless, relating the experience was still good for free beers for some years to come – and still is.

Since I knew I would never get another chance, I managed to talk my way into a conversion to fly the Messerschmitt. This aircraft does have a reputation. In 1940 it was matched against Spitfires and Hurricanes of the RAF and much has been written comparing them. To purely handle rather than fight in them there were a few differences. The Spitfire was a lady – elegant, responsive, and if you treated her right a delight to be with. The Messerschmitt has been described

as a highly strung thoroughbred racehorse straining to do its own thing, while you attempt to coax it to do your thing – and not crash. It sat squat on the ground with a high nose restricting forward visibility even more than the Spitfire. The cockpit was decidedly snug with a heavily engineered canopy hinging sideways and a windscreen made of tough green glass, crazed due to age that together, even on a sunny afternoon, made the cockpit feel like a fish tank, or worse a coffin. Lateral stability on the ground was unpredictable with a shortish fuselage, smaller fin than the Spitfire and strange forward canted main wheels retracting outwards, its wheels mounted with inward facing camber, all to save space for more ammunition. That undercarriage arrangement together with a powerful Merlin engine turning in the opposite direction to its original Daimler-Benz and putting differential weight on the two wheels combined to induce yaw when you least expected it to catch out the unfamiliar or inattentive. It also had automatic leading-edge slats on each wing which popped out at around 100 knots but not necessarily at the same time which could cause an annoying wobble when flying in formation. Apart from those characteristics, regarded as vices only

by the inexperienced it was a very pleasant and responsive aircraft to fly.

The weather in southern England in the summer of 1940 was glorious. The summer of 1968 was lousy with frequent cloud and blustery heavy rain. Lost filming time with large numbers of film people on generous salaries doing nothing but enjoy themselves meant that the lavish champagne lunches with exotic seafood and gourmet buffet spreads gave way to cheese sandwiches and builder's tea as the money ran out. Nervous investors made phone calls to nervous directors.

A bright young career-hungry film executive approached on one of the many rainy days to say, "Why don't we take the planes somewhere fine where we can film – Ireland say". We tersely pointed out that our weather mainly came from the Atlantic via Ireland and anyway we weren't bloody well going there.

We considered the problem among ourselves and thought, "Where can we go where we would like to be on holiday in the sun?". A flight plan for Montpellier in the South of France was

duly filed for nine Spitfires and three Messerschmitts led by the B-25 to stage down through France.

Departing over the cliffs of Dover on the south coast with a scattered 800 foot cloud base, sitting in a Spitfire Mk 2, the only Spitfire to have flown in the Battle of Britain, I felt privileged. I was born in 1940 and tried to imagine the thoughts of the young pilot who had last sat in this aircraft heading east to kill or be killed.

We got some funny looks from aged Frenchmen in berets sipping Pernod as we staged through Le Touquet and on to Dinard for an overnight stay, refuelling the next day at Bordeaux. But they were reassured the war was over and drank to our success.

We flew intensively at Montpellier while enjoying the delights of French food and friendliness if you spoke at least four words of their language in a recognisable accent. Mine were, "Quatre grandes bieres s'il vous plait". However, the French landscape did not look much like Kent and, annoyingly for the film company, only shots looking upwards could be used in the film. **W**

POSTSCRIPT

Ron Lloyd was an RAF flying instructor posted to Central Flying School staff at RAF Little Rissington in Gloucestershire when he thought all his Christmases had come at once; he was chosen to spend six weeks flying the Spitfire in making the movie *Battle of Britain*. He left the film after flying the Spitfire Mk 2 with its civil designation of G-AWIJ back to Duxford. That aircraft now flies with the Battle of Britain Memorial Flight based at RAF Coningsby in Lincolnshire where he was recently reunited with it, now affectionately known as 'P 7'.

In late 1968, he was posted to Perrin Air Force base Texas USA to fly the Delta Dagger F-102, where he met RAAF pilots Bruce Grayson and then Dave Bowden as they also flew the F-102 on exchange. Later, having bought a house within walking distance of RAF Staff College in Bracknell not far from London, he elected to serve again as an exchange officer attending RAAF Staff College Fairbairn – Bruce Grayson was on the same course.

A key pilot in the movie production was a flamboyant Texan businessman, warbird collector and much more, Connie Edwards. The Buchón aircraft were part of his extensive collection. Connie passed away earlier this year. A Google search will yield a swashbuckling exposé of his life story. Connie developed a deep affection for the British way of life and he and Ron met regularly in London. Ron remarked, "Connie was one of those unforgettable characters you meet rarely in life. It is a privilege to have known him".



 ABOVE Ron Lloyd with the MK 2 Spitfire, now designated P 7, which flew in the actual Battle of Britain and later in the making of the movie.

AN AUSTRALIAN IN BURMA

WORDS Adam Lunney



 **LEFT** At 45SQN's base at Kumbhirgram in India, Pilot Officer Bill Taylor and Flight Lieutenant Wally McLellan RAAF walk back to the crew room from their Mosquito, 7 January 1945. Photo courtesy AWM.

SERVING IN
45 SQUADRON
ROYAL AIR FORCE,
BILL TAYLOR
FLEW MOSQUITO
COMBAT AIRCRAFT
OVER BURMA,
DURING WWII,
AND UNDERTOOK
65 OPERATIONAL
SORTIES INTO
ENEMY TERRITORY.

WILLIAM GEORGE MAURICE TAYLOR didn't join the RAAF because he was inspired by Biggles, or because he'd been turned off the infantry by family experiences from World War I. He simply figured that by the time they'd taught him to fly, it would all be over.

Born on 24 May 1921, he was living in the Sydney suburb of West Kogarah, working as a clerk and serving in the militia with the 45th Battalion at the time he joined the RAAF on 7 November 1941. Just a month later, the Japanese attacked Pearl Harbor, and Bill's plan for a short war was crushed.

After initial and elementary flying training, he and many others set sail for Canada on the *USS Tasker H Bliss*, the onboard quarters described as "not fit for pigs". On arrival at 6 Service Flying Training School at Dunnville, Bill flew Harvards and was promoted to Sergeant. After a further seven weeks of reconnaissance training, he sailed for Scotland where he disembarked on 4 April 1943. At Bournemouth in England he converted to Airspeed Oxfords, Bristol Blenheims and finally Beaufighters.

His first assignment was to fly a Beaufighter to Bombay, India. Leaving England on 29 September as part of

a reinforcement group, he and his navigator, Sgt Putman, flew via Iraq and Bahrain to arrive at Agartana on 24 October.

For the Bahrain to Sharjah leg they managed to squeeze a hitchhiking padre into the two-seat Beaufighter. During climb at about 4,000 feet (1200m), Bill felt a rush of air from below and a tap on his shoulder. He turned to see their pale-looking passenger standing over the open entry hatch. Bill slowed to almost stalling speed to reduce resistance, while the padre closed the hatch and sat quietly for the rest of the journey.

On 6 February 1944, Bill finally reached an operational unit, 45 Squadron RAF, 'The Flying Camels', based at Yelahanka in South-West India. The first Squadron in India equipped with Mosquitos, it was a mix of Brits, Canadians and Australians.

In the Far East, pilots were told to expect to be killed if ever captured by the Japanese. Bill carried a service revolver and bandolier of ammunition with him when flying and, in addition to his silk map, a notice in Burmese promising a reward for his safe return. That assumed he might survive a crash landing or a successful parachute escape. Emergency exit was via the entry hatch, and to do so safely required the starboard engine to be shut down lest the perilously close propeller solved all his problems.

On 1 October Bill, now a Pilot Officer, and F/Sgt Putman flew their first operational sortie from Dalbhumgarth, a sector reconnaissance along the Chindwin River in Burma, during which they strafed Kalewa. The role of the Squadron was primarily ground attack, both day and night, in support of the British 14th Army. To get to their target areas, the Squadron had to fly over a mountain range. In daylight, 20,000 feet (6,100m) was sufficient to pick a path through the mountains, but at night it was a minimum of 25,000 feet (7,600m).

On 20 October 1944, a Mosquito crashed after its wing leading edge separated while turning to land, killing both crew. The squadron was grounded while the remaining Mosquitos were examined. This was one of a number

of fatal incidents involving failure of the Mosquito's wooden wings, occurring primarily in the Far East and Australia where tropical conditions could weaken the binding glue.

Six pilots, including Bill, were then sent to Cox's Bazaar in Bangladesh to evacuate wounded troops from the front lines with Tiger Moths and Sentinels. An oil drum or box placed in the landing zone indicated whether Japanese troops were around: if the marker was present, the plane could land. Labourers stationed with the troops would then run out and stop the plane by hand, lift the tail and wheel it to the end of the strip where a casualty would be loaded. Once the passenger was safely strapped in, the pilot eased the throttle forward while the labourers held the plane down and then, on the pilot's signal, let go. Bill flew 17 casualty evacuation sorties.

By mid-December the Mosquito's wing issues appeared resolved, and on the 26th Bill flew Mosquito HR447 with Putman (recently promoted to Warrant Officer) with three other aircraft to attack a Japanese airfield at He-Ho. The approach to target was made from the east in a wide sweep; the four aircraft roared in at full throttle in line abreast, as low as they could go.

Reaching the target, they were met by a wall of small arms and machine gun fire. Bill's plane was hit in the starboard engine and caught fire. He continued the attack and dropped his bombs, but without both engines he wasn't going to make it all the way home. They continued through valleys and over hills along their escape route, then headed for Kalemyo, the closest airstrip designated as having night landing facilities.

As Bill and his navigator fired recognition flares, he exclaimed, "These buggers haven't got lights!". Instead, trucks took up position on each side of the runway with their headlights on. He got the plane down safely and pulled up just at the end of the strip. For that effort he received a logbook endorsement for "exceptional flying ability".

Bill eventually made it home to Australia. After a long and fruitful life, he passed away in July 2019. 



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UNRAVELLING A MYSTERY

WORDS Tony Young



JUST BEFORE MIDNIGHT on 4 July 1944, with a full moon and scattered cloud ceiling of 1,000 to 3,000 feet (300-900m), a Mosquito FB.VI fighter-bomber took off from RAF Lasham in Southern England. Aboard were two flying officers of 107 Squadron RAF: Australian pilot Hector Ross, age 23, and his RAF Volunteer Reserve navigator Jack Green, 35. It was to be a long 'night intruder' patrol over Northern France, and their 33rd operation together.

Night intruder missions patrolled a designated route at a height of 1,000 feet (300m) and targets of opportunity were attacked from a shallow dive at 500km/h with the Mosquitos formidable armament: four 225kg bombs, four 20mm cannon and four .303-inch machine guns.

The men did not return from that patrol, and were listed as 'missing, presumed dead'.

Hector was the youngest son of Charles and Beatrice Ross, farmers from Bilambil, NSW. Three months after his

death his parents were informed that his grave had been located at Bayeux British Military Cemetery in France, and in 1949 they were sent a photo of it. However, they died without learning anything further of their son's death.

For 74 years the circumstances of the deaths of Hector and Jack remained a mystery to the Ross family. Then in February 2018, a chance comment by Hector's nephew led to a decision to attempt to solve the mystery. After months of dogged research, a small notation on an archival document of the Commonwealth War Graves Commission indicated they might have crashed near the small French village, La Chapelle-près-Sées.

While awaiting results from a request to RAF Records, which ultimately provided critically important material, contact was established with the French volunteer organisation ANSA 39/45, whose members are dedicated to investigating WW II air crashes.

Information provided by ANSA and RAF Records established that Hector and Jack's Mosquito had been hit by German anti-aircraft fire, and they had in fact crashed in a field near La Chapelle-près-Sées. Wreckage of the Mosquito had been identified at that location.

In addition to valuable research assistance, ANSA also prompted the local council to construct a memorial stele at the crash site. A formal dedication ceremony was held 18 May 2019.



ABOVE Presentation of French government commemorative medallions to members of the Ross family, May 2019. Photo courtesy of Adrian David, ANSA.



ABOVE LEFT Hector Ross in a formal portrait taken during his flight training in Canada, 1942. Photo courtesy of Climo Photographic Studio, Halifax, Canada.



LEFT Official service photo of Jack Green.

The ceremony was magnificent, attended by five Ross family members from Australia, six members of the French parliament, 13 mayors from the region, an Australian Government representative (Caroline Bartlett), a uniformed RAAF representative (FLTLT James Walduck), 25 French military colour bearers and more than a hundred local villagers. It included a low-level fly-over by a vintage Dassault Flamant twin-engine aircraft. Members of the Ross family and FLTLT Walduck were presented with commemorative medallions by the French Parliament.

The generosity and compassion of the French people was remarkable. "We must never forget" was their creed for those who sacrificed their lives in the liberation of France. **W**

• ANSA is willing to assist others seeking information about a relative who lost their life in the skies over Northern France during World War II. Email ansa3945@hotmail.fr



LEFT Hector and Jack's Mosquito, RAF serial NS886.



BELOW Metal detector search at the crash site, Menilgault Farm. From left, Rod Ross, Jean-Claude Clouet (ANSA), Bill Ross, Mick O'Toole, Sally O'Toole (niece of Hector Ross). Photo courtesy Adrian David, ANSA.





LEFT

WOFF Lawler and the refurbishment project team with the F-111 A8-134.



BELOW

A8-132's refurbished cockpit.



THE F-111 - UNIQUE IN THE RAAF



IN KEEPING WITH maintaining the significant heritage legacy of the F-111 and recognising its service through the Cold War, a team from the Directorate of Air Force Heritage replaced the reconnaissance F-111 held at the South Australian Aviation Museum (SAAM) with ex-ARDU F-111, A8-132, and during May moved the SAAM aircraft, A8-134, to the Australian War Memorial (AWM) in Canberra.

The Director-General - History and Heritage Branch, AIRCDRE John Meier, said: "This was a significant undertaking and thanks must go to Dr Brendan Nelson, Director of the AWM for recognising the F-111's service to the nation. By supporting the AWM, quality aviation heritage organisations and museums with the gifting of heritage aircraft and artefacts, the Air Force shares the record of Australian's air power throughout history. These aircraft represent a physical and three-dimensional expression of how the Air Force has developed its capability in order to protect Australian interests. The educational opportunities afforded in these collections are significant,

and have a profound influence on how people connect with and understand the Air Force."

WOFF Stan Lawler led the project team that refurbished and prepared A8-134 for display at the AWM. WOFF Lawler joined the Air Force in 1979 and graduated as an Airframe Fitter. With over 20 years of F-111 aircraft maintenance experience with No.6 SQN, including as the Warrant Officer Engineer, he was the obvious person to lead the team.

The other members of the team were: WOFF David Dowe, WOFF Peter Roney, FSGT Paul Denley, FSGT David Bell, FSGT Wayne Dupuy, FSGT Kerry Hughes, FSGT Murray Heath, SGT Steve Bohr, SGT Keith Weatherby, SGT Graeme Hill, AB Scott Bain, and LAC Darryl Prestidge. Together the team has over 150 years of combined F-111 maintenance experience.

WOFF Lawler said: "The thing that made the F-111 so different to every other aircraft I had worked on was the complex flight control system. The variable geometry wing and associated systems were radically different to

other aircraft operated by the Air Force, and as a technician it challenged you every day.

"SAAM had done a magnificent job of looking after A8-134, reducing the amount of 'cosmetic' work required prior to handover to the AWM. Our focus was on the disassembly, transport and reassembly of the aircraft."

The F-111 refurbishment project included work on the cockpit of A8-132, as WOFF Lawler explained: "The refurbishment of A8-132 was quite involved particularly as the cockpit was completely stripped of all components, with some environmental degradation of the aircraft surface finish. Given the skill set of our team, and the availability of sufficient F-111 unique components, the refurbishment of A8-132 to display standard progressed seamlessly."

Reflecting on Dr Nelson's speech at the handover ceremony, WOFF Lawler said: "Dr Nelson not only focused on the operational importance of this aircraft but also on the commitment and dedication of the men and women who operated, maintained and supported it, as well as the families of those involved throughout the 40-year service life of this aircraft.

• *WGCDR Mary Anne Whiting, History and Heritage Branch – Air Force*

LOST CATALINA FOUND



MORE THAN 75 YEARS after a Catalina flying boat, serial A24-50, of No.11 Sqn RAAF failed to return from a wartime mission, its wreckage has been located. The RAAF has now completed a search and recovery mission in Indonesia for the remains of its 10 Australian airmen.

The aircraft went missing on 2 September 1943 while on a sea mining operation in Sorong, occupied Dutch New Guinea. It was found near Fakfak in West Papua in April last year. Minister for Veterans and Defence Personnel Darren Chester said the Air Force

Unrecovered War Casualties team positively identified the missing aircraft.

“We are committed to honouring the service and sacrifice of Australian military personnel from all theatres of war,” he said. “The only major recognisable pieces of wreckage were two sections of the wing, engines and propeller, and the empennage (tail section) across the top of a ridge. The RAAF team has completed further search activities in the field and has reported finding a number of items of interest which require further tests to confirm each item’s origin.”

Source: Defence Connect



BERLIN AIRLIFT ANNIVERSARY

IN 1948, WHEN RELATIONS between the Western powers and the Soviet Union occupying Germany entered a state of cold war, the RAAF provided 41 aircrew to fly Dakota aircraft as part of the Berlin Airlift. Since the RAF did not have enough crews, the Australian pilots and crew flew mostly in RAF Dakotas. Among them was a young Flying Officer David Evans, who was to become Air Marshal S.D. Evans, AC, DSO, AFC, Chief of the Air Staff.

On 15 September 1948, the first Australian crew made the 250km flight from Lubeck to West Berlin, and the last crew left the city on 26 August 1949. A RAAF Unit specially formed for the action, the Berlin Airlift Squadron, flew 2,062 missions to Berlin without registering a crash. In Australia, the airlift was known as Operation Pelican.

On Sunday 12 May 2019 at the former airport of Berlin Tempelhof, which is now a recreational park, an exhibition was held to mark the 70th Anniversary of the Berlin Airlift. The exhibition included a large banner with a photo of AM Evans, captioned with his words: “We undertook our missions with an in-built zeal. We were all aware of the marginal standards of living that the citizens of West Berlin were enduring with such courage and steadfastness. I was glad to be of help.”

When speaking to History and Heritage Branch about his experiences, AM Evans reflected: “I was always concerned when we airlifted small children to safety; they would arrive with cardboard signs around their necks inscribed with their names and ultimate destinations, and accompanied by young women, possibly their teachers. They were always very excited to be coming on board the aircraft. We would talk to them as much as we could; because of course, we could not speak German. I often wondered what happened to them.”

• WGCDR Mary Anne Whiting, History and Heritage Branch – Air Force



BELOW

Displayed for the anniversary was a mural of children airlifted to safety.



LASTING FRIENDSHIP

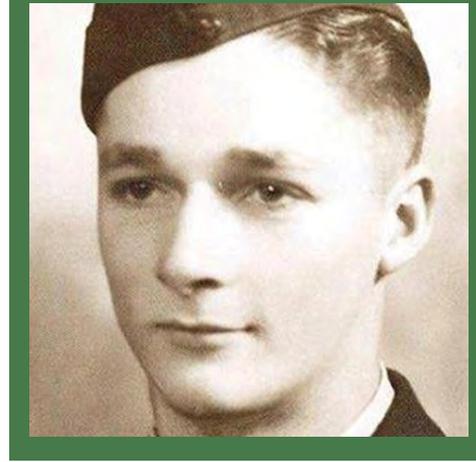
PILOT OFFICER Jim Hocking RAAF has been honoured by the English town of March in Cambridgeshire's Fenland District for his heroic actions.

Hailing from Nambour, Qld, Hocking was just 21 when, on 28 July 1944, he sacrificed his life to save his crew and many of the people of March. During his final training flight, an engine of his Stirling bomber caught fire. Ordering his crew to bail out, he diverted the bomber clear of the town.

Hocking was posthumously awarded the Australian bravery award the Star of Courage in 2015.

In memory of his heroic act the Fenland District Council has had a longstanding friendship agreement with Queensland's Sunshine Coast Council, which is "anchored in remembering the efforts of Pilot Officer Hocking". For the 75th anniversary, the March War Museum invited his family members to recite some of his letters and showcased the book *March Hero* by Sunshine Coast journalist and author Dot Whittington. The BBC featured a radio segment about him.

"Out of the tragedy of war a lasting friendship has developed with so many families in the March area, and March



is now a second home to members of the Hocking family," Jim Hocking's brother Alan said.

The museum displays a mannequin of Hocking in his pilot's uniform and a replica set of his medals provided by his brother.

Source: Defence Connect

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PHOTO Nigel Hitchem



AUSTRALIA ONWARD TO



CONTINUING THEIR PIONEERING 1919 FLIGHT FROM ENGLAND TO AUSTRALIA, INTREPID AIRMEN ROSS SMITH, HIS BROTHER KEITH AND THEIR FAITHFUL MECHANICS, WALLY SHIERS AND JIM BENNETT, FLY FROM RANGOON TO THE CONCLUSION OF THE RACE AT DARWIN. EXCERPTS ARE FROM ROSS SMITH'S 1922 BOOK, *14,000 MILES THROUGH THE AIR*.



IN THE CLOUDS ABOVE BURMA

THE TAKE-OFF FROM Rangoon was not without a thrill. As a matter of fact, to this day it is a mystery to me that we ever left the ground. The race-course was much too small for so large a machine as the Vimy and heavily laden as it was. It had barely attained flying speed when a fence loomed up in front of us. The Vimy just scraped over, but ahead were trees and buildings. I acted instinctively. The undercarriage brushed the tree-top, and danger was past. It was over in a breathless moment; but had the machine been but a single foot lower, disaster must have overtaken us. How slender is the cord that holds success from failure!

I circled above the race-course for twenty minutes; but, as Poulet had not yet left the ground, I concluded that he must be experiencing engine trouble, and so reluctantly we had to push off without him.

We flew due east to Moulmein. From there we headed southeast over country rapidly becoming mountainous; but, instead of encountering lofty summits, a mighty cloud bank, that seemed to reach to heaven and bar the entire prospect in the direction of our course, extended before us. The monsoon season was now due, and I concluded that this would be one of the initial

storms. Somewhere in that dread barrier lay the high peaks over which we must cross, and I admit that I was afraid of the prospect. As time wore on, the storms would grow in frequency and intensity, so I decided to plunge ahead.

The clouds rested down to 4,000 feet, and we were flying just beneath them. Somewhere ahead lay the mountains that had to be crossed, rearing their summits another 3,000 feet higher. Our maps indicated a pass which we tried to find, and so we started off along a deep valley...

At an altitude of 11,000 feet we were engulfed in a dense blanket of mist. As we had left England hurriedly, there had been no time to fit special cloud-navigating instruments, and the only ones we carried for this purpose were the ordinary compass, air-speed indicator, and inclinometer.

Any one who has flown through clouds in a big machine, under similar circumstances, will appreciate my feelings at this time. It was now an hour since we first started across the clouds, and both Keith and I concluded that we must surely be across the mountain range. So I decided to take the risk and go lower and "feel". Shutting off both engines, we glided down...

A few minutes more and we burst out into full view of a glorious world,

carpeted with trees, 1,500 feet below. The sudden transformation was stunning. It was an unspeakable relief — the end of an hour that was one of the scariest nightmare experiences I have ever passed through.

An hour later and we reached the Mekon River and the haunts of man. Small villages lay scattered along its banks and wide expanses of irrigated lands verdant with rice crops. Following downstream, we landed at Don Muang aerodrome, twelve miles north of Bangkok, after a flight that will live long in my memory. Don Muang is the headquarters of the Siamese Flying Corps. They have several hangars, a number of machines, and up-to-date workshops. During my visit to Siam the previous year I had been to Don Muang, so that on landing I found myself among friends...

BANGKOK TO SINGAPORE

[Next morning] we left Bangkok in good weather, and were escorted for the first fifty miles by four Siamese machines. Ahead we saw the rain, and I dreaded what was to come. While we were over the sea, with the land on our right, there was comparatively little chance of our crashing into anything. This was fortunate, for in a few moments we were soaked through, our goggles became saturated, and all vision for more than a few hundred yards or so was obliterated. The rain came down literally like a sheet of water, and as we had to remove our goggles and maintain a constant lookout ahead, we were almost blinded by the rain lashing our unprotected eyes.

I was afraid to go inland, as the rain only allowed us limited visibility. Once we almost crashed on to a hill, which suddenly loomed up through the rain ahead. I just had time, by a hair's breadth, to pull the machine around in a climbing turn and go farther out to sea. I have never experienced worse flying conditions, and had it been at all possible to land, I gladly would have done so.



LEFT The crowds at Rangoon.





At last we reached Singora, and a glance at the aerodrome showed that at least half of it was under water. There was, however, a narrow strip along the center which appeared more or less dry, but I would have to make a landing across wind. I came down low to examine this strip, and to my utter dismay noticed that it was covered with small tree-stumps! As we touched and ran along, I expected every moment to feel a jolt and the undercarriage wrenched off, or else the machine thrown on to her nose; but by the merciful guidance of Providence we miraculously came to rest safely.

The whole native population assembled to see us. None had ever seen an aeroplane before, and at first they would not venture near. Then several of them walked in front of the machine, flapping their arms and performing birdlike evolutions. We concluded that they were solving the mystery of flight and demonstrating how the Vimy flapped its wings to rise from the ground. My brother, unobserved, climbed into the cockpit and, seizing the control column, vigorously moved it to and fro, which caused the ailerons and elevators to flap about. There was a wild scamper in all directions. We learned afterward that the natives imagined that we were flapping our wings preparatory to starting off.

After breakfast in a bungalow we returned to the machine and found that the government had sent down



ABOVE Preparing to leave Singora once the tree stumps had been removed.

TOP Crowds watching on at Singapore. Note the guard at right.

200 convicts from the local jail to clear away the stumps; and so we set them to work to clear a strip about 400 yards long and fifty yards wide [365m x 45m] across the aerodrome. The day's rest from flying was a delightful relaxation; in fact, an imperative necessity, for my brother's and my own eyes were almost too painful for vision, after the previous day's battle with the storm.

After a much-needed night's rest, we were down at the aerodrome at daylight. Three large patches of water extended across the aerodrome at intervals of about fifty yards. This water was, on the average, six inches [15cm] deep; but, as the aerodrome was sandy, our wheels did not sink appreciably into it. A clear run of fifty yards allowed the machine to gather a fair headway. Then she struck the water, which almost pulled us up; a race across another fifty yards of hard

ground, and by the time we had passed through the second patch of water the machine was moving very little faster than at the beginning.

The third patch of ground was a little longer, and when we reached the third pool we were traveling at about thirty miles per hour [50km/h]. The sudden impact with the water almost threw the Vimy on to her nose, and water was sucked up and whirled in every direction by the propellers. Our flying speed had to be gained on the seventy yards of dry ground which now remained; beyond that extended scrub and gorse bushes.

The Vimy bounded forward as soon as she left the water, and just managed to get sufficient lift on her wings to clear a ditch and scrape over the shrub...

I had been dreading the landing and take-off at Singapore, as the improvised aerodrome, the race-course, was altogether too small for our large machine. I glided the Vimy down at as low a speed as possible, and just before we touched the ground Bennett clambered out of the cockpit and slid along the top of the fuselage down to the tail-plane. His weight dropped the tail down quickly, with the result that the machine pulled up in about one hundred yards after touching the ground...

[Next morning] the rain which had fallen overnight had made the race-course ground very heavy. My brother and I paced over and examined the ground and discussed the best way to take off, but we were both very dubious as to whether we could get the machine into the air or would pile her up on the adjacent houses in the attempt. I taxied into the position, so as to give the maximum amount of run, and then opened the throttle full out.

We gathered way slowly, and I watched the fence around the course come rapidly nearer and nearer, and still we were not off the ground. It was a tense and anxious moment. When fifty yards from the rails, I pulled my control-lever back; the trusty Vimy rose to the occasion and just cleared the rails. There were still houses and trees to be negotiated, and I set the Vimy climbing at an alarming, steep angle.

Another breathless moment passed, and the wheels of the undercarriage

just cleared the tree-tops. It was a great triumph for the Vimy. She achieved the seemingly impossible, and to this day I regard our escape from disaster during this perilous take-off as providential...

SINGAPORE TO SURABAYA

On reaching the coast of Sumatra we encountered a light head-wind and flying conditions became very bumpy. One immense vacuum into which we fell made us hold tight and wonder.

"That's the Equator," ejaculated my brother, and, sure enough, by dead reckoning, we had bumped across the line into the Southern Hemisphere. There developed in me a strange admiration — almost reverence — for the super-mechanism that hummed away rhythmically, that had now covered 10,000 miles without an overhaul, and at the opposite side of the globe was still singing a hymn of praise to the makers, as it had done when the bleak wintry snows had carpeted the aerodrome at Hounslow and Northern France. How far away this all seemed!

The sea was a glorious mirror almost as ripple-less as the canopy above, and scattered broadcast lay the Thousand Isles, each one beautiful, and all combined to make one of the most beautiful sights I have ever looked down upon. Many of the islands are heavily grown with palms extending to the very water's edge; others, sparsely cultivated, fringed with a narrow ribbon of beach; but around each is a setting of an exquisite shade of green, marking a sand-girt shallow; then deep blue and depth. Myriads of tiny white fisher-sails passed through the channels, gleaning their harvest from the sea.

[At Kalidjati] I was delighted to learn that several aerodromes had been constructed between Java and Australia for our use and I lost no time in expressing my heartfelt thanks to His Excellency the Governor-General of the Netherlands East Indies for his kindness and the interest which he had taken in our flight, without which we never would have reached Australia within the allotted thirty days.

After a well-enjoyed meal, we set to work on the machine. The petrol available was very heavy, and it took

us six hours to filter 350 gallons [1,600] through the chamois leather strainer into the tanks. As the next stage to Surabaya was only a short lap, we did not leave Kalidjati before 7.30am

At Surabaya we made a good landing and were easing off to rest when the machine seemed to drag, and from past experience I knew at once the Vimy was becoming bogged. Opening up the starboard engine, we began to swing slowly, but the port wheels immediately sank into the mud and we tilted on to our fore-skid. At once I shut off both engines and the Vimy gradually eased back to her normal position. I then discovered that our aerodrome was a stretch of land that had been reclaimed from the sea! The top crust had set quite hard, but underneath was a layer of liquid mud.

The native people, who had been kept back by the Dutch soldiers, rushed the ground, and their weight on the sun-dried crust soon broke it up, and mud began to ooze through. In a very short while the Vimy subsided to her axles and was surrounded by a pond of semi-liquid mud.

The engineer of the Harbor Board arrived, and together we discussed the situation. Disconsolate we decide to leave the machine for the night and resume our efforts in the morning. I don't think I ever felt so tired or so miserable in my life as I did then. Here we were only 1,200 miles from Australia; we still had four of our thirty days left in which to do it, and yet to all intents and purposes we were hopelessly stuck in this quagmire without a chance of getting out of it.

SURABAYA TO DARWIN

Next morning saw us at the aerodrome by daylight, and a gladsome sight met our eyes. Natives were streaming in from every direction bearing sheets of bamboo matting — they were literally carrying their houses on their backs — and already a great pile of it lay by the Vimy. More matting arrived on a motor lorry, so we made a road about 300 yards long and 40 feet wide [275m x 12m] and pegged it all down and interlaced the mats so that they could not blow up. At last all was ready and just 24 hours



BELOW Bamboo matting formed an improvised runway over mud at Surabaya.



after our arrival at Surabaya we started up the engines, ran along the roadway, and with feelings of intense relief felt the Vimy take off and get into the air.

We circled low over the town and anchorage, so as to give the engines time to settle down to normal running, and then headed on a direct compass course for Bima aerodrome in the island of Sumbawa.

At Bima the next morning, natives were swarming around the machine with presents of coconuts sufficient to start a plantation; evidently they thought the Vimy a very thirsty sort of bird. We took a cargo of nuts on board, as the water was unsuited for drinking, and, setting off in dazzling sunshine, once more pursued our course above scenes of tropical enchantment and alluring charm.



Ross Smith samples a coconut at Sumbawa.

A thick haze soon obscured the land and all distant vision, but we eventually picked up the Timor

coast a few hundred yards from our calculated position. Ten miles inland we came down on the aerodrome at Atamboea, our last landing ground before Port Darwin. A guard of Dutch soldiers kept watch over the machine while we proceeded with their officers to camp, some six miles away. It is hardly necessary to say that none of us over-slept. We were too excited at the prospect of the morrow. We felt sure that if it dawned fine and hot, our homing was assured.

If an aeroplane is forced to land in the sea it usually floats for a time, then the forward part sinks and only the tail remains above water. Remembering this, just before leaving Timor we tied a parcel of food, a bottle of water, the Very pistol and some cartridges on to the tail so that we would have something to fall back upon in case of emergency. Soon after 8 the fog began to thin, and at 8.35, to be exact, I opened up the engines and just managed to scrape out of the 'drome. Scrape is exactly the word, for the branch-tops of the gumtree rasped along the bottom of the machine as we rose. It was indeed one of the closest shaves of the trip.

In front of us rose a chain of high hills, and, as the atmosphere was hot and we climbed very slowly, we made a detour to avoid them. Still flying low, we approached the coast and pulled

ourselves together for the final lap — the jump across the Arafura Sea that lay between us and Port Darwin.

Keith took all possible bearings, noted wind direction, and made numerous calculations of ground speeds. Then we set compass course for Darwin, and with a "Here goes!" we were out over the sea. All our hearts were beating a little quicker; even our fine old engines seemed to throb a trifle faster. This was to be our longest stretch over open sea and I did not relish the prospect of being out of sight of land for five hours. However, as the coastline of Timor receded and disappeared behind us, my thoughts turned back to the great transatlantic flight made by the late Sir John Alcock in a Vimy similar to our own. What had we to fear with only a few hundred miles of open sea to cross, while he had nearly 2,000?

The Australian Government had arranged that a warship should patrol the sea between Timor and Port Darwin in case we should need help, and anxiously we scanned the distant horizon for the first glimpse of her.

Our watches registered 11.48 when Keith nodded ahead, and dead on the line of flight we made out a faint smoke that soon resolved into the smoke plume of a fighting ship. It was the HMAS Sydney, and we knew now that, whatever might befall, we had a friend at hand.

We swooped low, and exactly at twelve minutes past noon passed over the vessel, seeing plainly the upturned faces of the sailors and their waving hands. It was a cheer of welcome quite different from anything that we had experienced on the long journey. Perhaps it is not to be wondered at that the result of our snapshot was blurred through the shaking of the camera. We took the opportunity of snatching a speed test, and found that we were averaging

seventy-five miles an hour.

Two hours later both of us saw ahead and to port what appeared to be haze, but which we hoped was land, though neither dared express his hopes. They were justified, however, ten minutes later, and hailing Bennett and Shiers, we pointed joyfully to Bathurst Island lighthouse.

It was just 2.06 P.M. when, as our diary prosaically notes, we "observed Australia." At 3 o'clock we not only observed it, but rested firmly upon it, for, having circled over Darwin and come low enough to observe the crowds and the landing place, we landed on Terra Australis on December 10th, 27 days, 20 hours after taking off from Hounslow.

We had won the race against time and the £10,000 prize with just 52 hours to spare!

Two zealous customs and health officials were anxious to examine us, but so were about 2,000 just ordinary citizens, and the odds of 1,000 to 1 were rather long for those departmental men, and our welcome was not delayed.

The hardships and perils of the past month were forgotten in the excitement of the present. We shook hands, our hearts swelling with those emotions invoked by achievement and the glamour of the moment. It was, and will be, perhaps, the supreme hour of our lives.

Almost reverently we looked over the Vimy, and unspoken admiration crept over us as we paid a silent tribute to those in far-off England for their sterling and honest craftsmanship. The successful issue of the venture in a great



BELOW Lt Hudson Fysh greets his wartime No.1 Squadron colleague Capt Ross Smith at Darwin. Fysh and his former pilot Lt Paul McGinness had driven a Ford Model T from Queensland on a ground survey for the Vimy's route southward. Eleven months later they co-founded Qantas.



Joining the Vimy at Darwin's Fannie Bay on 12 December 1919 was a BE.2e. It had been flown from Point Cook, Victoria, on the first trans-Australia flight, by Captain Henry Wrigley and Sergeant Arthur 'Spud' Murphy to select landing sites for the Vimy.



degree was due to them, and surely they merited and deserved a large proportion of the praise.

• *Part 4 in the Autumn issue will conclude Smith's account, following the airmen's flight from Darwin to Melbourne to receive their prize, and finally the arrival at their hometown of Adelaide on 23 March 1920. For more, see the book reviews on page 74*

SA EPIC FLIGHT CENTENARY CELEBRATIONS

• AUGUST TO SEPTEMBER

- The EFC Schools Competition, sponsored by Boeing Australia, attracted entries from more than 60 SA primary school students, to create websites, photo essays, videos and Lego stop-motion films to tell the story of the epic flight. All participants received an EFC commemorative medallion, with five also receiving family passes to the Edinburgh Air Show.

- The Makers' Empire Marmaduke Mascot Competition, inspired by Sir Ross Smith's little pilot mascot Marmaduke, attracted 4,800 entries. The winning entry, Pete the Pilot, was created by a Henley Beach Primary School student. The 3D-printed mascot will travel on a C-17 RAAF mission to the Middle East. The winner and his family were invited to the RAAF Base Edinburgh Air Show to meet a C-17 crew and tour the plane.

• **3 SEPTEMBER** Launch of the Royal Australian Mint's Great Air Race coin collection. See ramint.gov.au.

• **1 OCTOBER** Release of Australia Post's Centenary of First England to Australia Flight stamp and First Overseas Airmail to Australia stamp. See australiapostcollectables.com.au

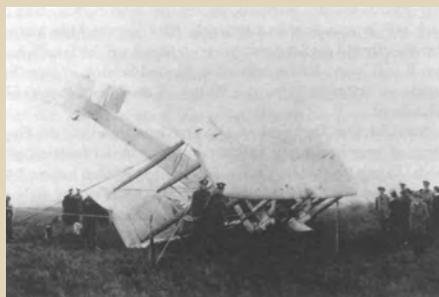
COMMEMORATIVE ITEMS: A copper/bronze EFC commemorative medallion has been struck by The Adelaide Mint and is available for \$30 plus \$3 postage/handling in Australia from saam.org.au/sales. Penny's Hill Wines has released a special Vimy Gin and a limited edition Vimy Centenary Gin, distilled by Kangaroo Island Spirits, available from Flights Gin Bar at Penny's Hill cellars, McLaren Vale, SA or phone 0459 652 227.

ACROSS THE ATLANTIC: ALCOCK AND BROWN

The crew had good reason to have faith in the Vickers Vimy. Months before their arrival in England to prepare for the flight, a previous example (supplied, like theirs, by Vickers) had made history. On 15 June 1919 British pilot John Alcock and navigator Arthur Brown completed the first non-stop flight across the Atlantic Ocean. The challenge had been put out in 1913 by the Daily Mail newspaper, and like the England to Australia flight that followed, the prize offered was £10,000.

Although a much shorter journey of 3,000km from Newfoundland to Ireland, the 16-hour Atlantic flight was perhaps as perilous as the Smith flight as it was entirely over ocean.

There was little chance of rescue in case of engine or structural failure – a real possibility in the prevailing weather conditions which,



Courtesy of Science Museum

like the Smiths', included snowstorms, heavy rain and fog. Unlike the Smiths Alcock and Brown carried a radio, but this became useless after its generator failed.

The pair were knighted by King George V. Then on 18 December 1919, while the Smith crew was in the Northern Territory, John Alcock died in France in the crash of a Vickers Viking amphibian aircraft. In 1922, the year Smith's book was published, another Viking crash was to claim his own life and that of Jim Bennett.



ABOVE Alcock and Brown's Vimy is preserved in London's Science Museum. Suspended above it is the DH.60 Moth of Amy Johnson, the first woman to fly from England to Australia in 1930.



LEFT Alcock and Brown ended their challenging transatlantic flight in a bog near Clifden, Ireland.





LEFT How the Corben Super Ace 1938 homebuilt aircraft was found in 2008.



A HUNDRED YEARS OF

WORDS Michael Nelmes | PHOTOS Peter Kierath & Michael Nelmes

AVIATION

THE NARROMINE AVIATION MUSEUM FOCUSES ON OBJECTS AND RECORDS CONNECTED TO THE AREA'S LONG HISTORY OF FLIGHT.

OF THE TWO DOZEN or more aviation-themed museums that have sprung up around Australia over the past 50 years, those that perhaps work best have a specific and well-defined focus for their collections and displays. The RAAF Museum, with its focus on air force history, might be the best-known example. Another is the aviation museum at Narromine, west of Dubbo in Central West New South Wales, which displays almost exclusively objects and records with a connection to local aviation.

THE LOCAL AVIATION STORY

In 2019, Narromine is celebrating its aviation centenary. On 22 September 1919, seven years after the first aeroplane had ventured west of the Blue Mountains (American daredevil 'Wizard' Stone with his US-built Bleriot XI), an Avro 504K landed on Narromine's polo ground and took joy flights to promote the First Peace Loan. That was a government scheme to sell bonds to help fund the repatriation of soldiers returning home from the Great War.

A couple of months later, Captain



LEFT The Corben after restoration in 2011 by the local Men's Shed. Its French Salmson AD9 engine was missing, but a replacement was sourced in the USA.



BELOW The museum entrance. The propeller is from one of the RAAF Caribou stationed at the aerodrome in 1990 for flood relief operations.

BOTTOM Pupil pilot and commanding officer mannequins in the WWII display.



squadron left Narromine two legacies: a school sport trophy called the Narraf Cup, and 30 of its almost fully intact Mosquito bombers, which were sold to local farmers. Only part of one of those now remains, in the collection of the Camden Museum of Aviation.

The government war-loan schemes made a big impact on the town, which topped the country in per capita contributions. In recognition, a Beaufighter was taxied into the main street for a ceremony to name it Miss Narromine, before it flew off to war. Its control wheel is displayed, together with a collection of war loan pennants.

The final RAAF presence at the aerodrome was No.93 Squadron RAAF. Its Beaufighters were sent to Japan in 1946 as escort for the Mustang Wing joining the British Commonwealth

Henry Wrigley and Sergeant Arthur 'Spud' Murphy became the next aviators to land at the town, this time using a lucerne field on Frank Mack's property near the present aerodrome. Wrigley had been tasked with surveying a route to Melbourne for the Vickers Vimy – the famous aircraft about to land in Darwin to become the first aircraft to fly from England to Australia (see The Great Air Race, page 38).

The following February, Ross Smith's crew in the Vimy finally landed on the field before continuing on to Sydney the next morning. The party that night was the talk of the town for years. The venerable Vimy was surrounded by beer bottles.

Through the 1920s and 1930s a veritable who's who of aviation passed through, especially once the aerodrome and aero club were formed in 1928/29. The club (now Australia's oldest regional aero club) hosted four highly successful air pageants of up to 30 visiting aircraft, featuring flying competitions and demonstrations by the air force. One regular visitor was Nancy Bird, who later served as the museum's patron.

WORLD WAR II

The aero club went into recess in 1940 to make way for the RAAF and the Empire Air Training Scheme (EATS). The Air Force's first regional elementary flying training school (No.5 EFTS) was established at what soon became a

busy station with a staff of 800 airmen and women. By the time EATS began winding down in 1944, Narromine had produced 20% of the RAAF's wartime pilots.

Narromine's training graduates included: Rawdon Middleton, who went on to posthumously earn the RAAF's first of two Victoria Crosses; actor Bud Tingwell, who went on to fly photo-reconnaissance Spitfires and Mosquitoes; Bill Brown who had already made his name as a test cricketer; Ray Thorold-Smith who soon became a noted Spitfire ace; Beaufighter leader WGCDR Jack Davenport; local man GPCAPT Vic Guthrie; GPCAPT Jim Wilson; and future 'top brass' AVM John Cornish and future Chief of Air Staff AIRMSHL David Evans.

In mid-1944 the Wirraways of No.8 Operational Training Unit replaced the Tiger Moths at Narromine, and two advanced training courses were conducted before a move to Parkes. Its most famous graduate was Aboriginal fighter pilot Len Waters.

The purpose of the next Unit to move in, No.618 Squadron RAF, was a mystery to the locals for 20 years before the archival lid was lifted. It was a top-secret Mosquito bomber Unit tasked with taking Barnes Wallis' Highball spinning mines into action against Japanese capital ships. Because of American resistance to the plan, no Highballs were dropped in anger. The

Occupation Force. The displayed mementoes from the Squadron include its Anzac Day banner, and a small figurine of a cat – a gift to one of its men at Hiroshima from a young girl orphaned by the atomic bomb blast. It is displayed with the man's ID disc, dug up in 2004 from the wartime aerodrome dump.

POST-WAR

After the war, the aerodrome with its large 7,000- and 5,000-foot runways became a training and check-flight base for Qantas and other airlines. Through the 1950s and 1960s Qantas Super Constellation airliners droned around town, and later a Hawker-Siddeley HS.125 'pocket rocket' jet trainer. The sport of gliding, too, took off after the Sydney Soaring Club had camped there in 1940 and broken several Australian distance and height records over just a few days. Narromine is counted among the world's premier gliding destinations: the aerodrome and the resident gliding club (previously called Orana Soaring Club) have hosted many national and an international world championship, with another coming in 2023.

For many years, Narromine Ultralights hosted Australia's largest annual ultralight fly-in. Nowadays the aerodrome hosts the wider-themed AusFly. A few years ago, the Sport Aircraft Association of Australia also moved its headquarters there.

THE MUSEUM

A 1985 reunion of RAAF and RAF airmen and women was one of the catalysts for the aero club to preserve local aviation memorabilia. In 1998 a

federal government grant funded the construction of a building at Narromine Aerodrome to house both club rooms for the aero and gliding clubs, and a museum. It was very much a community project. Patron Nancy-Bird Walton officially opened the building in 2002, the Year of the Outback.

In 2016 the museum was expanded to five times its original size with the construction of a hangar-style extension, and opened by former Defence Chief ACM Sir Angus Houston. State-of-the-art lighting and audio-visual equipment with a 5m projection screen are featured, and large built-in wall cabinets are gradually replacing the original free-standing glass cabinets. A wartime accommodation hut was replicated with original corrugated iron, and is used as an office and collection store. The project won the Museums & Galleries NSW IMAGinE Award for volunteer-run museums, and project manager and chairman Peter Kierath won the Individual Achievement award.

DISPLAYED AIRCRAFT

The museum's collection started out as, and largely still is, one of memorabilia, records and photographs. However, the building extension allowed the display of at least four aircraft, while a fifth is displayed in storage in the aerodrome's remaining wartime Bellman hangar. That is a CAC Sabre jet, 'liberated' in 1996 from its gate guardian status at Dubbo's former RAAF Stores Depot. It is hoped that a purpose-built, glass-sided display building for it can be funded and built.

The best-known of the displayed aircraft is the world's only airworthy



Wright Flyer Type 'A' replica. This iconic aircraft was built at the aerodrome and made its first public flight at Narromine in 2005 before a crowd of 10,000. Officiating on the day was Apollo astronaut Dr Buzz Aldrin. Neil Armstrong had to decline, but his letter wishing the launch well is displayed! In the hot seat for the first flight was Narromine-raised Colin Pay of 'warbirds' fame. The Flyer, a replica of the Wright Brothers' fourth design of 1907, is still airworthy, but fears that it might come to grief have grounded it. Film footage of its flights are shown on the big screen.

The other two aircraft currently displayed are originals. They, too, are thought to be unique in the world. The Corben Super Ace 'homebuilt' sports plane was built from plans by a local garage proprietor in 1938, and Narromine lost track of it after the war. In a case of serendipity, when museum staff attended the 2008 fly-in at Tooraweenah and put up a note asking of the Corben's whereabouts, one of the attendees announced that he had its remains stored in his rural shed. The following year it joined the museum collection, and in 2011 was restored to taxiing condition by the local Men's Shed group.



LEFT The aero engine display (VK-1 jet from a MiG-15, Rolls Royce Merlin V-12 from a Mosquito, and Gipsy Major from a Tiger Moth). Above them are wartime photos of Narromine Aerodrome.





RIGHT

A locally owned Tiger Moth that may be returned to the air if funds are raised, or installed in the museum.



LEFT View past the Wright Flyer 'A' replica towards the WWI display.



ABOVE This evocative bust greets visitors on entry. It was sculpted by Brett Garling, who also produced the Glenn McGrath statue in town.

Wright Flyer projects, it would be ideal for visitors to hear, at the touch of a button, descriptions of those building processes 'from the horse's mouth'.

Other future plans, subject to funding, include a memorial wall to line the wartime RAAF parade ground outside the museum. On that would be mounted bronze plaques listing Narromine's 2,850 pilot graduates, more than a quarter of whom did not return. **W**

• *Michael Nelmes is the museum's part-time curator and Wings' history editor. His latest book, Too damned far out west: Narromine's flying century, is available from the museum.*

Narromine Aviation Museum

Open every day except Tuesdays, 10am-4pm.

Phone: 02 6889 7131, 02 6889 4444
narromineaviationmuseum.com.au

The Hawkridge Venture glider, a type similar to the RAF's wartime Slingsby training gliders, was another amateur project built beneath Dubbo Showground's grandstand and first flown in 1953. Coincidentally, the build was headed by Jack Coomber, the Corben's builder and a former RAAF instructor. It, too, was found in a shed on a local property. Its large wingspan necessitated its display in the museum suspended from the roof trusses.

The museum also plans to buy an out-of-service Tiger Moth. It will be an important acquisition to represent both the wartime RAAF training school and the post-war aero club, which operated several. Tragically, in 1955 a mid-air collision of two Tigers over town claimed four lives.

THE WIDER COLLECTION

The displays include a treasure trove of local aviation artefacts and records spanning a century. In the World War I display are collections from three of the four active Australian Flying Corps Squadrons, brought home from France and Palestine by the men who founded Narromine Aero Club a decade later. Two of them were awarded the Distinguished Flying Cross. A Distinguished Service Order is also displayed. Highlights include a small piece of the Red Baron's aircraft, a larger piece of 'lozenge' German aircraft fabric, a bullet-holed propeller from an RE.8 reconnaissance aircraft, an AFC uniform, and a 'Sidcot' flying suit.

The largest collection covers World War II. Featured are aero engines (including two Rolls Royce Merlins) and a wide range of flying training memorabilia such as logbooks, instruments, instructional cartoons and manuals.

Many of the artefacts have been found or dug up in local fields. In one field, the wrecked wing of a Wirraway, thought to have been involved in a fatal mid-air collision in 1944 was found. In another, mysteriously, a Tiger Moth control stick was discovered. One field yielded a 20mm aircraft cannon. A few Mosquito bomber relics are displayed, including a recently-acquired undercarriage unit undergoing restoration. The rarest Mosquito piece is an arrester hook for aircraft carrier landings. No.618 Squadron aircraft were equipped for carrier deployment for their unique maritime mission.

An even rarer acquisition would be an inert Highball mine. Before No.618 Squadron came to Australia, several series of trial drops on water were conducted by Mosquitoes in the UK. Some of them are seen in the film *The Dam Busters*. Two years ago, a couple of the mines were raised from Loch Striven, and the museum is looking into raising another for its collection.

The museum is in the process of digitising its analogue film and sound collection, including many oral history interviews, so that segments from those can be incorporated into the relevant displays. For example, although videos have been produced on the Corben and

RAAF SABRES TO UBON



CONTINUING THE LITTLE-KNOWN STORY
OF THE RAAF'S ROLE IN THE LEAD-UP TO
THE WAR IN VIETNAM, AS RECOUNTED
BY **BOB RICHARDSON.**

MY FIRST OPERATIONAL Deployment to 79 Squadron at RAAF Base Ubon was in September 1963. It was for the standard eight weeks, and I travelled on the fortnightly RAAF C130A courier that operated from Richmond NSW via Darwin to Butterworth and Ubon before returning the same way.

The 79 Squadron operational fighter detachment of 10 armed Sabres was mounted under government direction in 1962. Its task was to provide for the air defence of Eastern Thailand against the possibility of Communist incursion from the North, under authority of the South East Asia Treaty Organisation (SEATO), of which Australia, New Zealand, UK, Thailand and the Philippines were signatories – but notably not the just independent Malaya.

Malaya, whose PM was informed of the critical necessity for RAAF

Butterworth to support the deployment, had reluctantly agreed, provided knowledge of that support did not leak! Thus, all aspects of Ubon being supported from Butterworth was classified secret and no one apart from immediate family was supposed to know about it.

Of course, many locally employed civilians were employed at Butterworth; all RAAF families had local servants. Thus, despite valiant efforts, individual deployments were invariably known quite widely, and occasionally our servants would ask, "Master gone to Ubon?"

We had quarters with rattan wall partitioning. There were no sealed windows, so air conditioning was entirely natural. A basic ablution block was nearby.

Outside the rooms was the Base air raid shelter, a dugout several feet

deep surrounded by sandbags which also covered the roof. Whenever I occasionally peered into the gloomy interior it was full of water, and as snakes were also prevalent, a dire emergency would need to be declared to encourage us to use it.

79 SQUADRON COBRA

On arrival at Ubon, aircraft livery comprised a simple black rectangle on the fin, offensive to our very proud ex-77 Squadron members – difficult to be inspired by a black patch on your rear end. J.L. (Jim) McGowan, Sergeant Instrument Fitter was contemplating some sort of emblem when a large cobra was found in one of the recently dug slit trenches. Instrument Fitter L.A.C. Dick Boldery had artistic talents and was commissioned to draw up a cobra, ready to strike. The result looked good, a stencil was cut, left over black



ABOVE Sabre A94-962 with the 79 Squadron cobra tail, Ubon 1962/63. Photo by Cliff Viertell.



LEFT Air raid shelter.

paint, a few touches, such as eyes and tongue and the 79 Squadron black cobra was born. It rapidly spread to the tails of the other nine Sabres.

A very convenient 30 yards from our quarters were the Officers', Sergeants' and Airmen's messes so that all three shared a common catering facility. That turned out to be a most cost-effective arrangement that was later adopted widely across the three Services throughout Australia.

BAR GAMES

The comfortable bar area, bamboo furnished and decorated from the local jail, was of course where we spent a lot of our off-duty time.

All sorts of games were played in the bar, many of which involved alcohol in its various forms. A popular game was Liar Dice, played with five poker dice. The first player rolled the dice but kept them covered while announcing the result, such as 'a pair of jacks', before sliding the dice hidden by the cup along to the second player, whose choice was to accept or reject the offering by calling 'liar'. If accepted, the receiver would peer under the cup and then decide what to do: he could announce that he was rolling any number of the dice again, do so and then pass the always hidden dice to the third player, making a claim of the contents that had always to increase in poker value. E.g. No.2 might then say to

No.3: there's now a 'full house' under there!

The third player might either accept that claim, knowing that he had to be able to convince the fourth player that he could improve on the full house – or he could say 'liar!' and reveal what was actually there. The losing 'liar' then normally had to pay for and imbibe a drink specified by the winning claimant.

We played a lot of real poker too, of course, usually simple draw poker under pre-agreed betting limits. Although there were no official sanctions about gambling, with occasional exceptions the unwritten rule was that while we always gambled for real money, the agreed limits generally ensured that nobody became financially embarrassed.

One memorable evening, with our fortnightly payday the next morning, several of us found that we'd run out of cash; IOUs were generally frowned upon. As it happened Mick, our Accountant Officer, was playing with us, and as midnight passed someone helpfully pointed that it was "now pay-day". The obvious follow-up question was, "Well I'm the Rostered Pay Officer Mick; I assume you've got the pay envelopes made up for the morning, so what are we waiting for?". After only a brief pause Mick replied that this suggestion did indeed seem legally sound, so we all tramped over to the nearby Accounting Office where

Mick opened the safe and we signed for our pay envelopes at 12.30am. The game then happily resumed for another hour or so.

Most Australians rather disparagingly referred to the 2.2% alcohol American beer as "watery piss" and the US servicemen certainly enjoyed visiting our Mess where 5% Fosters was on tap. But the spirit ration was indeed quite deadly. The large bottles of Black Label scotch, Gilbeys gin, Smirnoff vodka and Kentucky bourbon were very popular at parties, especially back at Butterworth and Penang, where alcohol was not duty free. We were all issued US BX ration cards on arrival, entitling holders each month to five cartons of American cigarettes, six cases of several brands of American beer, and six 40fl oz bottles of high-grade spirits. Fortunately, most of us didn't make any effort to consume our 'ration'.

A PRIMITIVE REGION

Ubon Ratchathani was the third largest urban area in Thailand, after Bangkok and Chiang Mai. But Ubon in eastern Thailand near the borders of Cambodia and Laos was in the most backward region of the country at that time. There was not a single pane of glass in the town of around 10,000 people and all facilities were very primitive.

Apart from some little paving in the town centre all roads were simply dirt and were often impassable after rain. The many 'buses' that transported the mainly subsistence farmers and their produce to the town markets were simply 4WD, 5 ton Japanese diesel trucks, and it was always interesting to visit the town bus terminus to see the families scrambling with their goods onto these trucks, with squealing pigs and chickens, baskets of fruit and vegetables, all mingled together with much shouting.

Unfortunately, one of the main roads out of town passed across the centre of the single 7,000 feet long Ubon airfield runway. This crossing was guarded during flying operations by a Thai military policeman on one side who held up a red flag saying "Yut!" (stop). The traffic was mostly on foot or pedalled vehicle, with a few larger trucks.

The most common public transport was the samlo, a tricycle pedalled



by a wiry-fit driver with one or two passengers seated low behind. Samlo taxis were convenient and very cheap. A couple were always available outside the Ubon guard gate, and the ten minute trip to town cost five baht, then about 25 cents Australian.

I had a very hairy experience with a samlo on my first Ubon tour. Just after touchdown I started aerodynamic braking by holding the nose high to increase drag. But a few seconds later I saw a samlo start to cross the runway some 2,500 feet ahead! It was instantly clear that a collision was inevitable, so I slammed full throttle to try to take off again.

The Sabre's Rolls Royce Avon engine of 7,500 pounds thrust was very reliable, but it had a problem accelerating from low power because of a tendency for the compressor to surge, especially in higher air temperatures. An engine Acceleration Control Unit (ACU) automatically slowed spool-up up to about half power at 6,500 RPM, it could take up to 10 seconds to accelerate from idle power.

So, having made the decision to take off again, all I could do was wait and watch. I had around 13 seconds to impact. The Sabre's wingspan gave very little opportunity on the narrow 125 feet runway to diverge laterally, and exiting to the side would probably have been catastrophic for my aircraft and possibly me.

In the final seconds the samlo driver must have heard the accelerating engine whine, because he suddenly looked at me in terror, and I swear that I saw a



small puff of smoke from his tyre as he futilely tried to accelerate from the middle of the runway.

But just then the ACU released and the engine slammed to full power in exactly the rated half a second. I dragged the Sabre off the runway well below recommended take-off speed and less than two seconds before the intercept point.

The tower operator later told me that my wheels were less than ten feet above the driver's head. After completing an uneventful closed circuit, I landed normally a minute or so afterward, and we later celebrated in the bar. 



ABOVE Off duty at the bar.



FAR LEFT Base facilities.

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2019

SPACE CAMP

AN AMAZING ADVENTURE

WORDS Suzana Thapa & Katie Forster
 One Giant Leap Australia Student Ambassadors

FOCUSED ON BUILDING AND MAINTAINING STUDENT INTEREST AND ASPIRATION IN SCIENCE, TECHNOLOGY, ENGINEERING AND MATHEMATICS (STEM), ONE GIANT LEAP AUSTRALIA TAKES GROUPS TO SPACE CAMP IN THE UNITED STATES.

LOOKING AROUND THE EXCITED GROUP of travellers, it was easy to see the smiles hid nervousness and apprehension. A group of 60 strangers, aged 10 to 71 years, signed up for ‘the trip of a lifetime’. More women and girls than men and boys. A year in the planning and we were going – ready or not.

After landing in Los Angeles, the coaches were loaded and we were off. First stop breakfast and then on to Spaceship Landing Way, Mojave – the home of The Spaceship Company (TSC). Enrico Palermo, an Australian, is president of the company tasked with building the spaceships for Virgin Galactic to take its customers to the edge of space.

The One Giant Leap Australia 2019 Space Camp tour group was the first public group allowed access to learn the history of the company, see how the spaceships are built, and to be inspired by the incredible staff at TSC. Enrico was unable to be there, but he prepared a video to welcome us and had an inspirational effect with his encouragement to aim to achieve anything we set our mind to.

The tour lasted three hours, starting

outside The Voyager Café and moving into the production facility and then to the Final Assembly, Integration and Test Hangar (FAITH). TSC staff explained that Virgin Galactic was developing commercial spacecraft designed to provide suborbital flights for space tourists. Words cannot describe the experience of sitting next to Unity eating pizza and discussing STEM careers while looking around at the construction of two more spacecraft.

Next morning, it was a very early breakfast and off to Disneyland for the day. We all made a bee line to the new Star Wars ride where we were all given a role to play.

The following morning, we were up bright and early again to head to Northrop Grumman. This was the third year One Giant Leap Australia groups had arranged to visit the site. The group was divided in half, with one group going to the museum first and the other to view the James Webb Telescope (JWT).

Due for launch in March 2021, JWT will be like a powerful time machine with infrared vision that will peer back over 13.5 billion years to see some of the first stars and galaxies forming out of the darkness of the early universe.



 **ABOVE** Tour group at the The Spaceship Company production hangar.

It had been completed recently and was folded out into its full configuration.

We spent an hour in the viewing room being given a detailed explanation, all questions answered and everyone in awe of the telescope that filled their eyes. Everyone fell in love with the JWT and will be cheering it on as it makes its way into space.

After touring the museum and learning about Northrop Grumman, we were on our way to the California Science Centre (CSC), a state agency and museum in Exposition Park. The park was established in 1872 as an agricultural fairground, it includes the Los Angeles Memorial Coliseum (home of the 1932, 1984 and 2028 Summer Olympics), the Banc of California Stadium, the California

Science Center, the Natural History Museum of Los Angeles County and the California African American Museum.

The CSC is the home of the Space Shuttle *Endeavour*, the last shuttle constructed and commissioned in 1987 to replace *Challenger*. It was created from spares in the Shuttle program. Its last mission was STS 134 in May 2011. One of the Astronauts on that mission was Gregory B. Bess, now retired and a professor at the University of Sydney and Texas A&M University, and the patron of One Giant Leap Australia.

Endeavour was named, through a national competition involving school students, after *HMS Endeavour*, the ship that took Captain James Cook on his first voyage of discovery (1768–1771) to the East Coast of Australia. The Space Shuttle carried a piece of the original wood from Cook's ship inside the cockpit. The name was also honoured in the command module of *Apollo 15*.

We had arranged for the Australian Consul General in Los Angeles, Chelsey Martin, to meet our participants and this happened under *Endeavour*. Chelsey spent more than an hour talking to the group, asking questions and inspiring them to “think outside the box”. We all felt very special as she had taken time out of her busy schedule to meet with us.

All too soon it was time to leave the Science Centre. We had a special event planned, dinner with NASA Jet Propulsion Laboratory (JPL) scientists and engineers. We arrived at the restaurant to find our guests were already there. Mike Malaska (astrobiologist), Tom Nolan (Earth scientist), Shannon McConnell (Deep Space Network), Rachel Zimmerman Brachman (solar system, earth, exoplanets, astrobiology, and technology public engagement specialist), Susan Finley (NASA JPL) and Rachel's son Ben who is a whizz at NASA Apps.

The room was lively and noisy, with food and drink served between discussions and people moving around. T-shirts were signed and new friendships formed. More impactful, however, were the talks around STEM

careers and jobs of the future. One of the participants wrote: *Almost every person I met over there believed in me when I didn't, saying, "Follow your dreams", "Do what you love". And I have started believing them. I have finally found a career path to pursue. I'm believing in myself and I'm going to get there.*

Our final day in Los Angeles was dedicated to team building for the upcoming Space Camp experience at Universal Studios. Next morning we flew across the United States to Huntsville Alabama (known as Rocket City), which is not only the location of the US Space and Rocket Center (Space Camp), but also the home of the Redstone Arsenal and the NASA Marshall Space Flight Center (MSFC).

The largest NASA Center, MSFC's most memorable mission was developing the Saturn launch vehicles for the Apollo program. Today, as well



BELOW James Webb Space Telescope.

BOTTOM Apollo 16 command module.



as continued development of launch vehicles, it houses Mission Control for all the science experiments carried out on the International Space Station.

“In the beginning, I was scared as I am not very good at science and always fail yet I have an interest. When I found out I could come, I cried ‘cause I’ve never been selected for much as I’m not smart.” Space Camp participant

Huntsville is a major development location for the space industry and Australian companies are expanding in the area.

In 1970 Ed Buckbee, the public affairs officer for the original Mercury and Gemini astronauts as well as the Apollo moon walkers at one time in his career, was selected by Werner Von Braun to be the first director of the US Space and Rocket Centre. He is the visionary who assembled and managed the world’s largest space and rocket exhibition and is the founder of the highly successful Space Camp and Aviation Challenge programs.

Space Camp was established in 1982 and continues to expand into the STEM fields with further programs that include Robotics and Cyber Camps. The facility is more than 4km long and has seen well over 950,000 students through its gates. The statistics in the STEM area are significant and the major reason One Giant Leap Australia has selected Space Camp for student development opportunities.

The unique opportunity provides a fully immersive program, with a cutting-edge curriculum that is continually being reviewed and developed. Not only do the students increase their leadership skills but over 88% of the alumni do more STEM based studies, with 66% ending up in high tech careers.

There are five Space Camp programs: Space Camp for years 5 and 6, Space Academy for Years 7 and 8, Advanced Space Academy for Years 9 to 11, an Adult Space Camp, and an Educators Space Camp. One Giant Leap Australia takes students from 10 years old and includes parents and adults as well as educators. Our studies have

shown that by including parents and adults, we increase the total community involvement in our students’ development. Statistics also show that

the more parental involvement in STEM and high-tech careers the more they can assist in selection of courses and careers for students.

The program at Space Camp ran for six days, from early morning until late evening. Each team had two counsellors, one in the morning and a changeover at 3pm. The amount of training in those six days would take three weeks of a normal 9-5 program. The feedback from all involved since 2008 has always been positive.

One Giant Leap Australia Foundation was born from these moments. Building friendships that will last forever. Make impossible possible. Making dreams take flight. [W](#)

• For more information see onegiantleapaustralia.com



BELOW
One of the three remaining Saturn V Rockets at U.S. Space & Rocket Center in Huntsville.

SPACE CAMP EXPERIENCES

EXCERPT FROM A STUDENT'S

SPACE CAMP JOURNAL: *One of the most immersive experiences at camp was the missions. Teams were taken to the incredible mission floor, home to all the simulators and mock-up space stations. Black curtains surrounded the room with blinking lights to replicate stars in the night sky. Off the side was the mission control rooms, where teammates sat in roles like CapCom, GNC, EGIL, PayCom and many more. Each role had a task to complete with data to analyse and relay to the shuttle team. We had the chance to participate in three simulated missions of varying levels, first was LEO (low earth orbit) to the international space station, the second was to the moon (Luna) and then off to Mars! Some of us got to go on an EVA (Extravehicular*

activity) where they floated (suspended in a harness from the ceiling) and were tasked to fix things on the outside of the space station. Others, like me, got to be the commander or pilot of the shuttle or Orion capsule. Walking into the simulator we were confronted with the hundreds of switches and buttons in the cockpit, and a small A5 binder full of instructions and potential anomalies. Our orders came over the intercom from our dear friend CapCom who kept our mission on time and running smoothly. Although panic set in when an alarm sounded and a red light on the front panel began to flash "Houston we have a problem", anomalies put our communication skills to the test. We had to work together to solve the problem.

Multiple times at camp we were trained like astronauts. We experienced what it would be like to walk on the moon, thanks to the 1/6th chair, a harness-like chair

that simulates the gravity you would feel jumping and walking on the moon. The multi-axis trainer was another unique machine. The crew trainers insisted no one has ever thrown up in this viciously spinning gyroscopic chair; your centre of gravity is aligned with the chair's centre of gravity which prevents any motion sickness. This was how the Mercury program astronauts trained.



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A MEASURED APPROACH

A UNIVERSITY OF QUEENSLAND AEROSPACE STUDENT IS REACHING FOR SPACE WITH THE DEVELOPMENT OF A THERMAL-SIMULATION TOOL.

A **PASSION AND CURIOSITY** for the earth's atmosphere and beyond led recent University of Queensland (UQ) graduate Clint Therakam to pursue a degree in mechanical and aerospace engineering. After four-and-a-half years of study, including a three-month research stint in Japan, Clint graduated in July 2019, before taking his first steps in the aerospace engineering industry as a thermal engineer at UNSW Canberra Space at the Australian National Concurrent Design Facility.

During his time at UQ, Clint developed a new thermal simulation tool, ThermSat, which can compute, calculate and simulate satellite temperatures in outer space. It can run 100 times faster than some existing commercial programs, performing large simulations in under a minute, as opposed to an hour.

"As the satellite orbits the planet, it can get too hot when facing the sun or too cold in eclipse, which could cause parts to stop functioning," Clint says. "Controlling the thermal range of the satellite is crucial for functionality and survival, because unlike things back on Earth, we can't simply go up and replace the part."

ThermSat can compute the external heat present for any satellite in orbit. "It then considers the amount of heat transfer between objects inside the satellite and, finally, it utilises those conditions to calculate the internal temperature profile during the satellite's orbit."

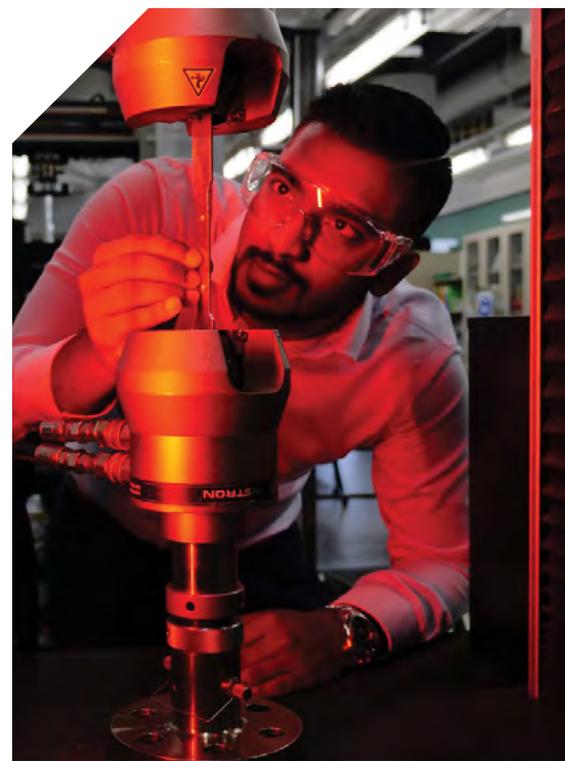
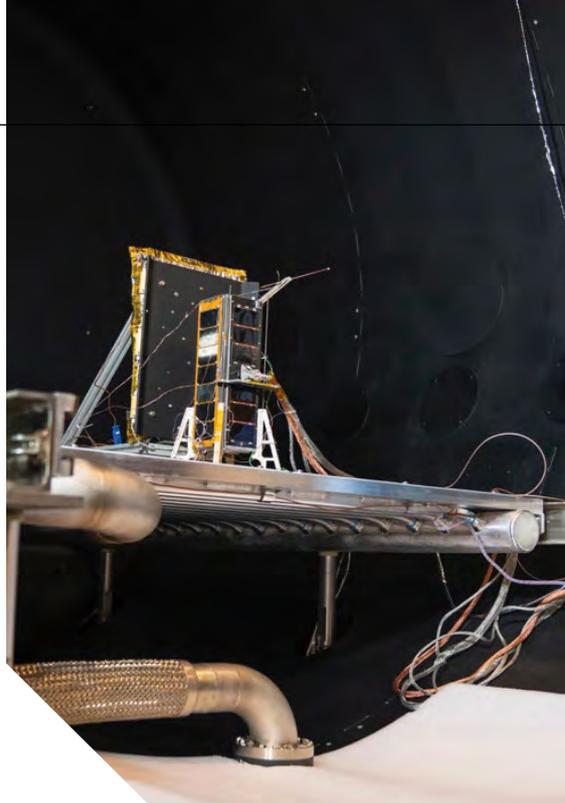
Clint says the courses he took through his degree equipped him with the skills and knowledge to develop

the tool. "UQ played a key role in this project by setting me up with the necessary programming skills through specific thermodynamic courses and the general problem-solving skills gained from my engineering degree." As a UQ student, he was able to access networking events and conferences through the Australian Youth Aerospace Association which led to the opportunity to collaborate with University NSW.

After a few months at UNSW Canberra Space, Clint has been able to develop his software further. "I have found that my thermal algorithm which solves for transient temperature changes has the same accuracy as industry software," he says. "It's exciting to see my work standing up next to the high industry standards." Proving the accuracy of the tool in simulations is an important part of Clint's role, but undertaking physical thermal testing of spacecraft is something he's never had the chance to do before.

"I have been heavily involved in the thermal cycling and thermal vacuum testing of our physical satellite, which we test at The Australian National University's Advanced Instrumentation and Technology Centre in Mt Stromlo, Canberra. We mimic the thermal flight condition inside the chamber by having an equivalent 'Earth', 'sun' and 'space' environment. Being able to test and match predictions of the physical satellite taught me how to improve thermal control system design for the entire satellite life cycle.

"Physical testing of the spacecraft is also necessary to demonstrate it meets the flight standards before we put it into space. We're still working on validating



the entire tool chain and demonstrating that all credible cases are correctly solved, but that's all part of the fun."

Clint has set his sights high and hopes ThermSat will soon be able to serve space companies around the globe. Real-life testing is as good as it gets for Clint, who is buzzing from the excitement of his latest endeavours. That is until his work meets its next frontier: space. **W**



LEFT
UNSW Canberra satellite.



BELOW LEFT
Clint validating his research.

ROCKETING AHEAD

IN LESS THEN TWO YEARS, UQ'S FIRST STUDENT ROCKET ASSOCIATION HAS SOARED TO GREAT HEIGHTS.

KEEPING THEMSELVES **GROUND**ED while launching rockets into the troposphere and taking out national titles has looked easy for UQ Space, the University of Queensland's first student rocket association. Established in early 2018, it has already become one of the big names in the game.

The group provides students with an opportunity to get hands on experience in aerospace technology, preparing them for a future in Australia's growing space industry. In the first twelve months, students tested and launched two rockets, each with an experimental payload, a mechanical

replica of the human cardiovascular system developed in collaboration with UQ Physics Club and a state-of-the-art rocket live-telemetry system.

It was a feat that led the team to victory at the first Australian Universities Rocket Competition. The team won the 10,000 feet (3048m) category with its rocket Athena, placed fourth in the 30,000 feet category with its rocket Minerva, and won the overall competition award.

Physics student Robert Hislop worked on the team that developed one of the four-kilogram payloads. "We were hoping that this payload, sent on Project Minerva, would allow us to study the effect of g-force loss of consciousness, all without having to rely on human test subjects. The apparatus was built using SLS-3D printing technology and uses three columns to create a flow of fluid replicating the cardiovascular system," he says.

"The Australian Defence Force already has pretty well-established techniques for simulating and reducing g-load effects, in particular g-suits – pressurised garments worn by fighter pilots and astronauts to enable them to withstand high gravitational forces. However, mechanical options like this allow medical researchers to investigate alternative breathing techniques and technologies at minimum cost."

UQ Space managing director, mechanical engineering and political science student Myrthe Snoeks, says it had been amazing to see the group grow and succeed. "UQ Space is only one year old, so to have developed two highly complex projects, and collaborate with such a diverse group of people has been incredible," she says.

"The rockets are 2090mm and 2,650mm long respectively, each carrying their 4kg payload as close as possible to their target altitude, reaching maximum speeds of Mach 1 and Mach 2.25 respectively."

Students are now preparing for take-off to the United States for the international Spaceport America Cup, which has a global field of more than 100 teams in multiple categories. "We don't have automatic entry, but we feel that winning the Australian competition, which also covered New Zealand, gives us pretty good standing," she says.

"In 2020 we're planning to tackle even more exciting and challenging projects, with the aim to go further than any Australian university team has gone before. Our next goal is to send a student built rocket to 100km, passing the Kármán Line, and officially reaching space." **W**



ABOVE Athena on the launcher.

BELOW UQ Space crew.



IGNITING ENGINEERING PASSION

A GROUP OF NEWCASTLE UNIVERSITY AEROSPACE SYSTEMS ENGINEERING STUDENTS GAINED VALUABLE INDUSTRY INSIGHT THROUGH THE INAUGURAL ALTITUDE ACCORD SCHOLARSHIP TOUR.

A GROUP OF 12 UNIVERSITY of Newcastle Aerospace Systems Engineering students qualified for the inaugural Altitude Accord Scholarship Tour 2019 as reward for ingenuity in executing their first-semester Introduction to Professional Engineering projects.

The qualifying competition saw 70 first-year students design, construct and test a Minimum Viable Product that could demonstrate delivery of a payload to a designated location. Three teams qualified for the prize, a four-day tour to Lockheed Martin Australia (LMA) sites in Melbourne and Canberra and attendance at the Women in Defence awards dinner.

University of Newcastle School of Engineering lecturer Dr Dylan Cuskelly says the scholarship was a strong motivator. "Students really committed to producing innovative and successful solutions to the engineering challenge we set them," he says. "They worked hard to apply their technical knowledge and develop a design that solved the problem. They learnt by doing – and they failed a few times."

Student Gerard Lazarus agrees. "From early on in the course, our team recognised the immense value that this scholarship represented," he says. "To say that the effort was worth it would be a stellar understatement."

The tour in July 2019 was part of the first student-focused outcome of The Altitude Accord, a partnership between Newcastle University, LMA and Regional Development Australia (RDA) Hunter, which was announced in February 2019.

The alliance seeks to raise the skills base of the Hunter's future workforce by growing a 5th generation, technology-enabled talent pool. The Altitude Accord aims to ignite student interest in STEM (science, technology, engineering and mathematics) careers in the Hunter's defence industry and at LMA.

The tour kicked off with an exclusive look at the new 3 Squadron Facility at RAAF Base Williamtown to experience the F-35 close-up. The students visited the hangar to see the F-35 and the equipment needed to fly: the custom-fit CAD designed carbon fibre helmet which includes sensors, cameras and night vision so pilots can navigate in all conditions; and the 8kg G-Suit that regulates pilot blood pressure to avoid grey-outs during gruelling missions. They also learnt about the aircraft's stealth and communications capabilities.

Guiding students through the \$1.5 billion facility built to accommodate the F-35s over the project's 40-year lifespan, RAAF's FLTLT Joseph O'Gara said: "RAAF's people are grown to have a breadth of experience rather than a specialisation. We're about capability. There are so many systems associated with this aircraft as well as maintenance and sustainment, personnel management and airworthiness, we need people to be adaptable. We actively help them build their skills and develop competencies."

LMA's F-35 In-Country Lead Andrew Doyle said LMA was keen to help create the workforce of the future. "The Altitude Accord gives students an idea of the career opportunities available to



them. The excitement they get from understanding what we're doing here at LM and the realisation of the possibilities and how they can be involved is really satisfying for us."

The group also visited Lockheed Martin's Science Technology Engineering Leadership and Research Laboratory in Melbourne, STELaRLab, LM's only such facility outside the US.

With a staff of 16, the lab is connected across all LM businesses and provides thought leadership to Defence and defence industry. Students were guided through demonstrations of the innovative work that keeps LMA's systems at the cutting edge: autonomous systems that 'learn' to beat humans at tasks, using AI to solve air combat battle management problems, and experimentation to help hone algorithms and predict scenarios.

Systems engineer David Harrison gave an insight to the design and development of the F-35. He recounted his work with BAE on the original design of the aircraft, the engineering challenges and how the team overcame them. "I love my job and have had an amazing career. Engineering can take you anywhere," he said.

Next stop was LMA industry partner Marand, a global supplier of precision engineered solutions to a range of industries including aerospace, Defence, rail, automotive and mining. It is the largest supplier on the F-35 program in Australia and one of the biggest worldwide, producing the F-35 Vertical Tails and the F-35 Engine Installation and Removal Trailer.

Student Christopher Neal said the



LEFT
Students at the
Marand Facility
at Moorabbin,
Victoria.

Marand visit had made him even more passionate about a career in the aerospace industry. "Being exposed to aerospace engineering and the industry has just been incredible. We (Australia) have a fairly big hand in the F-35 program and to go in and see how the vertical stabilisers are assembled from start to finish, and picking everyone's brains about the general operations of this facility has been great," he said.

Next stop was Canberra for an awards dinner to honour women in Defence and defence industry. Graduate systems engineer Taylah Griffin was recognised as the Rising Star for her work on RAAF's early warning aircraft, as well as her efforts to inspire more Indigenous people to consider careers in science and engineering. Student Stephanie McManus was certainly inspired. "She's indigenous like I am, and she's made it in an industry that I'd love to be a part of. I hope that I can achieve the success that she has," she said.

The tour wrapped up with a visit to Lockheed Martin Australia's Endeavour Centre in Canberra, where students flew simulated F-35s, C130 Hercules and UAVs. Student Toby Barry said it was an amazing experience. "I'm serious about a career in the defence industry and having access to the F-35 and Lockheed Martin Australia like we did is just invaluable," he said. "What we are able to do in this industry as a career really excites me and I can't wait for what's next." **W**

• *Kate O'Mara, Director,
RDA Hunter Special Projects*

AUSSIE ACE CLAIMS RED BULL AIR RACE TITLE

MATT HALL HAS SECURED the 2019 Red Bull Air Race world championship title by a single point over Japan's Yoshihide Muroya, who won the final race of the season in front of his home fans in Chiba.

While Hall came in third in the final event, it was enough for the 47-year-old to finally claim the title he has been pursuing for a decade.

This year was the final Red Bull Air Race season, which made the success all the sweeter for Hall, who came third on debut in 2009 and finished as runner-up in 2015, 2016 and 2018.

A third-generation pilot – his grandfather flew in World War II – Hall has exceptional pedigree and is a former RAAF fighter combat instructor. An aerobatic ace, Hall became the first Australian to be awarded a Red Bull Air Race Super Licence in 2008. From there, he was selected to join the world championship circuit in 2009, and impressed in his maiden season with third place behind three-time champion Paul Bonhomme.

Red Bull will not continue the championship beyond the 2019 season.

Source: Fox Sports



ABOVE World champion Matt Hall.

A SUCCESSFUL FINANCIAL PLAN



PUTTING SOME IMPORTANT LESSONS INTO PRACTICE CAN SET YOU ON YOUR WAY TO ACHIEVING A LEVEL OF FINANCIAL INDEPENDENCE YOU MAY HAVE THOUGHT WAS BEYOND YOUR GRASP.

IT'S OFTEN SAID that when it comes to successful investing, it's all in the timing. That's true, especially if you're an active investor who buys and sells regularly in the hope of turning a profit. The problem is that investment timing can be risky, rather like gambling. The hope is your net position will be positive, although for a lot of active investors, the outcomes are not encouraging.

In many cases, active investors behave in a way that is reminiscent of the definition of madness. That is, they employ the same losing strategy over and over again in the expectation of achieving a different result. We've seen this at play over many centuries with 'investment bubbles'. Notable was the Tulip Mania in Holland (1634-1637) in which the price of a tulip bulb rose to the price of a house in Amsterdam, before crashing, taking thousands of investors with it into financial ruin.

More recently, we've seen the Great Depression (1923-1932), the Japanese Stockmarket Boom/Bust (1982-1992), the Tech Wreck (1994-2000) and the Global Financial Crisis (GFC 2006-2009). And this decade, we've observed the phenomenon of cryptocurrencies, including Bitcoin.

In 2017, an expert commentator said: "Bitcoin could be at \$40,000 at the end of 2018". The reality was quite different. On 20 November 2015, Bitcoin was \$451

per unit, by 5 December 2017, it was at \$25,710 and by 3 May 2019, it was at \$8,244.

Of course, in all of these examples, there were winners and losers. Someone got out of Bitcoin at \$25,710 and made a fortune, but others purchased Bitcoin at that price and lost. Regardless, the prospect of easy money through apparently effortless speculation will always encourage humans to take big risks.

WHAT ARE THE LESSONS FROM THIS SHORT EXCURSION INTO HISTORY?

- 1 All markets are volatile, including conventionally "safe" investments like real estate. The Great Depression, the GFC and the recent boom and bust in parts of Australia were based on real estate speculation and excessive debt.
- 2 If you must borrow money (and most of us must to buy a family home), do so in moderation. Think about your needs – do you really need five bedrooms, and your ability to repay your debts if interest rates rise (they will at some stage), or you drop to one income in the family. Putting it another way, do a personal risk assessment.
- 3 Be sure you understand the products you're thinking about investing in, especially speculative ones.
- 4 If you assess the risks as high, consider not investing, or only invest an

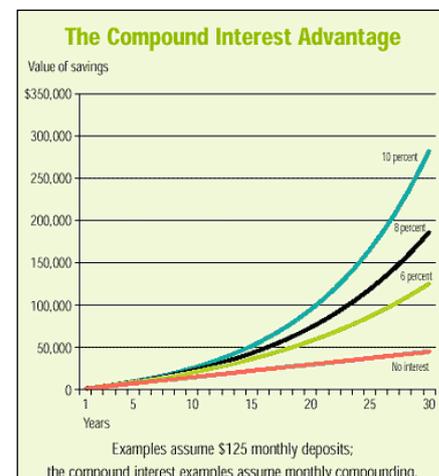


amount you can afford to lose. This is especially important if you're thinking about borrowing to invest. Remember, if you lose the money, you'll still owe the lender, a point many people should have understood before being sucked into dodgy "investments" before the GFC.

5 Successful investing is about setting goals and having the discipline to reach them. If you start when you're young, show patience, moderate debt, understand the magic of compound interest, and take calculated and informed risks, the chances are you won't be tempted to take the risks that have caused much pain and financial suffering over the centuries to many ill-disciplined, aimless, desperate and often greedy investors.

Put these lessons into practice and you're well on the way to achieving a level of financial independence that might appear to be beyond your grasp. And you'll do so without the worry of those who have no discipline, plan or financial goals. [VI](#)

• *Air Commodore Robert M C Brown AM Chair, ADF Financial Services Consumer Centre adfconsumer.gov.au*



MUSINGS ON LEADERSHIP

LEADERSHIP;
THAT ELUSIVE
QUALITY
EXERCISED
IN MANY
FORMS OFTEN
CONDITIONED
BY THE
CIRCUMSTANCES
WE ASPIRE TO.



LIFE IS A PROGRESSION of incremental goals which sustain us spiritually, emotionally, physically or vocationally. Attainment of each goal is influenced, both positively and negatively by the people involved in our life. So, whether we like it or not, we have other people involved in many of our goals and we need to consider leadership as an everyday influence. We need to contribute to other people's mental state so that we foster positive, confident and productive people around us, who then contribute helpfully towards the attainment of our own goals and

objectives. We have all had a teacher or coach stimulate our aspirations.

I admired and was inspired by many people I saw as good leaders. I saw they were liked, were excellent operators and others willingly worked hard to achieve the set objective. As I was put in more and more complicated jobs, I found I had to involve others more. So, I did what came naturally to me: I analysed, planned and organised and eventually, despite my trepidation, got to know the people around me. As I became confident in my craft, co-operation with people became easier and I started to observe "team" results that attracted good comment. Maybe I had become some sort of leader.

I started to copy some of the habits of my role models. They appeared to be natural networkers, but I later became aware that they worked hard at it because a network feels good, distributes the challenges and works well. My role models helped others to succeed and they supported honest input, spirited fun and positive emotions. My role models without exception were always open and forthright, mostly quietly, sometimes loudly, but always with affinity. They focused on the task through their people not on the task itself and they supported strong intellects. My role models had strong opinions but always focused on success for the team not for themselves.

"Each day, and the living of it, has to be a conscious creation in which self-discipline and order are relieved with some play and some pure foolishness." *May Sarton*

I learned good leaders realise few of their challenges are about the actual task, even though systems and procedures to support the task are essential. Most life challenges are about communication, team spirit and human emotions. Leadership is largely about collaboration in producing agreed frameworks. It is then about delegation within those frameworks, while offering

encouragement and supportive advice and decisions. A leader encourages people to display their own leadership and provides an environment for people to own their assigned tasks.

Here's an example. Put three people (two blindfolded, one not) at one end of a long room that has many chairs scattered about. They cannot be joined by any material thing. Instruct the person not blindfolded to get the two blindfolded people through the chairs and out through the door without incident. The general reaction is to guide them through the chairs with detailed instruction. A leader will move the chairs to offer a funnel toward the door and then encourage the two to navigate using their initiative.

Leaders need a personal vision and a framework to inform their lead. Their vision need not be totally formed and planned, as there would be no excitement in attaining the objective. But their vision is not unformed either as there would be no guide. The degree of excitement inherent in a vision would devolve the strength of motivation; and motivation would affect the willingness to embrace personal challenge.

With a vision, a leader can be proactive without, there is no objective. Leaders know the journey to their vision is the source of accomplishment and satisfaction. Leaders realise their behaviour should be dictated by the path of least resistance to their vision – and resist ad hoc or reactionary behaviour.

"The death of a goal is most likely to be a slow extinction from undernourishment. The answer is in the type of nourishment you provide to the people around you." *Unknown*

• *Shara Vewe, Team Consultant*

This article is derived from many years coaching senior corporate executives in leadership attributes and is intended to be thought provoking, not authoritative. Further discussion can be engaged at Shara.Vewe@gmail.com

PUTTING WINGS TO YOUNG DREAMS

THE AUSTRALIAN AIR LEAGUE has often been described as the primary school of aviation and the South Australia Group is certainly putting wings to young dreams.

Since re-establishment in 2006, the SA Group has run an active flying program with three or four major flying events every year, during which many young cadets experience their first taste of flying. Those activities are conducted in partnership with local aero clubs and other organisations, such as Barossa Helicopters, Adelaide Soaring Club and Adelaide Biplanes which provide the Air League with competitively priced flying rates.

Although small in organisational terms, comprising just three squadrons at Gawler Airfield, Parafield and Port Adelaide, the Group has, since 2014, awarded a number Flying Scholarships that enable cadets to commence flying training. Currently eight cadets are undertaking flying training and most have been assisted with scholarships.

This year the successful scholarship recipients were Sgt Matthew Jacks of Gawler Airfield Squadron, Cpl Preethika Ganiger and Cpl Braedon Medder of Port Adelaide Squadron. Each was awarded \$1,000, made possible with the financial assistance of the Sir Keith and Sir Ross Smith Fund.

Matthew will use his scholarship at the Adelaide Soaring Club at Gawler Airfield while Preethika and Braedon use their scholarships at Adelaide Biplanes at Aldinga Aerodrome.

Air League cadets have also been very successful with other aviation scholarships. Sgt Hayden Borchard from Gawler Airfield Squadron was awarded a Scholarship from RAAus. While he was already learning to fly gliders, the scholarship has allowed him to start power flying this year and his

goal is to apply for RAAF employment once he completes schooling.

Group Executive Commissioner Martin Ball, SA Group said: "Our strategy is to get cadets airborne. We have a large number of older cadets across the Group now undertaking flying training and this has also benefitted retention within the League as several older cadets now undertake officer training".

• *Further information on The Sir Ross and Sir Keith Smith Fund can be found at smithfund.org.au.*



ABOVE Sgt Matthew Jacks receives his Scholarship from Sqn Capt Mark Borchard at Gawler Airfield.



BELOW Cpls Preethika Ganiger and Braedon Medder of Port Adelaide Squadron receiving their Flying Scholarships from Gp Exec Comm Martin Ball at the South Australian Air Museum.



About the Australian Air League

The Australian Air League is a youth group for boys and girls aged eight years and older who have an interest in aviation either as a career or as a hobby. In the Air League they learn about aviation in all its forms through classes in theory of flight, navigation, aircraft engines and a variety of interesting subjects. It also aims to enable them to achieve their full potential and become better citizens. With Squadrons in most states of Australia, the Air League has been serving the community in Australia since 1934. It is self-funding and staffed by volunteers. For further information, phone 1800 502 175, email info@airleague.com.au or go to airleague.com.au.

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WORDS Flying Officer (AAFC) Paul Rosenzweig

CADET SCORES MULTIPLE AWARDS

CADET WARRANT OFFICER

Matthew Weatherald's precision target shooting has won him the AAFC Commander's Award for Best Shot of the Australian Air Force Cadets in the recent national competition held in Sydney, and follows his similar win at State level in Western Australia.

A Staff Cadet at No.721 Squadron in Madeley in Perth's northern suburbs, Matthew, 16, also duxed the state's Air Force Cadet Warrant Officer course earlier this year, rewarding him with a 30-minute familiarisation flight in Air Force's new Pilatus PC-21 advanced pilot trainer at RAAF Base Pearce.

In addition, he won Drill Captain at WA's Air Force Cadets annual marching competition against squadrons from around the state, and also won the WA Air Force Cadets Fieldcraft Team Leader Award, which involved leading a group of six Cadets in the bush for a weekend, completing assessed activities including field engineering, reconnaissance, navigation with compass and map, and overnight bivouacs.

Matthew's exciting and impressive career in Air Force Cadets also saw him dux his glider flying course in April when he qualified as a solo pilot. He also duxed his Corporal's training course at RAAF Base Pearce two years prior and received his Commanding Officer's Outstanding Cadet of the Year Award for two years in a row. And if that wasn't enough, Matthew will soon receive the Silver Award in the Duke of Edinburgh's International Award Program.

"I'm seeking a career in the Air Force as a fast-jet pilot after attending the Australian Defence Force Academy in Canberra," said Matthew.

And thanks to his Air Force Cadets experience, he is well on the way to achieving his goal.

Reading of his achievements,

Air Commodore Gary Martin, Director General Cadets – Air Force, described Matthew as a "very impressive young man".

Sponsored and supported by Air Force, the Australian Air Force Cadets is the nation's leading community-based youth development organisation and open to all Australians from the year they turn 13, through to 18.

Impossible-to-match activities can include qualifying to fly a glider solo after nine days training from age 15 and flying powered aircraft solo in nine days from age 16 (minimum legal ages), firearms safety training, fieldcraft and bushcraft, plus ceremonial activities and community service.

In addition, participation in the Duke of Edinburgh's International Award Program is coupled with tertiary-level leadership training for young people, still in their teens, that will help take Australia forward in the 21st century.



ABOVE Outstanding Australian Air Force Cadets Warrant Officer Matthew Weatherald of No.721 Squadron in Madeley WA with his award as WA's Best Drill Captain and Fieldcraft Team Leader.



SIGHTS SET ON THE ROYAL FLYING DOCTOR SERVICE

CADET WARRANT OFFICER Ian van Schalkwyk is fully GPC-qualified (Glider Pilot's Certificate), and has gained other awards including solo rating on a Carbon Cub; and the 'Silver C' badge which requires completing a flight of five hours duration, a straight line flight of not less than 50 kilometres, and a flight with height gain of at least 1,000 metres.

Ian is in the final stages of training to become a glider pilot instructor, and serves as Cadet Warrant Officer at No 617 Squadron in Netherby SA. His career objective is to be a pilot with the Royal Flying Doctor Service.

"I remember always being around aircraft as it was one of my father's passions, and we were often having to fly on aircraft for various work reasons. It was on a flight to visit family in Johannesburg, at eight years old, that I realised flying was my passion," said Cadet Warrant Officer Ian van Schalkwyk.

"My first gliding experience occurred on the first gliding camp I went on, and was the beginning of an amazing journey. I remember doing about an hour of ground school and finally getting out to the runway where I was, unfortunately, last in line. Luckily, my first-ever flight came before the end of the day, and it was even better than I had hoped.

"Later, I really enjoyed my first solo



LEFT Australian Air Force Cadet Warrant Officer Ian van Schalkwyk with Instructor Pilot Officer (AAFC) Dennis Medlow, undergoing continuation glider training at Gawler SA.

flight,” said Ian. “Going solo provides an incredible sense of freedom that is seldom, if ever, experienced on the ground by adults, let alone by someone aged 15 years. And going solo employs so much freedom, and of course, so much responsibility.

“My best advice to other Cadets is to do your very best in everything. And remember that Cadets is very much what you make it. So, if you want to fly, then

nominate for flying activities. If you want to shoot, then nominate for firearms activities, and so on.

“Finally, just enjoy it. You are getting a unique opportunity to do amazing things so early in life, that along with the hard work it takes to qualify, it can sometimes become difficult to remember that you’re also there for fun,” said Cadet Warrant Officer Ian van Schalkwyk.

FIRST SOLO FLIGHT IN THE NEW DIAMOND

EARLIER THIS YEAR, Air Force Cadets Corporal Max Ramm from No.609 Squadron (Warradale Barracks SA) flew his first solo flight in the new Diamond DA40 NG aircraft at the organisation’s Elementary Flying Training School, Aviation Operations Wing, which has provides gliding and powered flying training.

“My first flight in the Diamond was different to any other experience I have had in the air. The noise of the engine was distinctly different and far smoother than anything else I had hear,” said Cadet Corporal Ramm.

“The different systems I had learned about were all far more advanced than

most aircraft out there. When the instructor first handed over the controls to me, it was exciting and unique. I think I’ll remember that feeling for the rest of my life.

“My first time in the cockpit of an aircraft was on a weekend Scout camp where we all had 30 minutes flying time in a Tobago TB-10.

“I was a nervous 13 at the time, and I remember feeling almost scared of the aircraft - not exactly what you expect to hear from someone who is now hoping to find a career as a pilot, but my first time flying was not the best.

“But flying solo for the first time in the Diamond was without doubt the best experience of my life.

“However, during my check flight, to see if I was ready to fly by myself, I was certain I had failed. It felt like I was making mistake after mistake and I almost asked my instructor to just land the plane there and then.

“But after some encouraging words from my instructor, I went on to pass. The feeling of being so close to failure made the flight even more exciting.

“All of the errors I was making not five minutes before had all disappeared and it felt amazing.

“After the weeks of hard work that went into getting to that moment, it was all worth it.”



LEFT Following his first solo powered flight, Australian Air Force Cadets Corporal Max Ramm is congratulated by Squadron Leader (AAFC) Scott Wiggins, Staff Officer Aviation Operations Wing.

What have you done to my son?

WORDS Squadron Leader (AAFC) Roger Buddrige

True conversation. Word for word. A mother strode up to me during an Air Force Cadets event and demanded: “What have you done to my son?” She was not smiling.

“What do you mean,” I asked, worried. Very worried, especially as others gathered round to listen.

As public affairs officer, I was a visible face of the organisation but I’d never been fronted like this before.

“Since he joined the Air Force Cadets, he’s changed and I want to know why.”

“Err, how has he changed?” I said, with increasing trepidation.

“Well, just after he got back from his Cadet basic training camp, I found him in his room bouncing a 20c coin off his tightly-made bed and trying to catch it mid-air. He’s never even made his bed before.”

“Anything else?” I said, still worried.

“Yes. He now comes home from school, goes straight to his room and gets his homework and studying done before he plays with his phone or watches television. This is not like him.”

“Anything else?” I said, cautiously starting to relax. What was all of this leading up to?

“Yes. He’s stopped picking on his little sister and instead talks with her and plays with her. He’s never done that before, either.”

“Okay,” I said. “And?”

“And he’s stopped giving me cheek and a hard time.”

“So, what’s the problem?” I said.

“Oh, there’s no problem. I just want to know what you lot are doing so I can bottle and sell it!”

And on another occasion, at the first end-of-year parade of a new Squadron, I asked a mother in the crowd how her son was doing, now that he’d joined Cadets. “Oh,” she said, “he used to be a little slug. Now look at him. I’m so proud I could cry.”

Commemorative SERVICES

RAAF ASSOCIATION SOUTH AUSTRALIA and RAAF Edinburgh hosted two important commemorative services in August and September.

On 15 August, they held the first Victory in the Pacific Ceremony at the Air Force Memorial, Torrens Parade Ground. The new ceremony provides an important opportunity for those precious few remaining South Australian based World War II RAAF veterans who served in the Pacific to be appropriately acknowledged by the community. RAAF Association (South Australia) President Robert Black said: "It is wonderful to have this ceremony, along with our annual Bomber Command and our Battle of Britain ceremonies in Adelaide. They mean so much to our South Australian veterans and we greatly appreciate the fantastic support of RAAF Edinburgh without which these ceremonies could not be possible."

The keynote address by WGCDR Glenn Orton, Commanding Officer No.24 Squadron, an Edinburgh-based squadron that had noted service in the South West Pacific during WWII, recognised the tragic story of PLTOFF Eldred Quinn. Born in 1922 in the Adelaide Hills, Quinn enlisted in the RAAF on ANZAC Day 1942 and completed flight training at Parafield and Victor Harbour, SA. He served with No.80 Squadron flying Kittyhawks in the South West Pacific Area of Operations in 1944 and 1945. He was killed in action (flying battle), in Borneo, on 9 August 1945, in the Squadron's last combat sortie a mere six days before the Japanese surrender, at the age of 22

On Saturday 14 September, the RAAF Association (South Australia) and RAAF Edinburgh again partnered for SA's annual Battle of Britain Commemorative Service at the Air Force



 The No.24 Squadron Catalfalque Party march into position for the Victory in the Pacific anniversary ceremony.

Memorial, Torrens Parade Ground. No.1 Remote Sensor Unit, based at RAAF Edinburgh, provided the Catalfalque Party and the keynote address. The service commemorates in particular the eight South Australian aircrew who participated in the Battle of Britain. This year's service acknowledged Desmond Fopp and the RAAF and RAAF Association were honoured to have relatives of Desmond Fopp at the service.

Born in 1920 at Cudlee Creek in the Adelaide Hills, Fopp joined the Royal Air Force in 1939. He flew Hurricane's in fighter sweeps across France, Netherlands and Belgium to cover the retreat of allied troops and then flew all over southern England as part of The Battle of Britain.

On 3 September 1940 he and three other aircraft were scrambled to encounter an unknown size force identified on radar. Getting into the air, his flight found themselves facing overwhelming odds engaging a 60-strong German aircraft formation. Fopp saw one of his mates shot down almost straight away and after spending all his ammunition damaging a Dornier 17, he was then attacked by three Me 110 fighters. His aircraft was shot down and Fopp endured severe burns which saw him hospitalised for three months.

Showing incredible fortitude and resilience, he recovered and returned

to operations 12 months later flying "rhubarb" missions across France and was Mentioned in Despatches for his actions. Surviving WWII, Fopp retired from the RAF on 13 March 1975 at the rank of Squadron Leader after quite a remarkable career that spanned over three decades and included operations around the globe. Despite serving in the RAF, Fopp held true to his Australian heritage and remained an Australian passport-holder all his life. He was a passionate supporter of cricket and took great delight whenever the Australians won the Ashes. He died in 2005 recognised as Australia's last surviving Battle of Britain veteran.

After the service, the RAAF Association joined with the South Australian Aviation Museum in hosting the book launch of Dennis Newton's new biography on SQNLDR Robert Bungey, a South Australian air ace who served in the Battle of Britain and France before commanding No.452 Squadron, the RAAF's first Spitfire Squadron, in England. Surviving three operational tours, Bungey returned to Australia in 1943 only to tragically die in his home town of Glenelg leaving a young family. Richard Bungey, the only son of SQNLDR Robert Bungey, proudly wearing his father's Battle of Britain tie and medals attended the book launch.

Australian Operation DAMON REUNION

THE FIRST FORMAL REUNION will be held next year for personnel who served in Southern Rhodesia as a part of Operation Agila, 25 December 1979 to 5 March 1980.

The Australian Contingent operation was named Operation Damon, the first large force to be deployed on operations since the Vietnam War. The reunion will celebrate the operation's success as a mission and will be an opportunity for old mates to catch up.

Anyone who was a member of Operation Agila or had an extended role connected to the mission is welcome. Activities will include a meet and greet evening, memorial service and dinner.

The reunion will be held 6-8 March 2020 at Kedron Wavell RSL, Chernside, Qld. For information email Dick Clarke, ulyssess39371@gmail.com, or Les Norton, Lesnorton0@gmail.com



LEFT RAF Hercules and Puma supporting Commonwealth forces monitoring Rhodesian elections in 1980.



Far East MEMORIAL

THE FAR EAST STRATEGIC RESERVE (FESR) War Memorial Foundation is raising funds to install a memorial in the sculpture gardens at the Australian War Memorial in Canberra. The memorial will recognise the men and women who served in the Malayan Emergency and Indonesian Confrontation.

During the 1950s and 1960s, Australian forces were engaged in two conflicts involving Malaya (now Malaysia). British Commonwealth forces played a key role in combating a 12-year Communist insurgency, known as the Malayan Emergency, between 1948 and 1960. From 1964, Australians served in support of the newly federated state



of Malaysia. Known as Confrontation, the second conflict ended in 1966, by which time Australians had engaged in operations in Indonesian territory and on the Malayan peninsula.

In all, 44 Australian servicemen (seven RAN, 27 Army and 10 RAAF) lost their lives during the Emergency, 15 of them as a result of operations, and 27 were wounded. During Confrontation, 22 (21 Army and one RAAF) lost their lives and eight were wounded. The service

of Australian and allied forces during the Emergency and Confrontation commitments is recognised on Malaya and Borneo Veterans Day, 31 August.

With all approvals now in place, the FESR Foundation is making a push to raise funds to design and build the memorial. Information on how to contribute can be found on the website fesrmemorial.org.au, along with many images and old movie footage of the two conflicts.

A word from a national councillor - THE CASE FOR CHANGE

THE TERM **EXISTENTIAL THREAT** currently enjoys wide usage, perhaps to the point of becoming trite. Like almost every traditional ex-service organisation (and most other community-based volunteer organisations), AFA faces a membership crisis. Whether it proves to be existential depends on the decisions and actions we current AFA members take now.

Our National President, supported by the Board of AFA Ltd, resolved earlier this year to meet the membership crisis head on. Harmonisation is the first step in the process. The ramifications are becoming clearer as the State/Territory Divisions and Members address what needs to be done. One thing is clear, unless we set aside the comfort of 'business as usual' we will not resolve the crisis.

Let's start with the basics. Our RAAF experience was in a robustly hierarchical Service. We were told what was to be done, and we did it. Alternatives had to be thoroughly evaluated and advocated robustly. Once accepted, alternatives were a positive trust-factor at the interpersonal level and invigorating when scaled up across the RAAF. If delegated a responsibility, especially where risk necessitated tight parameters, successful completion was expected.

In the RAAF, we were all members of a great team. Our achievements came from common goals, shared commitment, active contribution and pride in outcomes. Now, as members of AFA, we are the beneficiaries of the efforts of those that established the AFC Association and expanded it into the AFC and RAAF Association. We are

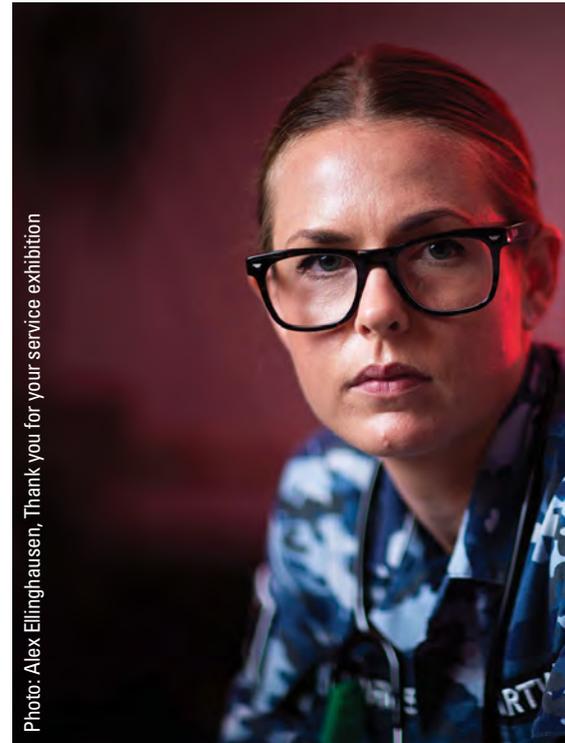


Photo: Alex Ellinghausen, Thank you for your service exhibition

The evidence is that a significant reorientation of habitual thinking is necessary. Two considerations scope the challenge.

The first is general: human dynamics research over 20 years with 40,000 people from 25 cultures showed that, when faced with a decision, the first response of about 85% of us is purely emotional, about 10% a combination of emotion and logic, and 5% on logic alone. Not helpful to leaders proposing change.

The second is situational: for many (if not most) of us, retirement was a release from the strictures of hierarchy, top-down direction and close control. As just discussed, research shows that, whether consciously or not, around nine out of 10 of us will respond emotively. At the organisational scale, change is resisted.

Looking forward: AFA must attract current and future serving personnel if it is to have a future. We cannot assume that hierarchical command and control will work. Fortunately, the 5th Generation Air Force shows us the way. Just as the modern battlefield is comprehensively networked, so too is the modern Air Force. The levels of authority delegated day-to-day are diametrically opposite the Air Force we



Photo: CPD/IS Cameron Martin

“ There is a time and place to be hierarchical and we're all taught when that is. But generally, the Air Force is extremely good at empowering their people.”

Squadron Leader Ajitha Sugnanam

creating AFA Ltd. Our challenge is to preserve the heritage but ensure AFA Ltd is fit for purpose into the future.

The past, however, can be a challenge for future tasks. Can we, as custodians of the past simultaneously be the stewards of the future?



“ Anyone can suggest new ideas and approaches, regardless of rank. You can ask and say anything, with the appropriate tone and the appropriate delivery.”

Corporal Hollie Cartwright

knew. A subject-matter expert is the authority turned to, irrespective of rank or position.

In a recent public media article, Squadron Leader Ajitha Sugnanam captured the modern Air Force way: “There is a time and place to be hierarchical and we’re all taught when that is. But generally, the Air Force is extremely good at empowering their people.” This opinion was reinforced by Air Force Corporal Hollie Cartwright: “Anyone can suggest new ideas and approaches, regardless of rank. You can ask and say anything, with the

appropriate tone and the appropriate delivery.”

Sheeting this home, we the older Members must actively create opportunities for younger members to guide and define the organisation they will inherit. We must give recently separated and current Air Force members a good hearing. Their experiences, perceptions and needs are the future AFA. We need them to become the future custodians of the past and the stewards of their successors’ future. To do so, we must go beyond emotive responses grounded on experience that is anachronistic. We must not only listen but must also understand and respond. That will necessitate putting our habitual world views aside.

That recognition does not devalue or negate our contribution. We routinely argue that wisdom comes with age – the quality of having experience, knowledge and good judgement. If we do not listen and understand, add our experience and knowledge, and exercise informed judgement, we are not wise.

One of our Division Presidents likened our need to a choir singing in parts. The

outcome, he said, is different tunes that work well together.”

Applying that perspective to our challenge: the National President and Division/Territory Presidents are deeply concerned about the survivability of the Association. On behalf of the AFA membership, they have resolved strategic objectives to maximise the likelihood of a viable future. That future depends on change. Reflecting the analogy: The objective is clear; how we get there will be most robust if it combines the best of all parts.

The challenge is ours. For there to be a future AFA, we the current members must actively support change. So, let’s rethink our presumptions and motivations. Our experience and knowledge are the foundations of the future AFA. We need the next generation of members to help evolve AFA Ltd. To do so we must enquire and listen and then support rational change. These prerequisites test us. If the future condemns us for poor judgement, it will be because we failed to rise to the existential challenge.

Richard Kelloway OBE (GPCAPT Rtd)

Spitfire

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Normandy Beachheads!
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FRIENDS INDEED

WHEN THE FRIENDS OF THE MIRAGE GET TOGETHER FOR A REUNION, THEY DO MORE THAN CATCH UP, THEY RAISE MONEY TO SUPPORT MAITLAND LEGACY.

THE SECOND ANNUAL Friends Of The Mirage (FOTM) reunion was held at the Stockton RSL near Newcastle, NSW on Saturday 29 June this year. The main objectives of our reunion are two-fold. Firstly, to reminisce and enjoy the company of fellow “sisters and brothers in arms” who had maintained, directly supported and flown the Dassault Mirage III and IIID fighter. Secondly, to undertake ongoing unofficial fundraising activities to support Legacy in some way.

Back in 2018, we decided to adopt Maitland Legacy as the major recipient of the funds raised and donations received. After receiving a generous donation from the Maitland Lions Club in 2017, the Maitland Division of Hunter Legacy Club set about creating a Youth Development Program. The program provides opportunities that Junior Legatees would most likely never encounter. It has three components.

A Sailing Program – with the Newcastle Cruising Yacht Club that begins with a try-sailing experience. Junior Legatees who take part are then able to apply to complete the standard learn-to-sail course run by the yacht

club. Admirably, the club provides the try-sailing day free of charge and is charging Legacy cost price for subsequent training.

A High Ropes Program – Legacy worked with a skilled outdoors instructor to set up a program involving climbing and abseiling. The High Ropes Program held a Climbing Day at Cessnock Police Citizens Youth Club (PCYC) supervised Legatee Peter Rosemont (ex-RSM A). Legatees Paul Burnham and Jane Hathaway concluded the climb with a barbecue and chocolate brownies.

A Lord and Lady Somers Leadership Camp – a unique development program completed over a two week period on the Mornington Peninsular in Victoria each January. As the Leadership Camp is expensive, priority is given to the Junior Legatees who are transitioning from Year 11 to Year 12.

All FOTM’s donations to Maitland Legacy are officially made in the name and memory of Corporal Mathew Ricky Andrew “Hoppy” Hopkins of the 7th Battalion Royal Australian Regiment (7RAR). Mathew, on his second tour in Afghanistan, was rushed home for the birth of his son Alex. He spent four precious days with his first-time brand new family unit before returning to his Unit. He was killed some five weeks later. FOTM’s connection to Mathew is through his wife Victoria, the daughter of ex-Mirage Airframe Fitter and Flight Engineer, Merv “Swerver” Mudge. Victoria and her son Alex are in the care of Maitland Legacy and their Legatee is Paul Rees, the Director of Maitland’s Legacy Division.

Following the 2018 reunion, Al Vincent and I presented a cheque to Maitland Legacy for \$1,000. With a 54% increase in attendance in 2019, my wife Glenda and I presented Paul Rees and the President of Hunter Legacy, Garth Carlson, with a cheque for \$3,000. Additionally, Glenda and I were able to present Victoria and Alex with a personal cash gift of \$2,800, most of which was donated by our members in a separate “basket collection”. Victoria and Alex expressed their immense gratitude to FOTM’s members and Victoria asked me



LEFT FOTM honours the memory of Corporal Mathew Ricky Andrew ‘Hoppy’ Hopkins, 7th Battalion Royal Australian Regiment.



TOP Barry Einam presents the FOTM donation to Victoria and Alex.



ABOVE Alex and friends at the Legacy Wall Climb.

to pass on “that the money will only be spent on family things that Alex would like to do” – things that bring a smile.

The overall compassion, empathy, generosity and the huge heart of our group has truly shone through. A big “Bravo Zulu” to all who were present at the 2019 Reunion. Al and I are proud to be associated with you all, you ladies and gentlemen who are covered by the RAAF Mirage Fast-Jet Umbrella – Fighter People. 🇺🇦

Buku Bagus Regardezvous’s Barry “Bones” Einam, FOTM Coordinator



**WGCDR (RETD) ROBERT
ANDREW MACINTOSH
AFC OAM**

12 March 1929 – 3 September 2019

BOB ENLISTED IN THE AIR FORCE

on 1 October 1951 completing No.8 Pilot's Course in 1952 and then Fighter Operational Conversion Course flying Mustangs and Vampires. He was posted to 77 Squadron where he converted onto the new Meteor aircraft serving in Korea from May to July 1953.

Returning to Australia, Bob converted onto the new Sabre fighter aircraft serving as one of four initial Sabre instructors in the new Sabre Trials Flight. He was at the forefront of the RAAF's new fighter capability for several years. After commissioning as a Pilot Officer in 1956 he served a brief six month posting at 3 Squadron as a Sabre flight instructor.

In 1962 he was selected to undergo training in the United States for the new Iroquois rotary wing aircraft. During his subsequent posting with 9 Squadron, from 1962 to 1965, he was awarded the Queen's Commendation for Valuable Service in the Air for flood relief operations. On one particular mission, he rescued 11 people from the top of a building and then went on to rescue a young family from an isolated property. In 1965/66 he completed an operational tour during the Malay Emergency flying the Iroquois on many sorties deploying Gurkas and Australian soldiers into the Malayan jungles.

From June 1966 to March 1967, he completed an operational tour in

Vietnam flying the Iroquois. Only six weeks after arriving in country, Bob piloted one of three Dustoff Iroquois into Long Tan in the evening immediately after that battle to evacuate wounded Soldiers. It was a feat of night flying for which he had no training preparation and in hostile terrain.

A month later, Bob was tasked with picking up a SAS patrol near Binh Gia. As he approached to land, a major firefright erupted. The patrol had to run for the helicopter firing their weapons and ducking as the door gunners fired over their heads. Despite direct targeting, Bob remained on the ground displaying immense courage ensuring the SAS patrol were all onboard before lifting off. In February 1967, he flew more than 30 sorties in a 24-hour period during Operation BRIBIE to resupply and medivac elements of 6RAR element that had encountered a significant Viet Cong force. The Iroquois Bob flew in that engagement, A2-1019, is now proudly on display at the Australian War Memorial. Bob was Mentioned in Dispatches for his distinguished service in Vietnam.

Returning to Australia, he wrote the syllabus for the RAAF's first helicopter pilot instructor's course for which he was awarded the Air Force Cross. After 27 years' service and three operational tours, Bob retired from the RAAF in 1978.

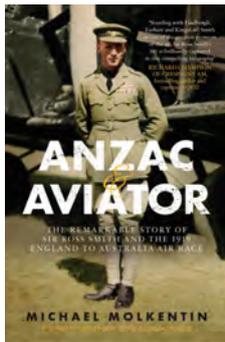
Completing training for the Uniting Church ministry he went to Meekatharra, WA, as a "Flying Padre" with Frontier Services. Bob and his wife, Jenny, flew the church Cessna C-182 serving an area of more than 450,000 square kilometers, or nearly half the size of SA. Bob retired (again) in 1994 and settled in Adelaide.

Having served in Korea, Vietnam and Malaya, Bob saw first-hand the effects military service has on those who serve and was passionate about supporting veterans. He was a tireless servant of the Royal Australian Air Force Association (RAAFA) SA Division, including service as President of its Mitcham Branch and as a Vice President of the State Council. He worked as a Pension and Welfare Officer and as an Honorary Chaplain for numerous ceremonies and commemorative services. Bob served on South Australia's Veterans' Advisory Council for three years from 2014 to 2016 sharing his passion, understanding and concern for the veteran's community. On 8 July 2015 Bob was awarded the Medal of the Order of Australia in the Queen's Birthday Honours List for service to the community, particularly through church and veterans' organisations.

Bob was a true officer and a gentleman. 



 **ABOVE** RAAF helicopter pilots, Flt Lt Robert Andrew (Bob) Macintosh (left) and Flt Lt Leigh Oxley 'Laddie' Hindley, at Vung Tau air base in South Vietnam.



REVIEW BY Greg Weller

ANZAC AND AVIATOR

By **MICHAEL MOLKENTIN**
Allen and Unwin, \$32.99

THE GREAT WAR catapulted Sir Ross Smith from a humble Harris Scarfe employee to one of Australia's most distinguished airmen hailed by the *New York Times* as the foremost living aviator of the time. In leading the intrepid crew of the Vickers Vimy on the record-breaking flight from England to Australia, he became an international hero.

Yet, 100 years on, his name has become somewhat lost, often confused with another great aviator, Sir Charles Kingsford Smith. Thankfully, Michael Molkentin, noted for his fine work on the Australian Flying Corps in *Fire in the Sky* (2010) and *Australia and the War in the Air* (2014), has partly addressed that discrepancy with this biography.

Through impeccable research of the personal letters exchanged between Ross Smith, his family and friends, Molkentin has been able to articulate a more complete understanding of this fascinating Australian, revealing aspects and details of his life and character one will not find elsewhere. His analysis of Smith's early years and his time at Gallipoli and the Battle of Romani serving with the AIF is particularly enlightening, providing a valuable insight into Ross Smith's character, values and leadership.

Good biographies of Australian military aviators are few and far between. It is incredible that until now, nobody has written a biography on Sir Ross Smith. In that respect, *ANZAC and Aviator* is a significant piece of work that is well researched, easy to read and appropriately released in the centenary of Smith's record breaking 1919 flight. The book was launched in Adelaide on 3 October 2019 during South Australia's Epic Flight Centenary celebrations.



REVIEW BY Greg Weller

LONG FLIGHT HOME

By **LAINIE ANDERSON**
Wakefield Press, \$29.95

IN A NOVEL APPROACH, this account of the epic flight by Sir Ross and Sir Keith Smith in 1919 is largely told, not by Ross Smith, but by his ingenious yet unassuming mechanic Wally Shiers.

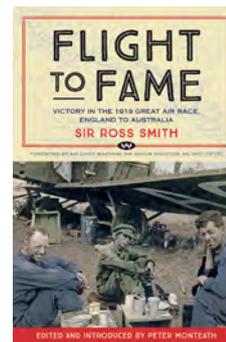
A South Australian, Shiers enlisted in the Australian Imperial Force in April 1915 serving in the 1st Light Horse Regiment before transferring to No.1 Squadron (AFC) in October 1916 where he served as an Air Mechanic for the remainder of the war and came to know Ross Smith, the distinguished 1SQN pilot.

While Laine Anderson retains Ross Smith as the central figure in the ultimate success of the flight, she does so in a modest way, emphasising his calm leadership and professional airmanship as he leads his navigator (his brother Keith) and two aircraft mechanics (Shiers and Jim Bennett) to overcome the many challenges that threatened the quest.

The book also tells the enduring romance story between Wally and his fiancée Helena Alford waiting in Australia for his return.

Anderson's excellent knowledge of the Smith brother's record-breaking flight is evident. A freelance journalist, she completed a Churchill Fellowship on the Great Air Race in 2017 and has been the Ambassador for South Australia's Epic Flight Centenary celebrations in 2019. She has extensively researched diaries, personal papers, records and photographs in developing the story.

Anderson's choice of Wally Shiers as the storyteller is the real success of the novel and the feature that makes it a compelling read. It is her first book and the result is impressive.



REVIEW BY Greg Weller

FLIGHT TO FAME: Victory in the 1919 Great Air Race, England to Australia!

Edited By **PETER MONTEATH**
Wakefield Press, \$29.95

IN RECOGNITION of the centenary of the Great Air Race, Wakefield Press has re-released Sir Ross Smith's account of the journey originally titled *14,000 Miles Through the Air* under the title *Flight to Fame*. Launched in May 2019 as part of the South Australia History Festival, the re-release is a welcome contribution to the historical tapestry of the nation. Originally published in 1922 and largely based on his personal diary and notes taken throughout the journey, Smith's account of the epic flight provides a fascinating and easy to read narrative of the incredible journey.

South Australian historian Peter Monteath has done a fine job in researching and editing the original publication manuscript. He has provided a thoughtful and well-researched introduction that backgrounds Ross Smith's family life and remarkable career as one of Australia's most decorated and distinguished military aviators in the Australian Flying Corps and then as an aviation pioneer. He also highlights the tragedy of Sir Ross Smith's sudden death in 1922 in front of his brother while preparing for a new and more challenging endurance flight around the world. The original publication illustrated the journey with early photographic images. Monteath has used new and previously largely unavailable imagery from the State Library of South Australia, recently digitalised and published online as part of the flight's centenary.

With the centenary of the Great Air Race there is no better way to reacquaint yourself with the challenges and experiences of the incredible flight than reading Ross Smith's personal account.



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