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COVER

In slightly over a decade, Unmanned Aerial Systems (UAS) have become increasingly more important to the efficient conduct of combat operations. Their impact has been particularly noticeable in the conduct of counter-insurgency operations of the past decade in Afghanistan, where it has attained the status of a critical element. As a corollary, this focus on a land-locked operation has also meant that most of the developments in the UAS capability spectrum have been oriented towards its employment in counter-insurgency operations across largely uncontested airspace, which may not be the reality in future theatres of operations. As multi-national forces commence their withdrawal from Afghanistan, there is a perceived need to re-orientate the operational employment and development of UASs"

FEATURES

REGULARS

CLOSING DATES FOR MATERIAL

Autumn Edition
- 14 January
Summer Edition
- 14 October
Winter Edition
- 14 April
Spring Edition
- 14 July

WHATEVER

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[NYSE: XLS]

President's Summer Message

As we head into the New Year I thought it opportune to provide a heads up on forthcoming Wings feature coverage of a seminal event to be held next autumn. Earlier this year I attended the events held at RAAF East Sale to commemorate the 100th Anniversary of the formation of Central Flying School, one of the first military aviation units to be formed in the World.

The School was formed on a site chosen on the Chirnside Park Estate, near Werribee, following Government approval of the establishment of a Flying Corps in October 1912.

The site was called Point Cooke, but the press and Army officialdom called it Point Cook, the name that exists today. It was not, however, until one year later that the School acquired aircraft and military aviation 'took off' in Australia. The Government had ordered three Bristol Biplanes and two Deperdussin (one a taxi ground trainer) monoplanes, which arrived in Australia late 1913. A Bristol and a Deperdussin were assembled at Point Cook in February 1914 in readiness for their first flights. March 1914 was a memorable month – the military aviators were airborne; and the first military flight and the first military crash.

In recognition of the following five score years of tumultuous and historic events that have played a large part in shaping Australia's present and future outlook, the Chief of Air Force, Air Marshal Geoff Brown AO, will host the Centenary of Military Aviation Air Show at Point Cook on the 1st and 2nd of March 2014.

The Air Show will feature a broad array of family orientated ground displays and include dog handling, fire fighting, rides in the tethered RAAF Balloon, the Box Kite and of course the Museum. There will also be trade booths, one of which will be that of the Australian Flying Corps and RAAF Association. Our Victorian Division are doing the heavy lifting for the booth with help from other State Divisions, especially Tasmania and New South Wales. The flying display will be firmly focussed on aircraft that have, or are being operated by, the Royal Australian Navy, the Australian Army and the Royal Australian Air Force.

Everything points towards the Air Show being a fitting celebration of the special place Military Aviation holds in Australia's history over the past one hundred years. From the fledgling days of the Australian Flying Corps through to the period between the Wars and on to World War II where Australia's contribution in the air was quite remarkable, then to the post 1945 period covering the Occupation of Japan, Malta, Korea, the Malayan Emergency, Ubon, Vietnam, the Gulf Wars and Afghanistan, Australian Military Aviation has written an imperishable record.

Wings will feature an article on the Centenary of Military Aviation in the autumn issue 2014, with a follow-up of the Air Show in the winter issue. Hopefully you can be there at Point Cook next March but in any case, watch out for these special editions of Wings.

Before I sign off for the year let me wish you on behalf of the National Council of the Australian Flying Corps and Royal Australian Air Force Association the warmest wishes for a Merry Christmas and a safe, healthy and happy festive season and into the New Year. For those of you who are travelling to spend time with your families take extra care and enjoy this special time with your loved ones. Good speed to you all.

Brent Espeland
National President
25 November 2013

Air Marshal Geoff Brown AO, CAF, will host the Centenary of Military Aviation Air show at Pt Cook 1-2 Mar 2014.

The Future Of Unmanned Aerial Systems

.. .military commanders and scientific advisers say that UAVs will continue to play a significant role in combat operations, although the pace of investment is likely to slow down and the focus of UAV development efforts is likely to shift.

Caitlin Lee,'Staying the Course', Jane's* Defence Weekly, *31 July 2013, p. 26.

In slightly over a decade, Unmanned Aerial Systems (UAS) have become increasingly more important to the efficient conduct of combat operations. Their impact has been particularly noticeable in the conduct of counter-insurgency operations of the past decade in Afghanistan, where it has attained the status of a critical element. As a corollary, this focus on a land-locked operation has also meant that most of the developments in the UAS capability spectrum have been oriented towards its employment in counter-insurgency operations across largely uncontested airspace, which may not be the reality in future theatres of operations. As multi-national forces commence their withdrawal from Afghanistan, there is a perceived need to re-orientate the operational employment and development of UASs.

While the efficacy of UASs in the battlefield has been accepted, further enhancement of their capabilities and the development of new UASs have hit a roadblock. Over the past few years the global financial crisis has forced governments across the world to reconsider and recast their national budgets. In these circumstances the debate tends to focus on whether or not the nation should engage itself in wars of choice. The answer normally, especially when the nation is facing financial stringency, would be in the negative. These are the circumstances that the democratic world faces today. When defence budgets are trimmed across the board in almost all nations, the resources available to further develop a fledgling idea— albeit one that has proven to be extremely efficacious— will also automatically dwindle. The development of UAS capability, therefore, is at a crossroads now.

The United States (US) has so far been the largest developer of UAS technology, and its military forces have been at the forefront of UAS employment in combat situations. However, with the US Government's sequestration plan that intends to cut US$500 billion from the defence budget over the next 10 years, the decision to curtail the number of UAS strikes, and the US pivot to the Asia-Pacific while withdrawing from Afghanistan combine to retard possible development initiatives in UAS technology. The developmental trajectory that UASs enjoyed in the last decade and more will, of necessity, decline and may even plateau. Since there are fewer resources available globally for indulging in cutting-edge research, the focus is likely to shift to improving the existing system performance and developing innovative concepts of operations.

The Black Hornet: a nano UAS personal reconnaissance system.
Photo: Prox Dynamics

The tiny drones send video and still images back to a handheld screen

Under these conditions, it would be worthwhile to examine the advantages that UASs bring to the combat capability of a military force. The fundamental benefits are extremely high endurance in relation to manned platforms, flexibility, the ability to provide timely intelligence and sophisticated targeting capabilities. Furthermore, armed UASs can act on freshly available intelligence much faster that other systems and thereby reduce the so-called 'sensor-to-shooter' timeframe, which can be a distinct advantage when operating against irregular adversaries. However, arming of UASs have become a politically fraught debate and therefore, nations at the forefront of such developments are likely to slow the developments in this direction. The four characteristics that make up the UASs' coveted capabilities have as much importance in maritime operations as in the current land-centric ones being carried out in Afghanistan, although the mainstay of the UAS in a maritime environment will be its long endurance and its unmatched capacity to carryout intelligence, surveillance and reconnaissance (ISR) role.

Smaller UASs that have already been operationalised permit small, forward-deployed units to function effectively even in semi-autonomous conditions. These small and relatively inexpensive UASs have captured the attention of all ground forces, but are specially prized by Special Forces who traditionally operate autonomously in small groups. This is one area of UAS employment that is bound to see further developments.

The changing focus of the US military towards the Asia-Pacific has highlighted the peculiarities of operating in a maritime environment. While the ADF has always been cognisant of the maritime environment, the renewed interest of Australia's closest ally to the Asia-Pacific is likely to bring about some salutary changes. For one, there is already a proposition to use UASs as relay platforms for long-distance communications that would be vital in a maritime environment. This conversion should not be cost-intensive and will provide another role for the existing long-endurance UASs. While this would involve a passive relay system, the concept could be further developed to provide a stop-gap solution in situations wherein satellite communications have been denied by an adversary.

Another concept that is attractive to fielded forces is the arming of small UASs operated by forward-deployed forces with small munitions of the calibre of a sniper rifle. The use of small calibre weapons could overcome the political pushback that is apparent when arming of a UAS involves weapon systems like the Hellfire missile that have a high probability of creating collateral damage. From a purely ISR role that provides a certain amount of force protection, small UASs could assume a more proactive role—almost akin to offensive air support, but in a more controlled manner.

UASs that can be towed by a normal vehicle and are easy to on- and off-load from ships for amphibious operations are likely to become more ubiquitous than they are currently. Further, the internal bays of these UASs are being converted to 'plug-and-play' facilities to increase the flexibility of the platform to carry out a number of roles. Some of the loads currently being tested include synthetic-aperture radar, ground-moving target indicator radar and communications relay systems. Already some of the UASs have swing role capabilities and this is likely to be further emphasised into the future. These developments will likely focus on UASs weighing less than 100 kilograms to retain surface mobility and ease of deployment.

Irrespective of the lack of resources to continue further developments, UASs have proven their worth in the battlefield in a number of ways and are therefore unlikely to become a redundant capability. There are a variety of innovative usages that are being envisaged for the existing family of UASs, without having to expend large amounts of resources to develop new versions. These new concepts will continue to retain the position of a 'must have' capability that the UASs have ascended to in the past two decades.

Key Points

- UASs have become a critical capability of fielded forces in the past decade
- Budgetary constraints in most of the nations will force a reduction in military budgets that in turn will have an adverse effect on the further development of UASs
- Innovative concepts of operations and improvement of existing performance will ensure that UASs remain essential elements in the overall capability of a joint force.

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***The hand-launched Altavian Nova Block III UAS, used by the US Army**. Photo Business Wire*

Black Hornet Nano UAV

U.S. Army researchers have asked a Norwegian company to develop a pocket-sized helicopter drone to provide a personal reconnaissance unmanned aerial vehicle (UAV) for infantrymen and Special Forces warfighters.

Officials of the Army Contracting Command in Natick, Mass., are awarding a $2.5 million contract to Prox Dynamics AS of Nesbru, Norway, to develop the Black Hornet Personal Reconnaissance System (PRS) -- a one-pound force-protection micro UAV for soldiers and small infantry units.

The Army Contracting Command is awarding the contract for the Black Hornet pocket unmanned aerial vehicle (UAV) on behalf of the Army Natick Soldier Systems Center as part of the Army Rapid Innovation Fund (RIF) for the transition of technologies developed by small businesses to solve immediate defense needs.

Prox Dynamics researchers will base the Black Hornet pocket UAV on the company's PD-100 personal reconnaissance system, a mobile unmanned helicopter designed to provide infantry soldiers with immediate intelligence, surveillance, and reconnaissance (ISR) capability.

The Black Hornet *Photo: Prox Dynamics*

http://www.flightglobal.com/news/articles/auvsi-special-the-uavs-to-watch-this-decade-330421/
http://www.proxdynamics.com/products/

Reaper MQ-9

A Reaper MQ-9 Remotely Piloted Air System (RPAS) prepares for takeoff in Afghanistan
Photo: Cpl Steve Follows RAF

Miniature EW Jammer

Northrop Grumman said recently they had fitted a miniature EW jammer to a small RPA/UAV and demonstrated its capability at a Marine Aviation Weapons and Tactics Squadron One event at Naval Air Weapons Station, China Lake, in October 2013.

Fitted to a Bat UAV, Northrop said in a news release "This marks the first time that such a system was used in operation on a Group III (small, tactical) unmanned aircraft system." The Bat is available in 10 and 12 foot wingspan variants.

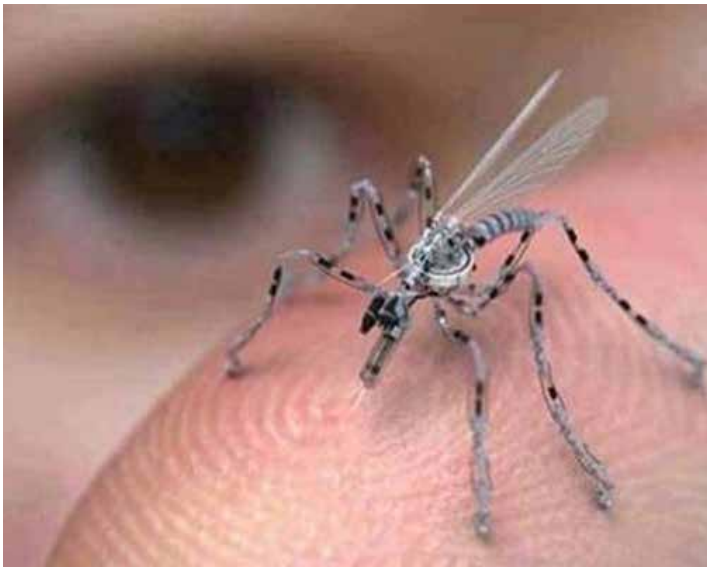
The Bat carried the Pandora electronic attack payload, a low-cost derivative of Northrop Grumman's APR-39 systems. Pandora was fitted to the Bat in less than two months.

A miniature radar jammer fitted on a Bat unmanned aerial vehicle. *Photo: Northrop Grumman*

Is This a Mosquito?

No, it's an insect spy drone for urban areas, already in production, funded by the US Government. It can be remotely controlled and is equipped with a camera and a microphone.

It can land on you, and it may have the potential to take a DNA sample or leave RFID tracking nanotechnology on your skin. It can fly through an open window, or it can attach to your clothing until you take it in your home.



Orion Unmannned Aerial System

Orion is Aurora's long-endurance, Unmanned Aircraft System (UAS) capable of providing extreme persistence for military applications, such as ISR and communication relay. Orion was competitively selected by the US Air Force for the Medium Altitude Global ISR and Communication (MAGIC) Joint Capability Technology Demonstration (JCTD). The MAGIC JCTD was sponsored by the US Central Command (CENTCOM) to meet its demand for persistent ISR. In the JCTD ranking process, five Combatant Commands ranked Orion as their number one priority.

Orion UAV on short finals for landing.
Photo: Aurora Flight Sciences

Northrop Grumman Triton

MQ-4C Triton is a new broad area maritime surveillance (BAMS) unmanned aircraft system (UAS) unveiled by Northrop Grumman for the US Navy. The UAS will complement the navy's Maritime Patrol and Reconnaissance Force family of systems, delivering SIGNET (signals intelligence), C4ISR and maritime strike capabilities.

Details of the BAMS UAS programme

"The MQ-4C Triton is a new broad area maritime surveillance (BAMS) unmanned aircraft system (UAS) unveiled by Northrop Grumman."

The BAMS UAS was acquired under a US DoD Acquisition Category (ACAT) 1D programme and Northrop Grumman was awarded a $1.16bn contract for the MQ-4C BAMS programme in April 2008. The programme saw the completion of preliminary design review in February 2010 and critical design review in February 2011.

The first of the three fuselages of MQ-4C was completed in March 2011 and the ground station testing of multifunction active sensor (MFAS) radar was completed in November 2011.

The flight testing of MFAS on the Gulfstream II testbed aircraft began in February 2012. The first MQ-4C Triton was unveiled in June 2012, while the maiden flight for the UAS is scheduled to be conducted by the end of 2012 with target of achieving initial operational capability (IOC) in December 2015.

MQ-4C Triton design features

The MQ-4C Triton is based on the RQ-4N, a maritime variant

of the RQ-4B Global Hawk. The main aluminium fuselage is of semi-monocoque construction, while the V-tail, engine nacelle and aft fuselage are made of composite materials.

The forward fuselage is strengthened for housing sensors and the radomes are provided with lightning protection, as well as hail and bird-strike resistance.

The UAS has a length of 14.5m, height of 4.7m and a wingspan of a 39.9m. It can hold a maximum internal payload of 1,452kg and external payload of 1,089kg.

MQ-4C Triton broad area maritime surveillance (BAMS)

Mission capabilities of MQ-4C Triton BAMS UAS

The MQ-4C is a high-altitude, long-endurance UAS suitable for conducting continuous sustained operations over an area of interest at long ranges. It relays maritime intelligence, surveillance and reconnaissance (ISR) information directly to the maritime commander.

The UAS can be deployed in a range of missions such as maritime surveillance, battle damage assessment, port surveillance and communication relay. It will also support other units of naval aviation to conduct maritime interdiction, anti-surface warfare (ASuW), battle-space management and targeting missions.

The MQ-4C is capable of providing persistent maritime surveillance and reconnaissance coverage of wide oceanographic and littoral zones at a mission radius of 2,000 nautical miles. The UAS can fly 24 hours a day, seven days a week with 80% effective time on station (ETOS).

Payloads of Northrop's unmanned system

The payload is composed 360-degree field of regard (FOR) sensors including multifunction active sensor (MFAS) electronically steered array radar, electro-optical / infrared (EO/IR) sensor, automatic identification system (AIS) receiver and electronic support measures (ESM). The payload also includes communications relay equipment and Link-16.

The MTS-B multispectral targeting system performs auto-target tracking and produces high resolution imagery at multiple field-of-views and full motion video. The AN/ZLQ-1 ESM uses specific emitter identification (SEI) to track and detect emitters of interest.

Engine and performance of the US's UAS

MQ-4C Triton is powered by a Rolls-Royce AE3007H turbofan engine. It is an advance variant of the AE3007 engine in service with the Citation X and the Embraer Regional Jet. The engine generates a thrust of 8,500lb.

The UAS can fly at a maximum altitude of 60,000ft. It has a gross take-off weight of 14,628kg. Its maximum unrefuelled range is 9,950 nautical miles and endurance is 30 hours. The maximum speed is 357mph.

Ground control station

The UAS is operated from ground stations manned by four-men crew including an air vehicle operator, a mission commander and two sensor operators. "The UAS can fly 24 hours a day, seven days a week with 80% effective time on station (ETOS)."

The ground station includes launch and recovery element (LRE) and a mission control element (MCE). The MCE performs mission planning, launch and recovery, image processing and communications monitoring.

The LRE controls related ground support equipment as well as landing and take-off operations.

Article courtesy of www.naval-technology.com/ and Northrop Grumman

Phantom Ray first flight, April 2011
Photo: Tony Landis, Boeing

Phantom Ray first flight, April 2011
Photo: Carla Thomas, Boeing

'Piloting' Unmanned Aerial Vehicles

By Dr Alan Stephens

Historian

The most intriguing personnel management issue faced by advanced defence forces in recent years has been the 'piloting' of unmanned aerial vehicles. Among other things, it seems to have challenged the self-image of air forces' ruling class.

An insight into the not-inconsiderable politics of the matter can be found in the tangled debate over what precisely unmanned aerial platforms should be called.

Initially, no-one cared too much, because real pilots flew real aeroplanes, and the roles of those aeroplanes – fighter, bomber, airlifter, etc - told us unambiguously what they were for and what their pilots did. Unmanned platforms, by contrast, were regarded as just another supporting technology. Typically, UAVs flew pre-planned routes – that is, there was no human directly in the piloting loop – and, unlike manned aircraft, they were implicitly considered disposable. The most common names of 'drone' and 'UAV' said nothing about the platforms' warfighting roles and were indicative of a somewhat offhand institutional attitude to their place in the greater scheme of things.

But as technology continued its inexorable march, that attitude had to change. The rapid emergence of large numbers of increasingly capable UAVs which were controlled ('flown') throughout their mission in real-time via data links, by remotely-located 'pilots', created operational and cultural imperatives that could not be ignored. Those imperatives grew even stronger when drones became the system of choice for many ISR (intelligence/surveillance/reconnaissance) missions; and when, fitted with precision weapons, they were used in highly successful (if controversial) anti-terrorist campaigns in Afghanistan, the Yemen, the Gaza Strip, and West Pakistan.

Descriptions such as 'Unmanned Aerial System' and 'Remotely Piloted Vehicle' started to enter the military lexicon, with the introduction of 'system' and 'piloted' tacitly acknowledging the platforms' new-found status. The USAF was the most assertive player in the re-naming game, describing its fleet as 'Remotely Piloted Aircraft', a title intended to leave no doubt that (1) these things were neither 'drones' nor 'vehicles', but aircraft, and (2) they were neither autonomous nor pre-programmed, but were at all times controlled by a man-in-the-loop – a pilot.

Who, though, were these 'pilots' to be? Here, the differing approaches of the USAF and the US Army have been instructive, reflecting contrasting cultures as much as operational practicalities.

For armies, aviation has never been anything more than one of a number of secondary arms whose main purpose is to support the infantry in the 'real' battle on the ground. Consistent with this (dangerously misguided) perception of military power, the US Army initially set a low base for its UAV pilots. Whereas its fixed- and rotary-wing pilots had to be fully qualified and were officers or warrant officers, some drone operators had minimal flying experience and held junior enlisted rank.

Perhaps sensitive to longer-term institutional implications, and with a surplus of pilots following the decommissioning of some strike/fighter squadrons, the USAF preferred to use pilots or non-pilot aircrew, all of whom were commissioned.

As institutional differences - some might say prejudices - played themselves out, lessons were learnt. Perhaps the most important is that it is advantageous for drone pilots to have a strong sense of aviation-related situational awareness. And as things stand, that awareness is best developed in the traditional way, namely, by undergoing traditional military flying training.

The RAAF's experience with its flight of Herons in Afghanistan has reflected those lessons. RAAF Heron pilots have been selected from the Air Force's existing pool of qualified pilots, and have come from the full range of operational backgrounds. On completion of a Heron tour, they have usually returned to a manned aircraft squadron.

In other words, the RAAF has elected not to make flying RPAs a specialist pilot role. But developments in the (British) Royal Air Force and the USAF may change that.

Recently the RAF established a specialised flying branch for drone pilots. Candidates undergo basic flying training and are then streamed onto drones, graduating as Remotely Piloted Air Systems pilots, with a distinctive brevet, and destined to spend the bulk of their careers as RPA specialists. The USAF, too, has now introduced a specialist category for drone pilots.

A consequence of the RAAF's existing policy is that hard-won RPA expertise is lost when Heron pilots return to manned platforms. The issue, though, is force flexibility. The RAAF is smaller than the RAF and the USAF, and managing numbers and the spread of talent is always a challenge. The freedom to shift pilots between types is important, and allowing some to specialise on RPAs could undermine the balance of the total force.

On the other hand, the rise of drones will be irresistible. There are indications that the ADF will retain its Heron capability when Australian forces withdraw from Afghanistan, and the acquisition of broad area RPAs seems to be a matter of when, not if.

If the ADF is to maximise its expertise, it will need a policy on how best to pilot its RPAs sooner rather than later.

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RAAF Association (Victorian Division) Sponsors AAFC National Fieldcraft Competition

At a recent ceremony in Melbourne, an agreement was concluded between the RAAF Association (Victorian Division) and the Australian Air Force Cadets National Council that will greatly benefit the AAFC's national competition program. Under the agreement, the RAAFA (Victorian Division) will sponsor the annual AAFC National Fieldcraft Competition for the next three years.

The Fieldcraft Competition brings together teams from the eight AAFC Wings at a central bivouac site where the cadets are put through a series of events to assess their fieldcraft skills. The teams compete for the Lydia Stevens Trophy, which is named after WGCDR Lydia Stevens, a long time Director of the AAFC. The current holder of the trophy is Number 8 Wing from the Northern Territory.

At the signing ceremony (pictured), the President of the RAAFA (Victorian Division), Mr John McCrystal, indicated that Division members were very keen to provide assistance to the AAFC. The Chairman of the AAFC National Council, AVM Dave Dunlop (Retd), added that although the RAAF provides logistic and administrative support for the competition, the sponsorship will add significantly to the total cadet experience by providing those items that Defence is unable to fund.

Exercise Green Eagle, the 2014 competition, will be held over the Easter long weekend at the Puckapunyal Military Area in Victoria.

Mr John McCrystal and AVM Dave Dunlop (Retd), after signing the sponsorship agreement, while Past President, Mr Peter Colliver, looks on.

First Flight of Bristol Biplane/Boxkite Replica

Air Vice-Marshal Mark Skidmore AM (Retd) successfully flew the maiden flight of the Bristol Biplane (Boxkite) replica aircraft on Wednesday 11 September 2013 at RAAF Base Williams, Point Cook. The brainchild of Group Captain Ron Gretton AM (Retd), and Wing Commander Geoff Matthews (Retd), the Boxkite replica was painstakingly built at the RAAF Museum, Point Cook and will eventually be a showcase display for the public.

The original Bristol Biplane was a close copy of the Henri Farman pusher biplane boxkite and was built by the British and Colonial Aeroplane Company in Britain. The first Australian military Bristol Boxkite aircraft flew from Point Cook on 1 March 1914. Three of the aircraft were purchased from Britain in 1913 and CFS Staff built a fourth (a replica), CFS No8. The Bristol Boxkite is expected to be a major drawcard at the Centenary of Military Aviation Air Show, at the RAAF Museum Point Cook, on 1-2 March 2014.

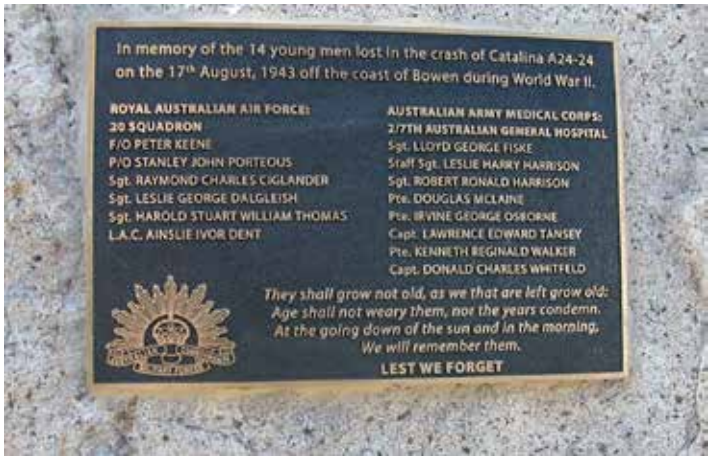
AVM Mark Skidmore AM (Retd) carries out an engine test run on the Bristol Boxkite replica aircraft. *Photo: RAAF*

Project Manager, Ron Gretton AM (left) and Assistant Project Manager, Geoff Matthews (right) stand proudly with their Bristol Boxkite replica aircraft and AVM Mark Skidmore AM (Retd), the pilot for the first flight. *Photo: RAAF*

Catalina A24-24 Memorial Dedication Ceremony

RAAF PBY-5 Catalina, A24-24, (RACF 9733), of 20 Squadron RAAF, took off from Bowen at 1545 hrs on 17 August 1943 on an air to sea gunnery training exercise flight. At the conclusion of firing practice, the aircraft was making a run across a choppy sea when it crashed into the sea and sank approximately 5 miles east of Bowen at approximately 1300. Investigators considered the aircraft was very low and the port wing hit the water during a turn. A memorial has been constructed in Bowen to commemorate the crew and passengers who were lost. Douglas Bower, RAAF Association (QLD Division) and his wife Barbara, travelled to Bowen recently to attend the Memorial Dedication Ceremony on 17 August 2013

Mr. Shane Porteous, son of PLTOFF Stanley Porteous, Pilot, one of the RAAF aircrew who perished in the crash of A24-24 on 17 August 1943, unveiled the Memorial. Mrs Rosemary Menken, Member for Burdekin, then dedicated the memorial and acknowledged the presence of the RAAF Association. A bronze plaque, which is to be affixed to the tail section of the aircraft at the memorial, was displayed and blessed at the ceremony.



The plaque in memory of the crew and passengers of A24-24

As the names of the lost crew were announced, Cadets of No 110 Squadron AAFC placed a sprig of Rosemary at the base of the memorial stone for each crewmember. As always, the Cadets were well turned out and conducted themselves with pride and dignity.

The Association was well represented by Mr Pat Mildren, Townsville Branch President, Mrs Barbara Bower, Branch Secretary, WOFF Ted Mildren, representing No 27 SQN RAAF, TVL Branch Treasurer, Padre Wayne Melrose, a member of the Townsville Branch who was also part of the officiating party, Mr Michael Surman, Branch Member and Douglas Bower, representing the National and State

WOFF Mildren, Mrs Rosemary Menken and Pat Mildren at the Catalina Memorial

Presidents of the RAAF Association.

Branch Secretary Barbara Bower researched, printed and laminated DVA Service Certificates and Service Details and presented them family members at the commemoration. At the conclusion of the ceremony, the family members, together with the padres, VIPs and officials, were transported to the crash site at sea, where they laid wreaths.

The commemoration ceremony was well organized and conducted by the local RSL, who after the event opened the club to visitors. The ceremony was well supported by many businesses, the local population and service clubs.

The Catalina Memorial Site, Bowen

Another Vietnam Forward Air Controller Story

Between 1966 and 1971, a total of 36 RAAF fighter pilots served as Forward Air Controllers (FACs) with the USAF in Vietnam. The early FACs flew the Cessna O-1 "Bird Dog," a single-engine, high-wing, tandem-seat aircraft, first used by the US Army in 1950. The twin-engine Cessna O-2, "Super Skymaster" was introduced as a FAC aircraft in early 1967 to replace the O-1. In 1968, the USAF introduced the twin-engine turboprop OV-10 "Bronco" to replace both Cessnas, but the O-2 continued on until the end of the war because it was more suited to two-crew night operations. The OV-10 suffered from internal canopy reflections at night, and the crew could not operate a starlight scope through an open window like in the O-2. The RAAF pilots flew all of these aircraft.

This story by USAF FAC Charles L (Charlie) Pocock gives the reader a good understanding about how tropical weather can affect flying operations. One must remember that the O-1 "Bird Dog" was not equipped with adequate instruments to safely fly in cloud. Many FACs ended up "running" from active fast moving thunderstorms.

Cessna O-1 "Bird Dog" FAC aircraft. *Photo by Sam Poole.*

Only Temporarily and Slightly Disoriented

We had both flown in the morning, but the weather was lousy and we didn't have any fighters in the afternoon, so after lunch I suggested to the other Song Be FAC that we cancel flying and take the rest of day off.

I was sitting at the desk in my room and had finished writing one letter and was starting on another. The field phone rang and I answered it. It was our TACP radio operator saying that an Army helicopter pilot had reported seeing a column of troops in khaki uniforms crossing a clearing. I copied down the coordinates and glanced out of the window. The sun was shining brightly now and steam was rising off of the roof of the next building. "Okay," I said. "I'll go take a look." I took my map out of my map case and checked the coordinates the radio operator had given me. It was a long way away, in the far southeastern corner of our Province, but I picked up my map case, bug-out-bag, and rifle and went off to find a mechanic.

While we were pre-flighting my airplane I noticed that the weather wasn't really very good in any direction, maybe we were just in a big sucker hole in the clouds. I knew that chances were slim that I would find the VC, and even slimmer that I would be able to put an air strike on them given the weather, but I thought something else might develop, and I always felt like I wasn't doing my job if I didn't fly at least twice a day.

After takeoff, I headed southeast to the target area, which was about six kilometers into the eastern end of War Zone D, an area that I really didn't like and seldom went to. I finally found the clearing and thought I could see a faint trail across it, but I couldn't tell which way the people were headed so I decided to return to Song Be.

When I looked around to get my bearings, I saw the mother of all thunderstorms bearing down on me from just the direction I needed to go to get home. My sucker hole had closed in and I was now under a descending and dark black overcast. I called my radio operator for a weather report. He ran outside of the commo bunker, deep underground, and came back to tell me that the wind and rain were really bad. He estimated the ceiling at 200 feet and the visibility less than a quarter of a mile. Getting back to Song Be wasn't going to be a very good option. I told him I thought I better stay under the clouds and try to make it to Bien Hoa.

I knew Bien Hoa was to the southwest of my position and I also knew that Xuan Loc was about fifteen miles east of Bien Hoa. If I couldn't go west far enough to find Bien Hoa, maybe I could find Xuan Loc by trying to go due south. At any rate I turned to a southerly heading and started running in front of the storm. I had to keep descending to stay out of the clouds and pretty soon I was down to about 300 feet above the ground and drifting farther to the east all the time. It was now raining very hard and I was having a hard time seeing the ground, but I didn't dare go any lower because the terrain was getting quite hilly.

USAF Captain Charles L. (Charlie) Pocock.
Photo Pocock Collection

I had flown off all my maps and was only going by memory. It was very dark for mid-afternoon with black clouds above and dark green jungle below. Finally, I came to a fair size river and dropped

down a little farther to see if I could determine which way it was flowing. Not so good, I thought, it's flowing southeast, the direction I want to go, but not in the direction I'm flying. I thought that it must flow to the ocean, so maybe I should turn around and follow it, but that would take me right into the heart of the storm. As I was concentrating on the black river between the dark green banks I almost missed it, but all of a sudden I saw a camp off to my right, along the river. It wasn't much of a camp, maybe an old French camp, but I saw a Huey helicopter parked off the end of the runway next to some tin roofed buildings. I circled the camp and pushed and pulled the throttle back and forth a few times to race the engine. I was down to about 150 feet when someone came out and waved. I couldn't tell how he was dressed, but I decided to land on the short muddy runway.

I was afraid I might nose over in the mud, and if that didn't happen, there was always the possibility that I might get the airplane stuck in the mud. I landed toward the buildings and about half way down the short strip, turning around near the helicopter.

Just as my O-1 came to a stop I noticed that the Huey certainly hadn't been anywhere recently and wasn't going anywhere soon. Both rotors and the engine were missing. Now I was really getting scared so I took out my pistol and laid it on my lap. I decided to keep the engine running in case I had to make a quick get-away.

Shortly, a young American dressed in tiger fatigues and carrying an M-16 came running up to the side of my airplane. I was certainly relieved. "Which way is Xuan Loc?" I called out to him.

"Never heard of the place." He replied.

Now my apprehension returned. "How about Bien Hoa?"

"Just follow the river for about 30 or 40 klicks that way. You can't miss it." He said, pointing in the opposite direction that I had been flying. It was the direction I figured I had to go but right into the center of the storm.

The very basic Cessna O-1 instrument panel.
USAF Photo

I guessed that he was the FNG (New Guy) and that's why he had to come out into the rain to meet me, and why he didn't know where Xuan Loc was. I also knew that I could indeed very well miss Bien Hoa in this weather, but on the other hand I was not too anxious to spend the night at this place. I was not only concerned about my own security, but the security of my airplane as well, and I certainly didn't want to let my airplane settle in the mud or else it might end up here as a permanent fixture, like the Huey. I said, "Okay, I'll give it a try."

"Good Luck," he hollered, as he backed away from the window.

I glanced out of the windows at the lower surface of the wings and the flaps, seeing that the wheels had splattered about two or three inches of mud on to them, so I decided to leave the flaps where they were, set at 30 degrees, and I pushed the throttle forward. As I moved down the runway I pumped the stick a little, trying to get the wheels to start hydroplaning on top of the mud, like trying to get a floatplane up on the step. It must have worked because I got airborne about two-thirds of the way down the runway. It was still raining very hard as I turned out to the left and started flying down the river. After I got everything set, I glanced out the window and saw that the rain had washed most of the mud from the undersides of the wings. A couple of minutes later I retracted the flaps.

The weather got progressively worse with torrential rain and wild and gusty winds. About 20 minutes later things started to improve, and by the time I was north of Bien Hoa I was up to about 500 feet, but still in the rain and just under the dense clouds. I landed without incident and got a phone patch back to my radio operator to let him know I was safely on the ground. I never was able to figure out exactly where I had been, but I believe the camp must have been the Special Forces camp at Tan Rai, in the II Corps area, and the river must have been the Dong Nai. I've often wondered what those SFs thought about that crazy, lost, FAC flying around in a thunderstorm.

The attitude indicator and directional gyro in the "Bird Dog" were driven by suction (vacuum) and the altimeter is the instrument at the bottom left corner. Hence the desire to avoid flight in thunderstorms.

This last story reminded me of a very similar incident in which I was involved. Here it is.

I was returning to Tan Son Nhut from Qui Nhon one day, and the weather was bad. I decided, for navigation purposes, to fly down the coast. The farther south I got, the worse the weather got, and I found myself getting lower and lower and farther and farther out to sea. The long and the short of it was that I ultimately found myself at about 200 feet, with nothing but gray sky above me, gray water below me, and gray driving rain all around. I had completely lost sight of land.

The O-1 was never an instrument airplane, and it was taking everything I had just to keep the aircraft under control. I was scared to death and hyperventilating. I was running out of adrenalin, and I really thought I was going to die. Just then I glimpsed what looked like the base of a radio tower off to my right in the gloom. I turned toward it and just as I crossed

the coast, I found myself at about 100 feet perpendicular to and over the end of a runway. I made a quick 270 degree turn and landed.

Once I touched down, I noticed a company of Vietnamese soldiers formed up on the runway directly in front of me. They undoubtedly assumed no one would ever be landing in that weather. As I rolled by, water spraying from my wheels, they dove left and right. I turned around and taxied right up to the small tower at the north end of the runway. Just like in the movies, I knocked on the door and asked, "Where am I?" The Army NCO in the tower said Phan Thiet. I had completely lost track of time and distance and had actually thought it was Vung Tau, a place I had never been which was much further south.

In a half hour or so, the weather cleared and I flew direct to Tan Son Nhut. That was another of those things I never told my boss, Gene McCutchan!

Editor's Note: Charlie Pocock is the author of an excellent published FAC memoir entitled simply "Viper 7."

There are 488 real-life stories written by USAF and RAAF pilots who participated in the Vietnam war as Forward Air Controllers, and included in two books titled, "Cleared Hot," and "Cleared Hot Book Two," which are available for sale at http://www.lulu.com. Just type "Cleared Hot" into the search window.

These 570 page books are produced by and for the FAC Association, Inc, in the USA (printed in Melbourne). Submitted by WGCDR Peter Condon (Retired) who is the Book Coordinator.

Flight Simulators in the RAAF - Part 2

What was then arguably the most modern aircraft anywhere in the world, the F-111, had a relatively unsophisticated flight simulation capability[1]. The technology limitations played a part in this but perhaps more significant was the lack of any relevant flight test qualified data on the flight performance of the RAAF's F-111C aircraft. It was not until the much later replacement of the F-111 simulator that it became more than a cockpit procedures ('switchology') trainer and became a flight simulator. Also about this time the issues associated with computers and 'software', rather than mechanical or electromechanical devices were starting to emerge, sometimes much to the concern of both the RAAF and the contractors. As Group Captain Ron Green observed:

> *We [RAAF and the contractor] talked about the simulator and amongst the points that arose with this simulator, was that it was the fifth one that Link had built and the only difference between this simulator and the A-model simulators was a couple of little tweaks in the software to cope with the longer wings. So I was invited that afternoon to use my flying kit and actually get in and fly this thing for the first time. It was essentially a procedures trainer—it looked like the cockpit and even smelt like it as well … We fired it up, we taxied out, lined up on an imaginary runway, looked at all the run-up procedures and they had really done an excellent job. Up to mil power and the engines responded just the way they should then into burner, again the response we recorded was very good. Maximum burner, again the same sort of thing, brakes off and away we went. At around about the 95 to 100 knots a little back pressure on the stick, the nose started coming up and then the nose wouldn't stop coming up. Stick forward until it was hard on the stops and the nose was still going up and up and up until it wheeled over on one wing and crashed. Very embarrassing for everybody. So we went back to the beginning of the runway and started off; three times I tried this and I couldn't stop that damn thing from crashing. And again it was the same thing. Then Link management brought in two tech sergeants, (not qualified aircrew at all), put them in the seats and away they went. They took off just like normal, brought it back and landed, touch-and-go, just as normal and people were laughing quite openly. It was a very interesting situation, very embarrassing. After that we sat down with Link to try and sort out what the problem was and at this stage Link had adopted the posture that they sat back with arms folded because there was nothing wrong as far as they're concerned. If a tech sergeant can fly it, why can't a test pilot? After some time I advised the higher-ups that I don't know what's going on here, but the aeroplane won't fly for me. It'll fly for a couple of tech sergeants, but it's totally unsuitable, it doesn't represent the aeroplane at all, so I'm going to have to reject it. Went back and I saw Link and said, 'In my opinion this does not represent the behaviour of the aeroplane and is not acceptable. Accordingly, I have to reject it'. And that of course really put the cat amongst the pigeons. Not long after I got a telephone call from Link saying we realise you've got problems with this, but we have been able to make a couple of adjustments to the software and we'd like to invite you to try it again. So I agreed to it, of course, and first thing on Monday morning we were out there again and, naturally, with everybody standing around. Got in and fired the thing up. It took off and behaved like a charm. Landing was no problem at all and I was able to complete the test cards and that constituted acceptance. And they wouldn't tell me what they'd done. A bit later on I came across one of the tech sergeants that had been*

[1] Editor's Note: Although the F-111 simulator was lacking as a Flight Simulator, it was a successful Radar Landmass Simulator where all F-111 crews trained on the Navigation Bombing System (NBS) before they saw an aircraft. It was an indispensable introduction to radar navigation in the F-111.

at Binghamton, running a course at Nellis [Nellis AFB in the US] and took the opportunity to have a few words with him. He was rather guarded, but he said essentially what they'd done that weekend was get together with their software engineers and run through the software section by section with a whole team of people working on it and they discovered that the coefficients used in the ground effect equations had some polarities reversed. When they put the polarities in correctly, then gave it back to me, the aeroplane flew fine. And guess what happened shortly after that? Link went around, and very quickly changed all the software.

Although a number of years later, Squadron Leader Bob Weight, the C-130H OFT RESENG/Project Manager, recalled that the OFT had been dropped into the ship when being readied for shipment to Australia (after the factory acceptance tests had been completed). When it was fixed some 8–9 months later, Bob and the test pilot Flight Lieutenant Bruce Fulton were retesting and each time they did a LAPES (Low Altitude Parachute Extraction System) drop it crashed. After some time it was determined by the contractor; that during the previous factory testing, where we had found that one of the 'malfunctions' we could feed in—the load shift malfunction (to simulate a load shift in flight)—it was this that caused the aircraft to crash. The contractor had modelled the load as a complete unit and when the malfunction was fed in it shifted rearwards to infinity, so as the load went backwards so did the centre of gravity of the aircraft until the obvious happened. To fix it at the time they put in a software switch to stop the load at the ramp. At the time we did not think to go back and retest all related potential impacts (things like software regression testing had not emerged at that time). It was not until the subsequent testing that we determined that by putting the software 'switch' in it stopped the total load at the ramp. But the way the load was modelled was that the switch was at the mid-point, so in 'simulation' half the load was going out when doing a LAPES and half was staying on the ramp. At the low levels of a LAPES drop, the change in the centre of gravity with this on the ramp caused it to crash. It took the contractors best software engineer and best aeronautical engineer some days to work out how to solve the conflict between dropping the load during a normal extraction and also having a load shift malfunction in flight where the load could not go past the ramp. As Bob Weight confirmed with the contractor at the time, it was most unlikely they would have sent such specialist to Australia had this problem not been detected until in the factory.

The C-130H introduced some really great capabilities at the time. Still not perfect but certainly a technology leap over the previous and existing flight simulators at the time. We were still almost a decade away from the application of systems engineering approaches to capability development, so the specification was still very much a 'personal' matter. There was no concept of a Training Needs Analysis to properly define the requirement—it was more like 'we are buying some aircraft, we might need a simulator'. What was also evident at that time was the fear held within the old A-Block in Russell that if they bought a simulator it might mean that the then FDA (Force Development and Analysis—or 'Forces of Darkness and Annihilation' as it was colloquially known) would reduce the number of aircraft they wanted to buy. It was a fight to convince the 'system' that flight simulators were adjuncts to the flying training program, not a replacement, and while simulators might reduce overall flying training time they do not replace aircraft. It was a fun time!

The truth was that, at that time, we simply took what the USAF was doing with its C-130H simulators and adapted their specifications to our unique variant. It was a similar approach for the AP-3C OFT, where we just took the 'spec' for the USN device at Barbers Point in Hawaii. However, while there was really no alternative, it did prove the vital importance of the contractor having access to flight test qualified data or at least quality aircraft performance data. In both cases neither the C-130H nor the AP-3C had such data so the end OFT product certainly had some limitations and differences to the aircraft but, even so, they were a significant step over the previous systems. Certainly, even though the AP-3C came along a couple of years after the C-130H, its technology was almost identical and its lack of qualified data did cause some serious training issues. Once again from Bob Weight's recollections:

The AP-3C OFT pilot—then Squadron Leader (I think) Mal 'Mother' McLean—took me on a flight in the P-3C to show me the acceleration issue. I was in the right-hand seat and Mal had slowed the aircraft down to as slow as he could and two things happened at once; just as he pushed the throttles hard to the wall, the co-pilot stepped into the cockpit with two cups of coffee. I am not sure what I learnt more, the shear acceleration forces we experienced or just how fast the co-pilot disappeared backwards at a great rate of knots until he slammed into a rear bulkhead with coffee all over him (there might also have been the odd word mentioned by the co-pilot about Mal's parental heritage!). Nonetheless, without any aircraft data there was nothing we could do at the fundamental software modelling level—we had to rely on tweaking the software based on pilot inputs over time.

But, as Bryan Harris pointed out:

… for quite a while with the H-model simulator they did have a bit of trouble with acceptance with the senior people around the squadron. New arrivals on conversion course could land it beautifully but line pilots couldn't. It was just the slight disconnect between the visuals and motion, and that is enough to totally throw you and you really get negative training transfer from it.

The problem of not having flight test validated data is that when individual pilots are used to 'tweak' the software to change the performance of the simulator, you end up with as many different simulator performances as you have pilots—they generally feel and see things slightly different and you end up chasing your tail—especially in regard to software changes. But while some might have had some negative views overall, it was Bob Weight's view that the C-130H OFT was generally well accepted and well used:

Generally I think it was quite well accepted given that it had some limitations, but compared to the old E model and the A model it was a significant leap in technology and flight training capability. But equally so I think it also proved to the flight crew what could be done. So they started to think about then of what things could be done better. Certainly the pilot that I was dealing with who was our operational liaison guy and did all the flight testing and the introduction into service, Flight Lieutenant Bruce Fulton, he was very enthusiastic about the whole training and training transfer. Again, not so much to reduce training flying hours of the aeroplane, but to make each one of those training flying hours that much more productive. So yes it was well accepted, but I think as the simulation technology improved so our knowledge of it and what we could do better improved. And the next generation of simulators started to emerge, so then I was heavily involved back here in Canberra on the P-3C flight simulator. At that stage we were looking at upgrading the F-111 and the F/A-18 and buying the 707 simulator back.

The C-130H and AP-3C OFTs introduced visual systems into the RAAF, albeit these visuals were night only, showing patterns of light points only with no associated ground surfaces. Importantly, they also introduced 6 DOF motion systems, high-fidelity audio systems and extremely capable instructor station capabilities. These devices proved to us all the absolute importance of the combination of these capabilities to the overall 'make believe' scenarios.

About the time the C-130H and AP-3C entered service (1982 and 1984 respectively), things started to move at a much faster pace in regard to flight simulators in the RAAF. This was directly related to the acquisition program for the replacement of the various aircraft, including that of the Mirage with the F/A-18 Classic Hornet.

Also around this time, we took a backward step in regard to flight simulation technology when we acquired the B-707 simulator from Aer Lingus—who had bought it from Qantas when they sold off their 707 fleet. The B-707 simulator at that time had no visual system and a 2 DOF scissor-jack motion system and a very rudimentary instructor station. Interestingly, Qantas had to rehire a senior technician, who had retired but was the most experienced B-707 simulator technician in Australia, to do the acceptance testing in Ireland. Nonetheless, it was the only 707 simulator in the world that represented the RAAF's 707 aircraft—so while not perfect it did provide some degree of flight training.

The Hornet acquisition introduced a number of new technologies but one in particular at the time was not properly appreciated when it came to buying the OFT—improved visual (day/night) and G-suit capabilities to better simulate the forces associated with fast jets. The combination of the visuals and the effects of the associated inflation and deflation of the suit provided a level of capability that was not possible with standard visual/6 DOF motion systems. Such motion systems simply are not able to simulate the associated g-forces. The F/A-18 purchase also introduced part-task capabilities to support the overall pilot training system. The HOTAS (Hands on Throttle and Stick) trainer removed the need for using the OFT for basic cockpit 'switchology' training.

Nonetheless, as Squadron Leader Weight, who was the engineering representative on the OFT evaluation team, observed we still had not necessarily learnt the lessons from the past or the disciplines associated with the systems engineering approach had not emerged:

I think we learnt lessons about being able to specify the technology maybe a little bit better and some of the requirements, but we hadn't actually moved to a systems engineering approach, I don't think, in Defence at all in those days. So things like an operational concept document just wasn't part of the whole development cycle. This whole business of defining the operational needs leading to then some sort of an overall capability which will then lead to a functional performance 'spec', it just wasn't heard of and it wasn't in the lexicon.

Also at that time there was considerable debate about the level of simulation to be involved with the two OFTs being bought for the Classic Hornets. While visual systems were developing at a considerable rate, in the world of fast jets there were still some significant limitations with the technology being able to provide the fast jet pilots with the essential visual cues across the entire flight regime. Things like the visual system being projected onto the pilot's helmet visor, with sensors detecting where the pilot was looking and the picture being projected accordingly into his/her vision, was one serious development. The one we were very interested in was what was called the 'dome' system, whereby the OFT sat inside a large dome (half sphere) which had a full 360° visual 'picture' projected onto the inside of the dome. It also had the ability to project friendly or enemy aircraft, and the ability to network the simulators was also emerging. We seriously considered at the time the capability and the ability to link the OFTs at RAAF Williamtown and RAAF Tindal, whereby the simulator pilots could be flying together or against each other even though they were some 'x' kilometres apart. At the time, this was seen as a 'Rolls-Royce' solution and was dropped in favour of a simpler and less costly simulator.

One might well ask if it was such a 'Rolls-Royce' solution or a simple matter of the lack of an available budget at the time. As an interesting aside, some years later, the Australian Army introduced a dome simulator for its RBS70 Ground-Based Air Defence (GBAD) system, whereby the RBS70 system and the gunner would be in the centre of the dome and attacking aircraft projected into the visual picture and the gunner could track the target and fire the missile with extremely high fidelity. At the time, the contractor and the Army were discussing the potential to link this GBAD simulator with the F/A-18 OFTs.

But had we learnt much or anything from the previous projects? In Bob Weight's view, not all that much:

At that time we made another fundamental mistake (my view) in that during the on-site tender evaluation we were extremely concerned over the ease with which McDonnell Douglas (one of the tenderers)

was able to alter the software and the performance characteristics of their OFT—we saw this as a huge risk in terms of software configuration control. We did not realise at that time the significance of McDonnell Douglas having used their OFT for the engineering development of the aircraft itself and the real benefits that brings with it. This did not become evident until much later on when the contractor (Sperry at the time) started to have real problems with simulating certain of the major aircraft systems. While it might not have changed everything, having a systems engineering approach at the time may well have reduced the chances of making the wrong acquisition decision.

To be fair, the combined benefits of formal systems engineering approaches and looking at the acquisition from a complete weapon system (the aircraft and everything that goes with it to make it a weapon system) point of view, rather than each element in isolation, were then starting to quickly become standard practice in Defence and also the RAAF. Accordingly, the updated F-111C and B-707 simulators proved to be hugely more acceptable than the devices they were replacing.

More recent capabilities such as the Wedgetail and C-17 had the simulator capability fully integrated into the fundamental specifications for the total weapon system. Perhaps this huge leap in technology is best described by Wing Commander Jack Foley[2] when he recalled:

Yeah, I think we really have come a long way just in my time in the Air Force. I remember like on CT4s we didn't have a simulator. I don't know what they use today, BFTS [Basic Flying Training School], but you basically just had this bit of a cockpit mock-up, if you like, and go through the checklist and sort of push these sort of buttons and it was all a bit 'noddy', but it had its place in trying to learn a checklist, but it really was a bit sort of hopeless. And then even some of the earlier sims that I remember having a go on when I was working at Williamtown on the Mirage simulator; there were no visuals whatsoever and it was a very clunky device; it had its purposes as a procedural device if you like and clearly we've come a long way since then. The last couple of years when I was at 285 [Squadron] and we've got some quite whiz-bang simulators on the H and J, and we did on the 707 at the time, although that simulator has now been retired, these flight sims, they really are tremendous. The standard of the visuals today and the ability to replicate the aircraft really are fantastic. Down to little things like the way a needle on a gauge might move on an aircraft. And after you've flown Hercs for years you just sort of know that the needle might sort of slowly move and then it has a bit of a twitch and then it drops, little subtleties almost like that that they will capture and capture well.

[2] Wing Commander Foley joined the RAAF in 1982 at the Academy, going through engineering and also navigator training. He also did the Aerosystems Course in the UK and spent many years with C-130s and at the School of Air Navigation with various flight simulation experiences over that time through to his current position in Russell involving the use of simulation and modelling for looking at future air force capabilities.

C-17 Simulator

To make it even more pertinent:

If I go back to sitting in a CT4 mock up or even those early Mirage simulators or the old E-model Herc simulator for example, no-one ever thought they were in an aeroplane. It just didn't provide that level of reality. But now, yes you damn well can and I would argue that simulation has reached a stage now where you really can give people a good sense of reality and to the degree that, whilst I'm certainly not suggesting that you don't need to go flying, there some things you can do in a simulator actually much better now than you can in a real aeroplane. And examples I can give you are: you can give all sorts of technical faults in a flight simulator—you know, things bursting into flames and blowing up—that you just can't do in a real aeroplane when you just pull the throttle back; I mean it's a bit lame really. But now we are more into the operational field where we go flying and well there's all sorts of helicopters coming hither and people firing from the ground over here and missile warnings going off, that sort of thing you can create an operational reality which has only really only been possible in the last 10 years or so.

During this relatively short period of time, flight simulators have progressed from really basic procedural trainers through to full experiential motion, vision and audio capabilities. Similarly, as we have gone along the story, initially the justification for simulators was economic along the lines of, 'Please let me buy a simulator and I won't have to fly so many hours', and of course the 'bean counters' instantly say, 'Well, we'll do that for you, give me a thousand hours and you can have a simulator', that sort of idea. About the 1990s, as technology had at last caught up with the wish list, the motivation for the acquisition of simulators changed slightly and it changed from a simple one of less flying hours through to the existence of a simulator will allow me to explore areas of the operational capability that I would not or should not explore in a real aircraft.

So where to from here? Ed Link may well be surprised to see what his 'Blue Box' has turned into but one suspects that people such as Ed Link would only be frustrated at the time technology has taken to catch up to his vision. Without doubt, the Gen Y and later kids are far more relaxed and accepting of simulation and simulators, and such capabilities are becoming increasingly a fundamental part of the engineering development and prototyping of many systems—not just aircraft. Simulation and modelling is becoming more and more a standard decision support tool for all commanders.

It is interesting that that progression in the justification a simulator does not apparently seem to have made its way as strongly as you might think into the procurement aspect. We are still acquiring simulators because they are economic to do so!

Nonetheless, the future is being managed well by some. Tony Di Pietro, ex-RAN experimental test pilot, provides an interesting insight into the possible future use of simulators:

Simulation is no longer affordable as a crutch or a

tool. It's an enabler for expanding the capability of our workforce. In the case of your example about flying hours, the argument I'm getting to here is that one hour in the sim does not mean one hour saved in flight. It is rather enabling us to get more of the 'how to fight in the air' into that one hour of flight. What we want to do is actually have people apply their mental models, their acuity and their intellect to things.

Also simulation is actually going to play a big part in removing some of the lesser more functional aspects of our daily workplace. For example, I'm going to have an artificial intelligence or a smart agent in the workplace. We'll have a smart agent which will give you the context and you, the human, are going to apply your intellect to that context; freeing you up from the burden of having the tedium and actually giving you space to be creative about what you've got in front of you.

So we're talking about a workforce that not only knows how to handle information and how to handle data, it now knows how to contextualise it. It knows how to take those contexts and build relationships across different contexts and, by doing so, know where to connect in terms of the community that they have to be part of to actually achieve an upper level product whatever that product might be. So if you think about it in terms of network centric warfare, we're talking about and what it really relies on is the human being making the context and the links. We've got to train our people to think like that.

In regard to flight simulation, systems are increasingly being designed and developed now with built-in simulation capabilities. So operators can be sitting in a Combat Information Centre (CIC) of a warship, or in a control cabin of a ground-based air defence system or the cockpit of a modern helicopter or jet and be running simulation scenarios in any part of the world, including the area you might be about to attack—and at the appropriate time just switch over to the real world radar, ESM or whatever feeds.

Will simulation, and flight simulation in particular, ever be universally accepted? Who can tell but perhaps Jack Foley put it best in his simile about 'digital natives' and 'digital immigrants':

Imagine if you grew up in another country. It doesn't matter where you grew up and then at some stage in your life you immigrate to Australia and you learn English and you learn the culture and you learn how our school system works and how our political system works and how our banking system works, all of those things. But you always have that accent in your language and you would always find certain things just downright weird or a bit wrong, but you kind of learn to sort of fit in. And that's the sort of typical immigrant. And I don't mean that in any derogatory sense—in fact, more the opposite. You admire the way that person goes out of their way to fit in with this different world, but it's always kind of a bit of a struggle. [Compare that to] the person who is the native, who is entirely comfortable in it. I mean, it is what it is and the world is good and that's what the world looks like and obviously it fits that way because that's the way we are. Well I think it's a bit the same with digital technology. I think people of my sort of generation are those digital immigrants if we look at flight simulators or simulations that you can put on a computer today. But the point is that I am that digital immigrant, but the people we're recruiting today and the people we should make our training systems fit are not people like me. Our training system should not be made to fit people of my generation. It should be made to fit the very capable, the very bright kids that we're recruiting today. And guess what, they're entirely comfortable with seeing something on a computer screen and being able to manipulate it on a computer screen and to understand that.

Air Battle Management Simulator

Of course the pace of technological change might also turn the native of today into tomorrow's immigrant—if not, dinosaur! The challenge for the RAAF leaders of today and the future will be to ensure that are the natives, immigrants and dinosaurs are ready for these bold steps forward into the new simulator-enabled RAAF.

By Bob Weight

The RAAF and Indonesian Confrontation

In the 1960s the RAAF faced the prospect of becoming involved in a regional conflict in which Australian territory and interests were directly threatened for the first time since World War II. As a consequence, some RAAF fighter squadrons were held on five-minute alert status, and aircraft carried live ordnance while operating in a declared Air Defence Identification Zone (ADIZ) - the first time this had happened since the Korean War ten years earlier. The RAAF response in these circumstances not only helped shape and deter the situation, but the RAAF itself was shaped by it.

The cause of so much anxiety was the British decision to grant independence to Malaya, Singapore and Britain's territories of Borneo by incorporating them into a federation called Malaysia in September 1963. This was a step vigorously opposed by President Sukarno of Indonesia, who regarded the new entity as a neo-colonial creation. Rather than provoke all-out war over the issue, Sukarno embarked on a sustained program of political and military aggravation—including limited cross-border incursions—aimed at destroying Malaysia. This policy was termed ''*Konfrontasi*' (Confrontation) by Sukarno's foreign minister, Dr Subandrio.

Because Australia (with Britain and New Zealand) had forces stationed in Malaysia as part of a regional stabilizing force known as the Far East Strategic Reserve, Indonesia's policy carried risks of wider involvement if there was any miscalculation or escalation in the military levels it employed. Australia's air presence in the affected region was sizeable, with three RAAF squadrons—No 2 (Canberra bombers) and Nos 3 and 77 (Sabre fighters)—stationed at the RAAF Base Butterworth, on the Malaysian mainland opposite the Indonesian island of Sumatra. This proximity placed Australian air elements in immediate front-line in case of any serious outbreak of conflict.

The first deliberate incursion into Malaysian airspace to which the RAAF responded occurred on 17 July 1963 when two unidentified aircraft, thought to be Indonesian MiG-19s, were separately sighted near the Malayan coast about 100 km south of Penang.

RAF Javelin interceptors *Photo Dave Rogers*

RAAF Sabre and Javelin aircraft on standby *Photo Dave Rogers*

One of the intruders was pursued back across the Strait of Malacca towards the Indonesian town of Medan. Following this incident, Far East Air Force (FEAF) commanders extended radar surveillance at key bases, including Butterworth, to 24 hours a day and upgraded the readiness status of air defences.

From October 1963, the RAAF was required to keep two Sabres at 'Alert 5' status during daylight hours, requiring fighters to take off five minutes after an order to scramble, with the RAF *s No. 60 ~ Squadron (operating Javelins) taking over this duty at night. Rules of engagement were initially complicated and only allowed RAAF fighters to engage Indonesian aircraft if a number of, not always well-defined, conditions were met. These rules were changed in October 1964, however, in response to continued Indonesian aggression, and thereafter any positively identified Indonesian aircraft operating in Malaysian or Singaporean air space was to be destroyed.

While the Sabres of Nos 3 and 77 Squadrons remained on alert for incursions by Indonesian aircraft, the Canberra bombers of No 2 Squadron prepared for possible strikes against Indonesian targets. Crews familiarised themselves thoroughly with potential targets, such as Indonesian air bases on Sumatra, and regular training flights included simulated low-level air strikes. The need for such operations seemed about to be realised in September-October 1964, after Indonesian paratroops and amphibious vehicles raided Labis and Pontian

Canberra bomber aircraft on standby at Butterworth
Photo: RAAF

on the south-western side of the Malayan peninsula, and Australian troops became involved in operations to mop-up the invaders. The Australian Government even felt compelled at this time to initiate a deployment of RAAF fighters to ward off any retaliatory strikes which the Indonesians might launch against Darwin (see Pathfinder 48).

The Labis-Pontian raids also brought to light a radar blind spot over the Strait of Malacca, behind Penang Island, which meant that Indonesian aircraft could approach Butterworth from Medan undetected by 114 Mobile Control and Reporting Unit (MCRU). This created a difficult air defence problem. Until a second MCRU could be established to close the radar gap, a radar-equipped Royal Navy destroyer had to patrol the Strait between Medan and Penang, and RAAF Sabres were required to mount armed dawn patrols to the west of Penang Island.

In conjunction with the armed incursions that were occurring on the ground and in the air, Indonesia was also applying political pressure which carried further implications for the RAAF. On 3 July 1964 the Australian Embassy in Jakarta was informed that two RAAF and eight RNZAF transport flights had been refused clearance to enter Indonesian air space, and a blanket clearance for C-130 courier flights from Darwin to Butterworth which also passed through Indonesian air space was withdrawn. In response, Australia's ambassador to Indonesia, Mr Keith Shann, supported by Chief of the Air Staff, Air Marshal Sir Valston Hancock, proposed to test Indonesian resolve by flying a combat aircraft from Darwin to Singapore via the standard route taking it over waters claimed by Indonesia but regarded by Australia as international. Government procrastination over granting approval, however, meant that the proposal was never implemented, and for more than a year RAAF aircraft were obliged to travel to Butterworth and Singapore via the Cocos Islands to avoid Indonesian air space.

By November 1964 the Australian Government was announcing a range of new measures which reflected its gloomy assessment of the strategic situation in the region, and sought to exercise a measure of deterrence. An increase of 4000 personnel to the RAAF's strength (taking it to over 20,000) was announced in Parliament, along with plans to build new airfields at Tindal, south of Darwin, as well as Wewak in New Guinea in case problems developed across Indonesia's border with the then-Australian territory of Papua New Guinea. Proposals were also conspicuously debated to upgrade the airfield at Learmonth, Western Australia, to enhance the publicly-vaunted ability of new nuclear-capable F-111 bombers, ordered from the US in October 1963, to comfortably strike at targets as far away as the Indonesian island of Java.

Concurrent with an Australian Government decision to deploy an infantry battalion to Borneo in January 1965, No 77 Squadron was also moved to Labuan in Borneo to patrol the border with Indonesian Kalimantan. Pilots were authorised to carry out direct armed action against Indonesian Air Force aircraft known to be strafing villages on the Malaysian side of the border. This situation was fraught with danger of accidental encounters, since existing maps were inaccurate and pilots were forced to draw their own maps of the patrol area.

Fortunately, Confrontation soon to come to an end. An attempted coup by Indonesian communists in September 1965 saw Sukarno removed from power and General Suharto installed as President. Tensions gradually eased, and a peace treaty was signed between Indonesia and Malaysia in August the following year. While it has since become history that matters never deteriorated to the stage where worst fears were realised, RAAF personnel in Malaysia had to contend with a tense war of nerves for the period that Confrontation lasted. The conflict has received little media attention and today is completely overshadowed by Vietnam. Of some 3,500 Australians who served during Confrontation, there were only 23 fatalities, including four RAAF personnel.

- Confrontation presented the greatest direct threat to Australian territory and interests in the fifty years after the end of World War II.
- Although full-scale conflict was avoided, air power was at the forefront of the Australian Government response
- The flexibility provided by air power undoubtedly helped to shape response and deter escalation of Indonesian military activity

Reproduced with permission of Ai Power Development Centre, RAAF,Canberra

Editor's Notes

Canberra aircraft of 2SQN were loaded with 6 x 1000lb bombs on a number of occasions, in readiness for air strikes against ground targets, primarily parked aircraft (MIG17 & 19s) and POL storage, at two Indonesian air bases. Crews carried out extensive photographic and intelligence studies of their primary targets. The *Wings* Editor was one of the crewmembers involved.

In a display of capability, Canberras of 2SQN also carried out HE bombing sorties to Balambangan Range at the NE tip of Borneo, refuelling at Labuan on the return to Butterworth.

On aircraft ferries to Australia, Canberra aircraft flew via the Nicobar Islands, 500 n miles north west of Butterworth, before changing heading to the south for Cocos Islands for refuelling, before flying to RAAF Base Pearce, WA. More capable aircraft were able to fly direct Butterworth to Cocos Is, over flying Sumatra at low and high altitudes.

Dedication to Duty

On 22nd March, 1945 a Lancaster bomber crashed in woodland between Weeting and Mundford, killing all seven crew on board.

This is the extraordinary story of the local residents who, more than fifty years later, felt they deserved a lasting memorial.

On 22nd March, 1945, an Avro Lancaster MK1 took off from RAF Mildenhall at l055, detailed to attack 'enemy transport' near the Belgian and Dutch borders.

It was the aircraft's 22nd mission, and the third sortie for the NCO crew on board. Within moments of take-off, the aircraft's port inner engine ignited, which started a desperate struggle to try and avert disaster. However, the wing's second engine cut-out and the Lancaster plunged to the ground. The aircraft was carrying a 4,000lb 'Blockbuster' bomb, which exploded on impact, killing all seven of the crew, and scattering wreckage up to a quarter of a mile from the crater it caused.

The story moves on more than 60 years, when local resident Pat Tuck was speaking to Irene Bennett, nee Jenkins, who was in her 8o's, and had lived for part of her life in the Icker buildings, the forestry cottages in that area. Irene told Pat the story, and that a memorial plaque had been placed there in 1999, but although she'd lived close for so many years, she was too old to visit it and see for herself.

For three weeks Pat walked her dog around the area, trying to find the site, eventually chancing upon it, buried and overgrown in the undergrowth. She took photographs, but Irene died before she got a chance to see them.

Pat's husband Robin had been a 9 year-old boy at the local school at the time of the crash, and vividly remembered hearing the explosion and feeling the shock wave from the exploding bomb as it crashed. He and his mates tried to ride to the crash site to see the plane but were turned back by the authorities. One local man who lived 3/4 of a mile away from the crash site later confirmed the windows of his cottage had blown out and the blast had brought down his ceiling. So Pat and Robin set about finding out more about the site.

It transpired that in May 1999, there had been a Dedication and tree-planting service at the site to provide a lasting memorial to those who lost their lives. One person who was there was FSgt John 'Swifty' Swallow, who had travelled from Canada to see the unveiling, as he had known the unfortunate airmen well. John had met up with them in July 1944 at RAF Station Desborough, but had known two of the airman, Tom Jenkins and Pete Cooley much longer, as they had trained together as air gunners. Like John Swallow, Pete Cooley was just 19 at that time. Their individual crews shared the same Nissen Hut, and in his own words, "became brothers-in-arms in the true sense, a bond that lasts even today."

Both crews were posted to Mildenhall, and John remembers waiving the plane off on its last, disastrous flight. He had been servicing the rear gun sights on his own aircraft, and having finished, started walking back to the Comns site.

He noticed some of the crew on one plane standing about 25 feet away were waving at him, and giving a thumbs up. He recognised John Newton's crew, so they waved back and watched them get airborne. He would be the last person to see them alive.

The crater left by the crashed Lancaster, with John Newton's great grandsons *Photo: Jacqueline Stewart*

Pat and Robin got in touch with John Swallow, who told them the story. So between them, and with friend and fellow local resident John Nash, they set about tidying up the site, and making it a permanent memorial. In October 2006 the three of them set about digging and mowing, and setting up a wooden surround to the memorial.

John Newton's headstone, Cambridge City Cemetery
Photo: Jacqueline Stewart

In November 2006 they received permission from the Forestry Commission to hold a Remembrance Service, which followed the same Order of Service carried out at the original ceremony seven years before. At the head of the newly cleaned memorial, they placed fragments found all around the site, which had lain untouched for 62 years. John 'Swifty' Swallow travelled from Toronto with his family for a reunion at Mildenhall in the summer of 2007.

Following the work of

Above: Headstones of John Newton and his crew, Cambridge City Cemetery *Photo: Jacqueline Stewart*

Pat, Robin and John, the Forestry Commission has now kindly cut proper paths from the main road to the memorial site. This should ensure that others who may wish to pay their respects will be able to do so, and the history of this site will not be lost again.

The seven crew are buried in Cambridge City Cemetery - such was the explosion that all, except the pilot, are in a collective grave.

Reproduced from The Mildenhall Register Newsletter Summer 2012, with permission of the family of Pilot Officer Jack Newton.

Jacqueline Stewart, John Newton's Daughter – Her Story

My father, WOFF Frederick John Newton RAAF, was the pilot of a Lancaster aircraft which crashed only minutes after take off from Mildenhall Air Force Base, Norfolk UK, on 22 March 1945. I was only 2 years and 11 months old when my father, serving with No 15 Squadron RAF, was killed.

My mother and I visited the UK and my father's grave at the Cambridge City Cemetery in 1953, but she could not find out any other information. The actual crash site was not known to me until 2010 (65years later).

After years of searching for more information, I was fortunate to discover the Mildenhall site and Robin & Pat Tuck of Thetford, who had rediscovered the crash site.

Robin & Pat cleared the overgrown area, revealing the original memorial Plaque (I believe was erected in 1966), and kept the site available for anyone interested in paying their respects, to not only the crew of seven but also another airman killed over France (Geoff Norris) who flew in a sister squadron.

Robin & Pat worked tirelessly to have a plaque installed in the local church in Thetford as a lasting memory. A remarkable couple, as they were not related to, nor did they have any association with any crew member onboard that fatal crash.

I have now discovered the cause of the crash was a spring that came loose in the engine (left inner), causing it to catch fire. The Lancaster was fully loaded with bombs including a 400lb blockbuster, and when the second engine faltered under the strain, the crash was inevitable. The Lancaster crashed in the Thetford Forest near Weeting, scattering debris up to a 1/4 of a mile from the point of impact. The crater still remains today.

Jacqueline in St Leonards Church, Mundford in front of the memorial plaque for the lost crew - (in centre below the stained glass windows). *Photo: Jacqueline Stewart*

In 2010, with my husband & two daughters, I attended a reunion at the Mildenhall Air Force Base which is held every year in May for Nos 15, 90, 149, & 622 Squadrons.

I was given the name of another airman, John Swallow, who was a good friend of my father and the last person to see him as he waved him off at take off. John was still alive and living in Canada. I knew I had to visit him to have a better understanding of my father. John (Swifty) Swallow & his wife Peg, welcomed my daughter & myself into their home where we spent three days catching up.

It took 65 years to finally receive all the details along with copies of documents, supplied by the XV Squadron Historian, Martyn Ford-Jones of Swindon. I came home with a folder full of information, and to my delight, a piece of the plane.

The memorial plaque near the crash site *Photo: Jacqueline Stewart*

I have since discovered that the site was rediscovered and in 1999, a ceremony was held with a tree planting service and a plaque recognising all crew on board.

All crew are buried at the Cambridge City Cemetery but the explosion was such, that they are buried in a collective grave except for my father who I believe was thrown through the windscreen on impact. My father, Pilot Frederick John

Newton, is buried beside his crew.

May They Rest In Peace.

In 2006 a second memorial service was held, this time the site had been cleared by Pat & Robin Tuck, with a surround around the plaque. A reunion is now held at Mildenhall RAF Base every May.

Jacqueline's story provided to the Editor by Dana Stewart-Thompson, John Newton's granddaughter.

The crew of Lancaster HK-773 LS-W of 15 Squadron RAF
Rear (L-R): Then FSGT Frederick John Newton, pilot, age 24; SGT M F Matthews, age 22; SGT P Cooley, age 20.
Front (L-R) Sgt G A Cope age 21; SGT C A J Church, age 19; SGT T E Jenkins, age 36. SGT WJ Dee not in photo.
Photo: Jacqueline Stewart

Big, Bigger and Biggest – the Data Storage Problem

Jay Parikh, VP Infrastructure Engineering, Facebook, said the scale of the challenge of storing user data was far greater than Facebook ever imagined.

Mr Parikh addressed the Open Compute Summit in Santa Clara 16-17 January 2013, an event supported by many of the world's major manufacturers of server and cloud storage hardware who are cooperating to find ways to store exponentially growing amounts of information.

He said the Open Compute Project "could not have been better timed in my mind". With more than 1 billion users across the world, data centre configuration and the cloud is a big issue for Facebook which has been the prime driver of the Open Compute project and involves hardware giants such as Intel, AMD, and Applied Micro.

At a summit discussion, Facebook revealed it had developed a three-tier approach to storing photos, which involved shifting older photos from hot to warm to cheaper so-called cold storage, as user demand to view a particular photo decreased rapidly over time.

Mr Parikh said that in 2010, there was about 800 exabytes of data stored in the world – ie, 800x 10^{18} bytes. An exabyte is or 1000 million gigabytes, ie, 1000 x 10^{6} + $10^{9.}$ "The crazy thing about this statistic is that 90 per cent of this data had only been created in the two years prior to 2010," Mr Parikh said.

It gets worse - by the end of last year, it was estimated there was 2.8 zettabytes of data (a zettabyte is 10^{21}) stored in the world. Two zettabytes had been created in two years, he said.

According to analyst IDC, there would be 40 zettabytes of data stored by 2020. "The 40 zettabytes is going to be 57 times the number of grains of sand on the earth," he said.

Mr Parikh said that in 2020, every man, women and child on the planet would have 5.3 terabytes of data just for themselves – which is equivalent to more than 2 million photos per person, or the taking of a photo every 15 minutes of a life span. "Billions of people and billions of devices are coming on line", he said.

He said Facebook had found it hard to keep up with the growth of its photos service, which had become a mainstream way globally for people to share their memories and events with friends and family. "In the last three years we've seen really astonishing growth in this system. Today we have roughly around 240 billion photos. Users were uploading more than 350 million photos every day, which was increasing as more and more smartphones get into people's hands around the world." Newly uploaded photos were consuming more than 7 petabytes (7 million gigabytes or $10^{15 \text{ bytes}}$) of storage every month, he said.

"The problem is we can't lose any of these photos. Our users expect us to keep these photo, and these memories for years, decades as they accumulate their lifetime of memories and experiences. This means we have to keep lots of servers around, this costs lots of money. "And we need to keep a fast user experience; we can't just put all those photos on tape."

Eventually a photo became a memory that was sitting in the timeline, he said. As a result, some 82 per cent of traffic was focused on just 8 per cent of photos – some 200 billion photos on Facebook were infrequently viewed. Therefore Facebook had been developing more efficient infrastructure which would see older or infrequently photos stored.

"So we looked at basically the data centre, the software and server and we focused on trying to maximize the efficiency of each of these stacks." Facebook had developed different software systems to deal with photos. "Haystack is a system when I upload that photo it's a hot photo, and that photo is stored on many, many spindles ... optimised there for fast performance. It's the only thing we care about.

"Over time we have another system we call warm storage where we look at the number of replicas of that photo we have and start to compress it. It's still online and it's still next to the hot stuff, but it allows us to store it more efficiently. Older photos, he said, were placed in "cold storage".

"If there's content that needs to be moved to cold storage, the cold storage client will grab the content, it will pass it to the staging service, the staging service will essentially take this file, (and) break it up into a group of chunks," he said.

Facebook's has four data centre regions in the world. Each centre has three rooms in each building, each room has 1Eb (Exabyte)of data with more rooms under construction. Each building has 500 racks of equipment and consumes about 1.5 megawatts of power.

From: Open Compute Project Summit, Santa Clara, January 2013

www.opencompute.org/community/events/

Battle of Khe Sanh

On 21 January 1968 the North Vietnamese unleashed a heavy mortar, artillery and rocket attack on the Marine base at Khe Sanh. According to some, General Giap hoped to emulate his great Viet Minh victory over the French, achieved 14 years earlier at Dien Bien Phu. Located on a plateau in the northwestern corner of 1 Corps and commanding the approaches to Dong Ha and Quang Tri City from the west, Khe Sanh was an important strategic post. By capturing it, the North Vietnamese would have an almost unobstructed invasion route in the northernmost provinces, from where they could outflank American positions south of the DMZ.

The NVA assault triggered Operation Niagara, an air campaign in defense of Khe Sanh. On the day of the attack, nearly 600 tactical sorties (including 49 by the B52's) were launched against enemy positions. Over the 2.5 months. more than 24,000 tactical and 2,700 B52 sorties dropped 110,000 tons of ordnance. The heavy air attacks (averaging 300 tactical sorties per day with a three x B52 formation every 90 or so) during the height of the battle destroyed enemy bunkers, supplies, ammunition dumps and caved in tunnels near the Khe Sanh perimeter. At night, AC47 gunships kept up a constant chatter of fire against enemy troops. Because of poor weather, about 62 percent of all strikes were directed to their targets by Combat Skyspot.

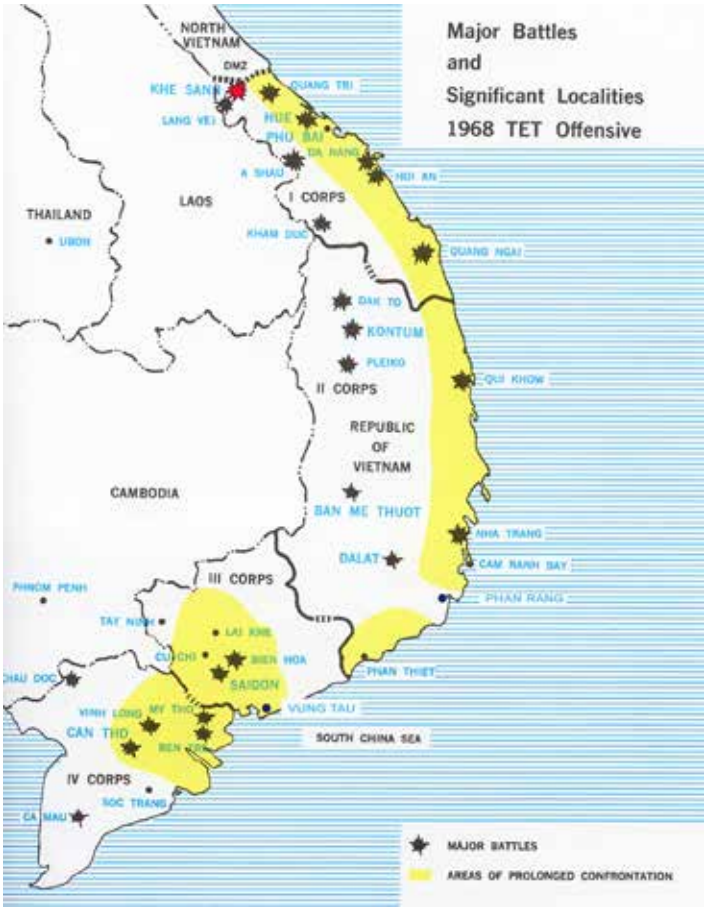
The 1968 Tet Offensive

Nine days after the siege of Khe Sanh began, NVA and Viet Cong troops launched the Tet Offensive. In simultaneous attacks throughout South Vietnam, they struck at 36 of 44 provincial capitals, five of six autonomous cities, 23 airfields, and numerous district capitals and hamlets. Saigon and the old imperial capital of Hue were among the prime targets. This nationwide enemy offensive apparently had as its ultimate goal the disintegration of the South Vietnamese armed forces, to be followed by the people rallying to the National Liberation Front (NLF).

The initial fury of the attack enabled the NVA/VC forces to seize at least temporary control of 10 provincial capitals, and to penetrate Saigon, Quang Tri City, Da Nang, Nha Trang and Kontum City. However, except for Hue, which took the allies several weeks of rugged fighting to clear, the enemy was ousted in two or three days. Most of 23 airfields attacked by the enemy were soon back in full operation.

Despite the heavy demands placed upon it to help defend Khe Sanh, the Seventh Air Force was still able to provide enough firepower to be a major factor in the defeat of the enemy offensive. Within Saigon and Hue, the Air Force launched carefully controlled strikes against enemy lodgments. Outside the cities USAF crews launched heavy attacks against Communist forces. Forward air controllers remained aloft around the clock directing strikes at enemy storage areas, troop areas and providing close air support for allied units in contact with Viet Cong and NVA forces. At Hue, only a trickle of essential supplies reached the besieged NVA troops.

By late February it was evident that the Tet offensive had failed



Map: The United States Air Force in South East Asia 1961- 1973,

and Hanoi's dream of a collapse of the South Vietnamese government and armed forces was illusory. Instead, Viet Cong/NVA troops had suffered heavy losses (an estimated 45,000, 8,000 in and around Hue alone). Unfortunately there also was a heavy civilian toll. More than 14,000 died, some of them (as in Hue) victims of NVA execution squads. Another 24,000 were wounded and 627,000 left homeless.

By midApril intelligence revealed another enemy buildup in progress around Hue. Accordingly, on 19 April the allies mounted Operation Delaware/Lam Son 216, aimed at destroying the NVA logistic base in the A Shau Valley and denying the enemy an essential source of supply and a line of communication for further operations against Hue. A Viet Cong colonel, defecting to the South, disclosed plans for a terrorist attack against Saigon beginning 4 May. It proved the start of another nationwide wave of assaults against 109 military installations and cities, including 21 airfields. Once again, U.S. air power played a major role battering the weary enemy.

As part of Hanoi's continuing effort to influence American public opinion and the peace talks (which began in Paris in May68, but quickly bogged down), General Giap on 23 August sent 4,000 NVA Ist Army Division regulars against the Duc Lap Special Forces camp, located some 3 miles from the Cambodian border and 15 miles from Ban Me Thuot.

The 2,500 South Vietnamese, Montagnards and Americans defending the camp were taken by surprise and the perimeter breached. However, 30 minutes after the first call for help, U.S. Army helicopter gunships arrived in the area, followed 15 minutes later by AC47 gunships. Placing the attackers under heavy fire, the AC47's remained overhead spotting and "hosing down" enemy units as they appeared. Their effectiveness drew high praise from the defenders. In all, more than 100 gunship and 392 tactical air sorties were flown in support of Duc Lap.

In October 1968, finally recognizing that it could not occupy and control the South Vietnamese countryside, Hanoi began withdrawing 30,000 to 40,000 troops. On 31 October, after receiving assurances from the North Vietnamese that "serious" talks to end the war would get under way in Paris, President Johnson ordered a halt of all bombings north of the DMZ effective 0800 Washington time, 1 November 1968.

Office of Air Force History USAF

Boeing Sonic Cruiser

The Boeing Sonic Cruiser was a concept airliner with a delta wing-canard configuration. It was distinguished from conventional jet airliners by its delta wing and high-subsonic cruising speed of up to Mach 0.98. Boeing first proposed it in 2001, but airlines generally preferred lower operating costs over higher speed. Boeing ended the Sonic Cruiser project in December 2002 and shifted to the slower (Mach 0.85), but more fuel-efficient 7E7, later 787 Dreamliner.

The Sonic Cruiser promised 15-20% faster speed than a conventional airliner without the noise pollution caused by the sonic boom at supersonic speeds. Travelling at speeds from Mach 0.95-0.98 (550-565KTAS), the aircraft would save 20 minutes flying time each 1000 nautical miles; on a flight from Sydney to Los Angeles (6,500 n miles), flight time could be reduced by about 2.5 hours, depending on upper level winds. Boeing estimated the Sonic Cruiser's fuel efficiency to be comparable to current wide body twin-engine airliners.

Reports from USA indicate that Boeing may have renewed interest in the concept of the Sonic Cruiser and filed patents for a new design in 2012.

Boeing Sonic Cruiser concept, 2002 *Photo: Boeing*

Local Hero's Medals Coming Home

After 68 years, the medals, log book, and memorabilia of Mildura's highest ranking World War II RAAF officer are coming home. He was Wing Commander Robert Alexander Norman DFC, the first Empire Air Training Scheme (EATS) graduate promoted to lead a RAAF squadron (460SQN), in Bomber Command.

The presentation will take place at the Museum at Mildura Airport at 1000 on Friday April 11 2014. Later in the day, family and veterans will remember the young airmen who lost their lives during training, at a ceremony at the Mildura War Cemetery, followed by a reception in their honour to be given by Mildura RSL.

Mildura knows very little of WGCDR Norman's career post-war; in fact he and Sheila returned to the UK after only two years in Australia. Their home was in Surbiton, Surrey, but in 1959 they moved to a family home nearby in Esher, only recently sold.

Born July 3, 1916, Bob Norman was the son of the manager of the Mildura Co-operative Fruit Company, and with his sisters Enid and Joan attended Mildura Central and Mildura High Schools. He then joined the Bank of New South Wales at Mildura and when war broke out in 1939 he was working in the Flinders Lane Branch of the Bank.

He enlisted in RAAF Aircrew immediately and commenced training at No 1 Initial Training School at Somers, June 24, 1940, with the Service Number 400102. At the conclusion of this course he was categorized pilot and posted to No 5 Elementary Flying Training School at Narromine July 25, 1940. Posted to Canada, Norman commenced flying at No 3 Service Flying Training School, Calgary, October 26, 1940, graduating as a Sergeant Pilot and 'winning' his wings on January 16, 1941.

Less than three months after arrival in the UK in 1941, he was flying Wellington twin engine bombers with No 58 Squadron RAF based at Linton on Ouse, Yorkshire. As a result of his service with this squadron, he was awarded the Distinguished Flying Cross; his citation stated:

> *"Squadron Leader Norman is a courageous and skilful captain of aircraft who throughout his many sorties has shown outstanding keenness and determination. His fine leadership as flight commander has produced a high standard of efficiency, in both ground and air crews".*

Completing his first tour of operations, during which time he was Mentioned in Dispatches, he was given a "rest" in administration.

He was then given the honour of commanding the famous RAAF No 460 Squadron September 8, 1943, flying four engine Lancaster bombers based at RAF Binbrook, Lincolnshire. No 460 Squadron flew the largest number of Lancaster sorties in Bomber Command (5700), and dropped the greatest

tonnage of bombs (24,000). The squadron lost no less than 169 Lancasters on operations and 31 were destroyed in crashes. 1018 aircrew did not return home, the greatest loss of any squadron.

Only one month after joining the squadron, Norman's aircraft was shot down over Germany and he was reported POW, imprisoned in Stalag Luft III, Poland, for Allied air force officers. For much of this time he was Senior British Officer (SBO), responsible for negotiations with the Camp Commandant.

Early in 1944, the "Great Escape" occurred at Stalag Luft III. Using great enterprise and ingenuity, the inmates had constructed tunnels leading to safety outside the camp. A total of 600 prisoners participated in the work, but only 220 were to take part in the escape. Each escapee was given forged identity cards, a compass, a map, clothing and money.

Wing Commander Bob Norman during WWII *Photo: Frances Evison*

In the film "The Great Escape", Wing Commander Norman was the officer seated on a chair counting the prisoners as they entered the tunnel. In fact only 76 prisoners emerged from the tunnel before the alarm was given, and they fled in every direction, mainly by rail.

The Germans launched the greatest search ever, only three prisoners reaching the UK. Two befriended Swedish sailors at Stettin, who smuggled them onto a ship bound for Sweden and then by RAF home to the UK. Another made his way home via France, Spain, and Gibraltar.

In blatant contempt of the Geneva Convention, and going beyond Hitler's instructions, 50 of the captured escapees were murdered by the Gestapo. After the war, those responsible for these atrocities were pursued relentlessly, and following their trial, were executed. Dick Churchill was spared, probably because of his name.

Following his marriage to an English girl, Sheila Churchill, Bob Norman elected to reside in UK after the war and represent both his employers, the Bank of New South Wales and on occasions, the RAAF. Sheila was the sister of Squadron Leader Dick Churchill, who was in Stalag Luft 3 Prisoner of War Camp in Poland with Bob; Sheila and Bob first met at a post-release welcome party for Dick at Surbiton.

Bob Norman started his banking career in the Threadneedle Street, London, branch of the Bank of New South Wales, and was located there for 40 years, travelling throughout Europe promoting the services of the bank. Working his way up to be Chief General Manager London, he served on a committee for ex-servicemen with the Duke of Edinburgh, and dined with the Queen on occasions at the Palace. During his career he

Bob Norman and Sheila Churchill on their wedding day, with members of their bridal party *Photo: Frances Evison*

became a leading bank authority in the City of London, and often appeared as a specialist authority on fraud cases.

Bob passed away in 1982 and his wife, Sheila, passed away several months ago, aged 95. Her daughter, Frances Evison, and family members have decided to visit Australia early in 2014 to bring her father's memorabilia home to Mildura RSL RAAF Museum and Memorial.

We look forward with great anticipation for Bob's medals and memorabilia to come "home" in April 2014

By Ken Wright

(*Ken was a former WW2 RAAF EATS pilot who also 'won' his wings at No 3 Service Flying Training School at Calgary, Canada)*.

Frances Evison, Bob Norman's daughter, at the Bomber Command Memorial, London *Photo: Frances Evison*

Working for the General

Life as a WAAAF in General MacArthur's Brisbane HQ

1942 was a decisive year for Australia and Jean Pollock. It began with Australia threatened by Japanese forces to its north and Jean working as a stenographer in Sydney, helping process government defence contracts. By year's end both things had changed significantly.

The Allies had halted the Japanese advance and Jean was now a member of Women's Auxiliary Australian Air Force (WAAAF). Along with dozens of other WAAAFs, she was working in the HQ of the Supreme Allied Commander, General Douglas MacArthur, in the AMP building in Brisbane.

The WAAAF was a separate force but it often worked so closely with the RAAF that in many cases they effectively became single, integrated units. Formed in March 1941 under the leadership of the remarkable Clare Stevenson, previously the boss of Berli, it became one of Australia's great WWII success stories.

Starting from scratch, over 27000 WAAAF enlistees created a skilled workforce of more than 70 musterings covering almost everything except aircrew. In other words, from March 1941 on the WAAAF grew from nothing to an effective war-time force almost twice the size of today's RAAF – an amazing achievement in so little time and one that rates far more recognition than it usually gets.

Pay and conditions were different from the RAAF, but as Jean and the other trainees soon found out on recruit training at Bradfield, in Sydney, much else was the same. In particular, discipline was expected, as was hard work to learn the ways of military life.

And just like the RAAF of the day, they often finished up in unexpected places doing things they had never thought of. This happened to Jean and others from her recruit course. On graduation, they were posted to RAAF Station Sandgate, Brisbane, with no indication at all of what they would do on arrival.

Things became a bit clearer when they were taken to the AMP building in Brisbane. There they began training to work in the Signals Office attached to MacArthur's headquarters that took up most of the building.

The AMP building had been selected for MacArthur's HQ because it was the largest and most modern building in Brisbane. There were eight floors, served by lifts, and a loft on the top floor reached by stairs from the eighth floor.

The loft was a very large room, taken over entirely by the signals office. WAAAF's worked mainly as teleprinter operators, radio operators and encryption specialists who coded and decoded classified messages.

They worked to one side of the loft, the other side being occupied by Americans who, while quite friendly, never discussed their work and were generally believed to be intelligence operatives of one kind or another.

The Australian part of the Loft was a RAAF unit, commanded by a RAAF signals officer, Wing Commander Wilmot. He was supported by a mix of RAAF and WAAAF officers and some RAAF technicians, but the operators were mostly WAAAFs.

Jean Pollock, with the fashionable hair style of the day

The loft ran 24/7 (as we now say), with three shifts per day and a full day off at set intervals. Jean was a teleprinter operator, tasked with dispatching messages via teleprinter throughout Australia to varied addresses, mostly RAAF. Ensuring the right messages went to the right addresses was obviously important and care and concentration were needed to avoid mistakes and a ticking off from those on high.

The WAAAFs were driven to and from their Sandgate barracks in trucks – a ride remembered chiefly as rough and unpleasantly cold during winter nights. But in most ways they lived comfortably and when not working always found plenty to do.

Visits to the beach were popular and dances eagerly anticipated, especially if civilian clothes could be worn. Photos of the day show that 'big hair' was very much in vogue, but this could be problematic.

Regulations called for much shorter styles and measures had to be found to 'shrink' the amount of hair when at work. Jean recalls that they 'shoved their hair up under their hats' and tied it up at other times.

The AMP still occupied much of the ground floor and could be accessed by civilians via the main entrance. The rest of the building was dedicated to approved military personnel who entered via a side entrance always guarded by two US servicemen.

When General MacArthur was about to arrive, the two guards would block access to the lifts and lesser beings would have to wait until the General had taken a lift to his offices on the eighth floor.

Jean was stranded one day when the guards froze the lifts. General MacArthur noted her plight and invited her to share his lift to the eighth floor. He chatted amicably with her on

(left) Jean Pollock with her hair 'shoved under her hat' (right) Wilmot, CO of the RAAF Signals Unit in the loft of the AMP building in Brisbane, with C Shift of the WAAAFs who worked in the unit. Jean Pollock is directly behind the CO's right shoulder and in uniform

the way up, asking where she was from and what she did in the RAAF, and appearing to be genuinely interested in her answers.

It was not what she expected from so famous a general and Jean remembers fondly her short chat with the gracious commander they worked for but almost never got to meet.

Most of the work in the Loft was classified and when asked what they did the WAAAFs simply answered that they worked in MacArthur's Headquarters. Further questions were rare as most people knew better than to pry and those that didn't were soon discouraged.

During 1944 MacArthur spent increasing time in PNG and when he moved his headquarters there permanently the Brisbane HQ in the AMP building was closed in November 1944. Jean and the other WAAAF's from the Loft were transferred to a RAAF communications Base at Victoria Park, Brisbane, where most of them served until war's end.

In general, the WAAAFs enjoyed their time in war-time Brisbane. The work was interesting and useful and they seldom wanted for company, male or female. Americans were there in large numbers and invariably invited the WAAAFs from the Loft to their dances and other social events. Romances blossomed and some WAAAFs married US servicemen and migrated to the US after the war.

After the war, Jean Pollock became Jean McAlister when she married Fredrick McAlister, an Army veteran of Greece and Crete and successful escapee from a German POW camp. She now lives in Canberra.

The AMP Building has long since been turned into apartments and renamed MacArthur Chambers. For those seeking more knowledge of the role the WAAAF and General Douglas MacArthur played in this part of Australia's military history, there is a museum on the eighth floor.

Boeing 787 Pilot Training on Global Scale

The 787 full-flight simulator shown here is one of two located at the Boeing Flight Services Seattle training campus. There are eight 787 training suites at five Boeing campuses -- Seattle, Tokyo, Singapore, Shanghai and London Gatwick.

The 787 full-flight simulator includes dual heads-up displays (HUD) and Electronic Flight Bags (EFB). The simulator is designed to train pilots to become proficient in visual maneuvers, instrument landing system (ILS) and non-ILS approaches, missed approaches using integrated approach navigation, non-normal procedures with emphasis on those affecting handling characteristics, and wind shear and rejected takeoff training.

Boeing

The Boeing 787 Simulator *Photo: Boeing*

Australian Air League Welcomes Home Teen World Flight Pilot Ryan Campbell

The cadets of the Australian Air League recently had a weekend they won't forget with a visit from the RAAF Roulettes aerobatic team to the Illawarra Regional Airport followed by the homecoming of Teen World Flight Pilot Ryan Campbell.

Teen World Flight pilot Ryan Campbell celebrates his homecoming

Departing Wollongong on June 30, Ryan had set out to become the youngest pilot and first teenager to fly solo around the world with the goal of inspiring young people to take flight, and allow their dreams to take flight too. The Air League cadets had followed the progress online of Ryan's little Cirrus SR22 aircraft as he circumnavigated the globe and were looking forward to seeing his return on September 7.

A few weeks before the scheduled return, the Australian Air League at Albion Park received a call from FLTLT Ross Laves of the RAAF Roulettes aerobatics team. A former Air League cadet himself, Ross explained they would be flying to Illawarra Regional Airport for Ryan's arrival and would like to visit them the night before!

On Friday afternoon the cadets assembled at the airport and were treated to a fantastic display as the Roulettes performed a show directly above them before landing and taxiing their Pilatus PC-9/A aircraft in to meet the cadets. The cadets were able to get up close and personal with the aircraft and pilots

Cadets of the Australian Air League meet the RAAF Roulettes

before retiring into the hanger where the Air League meets each week.

Seated in between an F-111 and Super Constellation belonging to the Historical Aircraft Restoration Society, the cadets were entertained by a video presentation on life in the Roulettes. It turns out the fuselage of a Super Constellation aircraft also makes a great impromptu projector screen!

Teen World Flight pilot Ryan Campbell speaks to the cadets of the Australian Air League

The Roulette pilots and ground crew took turns in explaining just what it takes to be a RAAF Instructor and of course being a Roulette. Topics included physical fitness, diet, training hours, education, shows they perform at, how to handle up to 6 G's of force and the equipment they use. The ground crew were also quizzed with questions about their roles, rank positions and what they enjoyed about being the ground support crew. The night ended with a BBQ dinner provided by Air League Officers and the cadet's parents, a great time was had by all.

The following morning saw an early start as the Teen World Flight crew prepared for the arrival of Ryan Campbell and the Roulettes put on an aerobatic display above the airport.

Shortly after 10.00am, Ryan Campbell arrived home and landed his little Cirrus aircraft to a huge applause from the assembled crowd. Taxiing to the point he'd left 10 weeks earlier, 19 year old Ryan had broken the record for the youngest person to fly a single-engine aircraft solo around the world.

After speaking to the crowd Ryan was escorted away for an interview with Charles Wooley from 60 Minutes, but not before stopping to shake hands with the cadets. They thought that was fantastic, however soon after they were also invited back to a private party with Ryan, his family and support crew! Here they had the opportunity to ask Ryan about his flight, and get a few photos with him as well.

This was definitely a weekend that the cadets from the Australian Air League won't forget in a hurry, and they would like to thank Ryan Campbell, his family and crew, and the RAAF Roulettes for making the occasion special.

For further information please contact:
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About the Australian Air League (www.airleague.com.au)

The Australian Air League is for boys and girls aged 8 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.

With Squadrons in most states of Australia the Air League has been serving the community in Australia since 1934. It is entirely self-funding and is staffed by volunteers who give their time to achieve its goals.

About Ryan Campbell and www.teenworldflight.com

Ryan Campbell is the youngest pilot and first teenager to fly solo around the world. His aim is to inspire youth to take flight, and for their dreams to take flight too, in whatever field that may be.

Air Force Cadets

Australian Air Force Cadets - 75th Anniversary Official History

The AAFC invites former members of the Air Training Corps (ATC) and the Australian Air Force Cadets (AAFC) to take part in recording the history of our much loved Air Training Corps, AirTC and the AAFC.

PLTOFF (AAFC) Matthew Glozier has been appointed Official Historian of the Air Force Cadets and he is looking for photographs, documents and oral history to record the first 75 years. He is working on producing a book for the 75th anniversary of the AAFC, covering the years 1941-2016. The book will form an important part of the Diamond Jubilee 2016 celebrations.

Matthew has created oral history survey forms which can be downloaded from the link/s below. Ex-cadets and staff of the ATC/AIRTC/AACF are requested to complete the forms and return them to Matthew at the email address below. Your contributions will enhance the final product and form a permanent part of our organisation's history. Please share information about this AAFC history project with as many other people as you can.

AAFC 75 Year History Book Oral Permission
AAFC 75 Year History Book Oral Survey Sheet

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RAAF Growler Training in the United States

An important step in the introduction of the Royal Australian Air Force's electronic warfare capability has commenced, with the first pilot instructor commencing flying on the EA-18G Growler in the United States.

Flight Lieutenant Sean Rutledge has commenced training with the Electronic Attack Wing, US Pacific Fleet (CVWP) at Naval Air Station Whidbey Island. Once he's completed his training, Flight Lieutenant Rutledge will be qualified to instruct other RAAF aircrew for the 12 EA-18G Growlers the Australian Government is purchasing from the United States Foreign Military Sales program.

Wing Commander Paul Jarvis, Deputy Director EA-18G Growler Transition team, believes training with the US Navy is essential. "Training with CVWP is essential to our ability to establish a credible airborne electronic attack capability," he said. "We've started early as there is an awful lot to learn between now and when we begin flying our own EA-18Gs in 2017. The support that we have had from the US Navy, particularly from Captain Springett and his team here at NAS Whidbey Island has been truly magnificent. They have really made us feel welcome as new members of the community.

"Growler is a game changer for the Royal Australian Air Force. With its unique mix of capabilities it provides multiple options to commanders, all of which reduce the risk to supported Australian Defence Force or coalition forces whilst increasing their lethality," Wing Commander Jarvis said.

Over the next three years, six crews (comprised one pilot and one electronic warfare officer) from RAAF will learn to fly EA-18G Growler at the US Navy's Electronic Attack Squadron 129 (VAQ-129), with assistance from the US Program Management Office (PMA-265) at Naval Air Systems Command in Patuxent River, Maryland.

Flight Lieutenant Rutledge said his previous flying experience will support his transition to the EA-18G Growler. He has several multi-national exercises under his belt including Exercise Red Flag held at Nellis Air Force Base, Nevada. He spent three years flying F-111s, and another three years flying F/A-18F Super Hornets at RAAF Base Amberley, Queensland. The experienced pilot hails from Far North Queensland and travelled to the US with his wife and family dog. "It's a great spot with plenty of outdoor things to do," he said.

"But I'll have to 'transition' from surfing to snow skiing to fit in with the very welcoming people here in the northwest."

WGCDR Paul Jarvis, Deputy Director Growler Transition and FLTLT Sean Rutledge and a US Navy EA-18G Growler at Naval Air Station Whidbey Island, Oak Harbor, Washington
Photo: RAAF

Maritime Surveillance Capability

Boeing will fly a demonstrator of its P-8 Poseidon-based Maritime Surveillance capability in a Bombardier Challenger next year.

Partner Field Aviation has begun modifying the business jet to carry a Selex 7000-series radar, mission system, electronic support measures (ESM) system as well as an electro-optical camera, which will turn the aircraft into Boeing's Maritime Surveillance Aircraft offering.

The demonstrator — which will be shown to potential customers during 2014 — will use a Boeing-owned Challenger 604, but customer aircraft will be based on the Challenger 605 model.

Tim Peters, VP and general manager of Boeing's Mobility, Surveillance and Engagement arm, said the company had selected the Challenger because of the type's payload, performance and speed capabilities.

The MSA will use elements of the mission system developed for the P-8 Poseidon, allowing the crews to integrate information from the various sensors on board the aircraft. Peters believes the aircraft will be an ideal choice for countries conducting long-range search and rescue, anti-piracy, environmental and economic zone patrols as well as general ISR missions.

The company says it is studying a wide range of sensors and systems for the aircraft, and while Boeing does not envisage an armed role for the aircraft, Eric Martel, Bombardier's president of specialized and amphibious aircraft, said there were no airframe limitations if customers wanted to add pylons to the wings. Boeing plans to make the MSA available to customers in 2015.

A Challenger 605 aircraft *Photo: Boeing*

James Strong Memorial Great Tiger Moth Race

Fri 25th April: First activity will be the memorial flypast down Sydney Harbour which hopefully can be included as part of the RAAFA/RSL's official ANZAC Day proceedings. We are hoping to get the RAAF Museum Tiger Moth in the race and leading the flypast down the Harbour. Additionally we are looking at seeing if Bill Purdy, ex-Lancaster pilot and Pathfinder who carried out 38 missions over Europe can fly as one of the crew members. We are also hoping to involve as many veterans as possible who may have trained on the Tiger Moth during WW2.

Following lunch and refuel at Camden the first race leg will be the return from Camden to Maitland.

Sat 26th April: Second race leg Maitland to Port Macquarie with the third and final leg back to overhead the finish line at Maitland but with the aircraft landing at Luskintyre. That night will be the presentation night at Luskintyre.

Sun 27th April: One of the comments after the last race was that they didn't have the usual post race airshow at Maitland which was a bit of disappointment for a lot of people. The plan will be to have a "Fly In" at Maitland that day with an open invitation to all aviators and types from around the Hunter and beyond.

This is the basic plan as it stands. One of the aims of the race is to support and promote awareness for two charities, LIFT Youth Development and Soldier On.

The Passing of another Fine Association

Syd Holmes, former President of the Combined Aircrew Association (CAA), has advised that this Association ceased in July 2013 due to diminished membership. At its initiation the CAA had some 592 members and after 56 years it had reduced to 23 members. Syd Holmes also wishes to advise that the residue funds of the CAA were donated to the NSW Division of the AFC & RAAF Association (RAAFA) where such funds will be utilised in welfare for RAAFA members. If further information required, please contact Syd Holmes on 0419 228 179 or (02) 4367 7450.

" They have grown old, age has wearied them,
But at the going down of the sun, and in the morning,
We shall remember them"

US pilots left standing on deck as they launch new 'stealth' drone, an X-47B, from an aircraft carrier for the first time... using handheld consoles

ANZAC Interpretive Centre Albany WA

Minister Assisting the Prime Minister for the Centenary of ANZAC, Senator the Hon. Michael Ronaldson, and Western Australian Minister for Veterans, Joe Francis MP, turned the first sod on construction of the Anzac Interpretive Centre in Albany, Western Australia on 25 October 2013.

Senator Ronaldson said he was delighted that construction had officially begun on the Centre – a key project for the Anzac Centenary – which has been jointly funded by the Australian and Western Australian governments. "The Anzac Interpretive Centre will be a physical, interpretive and online/interactive centre. It will help increase the understanding of current and future generations of the role of Albany in our First World War history," Senator Ronaldson said.

"The first convoy of ships that carried Australian and New Zealand troops to the First World War gathered at Albany, in late 1914. The first convoy left for Egypt and Gallipoli on 1 November 1914." "In little over a year, Albany will host some of the early events of the Anzac Centenary including a commemorative service to mark the 100th anniversary of the departure of the first convoy and the Anzac Interpretive Centre opening."

"Today is a significant milestone in the life of the project and I congratulate all involved in the local community, including the RSL and the City of Albany, on their commitment to seeing the Centre become a reality."

Senator Ronaldson said the Australian Government had allocated $6.55 million to the construction and development of the Anzac Interpretive Centre with the Western Australian Government providing $2.2 million. Western Australian Veterans' Minister Joe Francis congratulated BGC Construction Pty Ltd on being awarded the $6.1 million contract to build the Centre.

"I'm very proud that the City of Albany and RSL, led by the Western Australian Government, have worked together in a relatively short time to bring this project to fruition," Mr Francis said. "The work being done by the WA Museum in coordinating the development of the interpretive element through collaboration with appointed designers 'Thylacine' and a number of other contributors including the Australian War Memorial and the New Zealand National Army Museum (Te Mata Toa) means we will create an amazing experience for visitors."

"The addition of this Anzac Interpretive Centre and the Commemorative Walk and Lookout to the Mount Adelaide Fortress significantly increases the relevance and importance of this amazing part of the country's military history. Add to this the refurbished Padre White Lookout and the Desert Mounted Corps Memorial at Mount Clarence, the Lower Forts and the Ataturk Channel and The Peace Park, and Albany will now be the second most important military heritage site in Australia after the Australian War Memorial."

Mr Francis said the Centre would offer a contemporary experience for visitors which would allow people to follow personal stories of men and women who left on the first convoy. "Importantly, the desired views towards the Southern Channel, Ataturk Channel and Princess Royal Harbour have also been achieved," he said. "The building ties back to a maritime symbolism with reference made to the plated steel fabrication of ship hulls at each end of the form. It 'floats' above the landscape almost like a vessel at dock in order to capture these critical views." Mr Francis said planning was well underway for a program of events to support the official commemorative events.

The building was designed by Peter Hunt Architect and is being project managed by the Department of Finance, Building Management and Works. The centre will be operated by the City of Albany with curatorial services provided by the WA Museum.

Preparatory forward works have been completed at the Mount Adelaide site. Construction is expected to start in mid-November, with completion due in August 2014 in readiness for the finalisation of the interpretive fit out.

Minister Advances Centenary of ANZAC Planning

The Minister Assisting the Prime Minister for the Centenary of ANZAC, Senator the Hon. Michael Ronaldson, advanced First World War Centenary planning at a multi-lateral Ministerial meeting in Paris on 18 October 2013.

"The Anzac Centenary will be a significant time in our country's history – a period of national reflection, remembrance and commemoration of the service and sacrifice of so many Australians in defence of our way of life, our values and our freedoms," Minister Ronaldson said. "Today representatives from nations involved in the First World War will gather to discuss plans for the Centenary period. These commemorations will mark 100 years since some of the bloodiest conflicts in human history.

"More than sixty thousand Australians made the supreme sacrifice in the First World War, while some 18,000 remain buried on the Western Front with no known grave. Over this coming period of commemoration, it is important that their legacy of service and sacrifice, along with that of other allied nations, is appropriately honoured, remembered and commemorated."

While in Paris, Minister Ronaldson plans to meet with Turkish and New Zealand counterparts to discuss progress on Anzac Day commemorations at Gallipoli in 2015, marking the 100th anniversary of Australian and New Zealand troops landing on the peninsula. "Both the Australian and New Zealand Governments' priority is to deliver solemn, dignified and well-managed Anzac Day commemorations, with the valued assistance of our Turkish hosts.

"There is already a great deal of interest from Australians and New Zealanders in attending Anzac Day commemorations at Gallipoli. A fair and transparent ballot will open soon for all Australians who would like the opportunity to be at Gallipoli in 2015."

The Minister will also visit the Australian National Memorial and Victoria School at Villers-Bretonneux and other sites

of significance along the Western Front. "Australia made a significant contribution during the First World War on the Western Front in France and Belgium. Between 1916 and 1918, more than 295,000 Australians served on the Western Front and some 46,000 lost their lives. We must never forget their service and sacrifice," Minister Ronaldson concluded.

Australians visiting the Western Front can find out more at www.ww1westernfront.gov.au For more information on Anzac Day commemorations at Gallipoli in 2015 visit www.gallipoli2015.dva.gov.au

Gallipoli 2015 Ballot Process

The ballot for places at Gallipoli on Anzac Day 2015 opened on 15 November 2013, the Minister Assisting the Prime Minister on the Centenary of ANZAC Senator the Hon. Michael Ronaldson announced on 14 November.

Senator Ronaldson said the ballot was open until 31 January and that there was no need to rush applications. "The ballot will open at midnight, 15 November 2013 and close at midnight, 31 January 2014 – allowing plenty of time for interested Australians to apply," Senator Ronaldson said.

In 2015, places will be available for 8,000 Australians, 2,000 New Zealanders and up to 500 official representatives of all countries involved in the Gallipoli campaign. Of the places available to Australians in ballot, 2,000 will be reserved for special representatives such as direct descendants, the veteran community and secondary school students and their chaperones. The remaining 6,000 places will be for all Australians. Applicants must be aged 18 and over on or before 25 April 2015.

Widows of First World War veterans do not need to apply and will be invited separately by the Australian Government to determine their interest in attending. Places for secondary school students and chaperones will be allocated outside the ballot by state and territory governments.

Advice will be provided to individuals on the ballot outcome before March 2014, to ensure those successful have enough time to organise and pay for their trip. This will also allow tour operators time to make specific arrangements with those travellers who have secured a place.

Senator Ronaldson said that although attending Anzac Day commemorations in 2015 would be a once-in-a-lifetime experience, visitors could also consider visiting Gallipoli at another time during the Centenary year.

"The Gallipoli campaign lasted eight months from April to December 1915 – I encourage those who may not be successful in the ballot to consider visiting Gallipoli at another time in 2015," Senator Ronaldson said.

For more information on the ballot, eligibility arrangements, and to apply from midnight 15 November, visit the Department of Veterans' Affairs Gallipoli 2015 website www.gallipoli2015.dva.gov.au. Ballot arrangements are outlined below.

Gallipoli 2015 ballot arrangements

Gallipoli
Gelibolu
2015

Step	Activity	Date
1	Registration for ballot opens	Midnight 15 November 2013
2	Registration for ballot closes	Midnight 31 January 2014
3	Finalisation of administrative details, running of ballot and checking of descendant and veteran claims	February 2014
4	Advice sent to applicants	March 2014
5	Accompanying person's details registered, passport details to be provided and confirmation of travel arrangements by successful ballot applicant	1 May – 25 October 2014
6	Reissue of any returned or forfeited passes to individuals on the waitlist	26 October 2014 – 31 March 2015

1st	Applicants who have indicated "Direct Descendent" with preference to first generation – sons and daughters	400 double passes	Those who have also indicated "Veteran" go to 2nd cascade. Those who haven't go to 3rd cascade
2nd	Applicants who have indicated "Veteran"	400 double passes (800 passes)	Go to 3rd cascade
3rd	Applicants who haven't indicated either "Direct Descendent" or "Veteran" (i.e. the Australian public), plus unsuccessful applicants from 1st & 2nd cascades	3,000 double passes	Those who have indicated willingness to be placed on a wait list go to 4th cascade. Those who haven't are out of the ballot
4th	Applicants who have indicated willingness to be placed on a wait list	Establish a priority order for allocating passes as they become available	

New Minister for Veterans Affairs

DVA welcomes the new Minister for Veterans' Affairs, Senator the Hon. Michael Ronaldson, who was sworn in on 18 September 2013. Minister Ronaldson has also been appointed as the Minister Assisting the Prime Minister for the Centenary of Anzac and the Special Minister of State.

Minister Ronaldson said that, "it is a true honour to serve Australia's veterans and their families. I want to learn from them, hear their concerns and do everything within my power to give them the support they so deserve."

Minister Ronaldson has had a long history in politics, beginning his public service career as a councillor for the City of Ballarat in 1981. He has also spent time as the Federal Member for Ballarat, and held appointments of Parliamentary Secretary, the Minister for Transport and Regional Development, Chief Government Whip and Senator for Victoria. Prior to the 2013 election he was the Shadow Minister for Veterans' Affairs and Shadow Minister Assisting the Leader of the Opposition on the Centenary of Anzac and Shadow Special Minister of State (2007-2010).

Exercise the Key during Veterans' Health Week

The Minister for Veterans' Affairs, Senator the Hon. Michael Ronaldson, said Veterans' Health Week, 14 to 20 October, was a great time to incorporate a little more exercise into your day, and in turn, improve your health and wellbeing.

Veterans of all ages are encouraged to improve their health and wellbeing by increasing their levels of physical activity, not just during Veterans' Health Week.

"Why wait until the new year to make a health resolution, get started now and make the commitment to become more active. Even a small step, like taking your children or grandchildren for a walk with the family pet, can make a big difference," Minister Ronaldson said.

According to the Australian Government *Physical Activity Guidelines for Adults,* all it takes is 30 minutes of moderate intensity activity on most days to enhance your health and help prevent conditions such as heart disease and type II diabetes, build and maintain healthy bones and muscles and promote psychological wellbeing.

This year, the theme of Veterans' Health Week is *Physical Activity – Fitness, Strength, Flexibility and Balance,* with activities designed to encourage the veteran community to:

- enjoy **fitness** and keep physically healthy through exercise and good nutrition;
- find the mental **strength** to participate in activities that will help prevent illness and injury;
- develop **flexibility** in daily routines, allowing the incorporation of more physical activity; and
- maintain the right **balance** of exercise, nutrition and rest.

Veteran and community groups around the country will partner with the Department of Veterans' Affairs to host a range of events including activities such as surfing and gardening lessons, group challenges, family fishing and fun days, bowls competitions and a health and wellbeing expo.

"I encourage members of the veteran and defence communities to find out what is going on in their local area and take part. Looking after yourself physically and mentally are two of the most important things you can do to improve and maintain your overall health and wellbeing, ensuring you stay in the best shape possible.

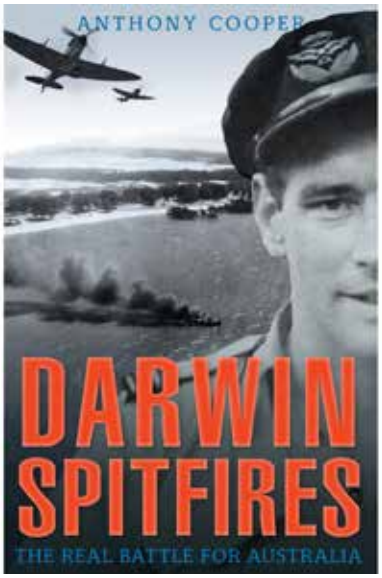
"While strenuous physical activities are not suitable for all, there are a wide variety of sports and hobbies suited to all different ability levels and even the smallest amount of exercise can help improve your health," Minister Ronaldson said.

SRCA clients to benefit from DVA card arrangements

More than 225,000 DVA clients access a comprehensive range of health services through Gold or White Cards, that provide treatment at DVA's expense.

From 10 December 2013, clients with accepted conditions under the *Safety, Rehabilitation and Compensation Act 1988* (SRCA) will also be able to use DVA card arrangements to access treatment for their long-term treatment needs. This means they will no longer need to claim reimbursement or have an account sent to DVA to pay for the cost of health care services. Payment for services will be arranged directly between the health care provider and DVA. Health care providers will receive payment faster and with less paperwork.

SRCA clients will receive a letter outlining the new arrangements this month. For more information, visit the DVA website.



Darwin Spitfires: The Real Battle for Australia

No 1 Wing RAAF

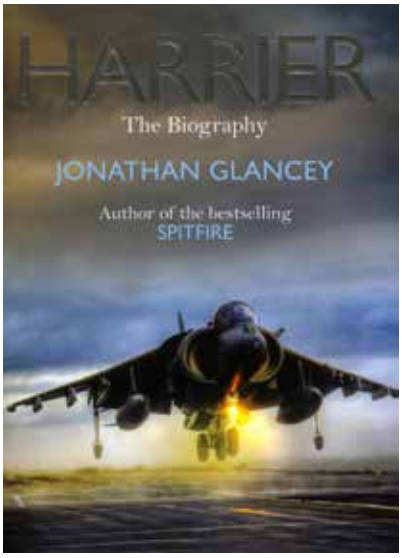
Author: Anthony Cooper

UK Publisher: Pen and Sword Books
01226 734679
Price: £25 ($44.00)

Further information: pr@pen-and-sword.co.uk, www.pen-and-sword.co.uk

The Japanese air raids on Darwin on 19 February 1942 are well-known to most Australians, although not perhaps to the rest of the world. What happened afterwards, however, remains unknown to many. This publication attempts to illuminate this little-known period of war history, charting the exploits, losses and successes of the RAAF's No 1 Fighter Wing and the contribution they made to the allied war effort.

For almost two years the airspace over North West Australia was routinely penetrated by Japanese raids, tallying about 70 in total. Telling the story of the RAAF'S No 1 Fighter Wing, composed of both Australian and British Spitfire pilots, Darwin Spitfires explores the little known 1943 season of air combat over the top end, recovering important aspects of Australian history. It brings to the attention of the world the heroic exploits of the skilled pilots who did so much to protect Australia and support the Allied effort. This important publication attempts to celebrate and commemorate the spirit of solidarity that characterized the experiences of No 1 Fighter Wing.



Harrier – The Biography

Author: Jonathon Glancy

Publisher: Atlantic Books, UK

Hard cover with dust jacket; 290 pages, with 35 B&W and colour photos

Distributor: Allen and Unwin
02 8425 0100
Price: $39.99

Further information: www.allenandunwin.com/mediacentre

It was the Germans in the 1940s who first conceived of a fighter plane that could take off and land vertically, like a helicopter. In the years following the Second World War the US Navy were the first to demand combat aircraft with such capabilities. On both sides of the Atlantic, prototypes were built and tested. Test pilots flew - and crashed - in a myriad of flying machines, from flying saucers to vertical rockets. So when the Hawker P. 1127 rose vertically and untethered from the ground on 19 November 1960, British engineers had finally achieved what some thought was impossible.

The Hawker Harrier rapidly established itself as the world's most successful vertical and short take-off and landing (V/STOL) aircraft. From the moment of its maiden flight, the Harrier proved itself indispensible to the Royal Air Force and the Royal Navy. It made its combat debut, famously, during the Falklands War in 1982, but has since fought in many other conflicts: over Iraq, Sierra Leone, Serbia and Afghanistan.

Jonathan Glancey's original and gripping account charts the history of this remarkable aeroplane, from prototype to Kestrel to Harrier II. In a vividly enjoyable and, at times, very personal narrative, Glancey recounts his life-long fascination. His book is an enduring tribute to the determination and ingenuity of those who created the Harrier and the bravery of the men and women who have flown it, often in extremely dangerous conditions.

Membership of the RAAF Association

Members and ex-members of the Royal Australian Air Force, aircrew of Australian and other Designated Services' Navies and Armies and technical personnel specifically engaged in the maintenance of the aircraft of the above Services

Serving and former members of the Australian Air Force Cadets or the Australian Air League and its predecessors who are over the age of eighteen years and have given satisfactory service

Persons who being not less than eighteen years of age, are siblings, sons or daughters of members, or of deceased former members of this Association Spouses of Association members, deceased Association members or of deceased members of the Royal Australian Air Force

Persons who have an involvement or relationship with the uniformed or civilian areas of the Royal Australian Air Force, related industries or activities

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Commemoration of Dutch Free Forces - World War II

During a recent visit to Australia, Lieutenant General Alexander Schnitger, Chief of Royal Netherlands Air Force, attended a short ceremony on 3 October 2014 at the Australia-Netherlands Commemorative Memorial at Russell Hill. Both he and Air Marshal Geoff Brown AO, Chief of Air Force, laid wreaths in recognition of the sacrifices made by Dutch Free Forces in Australia's region during WWII.

Other attendees were HE Mrs Annemieke Ruigrok, Netherlands Ambassador, Mr Peter Kloppenbeg, Liaison Officer Netherlands Ex-Servicemen & Women's Association, Air Commodore Peter McDermott AM CSC (Retd) President ACT Divison, representing National President RAAFA and WGCDR Charles Hill RAAFAR, President RAAFA Tasmanian Division.

Air Marshal Geoff Brown AO, Chief of Air Force, far right, and (L-R), Mr Peter Kloppenbeg, Liaison Officer Netherlands Ex-Servicemen & Women's Association, Lt. Gen. Alexander Schnitger, Dutch CAF, HE Mrs Annemieke Ruigrok, Netherlands Ambassador

SQNLDR Aubrey J R (Titus) Oates

SQNLDR Aubrey J R 'Titus' Oates was a wartime pilot who flew Beaufort aircraft with the RAAF in the South-West Pacific and was awarded the DFC during flying operations against the Japanese.

After the war he kept flying as a civilian and did so until at least the late 1960's. He entered a former RAAF Mosquito in the 1953 England to Australia air race. Unfortunately, the aircraft ditched on its way to the UK for the start of the race. Oates and his co-pilot suffered minor injuries but the aircraft was a write-off as a result. After that time he seems to have walked off the map.

Dave Prossor is gathering notes on his life and times for an article in the publication of the Aviation Historical Society of Australia. He would be very pleased to hear from any reader who knows the fate of SQNLDR Aubrey J.R. 'Titus' Oates. Any additional information on the RAAF or civil flying history of Titus Oates would also be very welcome.

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