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News Briefs, including Arrears

16 September 2019 - Royal Australian Navy's third air-warfare destroyer, NUSHIP Sydney, has commenced its first phase of sea trials, which will test the ship's hull, propulsion and navigation systems. Update: Completed 11 November 2019

Photo: Air warfare destroyer NUSHIP Sydney departs Osborne Shipyards for the first time as it commences its builder's sea trials. Photo by Simon Casson.

05 July 2019 - Australian Army 2nd Commando Regiment are pictured practising climbing a wire ladder underneath a 6th Aviation Regiment Black Hawk helicopter (A25-218) during a training activity as part of Exercise Talisman Sabre

2019 in Townsville, Queensland. 6th Aviation Regiment Black Hawk helicopter (A25-102) is pictured with underslung an all-terrain vehicle.

14 July 2019 - Two CH-47F (A15-304 and A15-305) embark on HMAS Canberra and below A15-305 lifts a M777 Gun/Howitzer and ammunition.

Further Chook tails. Note: Fitted fully with IR Suppressor and sand/filter equipment per A15-302 and nil with A15-310.No Beach or sand pit work for the latter? On right A15-306 fitted. Above A15-305 has filter but no IR Suppressor

25 July 2019- The Australian Defence Force (ADF) grounded its entire fleet of 47 Airbus MRH 90 Taipan helicopters following a recent precautionary landing caused by a tail rotor vibration. Meanwhile, the RNZAF wasn't affected or concerned...therefore it's not a rare shot of seeing a "Kiwi" in the air during the big Exercise Talisman Sabre 2019.

Editor: Best sourced Australian Army "Operator" Comment per Land 2097 Phrase 4 "Special Forces Helicopter" this year was:

"This helicopter is replacing the Blackhawk but is not a Blackhawk replacement program, as that program is transitioning to the MRH-90 Taipan"

Note: First of 46 contracted MRH-90s delivered in December 2007, with the last one, the 47th, at no cost, A40-047, delivered and in use by mid 2019.

A German MRH90 Relation

October 2019: Airbus Helicopters has delivered the first NH90 Sea Lion naval multi-role helicopter to the German military, with a further two to be delivered by the end of the year. In total, 18 Sea Lions have been ordered for the German Navy, with deliveries expected to be completed in 2022. The selection of the Sea Lion as the successor to the Sea King was made in March 2013 and the corresponding contract was signed in June 2015.

When deployed, NH90 Sea Lions will take on a wide range of roles including search and rescue (SAR), maritime reconnaissance, Special Forces as well as personnel and material transportation missions. In addition to its land-based use, the Sea Lion will also operate on Type 702 (Berlin class) combat support ships. The Sea Lion will not only replace the German Navy's Sea King Mk41 fleet, but Germany has also recently opted for the naval version of the NH90 to succeed its 22 Sea Lynx Mk 88A on-board helicopters, in service since 1981. This first Sea Lion is also the 400th NH90 helicopter to be delivered.

F-35A Lightning II Deliveries

10 September 2019: RAAF F-35As A35-015 and A35-016 arrived at RAAF Base Williamtown for the first time on the 10 SEP 2019. Meanwhile both A35-017 and A35-018 have flown in the US, and are on the line for training at Luke AFB, AZ. We assess that these two, together with A35-007 and A35-008, will be delivered to 3SQN at RAAF Williamtown before the end of the year – perhaps even a 4-ship delivery this time?

A35-018 in 3SQN markings, on a test flight at Fort Worth in OCT 2019 *[pic F-16.net]*

RAAF Serial	USAF Serial	msn	First Flight	Details
LRIP Lot 6				
A35-001	12-5060	AU-01	29 SEP 2014	61FS Luke AFB, del DEC 2014, 2OCU mkgs
A35-002	12-5061	AU-02	1 OCT 2014	61FS Luke AFB, del DEC 2014, 2OCU mkgs
LRIP Lot 10				
A35-003	15-5211	AU-03	DEC 2017	61FS Luke AFB, del DEC 2017, 3SQN mkgs
A35-004	15-5212	AU-04	12 DEC 2017	61FS Luke AFB, del DEC 2017, 2OCU mkgs
A35-005	15-5213	AU-05	JAN 2018	61FS Luke AFB, del 2018, 2OCU mkgs
A35-006	15-5214	AU-06	MAR 2018	61FS Luke AFB, del 2018, 2OCU mkgs
A35-007	15-5215	AU-07	2 JUL 2018	61FS Luke AFB, del 2018, **3SQN, WLM NOV 2019**
A35-008	15-5216	AU-08	16 JUL 2018	61FS Luke AFB, del 2018, **3SQN, WLM NOV 2019**
A35-009	15-5217	AU-09	15 AUG 2018	del SEP 2018, **3 SQN Williamtown 10 DEC 2018**
A35-010	15-5218	AU-10	16 AUG 2018	del SEP 2018, **3 SQN Williamtown 10 DEC 2018**
LRIP Lot 11				
A35-011	17-5294	AU-11	25 JAN 2019	61FS Luke AFB FEB 2019, **arrived 3 SQN Williamtown 7 APR 2019**
A35-012	17-5295	AU-12	25 JAN 2019	61FS Luke AFB FEB 2019, **arrived 3 SQN Williamtown 7 APR 2019**
A35-013	17-5296	AU-13	11 MAR 2019	61FS Luke AFB, 2OCU markings
A35-014	17-5297	AU-14	15 MAR 2019	61FS Luke AFB, 2OCU markings
A35-015	17-5298	AU-15	14 JUN 2019	3SQN markings, **arrived 3 SQN Williamtown 10 SEP 2019,** Edinburgh Air Show 9-10 NOV 2019
A35-016	17-5299	AU-16	JUL 2019	3SQN markings, ferry to 61FS Luke 2 AUG 2019, **arrived 3 SQN Williamtown 10 SEP 2019,** Edinburgh Air Show 9-10 NOV 2019
A35-017	17-5300	AU-17	OCT 2019	del OCT 2018, **3SQN markings, WLM DEC 2019**
A35-018	17-5301	AU-18	OCT 2019	del OCT 2018, **3SQN markings, WLM DEC 2019**

Estimated data provided in red. Australia will take delivery of eight F-35A aircraft in 2019 – presumably this is at RAAF Williamtown, as the planned IOC date for 3SQN is MAR 2020.

The arrival of aircraft A35-015 and A35-016 as stated brings the 3SQN fleet to six aircraft. Two RAAF aircraft in sequence, A35-013 and A35-014, have been retained in the US as part of the international training program.

A35-015 A35-016 *[Pictures Defence]*

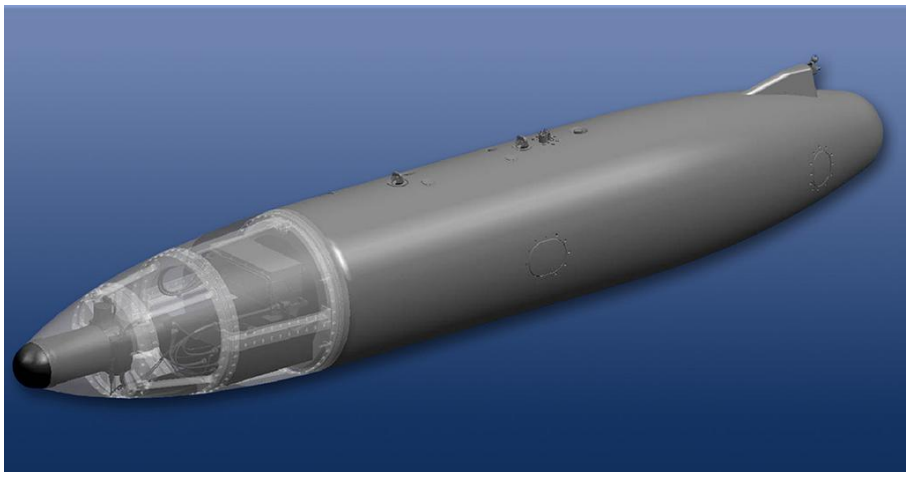
28 October 2019: A RAAF F-35A Lightning II, assigned to the 61st Fighter Squadron 'Top Dogs', flew the 35,000th F-35 sortie flown at Luke AFB, AZ. The sortie, which was carried out by RAAF Lightning II **A35-008** marked a true milestone since F-35 flight operations began at Luke in 2014. Luke is the largest F-35 initial training base for the USAF and international partners, but is already crowded. With more countries purchasing F-35s (Belgium, Denmark and Poland), the USAF is expected to identify an additional permanent F-35 FMS training base to support new customers.

17 September 2019- Raytheon is developing a new medium-range, air-launched weapon called the "Peregrine™ missile that is half the size and half the cost of today's air-to-air missiles, yet delivers greater range and affect. Developed to strengthen the capabilities of current fighter aircraft, the new, smaller Peregrine missile is faster and more manoeuvrable than legacy medium-range, air-to-air missiles, and doubles the weapons load out on a variety of fighter platforms. This is especially important given the F-35A's current internal payload limitation of four AAMs. Picture: Raytheon

2 October 2019- The Royal Australian Air Force (RAAF) is to equip its Boeing F/A-18F Super Hornets with the same AN/ASG-34 podded infrared search-and-track (IRST) system as carried by the US Navy (USN). A sources-sought notification issued by the US Naval Air Systems Command (NAVAIR) on 2 October calls for 12 IRST. According to the notification, the contract is expected to run for 36 months, although no further details pertaining to timelines or contract values were disclosed. Developed by Lockheed Martin, with Boeing and General Electric, the AN/ASG-34

IRST is a passive system geared at giving the Super Hornet the capability to locate and engage airborne and ground targets when use of the Raytheon AN/APG-79 active electronically scanned array (AESA) radar would give away the aircraft's position.

Unlike most other IRST systems that are fully integrated with their host aircraft, the AN/ASG-34 is designed to be carried in a modified centreline drop tank. Boeing officials previously told Jane's that locating the IRST underneath the aircraft has no adverse effect on its ability to identify and track aircraft that might be flying higher than the Super Hornet and that at 10 miles (16 km) from the target aircraft it will provide unlimited visibility up to 60,000 ft (as high as any target would fly.



September 2019- This month marked the 20th anniversary of the introduction of the C-130J Hercules to Royal Australian Air Force service. Five C-130J Hercules aircraft from No.37 Squadron fly in formation over RAAF Base Richmond. The Australian Government ordered twelve C-130J Super Hercules in December 1995 and deliveries began during 1999.

As part of the deal negotiated with Lockheed Martin, seven of the RAAF's C-130Es were transferred to the company in return for a reduced price on the new aircraft. At the time the order for the twelve C-130Js was placed, the Government also took out options for a further twenty-seven Super Hercules, but these were not taken up; the options included seven airborne early warning and control and eight aerial refuelling variants, as well as up to eight transports for the Royal New Zealand Air Force.

The RAAF was the first operator of this C-130 variant. The aircraft initially suffered from serious mechanical and software problems as well as a shortage of spare parts, and were assessed as "experiencing significant operational shortfalls" in a 2002 Australian National Audit Office report. The Defence Science and Technology Organisation undertook considerable research into the C-130J design and developed improvements to the aircraft that addressed problems with excessive vibration

A familiar case issue with a lot of RAAF aircraft procurement programs dating back to Adam

Photo by Corporal Craig Barrett.

Super Hornets Exercise in SEA

28 August 2019: The RAAF deployed more than 120 people and six F/A-18F Super Hornets from 1 SQN RAAF Amberley to participate in two bilateral fighter exercises in South-East Asia. Exercise *Thai Boomerang* and Exercise *Elang AUSINDO* will run consecutively from 2 September to 28 September 2019 in Thailand and Indonesia.

The six Super Hornets departed Amberley on 28 August supported by a 33 SQN KC-30A and C-17s from 36 SQN to start the month long fighter combat readiness training. The aircraft deployed to RTAF base at Korat in north-east Thailand, training with the 1st RTAF Wing, comprising F-16MLUs of Nos. 102 and 403 Squadrons. The RAAF routinely trains with RTAF in exercises such as *Pitch Black* held in the Northern Territory.

OC 82 Wing Group Captain Stephen 'Chapps' Chappell, who oversees 1 SQN, said that exercises like these demonstrated the close relationship Australia has with its regional partners: "The focus of regional exercises like *Thai Boomerang* and *Elang AUSINDO* is integration and interoperability". The RAAF has been participating with the RTAF in *Thai Boomerang* since 1992, and in Elang AUSINDO with the TNI-AU since 1995.

[Jaryd Stock image in AERO]

1 SQN Super Hornet A44-219 departing Amberley

…and Hornets in Japan

11 September 2019. CO of 77SQN, WGCDR Jason Easthope, leads the Squadron's F/A-18 Hornets into Chitose Air Base in Japan for Exercise *Bushido Guardian,* conducted from Japanese Air Self-Defense Force (JASDF) station Chitose Air Base, Hokkaido. 77SQN returned on 6 October.

77 SQN Hornet A21-39 arrives at JASDF Chitose AB for Exercise *Bushido Guardian* *[RAAF image]*

This is the first ever air combat exercise between the two countries, and will cover 11 SEP–4 OCT. Chitose AB is home two F-15J squadrons – 201 and 203 *Hikotai*, which form the 2 *Kokudan* – and was close to Sapporo, handy for the WRC!

77SQN A21-36 and A21-23 lead a mixed formation during Exercise *Bushido Guardian* in Japan *[RAAF image]*

Tracker at HARS

14 September 2019. Australia's only airworthy Grumman Tracker flew for the first time in over ten years from her former home at HMAS *Albatross* at Nowra to the HARS Museum at Albion Park. S-2G N12-152333/844 is part of the RAN Historic Flight, now maintained by HARS. Notice that '**NAVY**' had been overpainted for this ferry.

10 NOV 2019: HARS S-2G N12-152333/844 departs Shellharbour Airport for a flypast Stanwell Tops – with 'NAVY'

26 October 2019. And on the subject of maritime aircraft, the dis-assembly of ex-RAAF 10SQN AP-3C A9-760 at Maroochydore/Sunshine Coast airport was being prepared for transfer by road to the Queensland Air Museum at Caloundra.

P-8A Poseidon Deliveries

4 October 2019: The Minister for Defence had announced in April that the eighth aircraft, **A47-008,** would be delivered in mid-2019 and it duly arrived on 13 JUN.

This will be the RAAF's long-term fatigue management aircraft, fitted with diagnostic equipment to allow the RAAF to collect the data to analyse and sustain the life of the aircraft, and will be the upgrade and instrumented test vehicle.

The next aircraft, **A47-009,** arrived at RAAF Edinburgh on 1 AUG, **A47-010** at the end of that month, and **A47-011** in early October. Only one to go on the firm order, **A47-012** will probably be delivered by the end of this year. There are options for a further three.

[Nathan Rundle Photography]

4 OCT 2019: P-8A Poseidon A47-011 (msn 64167), arriving at RAAF Edinburgh

RAAF Serial	msn	Line no.	FAA Test Reg	Date of FAA Reg	RAAF Delivery
A47-008	63191	6750	N872DS	27 AUG 2017	13 JUN 2019
A47-009	64165	7324	N391DS	18 SEP 2018	1 AUG 2019
A47-010	64166	7392	N397DS	24 OCT 2018	29 AUG 2019
A47-011	64167	7427	N398DS	14 NOV 2018	4 OCT 2019
A47-012	64168	7603	N468DS	6 MAR 2019	DEC 2019

Please note that A47-009 was delivered on the 1 August 2019 as the first Fleet Release 46 partial increment 3 ECP 1 upgraded systems, over the preceding eight operational Increment ECP 2 Spec Aircraft (A47-001 to A47-008) delivered. Increment 3 design changes intended to provide enhanced capabilities in four areas. *T*hese ECPs will be retrofitted to the earlier eight as they pass through maintenance.

The first two include communications, radar, and weapons upgrades in current a/c, the second two are a new open systems architecture, add improvements to the combat system's ability to process and display classified information, and enhance the P-8A's search, detection, and targeting capabilities.

Drilling down, it means:

- AN/TPY-10(v2) Surface Search Radar, which features a terahertz sub-millimetre SAR mode, improved ISAR classification algorithms, and an active scan AESA (GaN) mode.
- Support for the MAC (Multi-Static Active Coherent) buoy, which when airdropped into the water, generates a wide-ranging electronic frequency burst, powered by durable inline batteries – allowing it to emit multiple, precise pulses – and assisting the onboard ADS to locate anomalies undersea in the return. Acoustic data is transmitted by MAD-L to Poseidon operators.
- Integration of the High Altitude ASW (HAASW) Unmanned Targeting Air System (UTAS) onto P-8A controlled and launched MQ-4C Triton, allowing the Poseidon to network an autonomous or remotely piloted UAV equipped with a high-strength MAD detector. Integration and control of Pathfinder ACTUVs is made available to onboard operators.
- Replacement of the AN/APS-14 with the Advanced Airborne Sensor, built by Raytheon, providing additional side looking AESA, MTI, SAR, and ISAR coverage. The AAS includes NCIC and NSSN network integration, allowing for the direction of wide-area countermeasures such as torpedoes.

Additionally, though a current US Navy requirement...Fin kits for the Mk 48 Mod 8 CBASS heavyweight torpedoes, allowing for a glide-launch at 30,000 feet, complimenting the Mark 54 of Increment 2.

[Photo: Phillip B Hoskings]

PC-21 News

3 OCT 2019: Roulette's first PC-21 display, held at Point Cook
Roulette aircraft present from East Sale were A54-031, -032, -033, -034, -035 and -038.

3 October 2019: A practice session prior to the Roulette's first display, held at Point Cook on 3 OCT 2019

23 September 2019: HB-HWQ (A54-043) arrived at RAAF East Sale, but its partner HB-HWR (A54-044) was delayed with an unserviceability in Fujairah (UAE) and arrived three days later.

28 October 2019: A54-046/HB-HWT (above, 4SQN FAC colours) with A54-045/HB-HWS (in ARDU grey colours) arrived at East Sale on 28 OCT after their 10-day trek from Switzerland. The last three planned for delivery ferry NOV 2019.

RAAF Serial	Ferry Reg	msn	Delivery Details
A54-043	HB-HWQ	276	Test flown at Stans on 17 JUN 2019 **(Roulettes)**, departed Stans 13 SEP 2019, arrived ESL 23 SEP 2019.
A54-044	HB-HWR	277	Last pre-flights at Stans 24 JUN 2019 **(Roulettes)**, departed Stans 13 SEP 2019, went U/S Fujairah UAE; arrived ESL 26 SEP 2019.
A54-045	HB-HWS	278	FAC grey with **ARDU** markings, first flight 16 JUL 2019, departed Stans 18 OCT 2019, arrived ESL 28 OCT 2019.
A54-046	HB-HWT	279	FAC grey with **4SQN** markings, compass swing on 23 JUL 2019, seen in full 4SQN markings with blue tail band 13 SEP 2019, departed Stans 18 OCT 2019, arrived ESL 28 OCT 2019.
A54-047	HB-HWU	280	FAC grey with **4SQN** markings, blue tail band, compass swing on 9 AUG 2019, ETA ESL 25 NOV 2019.
A54-048	HB-HWV	281	FAC grey with **4SQN** markings, blue tail band, ETA ESL 25 NOV 2019.
A54-049	HB-HWW	282	FAC grey with **4SQN** markings, blue tail band, towed to final assembly hangar on 8 AUG 2019, FF 17 SEP 2019. ETA ESL 25 NOV 2019.

A54-043 / HB-HWQ – test flight at Stans on 17 JUN 2019 – and arrived at Sale on 23 SEP 2019

[Stephan Widmer]

18 October 2019 – A54-046/HB-HWT about to depart Stans on ferry to Australia

[ASO image]

26 OCT 2019: PC-21s A54-045/HB-HWS and A54-046/HB-HWT arrive in Darwin

[Stephan Widmer]

7 NOV 2019: A54-047/HB-HWU back from the last test flight with underwing-tanks
The ferry flight of the last three PC-21s to Australia (A54-047, A54-048 and A54-049 (Below)) is planned this month

[Stephan Widmer]

RAAF WWII IN COLOUR

A series of RAAF aircraft in WWII – in Australia, New Guinea and the islands. Later, Europe and the Middle East will be included.

No.2 – RAAF Vengeances

The RAAF's lack of preparedness with combat aircraft was obvious as War approached in 1939. Soon the first two RAAF squadrons despatched to the Middle East and Britain (3 and 10 Squadrons) were sent without aircraft as all frontline aircraft in Australia were obsolete – the Wirraway as a fighter, the Anson as a bomber and the Seagull V for coastal patrol. 100 Hudson bomber reconnaissance aircraft were ordered in 1939 for delivery in 1940, and plans were underway to build the Beaufort in Australia with the first available in 1941. Such unpreparedness had placed the country in a dangerously precarious position as hostilities confronted British Commonwealth forces.

But then, 1942 was to be an even bleaker year for Australia. After the Japanese attack on Pearl Harbor in DEC 1941, Japan's forces spread throughout the Pacific and advanced down the Malay peninsula, as the only RAAF fighters were the lumbering Buffaloes inherited from the RAF for 21 and 453SQNs based in Singapore. These would soon be fighting for their lives in Malaya, and the fall of Singapore in FEB 1942 coincided with the Japanese bombing raids on Darwin. The defenders here were a handful of USAAF P-40s. The RAAF was desperate for fighter aircraft, and as the enemy South Pacific sweep reached New Guinea, USAAF P-40s were diverted for the RAAF's urgent needs. This would enable the RAAF to form 75SQN and deploy immediately to fight the Battle of Port Moresby.

It was soon apparent that American aid was fundamental to the expansion of the RAAF, and the generous Lend-Lease program – by which the US lent or leased materiel to Allied nations, with no payment required until after the War – benefitted Australia in providing modern combat aircraft.[1] As related in the previous article No.1 in this series,[2] fifty-four Beaufighters had been ordered in MAY 1941, but the first was not arriving until the end of MAR 1942. In addition, Spitfires had been ordered from UK but most of that first shipment was diverted to the Middle East, and the first Spitfires would not arrive until the second half of 1942. The RAAF's stopgap Wirraway soon proved unsuccessful as a fighter in Rabaul and, in anticipation of invasion, was re-roled as a dive-bomber.

The Germans had shown in Spain and by its European *blitzkrieg* campaigns in 1939 and 1940 that the *Luftwaffe* tactical air power was fully integrated with its land forces, and combined arms warfare had forced the British across the Channel. Over 1938-1940, a series of purchasing visits to the US aviation industry by French air missions had led in desperation to orders of the Vultee V-72 Vengeance dive-bomber.

French Vengeance orders were taken over by the RAF *[image from P Smith's "Vengeance!"]*

French negotiations with the US had in fact triggered the Vengeance design by the Vultee Field Division at Nashville, in response to French specifications. 300 were ordered immediately with the planned delivery projected from OCT 1940 to SEP 1941.[3] The British also required a dive-bomber, as this had been a role neglected in the decade preceding hostilities. If Britain was to face invasion, dive-bombers could be crucial.

For France, this proved too little and too late. The French had been in no doubt to their perilous position, ordering nearly 2000 aircraft – and 6000 aero engines – from US industry during 1939. Overall, in the 18 months over 1939 and up to the end of JUN 1940, Britain and France had ordered an incredible 10,800 aircraft from the US. [4] .

British Purchasing Commission

Within months of Britain and France being at war with Germany, the US passed the 'Cash & Carry Act' on 4 NOV 1939 to enable those two countries to buy arms with cash, and then carry them away in their own ships. To coordinate this activity the British Purchasing Commission (BPC) was immediately established in New York to enable the RAF procurement of US aircraft. The BPC purchased equipment directly from manufacturers on the open market, and not on contracts through the US Government.[5]

With the fall of Paris in JUN 1940, undelivered French contracts were taken over by the RAF. As events quickly unfolded, this was the case too of Belgian and Dutch military orders. Obviously, no Vengeances were delivered to France in 1940.

In Australia, at the beginning of 1940, the first of the RAAF's 100 Lockheed Hudson reconnaissance bombers were being received from the US, having been ordered directly from Lockheed in early 1939. But by AUG 1940, the rapidly and expanding US domestic and defence program was making greater priority demands on local industry and progressively increasing difficulty of obtaining Empire requirements. Washington therefore had advised that essential Empire requirements of all supplies must be channelled through the BPC, with substantial justification for the export permits.[6] Through coordination with the BPC, the RAAF was able to take over some British contracts. For example, some of the first BPC orders for the RAAF were for ten ex-Eastern Airlines DC-2s, shipped to Australia from SEP 1940, for use as transports and aircrew trainers. But now the main activity with the BPC was to procure dive-bombers, and Britain had on order the US the Brewster Model 340 Bermuda.

[Etienne du Plessis website]

RAF Bermuda Mk.I dive-bombers FF841 and FF840 in the US before delivery c1942

THE BREWSTER BERMUDA FOR AUSTRALIA

By AUG 1940, the RAAF was looking for dive-bombers. The preferred type from the US, which had been ordered by the RAF, the French and the Dutch, was the Brewster Model 340 Bermuda. This was the export model of the US Navy's SB2A Buccaneer. The Australian requirement was initially for 243 aircraft.[7]

The first XSB2A-1 prototype commenced flying trials on 17 JUN 1941, but the results of this testing and changing requirements led to significant re-design. These technical problems meant that deliveries of the SB2A would be greatly delayed, but serious problems within Brewster also contributed to delays as the company was badly run.

British deliveries finally commenced from JUL 1942. The British ordered 750 Bermudas from several sources, including taking over the French order. 450 aircraft (serial numbers FF419 to FF868) were ordered through the USAAF as the A-34. In addition, a further 300 (RAF serials FF869 to FF999 and FG100 to FG268) were ordered from the US Navy as the SB2A-1B Buccaneer. All aircraft were known in RAF service as the Bermuda Mk.I, but ultimately most would be cancelled and records only exist up to the receipt of FF633.[8] Those delivered to Britain were relegated to target-towing. The USAAF had not wanted the A-34 Buccaneer – the designation was for Lend-Lease supply of the B.340E to Britain – but after Pearl Harbor some were accepted, and were found unsuitable for combat and even training purposes.

Brewster SB2A-4 (repossessed NEIAF B.340D) Buccaneer in 1942 *[image from internet]*

In addition, the Dutch had ordered 162 B.340D Buccaneers for the NEIAF (as BD-9001 to BD-9162); these were not delivered due to the Japanese invasion of NEI and were taken over by the US Navy as the SB2A-4 and allotted to USMC training units.[9] A further 56 were to be delivered to Russia under Lend-Lease, but this too did not proceed.[10]

The RAAF requirement for 243 aircraft (Indent 912) had been determined for six squadrons, each with an establishment of 18 aircraft – 12 IE and six IR – for 108 as initial equipment, and 135 as reserve.[11] In mid-1941 a further 54 Bermudas were requested (Indent 928), making the total RAAF order 297.[12]

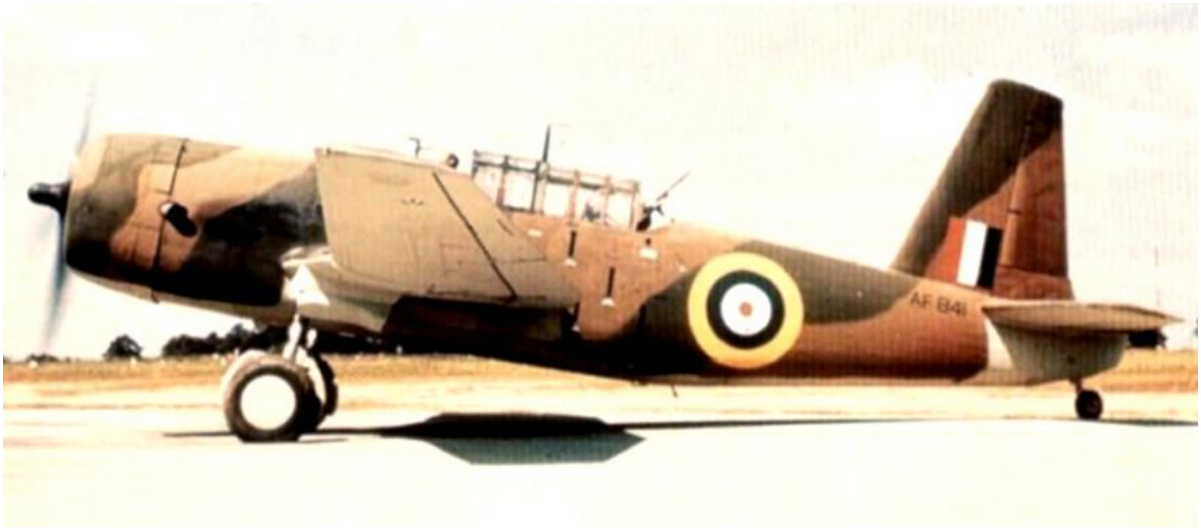
Design and technical delays by Brewster with the British prototype continually pushed the date for first flight towards late 1941. Therefore alternatives were considered, and comparison with the Vultee Vengeance over SEP 1941 showed this to be the preferred option. The Vengeance could be guaranteed for an earlier delivery (as the Bermuda program continued to slip), and although its specifications were similar to the Bermuda, the Vengeance's performance was assessed to be better.[13]

Eventually in OCT 1941, after the British recommendations and Australia had considered its options, the RAAF cancelled its order and accepted the Vengeance, and in the same numbers as the Bermuda.[14] The Bermuda has been described as "one of the worst aircraft of World War II".[15] That was a bullet we luckily dodged!

Therefore, at the end of OCT 1941, Australia lodged its request for 297 Vengeances; these were intended to be numbered A27-1 to A27-297.[16] To expedite delivery, the RAAF in MAR 1942 requested early release of 18 aircraft to equip a squadron[17] – advice in MAY 1942 from Washington was that the first five (AN853 to AN857) had been shipped, being received by the end of MAY. In JAN 1942 the RAAF ordered a further three aircraft, to round the total up from 297 to an even 300.[18] Then, in the first half of 1942, the order was evidently further increased to 400.[19] This first batch of deliveries, which totalled only 15 of the 18 requested, were delivered by JUL 1942. To prevent any delays, these first aircraft were delivered with US-standard Colt 0.30 calibre machine guns, and the preferred British-standard Browning 0.303 would be retrofitted. This first batch were delivered for assembly at No.2 Aircraft Park at Bankstown.

Britain would ultimately order around 1,500 Vengeances – of these, 700 were direct purchase by the BPC (which included the taken-over French contract) and 800 under Lend-Lease. Of the 700 BPC orders for the V.72, 200 were built by Northrop at Hawthorne CA, and designated **Vengeance Mk.I**. The other 500 were built by Vultee at Nashville TN, and designated **Vengeance Mk.II**. Other than the manufacturer, they were identical. Following these, the first Lend-Lease (LL) order in 1941 for 200 was placed with Northrop, and to differentiate were designated **Vengeance Mk.IA** – furthermore these received the US military designation A-31-NO and USAAF serial numbers with the RAF serials.

Later RAF orders through Lend-Lease, all built by Vultee, included the **Vengeance Mk.III** (A-31C-VN), similar to the Mk.IA, and the **Vengeance Mk.IV,** which was subdivided into the IV Series 1 and IV Series 2 (IV-1 and IV-2, both being variants of the A-35B-VN). Note that the RAF did not receive the A-35A version, which the RAAF labelled the Vengeance IVA, with the A-35B as the Vengeance IV. A total of 1931 Vengeance were built, of which 1563 were allocated RAF serials – but of these many carried duplicate serials and many not delivered.[20]



[internet colour image]

RAF Vultee A-31 Vengeance II (AF841) in JUN 1943 – BPC ordered, changed to Lend-Lease and to RAAF as A27-276

Purchased through BPC, and RAAF requested transfer to a Lend-Lease contract, so the 'V-72' designation became the 'A-31'

Lend-Lease

Britain had struggled through 1940 – while US industry was stepping up to the challenge, the problem for the British was funds. In DEC 1940 Britain had received only 2,100 aircraft of the now 23,000 ordered, and the lack of dollars was an immediate problem.[21] But US assistance to Britain was soon monumentally increased by the passing of the 'Lend-Lease Act' on 11 March 1941 as the US became the 'arsenal of democracy'.

Following the 200 Harvard trainers and 200 Hudson bombers already ordered and paid for by the BPC, Lend-Lease enabled a flow of more than 75 different types of aircraft for the RAF, its Allied air forces and Empire air training developed around the world – to eventually total 38,800 aircraft.[22] The generosity of the US with its enactment of the Lend-Lease Bill was a reversal of the previous Neutrality Act, under the guise of *being essential for the defence of the US*. It enabled the supply of defence materiel to Allies anywhere in the world without cash payment.

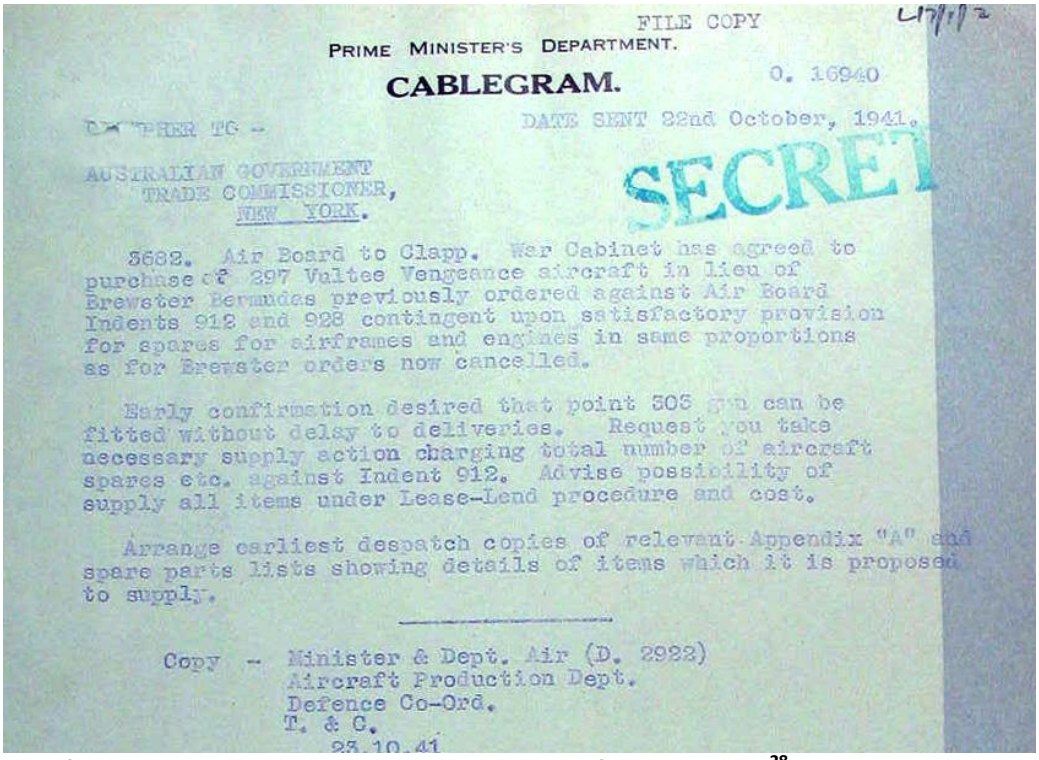
To participate in the largesse of Lend-Lease, the US Administration required that BPC coordinate all Dominion purchases, meaning that Australia could not liaise with manufacturing companies nor visit factories without US Govt approval through the BPC. Therefore, an 'Australian Division' was set up within BPC in New York to coordinate Australian requests for materiel from the US. [23] Also it was necessary to stop possible duplication of Australian orders (which had sometimes been placed with the British Ministry of Supply in London[24]), and all Australian arms procurement responsibilities moved with the BPC from New York to Washington by August 1941.[25]

After Lend-Lease became effective, all procurement was through the Air Corps – USAAF after 20 JUN 1941 – using US designations and serials. Even though a specific airframe was intended for Britain (was equipped to meet RAF requirements and to carry RAF markings and serial number), it also had a US designation and serial number. Up to this stage, all aircraft requisitioned on a British direct purchase order were flown with RAF (or RN) serial numbers, and so had received no USAAC serial.[26] As the type may not have been in US service, it did not necessarily have a US military designation either. Thus some of these initial taken-over contracts had US company designators – examples being the V-72 for the Vengeance, DB-7 for the Boston, Model 28-5 for the Catalina, and P-400 for the Airacobra.

A-31/V-72 Vengeance II RAF serial AF870 and camouflage, 40" US roundel – taken over by the USAAF *[internet]*

With Lend-Lease, aircraft received a US military A-31 designator and assigned USAAF serials, and if urgency required, would be inducted into USAAF service. This flexibility in filling an immediate Allied requirement would see Lend-Lease aircraft (particularly apparent with P-40s) operating in a variety and combination of national markings. Here the RAF roundel and fin flash have been over-painted, but the RAF serial retained.

Not only being a US requirement, continuing procurement through the BPC was advantageous to Australia. The BPC drew up the aircraft contract for signature by the 'Australian Division', and would provide the full services of BPC legal, inspection, credit and services.[27]



FILE COPY

PRIME MINISTER'S DEPARTMENT.

CABLEGRAM. O. 16940

DATE SENT 22nd October, 1941.

SECRET

AUSTRALIAN GOVERNMENT
TRADE COMMISSIONER,
NEW YORK.

5682. Air Board to Clapp. War Cabinet has agreed to purchase of 297 Vultee Vengeance aircraft in lieu of Brewster Bermudas previously ordered against Air Board Indents 912 and 928 contingent upon satisfactory provision for spares for airframes and engines in same proportions as for Brewster orders now cancelled.

Early confirmation desired that point 303 gun can be fitted without delay to deliveries. Request you take necessary supply action charging total number of aircraft spares etc. against Indent 912. Advise possibility of supply all items under Lease-Lend procedure and cost.

Arrange earliest despatch copies of relevant Appendix "A" and spare parts lists showing details of items which it is proposed to supply.

Copy - Minister & Dept. Air (D. 2922)
Aircraft Production Dept.
Defence Co-Ord.
T. & C.
23.10.41

The Australian order for 297 Vultee Vengeances on Indent 912, of 22 OCT 1941 [28]

Contracts

The British Vengeance order for the first 200 aircraft in JUL 1940 specified first delivery in JAN 1941, with 200 by OCT 1941. The BPC was soon merged into the British Air Commission (BAC) which was responsible to the Ministry of Aircraft Production (MAP) in Britain for the procurement of aircraft and air supplies in the US. To understand the procurement method and the variants of RAAF Vengeances, below is a list of RAF acquisitions through the various British Commissions and then via Lend-Lease.

RAF Vengeance Orders

Manufacturer	Variant	Number of A/c	RAF Details of Order
Vultee (VN)	Mk.II	200 Plus 300 LL	**BPC/Vultee Contract A-557** of 3 JUL 1940; supplements of 16 SEP, 2 DEC, and final 100 1940, before the start of Lend-Lease. RAF Mk.II serials AF745/AF944 (200). Lend-Lease Vultee contract BSC 145 9 APR 41 for AN538/AN837 (300) [FP686 as replacement for crashed AN679]. First flight DEC 1941, so with US entry into the war, 243 were retained by USAAF.
Northrop (NO)	Mk.I	200	**BPC/Northrop Contract A-1555** 25 FEB 41 for $17m order of SEP 1940,[29] RAF serials AN838/AN999, AP100/AP137, deliveries from JAN to AUG 1942.
Northrop (NO)	Mk.IA	200 LL	Additional 200 by **BPC/Lend-Lease $16m Contract DA-120** (**LL Requisition BSC2648** of 17 JUN 1941), ordered as A-31-NO by USAAF as 41-30848 to 41-31047 with the RAF Mk.IA serials EZ800/EZ999, last delivered in MAY 1943. Some kept by USAAF as the RA-31 ('R' prefix for restricted flying, i.e. non-operational).
Vultee (VN)	Mk.III	100 LL	**BAC/LL Contract DA-119** (**LL Requisition BSC2647** 17 JUN 1941) as A-31C: assigned USAAF 41-31048 to 41-31147 with RAF serials FB918/FB999 and FD100/FD117.
Vultee (VN)	Mk.IV-1	104 LL	**BAC/LL Contract DA-119** (**LL Requisition BSC145** of 9 APR 1941) as A-35B USAAF serials between 41-31258 and 41-31410 with RAF Mk.IV-1 serials FD118/FD221.
Vultee (VN)	Mk.IV-2	458 LL	**BAC/LL Contract AC-24664 (LL Requisition BSC145)** as A-35B USAAF serials between 42-94149 and 42-94549, with RAF Mk.IV-2 serials FD222/FD417, HB300/HB550 and KG810/KG820.

Because of the sub-contracting by Vultee to Northrop, the BPC cash contracts being overtaken by the introduction of Lend-Lease, the USAAF requisitioning aircraft from the RAF and LL contracts, and then with V-72/A-31 aircraft requiring modification on the production line, the exact Contract No. for some of these batches has been muddied over the years. And furthermore, the BPC had changed into the BAC. In this table, correlation of various sources has been necessary for a production list, but even this needs further amplification.[30]

Production

The first two prototypes on **Contract A.557** were built at the Vultee factory at Vultee Field, Downey CA, but the main production was to be at a new plant in Nashville TN. Vultee had bought the old Stinson factory at Nashville and converted it into a modern plant, however it was 2,000 miles from the Vultee headquarters at Downey. The first Vultee contract was A.557 of 3 JUL 1940 for 200 aircraft [total 200], with an option to double to 400, which was done within the month in AUG 1940. To enable these numbers, Northrop at Hawthorne joined this contract for building the second 200 changed to **Contract A-1555**, with Northrop paying Vultee $1m for engineering drawings and the building rights [total now 400]. Then MAP ordered a further 200 on 26 SEP 1940 on A-557 Supplement [total 600], and two months later BPC further extended the A-557 contract with Vultee for another 100 on 2 DEC 1940 [total 700]. 200 were now ordered from Northrop on Lend-Lease on Defence Aid (DA) Contract **DA-120** [total 900].

The further RAF orders all through **Lend-Lease DA-119/BSC2647** for 100 A-31C Vengeance III [total 1000], and 465 aircraft **DA-119/BSC145** (aka **BAC145, RFDA 145 and BAC AC-24664**) as the A-35B Vengeance IV [total 1465]. Note that the RAF did not accept the A-35A, of which the RAAF accepted 23 as the A-35A Vengeance IVA (also under contract Lend-Lease BAC145/BSC145). The various block numbers of the A-35B were issued different designators by the RAF as the Vengeance IV Series 1 and Vengeance IV Series 2 – the RAAF differentiated by 'block' serials running from A27-500, A27-560 and A27-600. Australian deliveries were under **Indent 912 and LL Case 200**, and as changes were made to earlier contracts, Australia's became **Indent 912AA**. Furthermore, the order for 297 had been casually

referred to as “300”, so this was formalised by the further three in JAN 1942.[31] Another 100 would soon be added, to total 400.

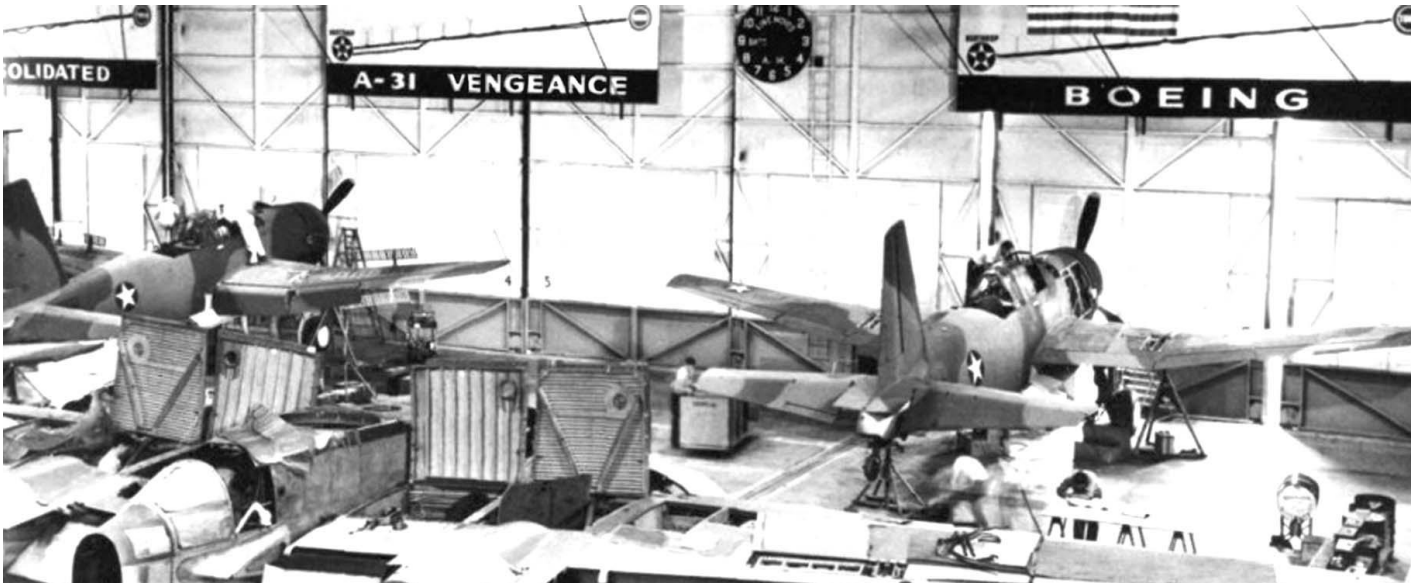
A major pre-flight redesign for the Vengeance was its original twin-fin empennage being hurriedly changed to a tall single square-cut fin and rudder. Also, a late decision by the British MAP was to incorporate self-sealing fuel tanks. Two prototypes (included in Contract A-557) were built at the Vultee California factory at Downey, with production carried out by Northrop at Hawthorne (CA) and by Vultee at its Nashville (TN) plant. The prototype AF745 (joined by AF746) commenced test flying in JUL 1941.

[colourised from internet image]

Prototype V-72 Vengeance AF745 hurriedly painted in a rough RAF camouflage, at Vultee Field, JUL 1941

By NOV 1941, BAC was working on the 1942 monthly production schedules for the 700 aircraft ordered on Vultee Contract A-557 and Supplements (below), prior to the Lend-Lease orders becoming available: this plan by Northrop and Vultee is below.[32] Note that these figures do not include the 200 JUN 1941 Northrop Lend-Lease order.[33]

	JAN 42	FEB 42	MAR 42	APR 42	MAY 42	JUN 42	JUL 42	AUG 42	SEP 42	Total
Northrop	5	12	16	20	30	35	35	35	12	200
Vultee	4	16	35	66	88	110	115	69		500



[Northrop, An Aeronautical History]

Northrop A-31-NO Vengeance IA Lend-Lease production at Hawthorne CA during 1942 – RAF EZ serials

RAAF Vengeance Mk.IAs in the RAF EZ-serial range were Lend-Lease deliveries between EZ880 to EZ999 (A27-16 to A27-99, received in the first half of 1943), the last being Camden’s famous “only complete Vengeance” – the last Northrop-built Vengeance.

Vengeance Manufacture at Vultee Aircraft Inc, Nashville, Tennessee

Images taken at Nashville, 1942-1943 *[via internet, Library of Congress]*

"Rosie the Riveter" **yellow Zinc Chromate was used as the primer undercoat**

[US Lib Congress image FSA.8d00305]

V-72 Vengeance production at Vultee's new plant Nashville in AUG 1942

The manufacture in both factories looked basically the same for the V-72, and did not substantially alter with the change-over to Lend-Lease contracts as the A-31. Contracting for RAAF Vengences (by Air Indent 912) through the BPC (and then the BAC) was by direct contract A-557 with Vultee, and Lend-Lease contract A-1555 with Northrop. Negotiation confusion between all parties resulted in early 1942 that of the 300 RAAF aircraft, allotment was 243 on cash repayment and 57 on Lend-Lease;[34] but the swapping of aircraft across contracts then saw, by mid-1943, **52 of Australian contracted Vengeance Mk.II production being procured through Lend-Lease** (via amendment BSC40452), which covered RAAF serials **A27-270 to A27-321**.

[colourised from internet image]

A-31 production from the Vultee plant at Nashville c JUN 1943

This closest aircraft appears to be **AF899** (by no means certain, but not allocated to the RAAF) – Vengeance IIs contracted by the RAAF around AF899 were diverted to Lend-Lease and flown from Nashville to California over JUN/JUL 1943 for packing to Australia. Production report of 19 JUL 1943 covers 18 LL aircraft **AF795/AF921**, arriving in Australia and serialled between **A27-270/-290**.[35]

RAF Temperate Land Scheme – TLS

The delivery Vengeance colours were the RAF Temperate Land Scheme (TLS). The first five (A27-1 to A27-5) were assembled and test flown at Bankstown by 2 Aircraft Park (2AP) in JUN 1942.[36] 2AP had been formed from Erection Section of 1AD at Laverton, to unpack and assemble aircraft being received from overseas.[37] In DEC 1940 the unit re-located to Bankstown to provide assembly support to 2AD at Richmond. These first Vengeances were despatched to 2OTU at Mildura in AUG 1942 to commence RAAF training. At this early stage, there was no urgency to replace the RAF colours by RAAF *Foliage Green/Earth Brown*, but RAAF *Sky Blue* probably overpainted the RAF *Sky Type-S*.

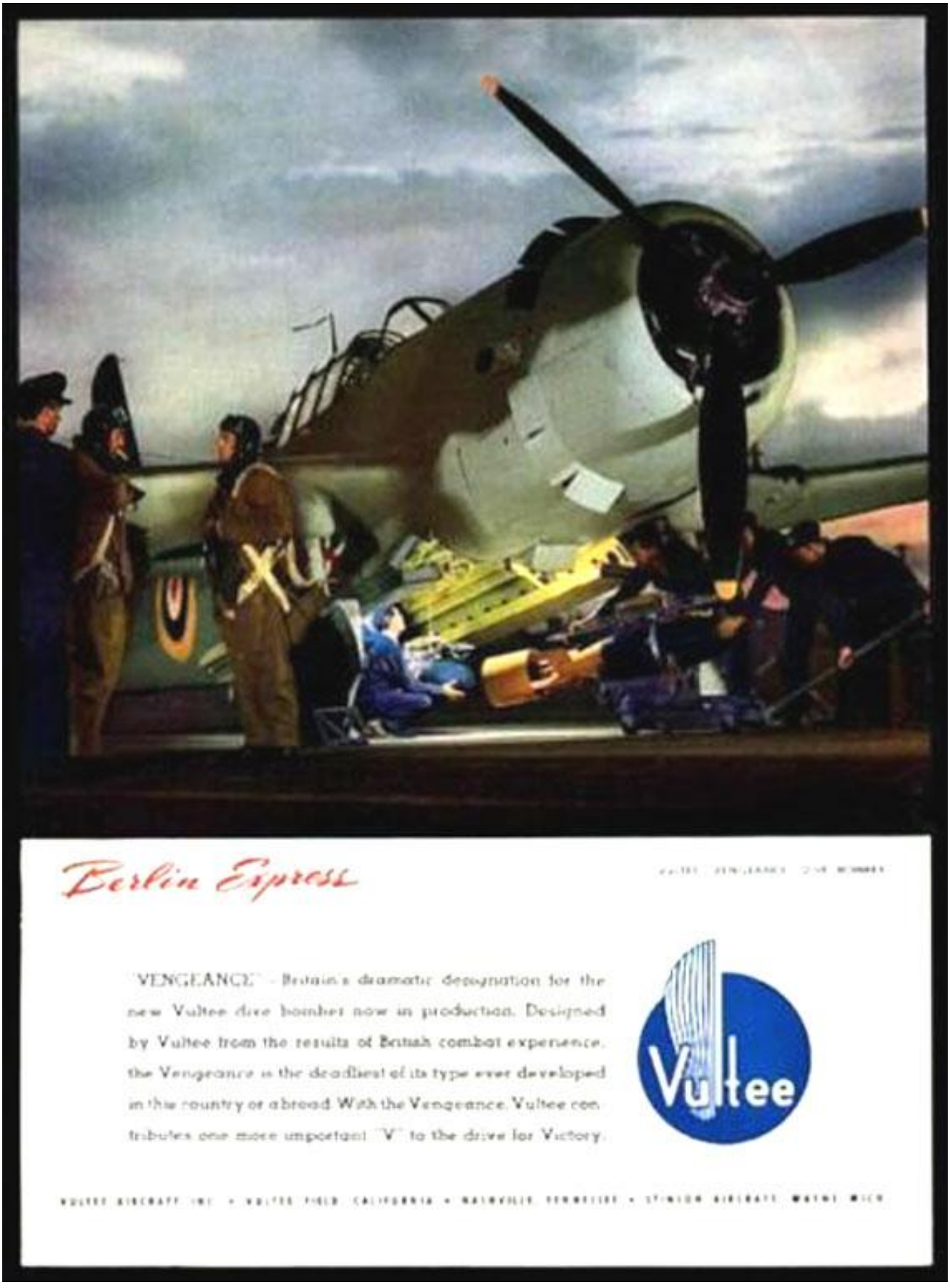
Colour photograph of Mk.I A27-9 and the second batch after assembly at 3AD Amberley, AUG 1942 *[adf-serials]*

The next Vengeances of the initial RAAF Mk.I aircraft (A27-6 to A27-15) were assembled in JUL 1942 at 3AD Amberley, for 2OTU at Mildura. In OCT 1942, the Vengeances split from the fighter 2OTU and were transferred to Williamtown to form 4OTU. The 4OTU courses involved dive-bombing on Wirraways, then Vengeance training.

MAP *Dark Earth*	**MAP *Dark Green***	**MAP *Sky***	**RAAF K3/195 *Sky Blue***

RAAF Camouflage. When aircraft underwent repair or refurbishment at RAAF Aircraft Depots (AD) or Repair and Salvage Units (RSU), MAP *Dark Earth* would be replaced by RAAF *Earth Brown* (K3/178) and MAP *Dark Green* by *Foliage Green* (K3/177). Generally, if not in all cases, the MAP *Sky Type-S* undersurfaces had been overpainted by RAAF *Sky Blue* (K3/195) on arrival.

Roundels. Here the *Yellow* surrounds of the RAF Type-A1 roundel were oversprayed in camouflage – probably a RAAF approximation of the RAF *Dark Earth* port, and *Dark Green* starboard, but later the RAAF colours FG and EB would be used for roundel overpainting. Removal of the outer *Yellow* ring resulted in the RAF Type-A roundel. *Red* was removed from National Markings by the RAAF directive in SEP 1942.



1942 Vultee ad for the Vengeance – it wasn't going to Berlin !

The V-72 was designed specifically as a close support weapon to blast the way forward for ground forces, and therefore long range was never a high priority requirement. The Vengeance was never intended to fly to Berlin and back from England. Maximum range (with a 1000 lb bombload – typically 2x500 lb – dropped halfway and with normal 200 gallon fuel supply) was estimated at 950 miles, i.e. a 475 mile (765km) combat radius.[38] This would ultimately impact the future of RAAF Vengeance operations in New Guinea in 1944.

U.S. ATTEMPTS AT MATCHING THE RAF COLOURS

A problem at the US factories was trying to match local paints to the RAF specifications, probably Du Pont was the main supplier. To try to match the British Ministry of Aircraft Production (MAP) colours, Du Pont used *Dark Green* (DuPont 71-013), *Dark Earth* (71-009), over *Sky Type S Gray* (71-021).[39] But Du Pont had two MAP *Dark Earth* colours – 71-009 in addition to 71-035 (both shown below).[40] This later 71-035 is darker and better matches the MAP *Dark Earth*, so probably replaced the "sandy" 71-009. RAAF Vengeances were diverted from British contracts, so were finished in BPC-approved American MAP paint equivalents at the Northrop and Vultee plants. *Sky* was a difficult match apparently, and a light *Pastel Blue* was sometimes substituted.[41]

Aircraft ordered by Britain from the US under Direct Purchase, and later Lend-Lease, were painted in the US before delivery, using paints which were required to match the Air Ministry Standards. But with the huge production increase in the aircraft industry, shortages of materials led to being finished from the closest colour available from stock. Dark *Olive Drab 41* replaced *Dark Green* on American aircraft supplied to Britain under Lend-Lease, and this was a very near match when initially applied.[42] Although AP123 was taken over by the USAAF, the roles in the US became training and target towing. Here the upper colours of MAP *Dark Green* and *Dark Earth* look a fairly close match, better than some others.

[image from Smith:"Vengeance!"]

Northrop-built direct contract Northrop V-72 Vengeance Mk.I AP123 in 1942, repossessed by the USAAF. Both these colours are darker than the other manufacturers shown here, and probably 71-035 *Dark Earth*, i.e. closer to MAP specification.

[colour image du Plessis collection]

The RAF's first P-40D Kittyhawk Mk.I AK571 at the Curtiss factory, Buffalo NY in 1940. What is supposedly a match for MAP *Dark Earth* is too light (see colours below) – almost equivalent to MAP *Light Earth*, probably the DuPont 71-009.

[colour image du Plessis collection]

This Bell Airacobra Mk.I AH621[43] at Bell plant in Buffalo 1941, colours appear too light and, like the prototype Vengeance AF745 and Kittyhawk AK571, undersides (without a green hue) come too far up the fuselage. Basically a P-39D.

[colour image du Plessis collection]

Douglas Boston Mk.III W82xx 1941, no. '17' of 150 RAF order W8252/W8401[44] (possibly the 17th W8268?) at Floyd Bennett Field NY in 1941. The colours are darker than the Airacobra, and camouflage scheme closer to the MAP specification.

MAP Dark Green

MAP Dark Earth

MAP Sky

Du Pont Colours to MAP Colour Standards

British Ministry of Aircraft Production (MAP) Colours

While allocations of aircraft were being juggled to cover rapidly increasing demands, American manufacturers continued to produce aircraft in foreign colours – mostly for the RAF – even though the final destinations were uncertain. Many of these aircraft were eventually absorbed by the USAAF. Up to JUN 1942, the most common paint job in the USAAF, after *Dark Olive Drab/Neutral Gray* was the RAF *Temperate Land Scheme*. American paints were produced to RAF (i.e. MAP) specifications for *Dark Earth, Dark Green* and *Sky Gray* (i.e. *Sky Type S*). *Dark Olive Drab* was considered close enough to RAF *Dark Green*, so was substituted starting from MAR 1942, when available stocks of Dark Green were exhausted.[45]

Sometimes *Dark Earth* is codified as DuPont 71-035 or as 71-065, believed essentially as being the same shade. But the 71-009 *"lighter Dark Earth"* (mentioned earlier as being used by Curtiss, Bell and possibly Vultee), Dana Bell refers to this as *Sandy Earth*. There was no USAAF brown in the camouflage colour card until 1942 when the USAAF introduced *Sand 39*[46] – this new colour may have been substituted in the disparate examples of different aircraft types.

Also *Sky* was difficult to match, and colours such as *Aircraft Gray* and *Pastel Blue* were used. Dana Bell gives the FS equivalents to the standard USAAF camouflage colours,[47] and following on from Bell's research, Ian Baker gives these USAAF DuPont colour FS equivalents.[48]

Colour Standard	Colour Designation	Federal Standard 595B equivalent
USAF Camouflage Colours	*Dark Olive Drab 41*	FS34087
	Medium Green 42	FS34092
	Neutral Gray 43	FS36173
DuPont Equivalents to RAF Camouflage Colours	*DuPont Dark Green 71-013*	FS34092
	DuPont Dark Earth 71-035	FS30118
	DuPont Dark Earth 71-009 Referred to as "Sandy Earth"	FS30219
	Aircraft Gray	FS36473
	Pastel Blue	FS35526, but greener

[colourised from internet image]

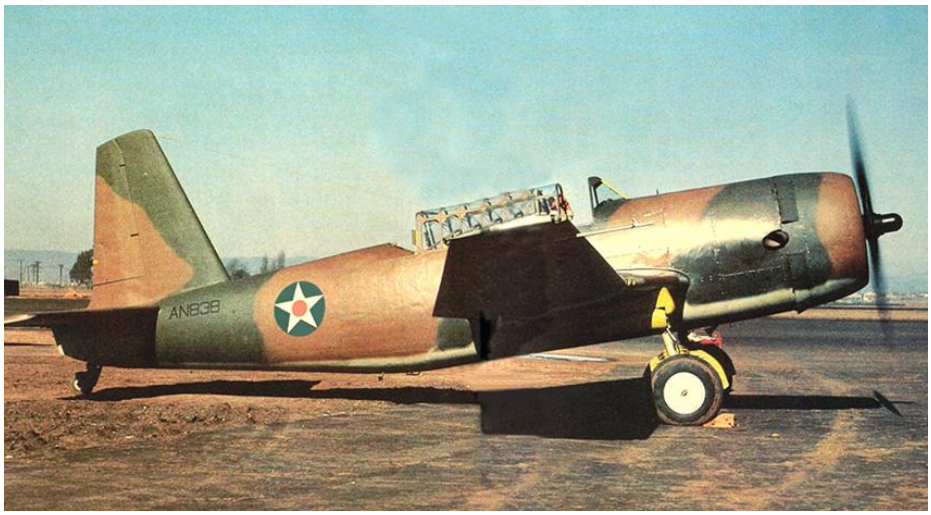
V-72/A-31 Vengeance masked for the paint shop at Vultee Nashville

[internet]

Vengeance manufacture by Northrop at the Hawthorne factory, California

VENGEANCES FOR THE USAAF

With the attack on Pearl Harbor in DEC 1941 and America's entry into the War, the USAAF urgently needed aircraft for combat, training and a variety of second-line roles. Many Vengeances were repossessed from RAF orders (negotiated from both cash direct orders and Lend-Lease). The USAAF requisitioned 243 RAF Vengeances with RAF serials,[49] and these being pre-Lend-Lease were known in USAAF service as the V-72. Others from Lend-Lease contracts were A-31s or A-35s, with USAAF serials.



First Northrop-built Vengeance AN838 which flew from Northrop Field, Hawthorne, on 30 NOV 1941

[image Library of Congress]

The Vultee Nashville plant 1942. The red inner circle was eliminated from the national insignia by War Dept Circular #141 on 12 MAY 1942, for the design shown on the right.[50]

[colourised for internet image]

The later USAAF marking on a A-31 Vengeance in final assembly at Nashville – insignia is the same size as the RAF 35" type-A1 roundel; on EZ856 (below) it is smaller, probably 25".

[image from "Vengeance!"]

Northrop-built Lend-Lease A-31-NO Vengeance 1A RAF EZ856 repossessed by the USAAF

EZ856 in RAF camouflage and serial, with US insignia. Being a Lend-Lease aircraft, it had USAAF serial 41-30904 allocated, but not necessarily marked. In USAAF service, these Vengeance IAs may have worn American serials at some stage, and were designated the RA-31 – the "R" indicating *Restricted* for second-line duties only. 41-30904 was struck off charge in AUG 1944.[51]

Our Vengeances that were not delivered

With so many aircraft ordered, it was inevitable that aircraft would crash or be damaged between test flights at Nashville, at the various modification centres in the southern states (such as the Louisville modification centre Kentucky, San Antonio depot Texas, and Warner Robins airfield and Atlanta mod centre Georgia) then for delivery to Vultee Field at Downey for packing and shipping to Australia. Our *adf-serials* A27 database provides the serials of Vengeance IIs allocated to the RAAF, but not delivered by Vultee due to being damaged in the US:

AF798, AF812, AF825, AF833, AF847, AF873, AF892, AF900, AF903, AF904, AF937 (below), AN545, AN575, AN573.

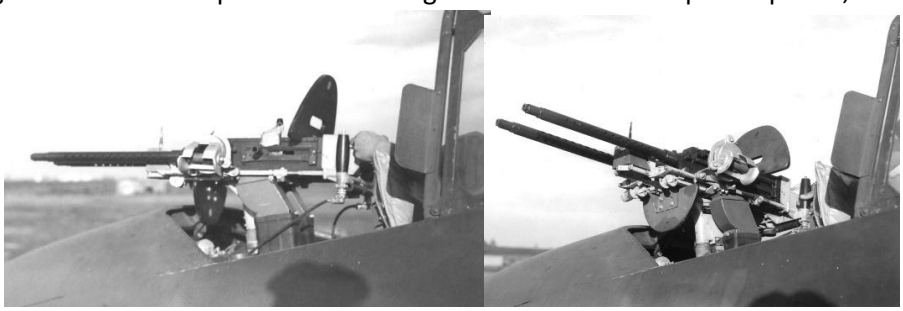
A-31-VN Vengeance II AF937 crashed on take-off at Nashville on 18 SEP 1942 *[colourised from internet image]*

AF937, diverted to a Lend-Lease contract for RAAF, became an A-31 (but no USAAF serial). It may have been departing Nashville for a USAAF base, or to one of the modification centres. If delivered to the RAAF, it would have been serialled around A27-250.

Weapons

The major difference in two Vengeance variants – V-72/A-31 and A-35 – would occur with the improved A-35 in late 1942. Between those two basic versions were the more powerful **engines** and heavier **firepower** of the A-35, and a changed wing **angle of incidence.** The few external differences with the A-35 were longer exhaust pipes, more prominent landing-gear housings, and of course the 0.5-in guns.[52] The V-72/A-31 had zero degrees wing incidence, the A-35 had 4 degrees angle of incidence – the difference may be visible in some images, the A-35 leading edge is 10cm higher and the trailing edge is 10cm lower, so the A-31 appears to fly "nose-up".[53] The A-35 had an extra 100hp power, with the 1700hp (1270kW) R-2600-13 Cyclone, and the A35B had additional fuel capacity. Standard bomb load for a Vengeance was one 1,000lb bomb or two 500 lb bombs carried internally on 'Y' forks which swung the bomb(s) clear of the propeller arc for release. The RAAF normally operated with two 500 lb bombs in the bay.

But of interest, was the change of guns. The Mk IA, II and III were all armed with six 0.30in (7.62mm) machine guns – two flexibly mounted in the rear cockpit and four fixed in the wings. The RAF and the RAAF both changed the guns of the Vengeance from the US Colt 0.30" calibre to the standard British Browning 0.303" (7.7mm) for reliability and commonality across the air force fleet – the fixed guns in the wings, and the flexible Bell hydraulic mount in the rear cockpit.[54] The A-35A Vengeance IVA introduced four forward-firing Browning M2 0.5" (50-cal, 12.7mm) machine guns, and one in the rear cockpit; the A-35B Vengeance IV then introduced **six** forward-firing 0.50 guns and additional underwing bomb racks. This provided the Vengeance with more firepower punch, but it would be too late.



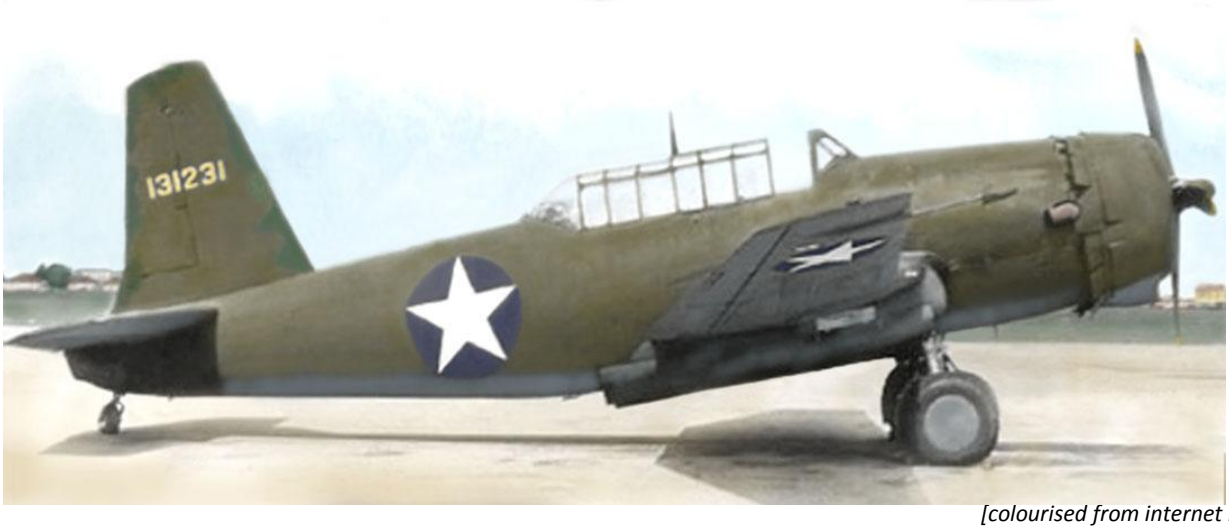
The RAAF twin 0.303 gun installation in the rear cockpit *[RAAF]*

DIFFERENCES IN VARIANTS OF RAAF VENGEANCE AIRCRAFT					
Factory	**Northrop Hawthorne (NO)**		**Vultee Nashville (VN)**		
Variant	**V-72 Vengeance Mk.I**	**A-31-NO Vengeance Mk.IA**	**V-72 Vengeance Mk.II**	**A-35A-VN Vengeance IVA**	**A-35B-VN Vengeance IV** [55]
RAAF Serial Numbers	**A27-1/A27-15**	**A27-16/A27-99** Same as Mk.I	**A27-200/A27-321** Small difference from Mk.I; some became Lend-Lease A-31-VN	**A27-400/A27-422**	**A27-500/A27-549** **A27-560/A27-566** **A27-600/A27-640**
RAAF Total	15	84	122	23	50 7 41
Source	BPC	Lend-Lease	BPC / Lend-Lease	Lend-Lease	
RAF Order	**200** (A-1555)	**200** (BSC 2648)	**500** (A-557/BSC40452)	**n/a** **Not ordered by RAF** *[RAF received 100 A-31C Vengeance III* [56] *FB918/FB999 and FD100/FD117, with Vultee model number V-73, LL contract BSC 2647.]*	IV-1 104 (BSC 145)
RAF Serials [57]	AN838 – AN999 AP100 – AP137 Deliveries were JAN to AUG 1942. RAAF aircraft between AN853 and AN898.	EZ800 – EZ999 This L-L order was placed by the USAAF designated A-31.[58] Last delivered MAY 1943. RAAF aircraft between EZ880 and EZ999.	AF745 – AF944 [59] AN538 – AN837 FP686 Includes two Northrop built prototypes (AF745, AF746). First prodn Mk II flew DEC 1941, 243 of the 500 retained by USAAF. RAAF aircraft between AF758 and AN580.		USAAF 41-31247 to 41-31447 incl 104 RAF Mk.IV srs 1: FD118 to FD221 IV-2 458 (BSC 145) 42-94149 to 42-94549, RAF IV-2: FD222/FD417, HB300/HB550, and KG810/KG820 The A-35 had the Vultee model number V-88.
US Serials [60]	n/a	41-30848–31047 USAAF serials assigned for Lend-Lease	n/a	41-31148–31246 USAAF serials assigned for Lend-Lease	41-31264–31438 42-94171–94222 42-94201–94488 USAAF serials assigned for Lend-Lease
C/n	401 to 600 [61]	101 to 300	4101 to 4299 4300 to 4600A	4799 to 4897 99 A-35A built	between 4915/5440 for RAAF deliveries
Receipt Date	MAY 1942 to JUL 1942	FEB 1943 to JUN 1943	MAR 1943 to APR 1944	JUL 1943 to SEP 1943	NOV43 to MAR44 MAR44 to APR44 MAR44 to MAY44
Engine	1600hp (1200kW) Wright R-2600-5B5 (R-2600-19) Cyclone			1700hp (1270kW) Wright R-2600-13 or R-2600-8 Cyclone	
Weapons	Four 0.3 guns in wings, and two dorsal – changed to 0.303; 1000-lb bombload in the bay, 2 x 250-lb underwing racks			Four 0.5 guns in wings, one dorsal; Bombs 1500-lb	Six 0.5 guns in wings, one dorsal; Bombs 2000lb
Fuel	320 gallons				325 gals + 320 gals in external tanks[62]
Delivery Colours [63]	In US equivalent of RAF TLS – *Dark Green* and *Dark Earth* – both appeared shiny and very dark, the green more blackish-bluish and darker than MAP *Dark Green.* Wear and exposure steadily faded and matted the sheen.		Matt TLS: Green very dark like *Dark Olive Drab;* marked contrast with brown (lighter than *Dark Earth*) which appeared to darken with wear, while green faded – the dark/light contrast less apparent.	As these were all Lend-Lease deliveries with USAAF serials, all delivered in USAAF colours of *Dark Olive Drab 41, with Neutral Gray 43* undersurfaces. **DTS SIG/8 of 26 AUG 1943** stipulated no requirement to re-camouflage on assembly at AD; a few were soon camouflaged in *FG/EB*; after **SIG/34 and AGI Pt.3(c) MAY 1944 AGI** all-over *FG*.	
RAAF colours	Retained RAF camouflage colours until repairs/repaints required, then RAAF colours *Foliage Green/Earth Brown*. *Sky Blue* probably used on induction at the AD. White tails when operating under US 5th Air Force in New Guinea 1943-44.			The USAAF colours of OD/NG from 1944 were eventually replaced by overall *Foliage Green*, and many became target-towers with *Yellow/Black* underside striping.	

Based on NAA A705 series, 150/4/4215, *'Vengeance Instruction No.6'* of 31 MAR 1944, with additions annotated.

RAAF LEND-LEASE A-35A VENGEANCE IVAs

Twenty-three A-35As (**A27-400 to A27-422**) were delivered to the RAAF over the third quarter of 1943, through Lend-Lease contract DA119/Australian Indent AIR 912 – all had been marked on the Vultee production line in USAAF camouflage and markings. Standard USAAF camouflage was ***Dark Olive Drab*** **(No.41)** on sides and uppersurfaces, ***Neutral Gray*** **(No.43)** undersurfaces. Visible on A-35A 41-31231 (which became A27-409) are the ***Medium Green 42*** **"splotches"** on the edges of the fin and rudder, introduced on vertical and horizontal control surfaces in JUL 1942,[64] which had a distinctive and uniform shape.[65]



[colourised from internet image]

A27-409, Vultee-built at Nashville in 1943, marked as USAAF 41-31231, before receipt in Australia in JUL 1943

Dark Olive Drab 41	***Medium Green 42* splotches**	***Neutral Gray 43***

Although camouflaged aircraft received at the Depots from overseas could be accepted and remain in that scheme until repairs or overhaul, it appears some A-35As – now not so urgently required – were overpainted in disruptive *Earth Brown* and *Foliage Green,* with *Sky Blue* undersides. With delivery of A-35Bs later in 1943, when repainting became necessary, these appear to have been painted in overall *Foliage Green*. Most A-35As and A-35Bs served with Comms Units, and were often marked for target-towing with yellow and black striped undersides. A-35A Vengeance IVA A27-412 (below) was issued to 5CU in FEB 1944.

[colourised from RAAF image]

A27-412 KF-V 5CU based at Townsville from FEB 1944, landed wheels up in OCT 1944 at Higgins Field (aka Jacky Jacky, now Bamaga) on Cape York. 5CU's area of operation was throughout far north QLD. Unusually camouflaged in RAAF *Foliage Green/Earth Brown/Sky Blue*, serial stencilled in grey. Another 5CU Vengeance was KF-Q, probably A27-407.

RAAF LEND-LEASE A-35B VENGEANCE IVs

The A-35B was superior to the V-72/A-31 with better ease of handling and turning, increased manoeuvrability and lighter controls.[66] In all, the RAAF accepted 98 A-35Bs before further deliveries were then cancelled: this comprised the A-35B-5-VN (**A27-500/A27-549**), A-35B-10-VN (**A27-560/A27-566**), and A-35B-15-VN (**A27-600/A27-640**).

These were delivered to units from early 1944 to be typically stored and reserved for second-lines duties and target-towing with the OTUs and CUs. However, some were issued to the Squadrons over APR-JUN 1944: four to 12SQN at Merauke and nine to 25SQN at Pearce. A visual difference introduced by A-35 variants was the small intake under the cowling chin.

[colourised from RAAF image]

A27-508, A-35B Vengeance IV at Townsville accepted in delivery *Dark Olive Drab* and *Neutral Gray*

Served with 5CU at Townsville NOV 1944 to SEP 1945; no known KF- code. ***Medium Green* 'splotching'** is visible around the fin and upper wing surfaces, and some touching-up in *Foliage Green* around the roundel. Stencilled serial number *Medium Sea Grey*.[67] Note the UC-64A Norseman in the background (which could have been A71-1 KF-T, A71-4 KF-B, or A71-10 KF-H).

Dark Olive Drab 41

***Medium Green 42* splotches**

Neutral Gray 43

Although those camouflaged aircraft accepted at the Depots from overseas from mid-1943 could remain in that delivery scheme until repairs or overhaul, some A-35As not urgently required on squadrons were overpainted in disruptive *Earth Brown* and *Foliage Green*. In the case of the later A-35Bs: (1) some appear to have remained *Olive Drab*, (2) some were camouflaged, and (3) later after the MAY 1944 policy were repainted as required into overall *Foliage Green*. Most A-35As and A-35Bs served with Comms Units, some marked for target-towing with *Yellow/Black* striped undersides and, more rarely, with overall striping.

[colourised from internet image]

This 6-gun A-35B was used for target-towing – the *Yellow/Black* TT striping goes higher than usual up the fuselage

RAAF CAMOUFLAGE AND MARKINGS

In the last instalment covering RAAF Beaufighters, the RAAF camouflage and marking details from 1939 were covered, with the changes up to 1945.[68] This, by origin of that aircraft, covered the RAF delivery colours, and to some extent those points do not vary too much from the Vengeance – as the V-72 and A-31 were delivered in RAF colours. Below is a chronological summary of RAAF policy for aircraft markings, so this can be followed in a logical timeline.

Year	Change	Policy and References
1939	RAAF aircraft finishes, identification markings, and squadron code letters.	**RAAFHQ Aircraft General Instruction No. C.11, of 22 SEP 1939,** 9/1/396 (13A).
1940	RAAF camouflage stores numbers were K3/177 *Foliage Green*, K3/178 *Earth Brown*, over K3/195 *Sky Blue*. **OCT 1940.** Policy AGI No. C.11 Issue 3 specified National Markings: ○ *Marking M.1* – a *Blue* ring surrounding a red centre, the diameter of the *Red* to be 2/5 of the *Blue* circle, on upper wings (i.e. type-B roundel). ○ *Marking M.2* – a *Blue* ring surrounding a White ring surrounding a *Red* circle, the proportions to be 1:3:5 (type-A roundel). ○ *Marking M.3* – three colour circle (i.e. *M.2*) surrounded by a *Yellow* ring, proportions as for M.2 and the *Yellow* the same width as the *Blue* circle, i.e. 1:3:5:7 proportions (type-A1 roundel). ○ *Marking M.*4 – *Red, White* and *Blue* stripes on the fin, stripes the same widths as the rings of the roundel, *Blue* nearest rudder (Seagull only). **NOV 1940.** The **RAF's Aircraft Design Memorandum (ADM) No.332** specified Air Diagrams for camouflage schemes for different types of service aircraft. The RAF *Temperate Land Scheme* (TLS), had been mandated by **RAF AMO A.926 in DEC 1940** – upper surfaces in Ministry of Aircraft Production (MAP) *Dark Green* and *Dark Earth,* and undersides MAP *Sky*.	**RAAFHQ *Aircraft General Instruction* No. C.11, Issue 3, of 3 OCT 1940,** AFHQ file 1/501/329. P.3 stipulated grey serial number and code letters on camouflaged aircraft. **RAF ADM 332 (Issue 3) of 15 NOV 1940**, ***External Colour Schemes of Aircraft***, RAAFHQ file 150/4/852 AGI C.11, *Standard Finishes and Markings*. Air Diagram A.D.1160 would apply to Vengeance. **AMO A.926/40 of 12 DEC 1940.**[69]
	  	
1941	The RAAF adopted 1941 policy of the RAF Directorate of Technical Services (DTS) in **DTS 368/41**, which also for the first time laid out the RAAF's standard overland camouflage scheme; specifying *Foliage Green* (K3/177, to replace RAF *Dark Green*), *Earth Brown* (K3/178 to replace RAF *Dark Earth*), and *Sky Blue* (K3/195 instead of RAF *Sky*).	**RAAFHQ DTS directive 368/41, file 150/4/852(53A) of 23 DEC 1941,** signal SAS 9984, paras.2 and 4.
	 	
1942	**US colours:** When US-produced aircraft began to arrive for the RAAF in 1942, these continued in British colours and markings being diverted from RAF contracts; US manufacturers tried to match their paint to the RAF colours. (Later, RAAF aircraft were delivered in USAAF standard camouflage of *Dark Olive Drab* and *Neutral Gray,* adopted for the Curtiss P-40 in 1940 and remaining the benchmark until late 1943 until natural metal.)	Matching US paints to MAP colours [70] **USAAC Spec 24114, Air Corps Bulletin No.41, of 22 OCT 1940.**[71]

	JUN 1942. Deletion of *Yellow* from RAAF roundels.	**RAAFHQ DTS 280/42 of 18 JUN 1942,** filed on 1/501/329(63A); 1TG signal T.670 19 JUN 1942; Signal School Point Cook A.50, 29 JUN 1942.
	JUL 1942. RAF changes to TSS, DFS and Desert Scheme, and type-A1 roundel to type-C1 National Markings. 	**RAF AMO A.664/42 of 2 JUL 1942, para.5**.[72]
	AUG 1942. The *RAAF Technical Order, Aircraft General Instruction (AGI) No.C.11* was changed by Issue 4 of 31 AUG 1942, for operational aircraft retained *Red/White/Blue* National Markings, dropped the *Yellow* outer ring, but there were still unintended consequences. ○ Upper surfaces – *Red* was dropped, so the roundel was specified as *Matt White* and *Matt Dull Blue*, with the *White* diameter to be 2/5 of the *Blue* –the first directive for what we call the 'Pacific' Roundel. Red was deleted because on 26 JUN 1942 a USN fighter had attacked a RAAF Catalina confused by the *M.1* roundel *Blue/Red* roundel. ○ Fuselage sides – *Dull Red, White,* and *Dull Blue* roundels in the 1:3:5 proportions. ○ Undersurfaces – the same *Dull Red, White,* and *Dull Blue* roundels but only for day fighters and trainers, but not for bombers or seaplanes. ○ Fin markings – all aircraft marked with *Dull Red, White* and *Dull Blue* stripes of the same width, with red leading.	**RAAFHQ Technical Order AGI No.C.11 (issue 4) of 31 AUG 1942.** Colours were specified as *Matt Dull Red* K3/214 or K3/199, *Matt Dull Blue* K3/196 or K3 197, and *Matt*
	SEP 1942. On 19 SEP 1942 *Red* was dropped completely from National Markings – *Blue* and *White* roundel with *Blue* not to exceed 48", with the *White* diameter 3/5 (3:5) of the *Blue*. Roundels were to be in the six positions, with *Blue/White* fin stripes – specified colours *Matt White* K3/170 and *Matt Dull Blue* K3/197. The *Yellow* surround of the A1 fuselage roundel had been overpainted in AUG 1942 with camouflage paint. 	**RAAFHQ message T520, file 0947/19 (30A), of 19 SEP 1942.** **USAAF War Dept Circular #141, 12 MAY 1942,** had removed *Red* from the US National Markings.[73]
1943	**JAN 1943.** RAAF squadron code letters – three letter codes introduced, two letters signifying the squadron, the third as an individual aircraft identifier.	**Air Force Confidential Order (AFCO) A.3/43, *Code Letters for Operational and Reserve Squadrons*, of 4 JAN 1943,** 62/1/271.
	JUL/AUG 1943. Cease re-camouflaging US aircraft arriving in OD/NG – the standard RAAF camouflage colours up to 1943 were uppersurfaces *Earth Brown* and *Foliage Green*, undersides *Sky Blue*; in DEC 1943 in line with 1940 US colours Spec 24114 (Air Corps Bulletin 41, 22 OCT 1940) this was changed to uppersurfaces *Green*, undersides *Grey*. ('Green' in this context refers to *Foliage Green* for Australian refurbishment, *Olive Drab* from US factories.)	Request from HQ 5MG 300/3/1 of 20 JUL 1943, 1/501/329 (89A), to cease re-camouflage. **RAAFHQ DTS Special Instr Gen/8 (SIG/8) 26 AUG 1943:** Aircraft finished in American camouflage scheme are to be accepted and not to be re-camouflaged in RAAF scheme during erection. Aircraft will be finished in RAAF camouflage when repainting required or during major overhaul.
	JUL 1943. RAAFHQ D/DTS AMEM specified that the roundel *White* circle was to be smaller, at 2:5 the size of	**RAAFHQ AMEM DTS 1/501/329 SAS 13552, 8 JUL 1943,** adopted from RAF AMO A.664/42, of 2 JUL

	the *Blue*.  **AUG 1943.** US bars added to star roundel, with *Blue* surrounds.   **AUG 1943.** Retention of US OD/NG not requiring RAAF camouflaging. **SEP 1943.** *White* tails in New Guinea mandated by 5th AF. This was the complete tail assembly (empennage) and wing leading edges for single-engined fighters. Initially there was confusion whether this applied to just radial-engined fighters, but was extended to all fighters, and to all single-engined aircraft in-theatre (e.g. Vengeance, Boomerang, Wirraway). In force until late 1944. **DEC 1943.** US elimination of camouflage from combat aircraft.	1942. Further, in NOV 1943 SEAC specified the size of its new roundel (**based on that of the RAAF**) for 'medium' aircraft as approx. 2:5 32" (and fin flash 24" high x 22" wide) – Air Force Order (India) No.357. RAAF DTS specified 32" Blue roundel, 12" White, i.e. 3:8 (approx 2:5) and fin flash 24"x16".[74] **US amendment AN-1-9b 14 AUG 1943,** replaced short-lived *Red* surround of T.O. 07-1-1B 29JUN43.[75]  **RAAFHQ signal TJ.436 of 18 AUG 1943.**[76] **HQ Allied Air Forces SWPA directive c4 SEP,** advised by **RAAFHQ signal T339 of 7 SEP 1943,** re all fighter aircraft tail assemblies to be *White*. **RAAF Command (Forward Echelon) signal L3048 of 7 SEP** advised that *White* to be permanent, NG area only. **RAAF Command signal L3586 of 8 SEP 43** elaborated the fin flash over *White* to be retained.[77] **US T.O 07-1-1 26 DEC 1943,** followed from Mil Requirements Policy No.15 of 16 NOV 1943, and GEN Arnold's preliminary order of 30 OCT 1943.[78] **RAAF Washington message WL657A of 29 OCT 1943 advice to RAAF HQ**, re cam be eliminated.[79]
		
1944	**APR 1944.** DTOR letter to all Areas, camouflage schemes, attack aircraft to be *Foliage Green*, and change to the AGI.[80] **MAY 1944.** *Azure Blue* only introduced for undersurfaces in APR 1944, was then cancelled in MAY 1944. At the same time, *Earth Brown*, *Sky*, and *Dark Ocean Blue* discontinued.  • AZURE BLUE Part No. 7547 Ident. No. K3/316 **K3/316 *Azure Blue*** **OCT 1944.** RAF Camouflage Scheme and Marking changes.	Formalised by **RAAFHQ DTS SIG/34 1 MAY 1944,**[81] then **T.O. AGI Pt.3 Sect**(c) **Instr No.1, 26 MAY 1944,** with Diagrams A5524 (roundels).[82] **RAAFHQ 1/501/329 (143A), 392/44, of 6 APR 1944.** *Azure* brought into inventory as *Sky Blue* was fading to off-white in Northern areas,[83] and was introduced to Beaufighter 21 and Mosquito FB.40 production lines, but ultimately attack aircraft were to have all-over *Foliage Green. Azure Blue* referred by RAAFHQ as BALM 201228,[84] then cancelled **RAAFHQ 1/501/329(162A) QQ.457, 2 MAY 1944.**[85] **RAF Air Publication A.P.2656A of OCT 1944.**[86]
1945	**APR 1945.** RAAF squadron code letters, more added to the list of AFCO A.3/43. **APR 1945.** No removal of camouflage from transport aircraft.	**AFCO A.11/45, *Code Letters for Operational and Reserve Squadrons*, of 26 APR 1945,** 62/1/271. **RAAF Command letter 2198 of 27 APR 1945,** 1/501/329 (21A).

AUSTRALIAN UNIQUE COLOURS

When aircraft underwent repair or refurbishment at RAAF Aircraft Depots (AD) or Repair and Salvage Units (RSU), MAP *Dark Earth* would be replaced by RAAF *Earth Brown* (K3/178) and MAP *Dark Green* by *Foliage Green* (K3/177). Generally the MAP *Sky Type-S* undersurfaces had been overpainted by RAAF *Sky Blue* (K3/195) on arrival. Probably the best contemporary colour photograph showing the ***richness*** of these RAAF colours is that of a RAAF Tiger Moth in 1942 on loan to the USAAF.

Tiger Moth in the Northern Territory 1942 (still with *Red* in National Markings) showing rich RAAF colours

RAAF K3/178 *Earth Brown*	**RAAF K3/177 *Foliage Green***	**RAAF K3/195 *Sky Blue***

Although RAAF policy was for *Foliage Green/Earth Brown*, because of the urgency at the time it is apparent newly arrived aircraft did not unnecessarily have a completely repaint, probably only the underside RAF MAP *Sky* was replaced by the RAAF *Sky Blue*. The *Yellow* surrounds of A1-roundels overpainted in camouflage, an approximation of the RAF *Dark Earth* starboard (or even *Earth Brown*), and *Dark Green* port. *Red* had been removed from National Markings by the directive of SEP 1942.

[colourised from adf-serials image]

A27-53 Vengeance Mk.IA still in RAF colours at 4OTU Williamtown over 1943-44

Vengeance delivered in JUN 1943 to 2AD, the earlier RAF A1-roundel had *Yellow* overpainted by a brown, and *Red* by *White*, giving 25" size.

AUSTRALIAN UNIQUE COLOURS

Many camouflage trials were conducted in Australia during the War by the Government's Dept of Home Security (DHS) Camouflage Wing, mainly for ground concealment of installations and facilities. Products developed for this were 'linoflage', also known as 'camsheen', which was hessian cut into strips and dyed, then baked in five-mile lengths in industrial ovens – a standard colour was *Dark Earth*.[87] The main colours we know from RAAF use on aircraft were *Earth Brown* and *Foliage Green*.

- ***Earth Brown*** around 30097/30099 in FS595a/B Standard according to Ian Baker.[88] It is "chocolatey" in appearance, while a *Chocolate Brown* was match to DEC 1943 BALM paint colour called *Earth Camouflage*. The colour by the Camouflage Wing, **T – *Dark Earth,*** was close to the earlier MAP shade, used by the RAAF pre-1942. ***Earth Brown*** in service until 1944.
- ***Foliage Green*** Peter Malone and Gary Byk assess ***Foliage Green*** as in the FS34092–FS34096 region.[89] Ian Baker agrees to FS34092 fading to FS34096 with some exposure.[90] To my eye, US ***Medium Green 42*** has the definite 'bottle green' or 'bluish' hue as has FS34092, noted for *Foliage Green*.[91] *Foliage Green* in APR 1944 was also referred to by the DAP Beaufort Division (for Beauforts and Beaufighters) as ***Tropical Green***,[92] then referred to as ***Foliage Green*** with BALM no.201983.[93] Spartan colour card lists as Part No.7511. Also seen referred to as ***Forest Green*** and ***Jungle Green***. *Jungle Green* was the Army colour adopted in New Guinea for the war, as *Khaki* made the soldier a misfit in the jungle, 'a danger to himself'.[94]

[AWM REL 16500]

This fan of 17 Australian camouflage colours is a set of metal paint tablets developed by the Camouflage Wing. The changing light and darker shadows in Australia made colours more visible at a distance than in England.[95] The AWM image identifies these colours, from left, as: P – *Light Brown*; J – *Khaki Green*; A – *White*; D – *Dark Grey*; S – *Basalt Red*; Q – *Darwin Stone*; F – *Grey Green*; L – *Scrub Green*; C – *Slate Grey*; **K- *Foliage Green***; S – *Gritty Basalt Red*; N – *Light Stone*; B – *Light Slate Grey*; M – *Dark Green*; **T – *Dark Earth***; H – *Light Green*; U – *Night Black*.[96]

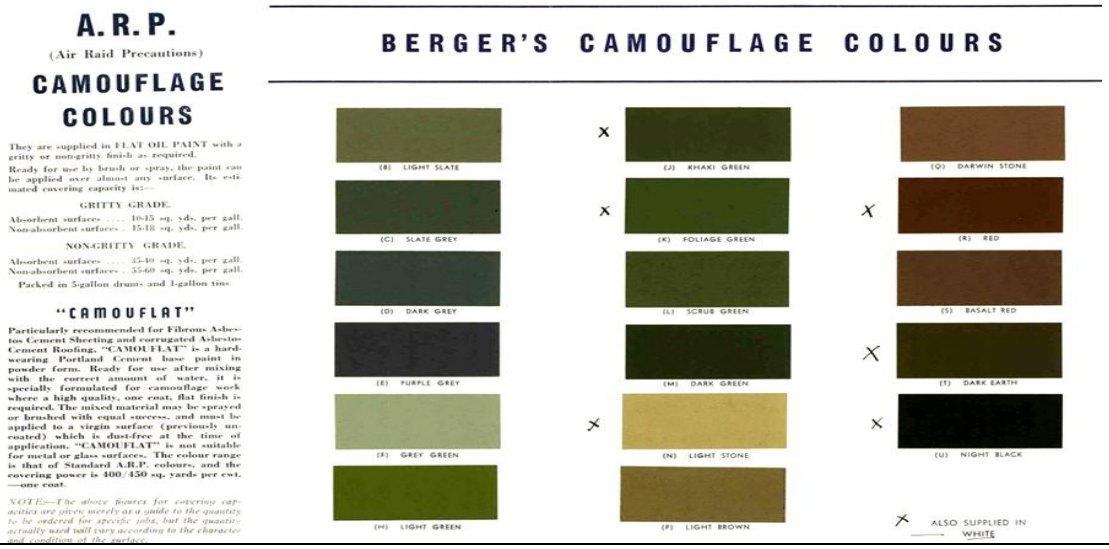
This set was from the Standards Assoc of Australia, first issued DEC 1941, amended FEB 1942, revised JAN 1943.

Berger ***Foliage Green*** in this sample (shown below) is a light *Green/Yellow* of a completely different hue, value and chroma to *Foliage Green* that that the RAAF adopted for aircraft, which was much darker.[97]

Berger (Q) *Darwin Stone*	Berger (T) *Dark Earth*	K3/178 *Earth Brown*	FS34092 K3/177 *Foliage Green*	Berger (K) *Foliage Green*

Berger's Camouflage Colours

Berger camouflage colours were for the ground concealment of installations for Air Raid Precautions – varying from aircraft paint colours. For instance **Berger (K)** ***Foliage Green*** (shown above) is more 'olivey' than the richer blue hue of FS34092. *Darwin Stone* was an example developed by the Camouflage Wing research team, working with the Royal Australian Engineers, to devise richer colours for Australian lighting, to add to the palette used by the British.[98] To these colours, also used for mixing with asbestos cement sheeting known as 'Camouflat', Berger also added colours (below): (E) – *Purple Grey*, and (R) – *Red*.



A.R.P.
(Air Raid Precautions)
CAMOUFLAGE COLOURS

They are supplied in FLAT OIL PAINT with a gritty or non-gritty finish as required.
Ready for use by brush or spray, the paint can be applied over almost any surface. Its estimated covering capacity is:—

GRITTY GRADE.
Absorbent surfaces ..... 10-15 sq. yds. per gall.
Non-absorbent surfaces .. 15-18 sq. yds. per gall.

NONGRITTY GRADE.
Absorbent surfaces ..... 35-40 sq. yds. per gall.
Non-absorbent surfaces .. 55-60 sq. yds. per gall.
Packed in 5-gallon drums and 1-gallon tins.

"CAMOUFLAT"
Particularly recommended for Fibrous Asbestos Cement Sheeting and corrugated Asbestos Cement Roofing. "CAMOUFLAT" is a hard-wearing Portland Cement base paint in powder form. Ready for use after mixing with the correct amount of water, it is specially formulated for camouflage work where a high quality, one coat, flat finish is required. The mixed material may be sprayed or brushed with equal success, and must be applied to a virgin surface (previously uncoated) which is dust-free at the time of application. "CAMOUFLAT" is not suitable for metal or glass surfaces. The colour range is that of Standard A.R.P. colours, and the covering power is 400/450 sq. yards per cwt. —one coat.

NOTE—The above figures for covering capacities are given merely as a guide to the quantity to be ordered for specific jobs, but the quantity actually used will vary according to the character and condition of the surface.

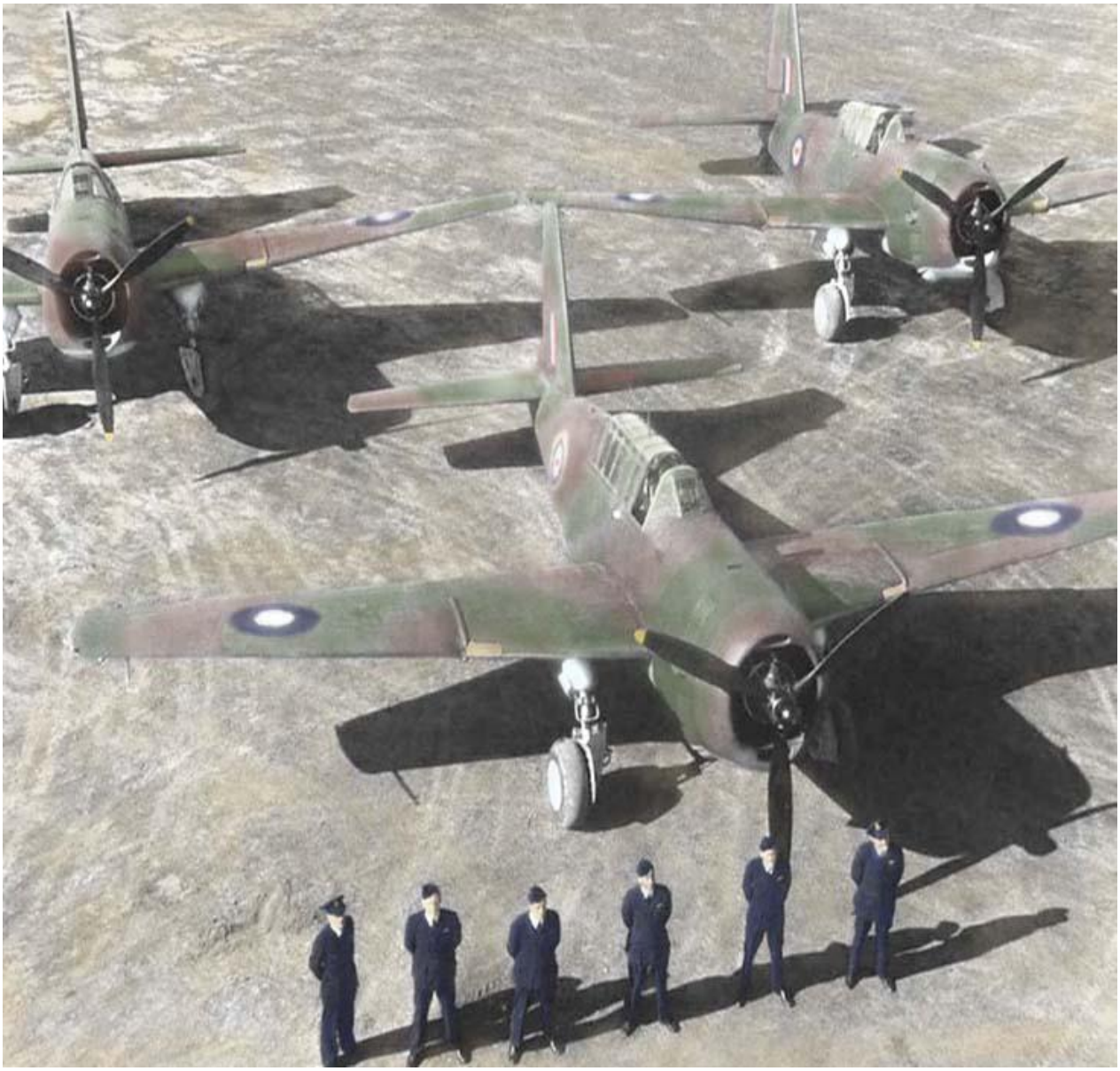
BERGER'S CAMOUFLAGE COLOURS

(B) LIGHT SLATE
(J) KHAKI GREEN
(Q) DARWIN STONE
(C) SLATE GREY
(K) FOLIAGE GREEN
(R) RED
(D) DARK GREY
(L) SCRUB GREEN
(S) BASALT RED
(E) PURPLE GREY
(M) DARK GREEN
(T) DARK EARTH
(F) GREY GREEN
(N) LIGHT STONE
(U) NIGHT BLACK
(H) LIGHT GREEN
(P) LIGHT BROWN
× ALSO SUPPLIED IN WHITE

AUSTRALIAN UNIQUE COLOURS

The changing markings

This image would be dated early SEP 1942 and captures the changeover of National Markings. The aircraft are from the first RAAF batch of 15 Northrop-built V-72 Mk.I aircraft, and probably with 2OTU at Mildura. This first batch was delivered from depots over AUG 1942 to 2OTU, retaining the delivery RAF scheme TLS of RAF, *Dark Earth* and *Dark Green,* with only the *Sky* undersides being changed with RAAF *Sky Blue.* But of interest is the ongoing deletion of *Yellow* and *Red,* which was also apparent with RAAF P-40Es at Milne Bay over this period. 2OTU Vengeances formed 4OTU at Williamtown in OCT 1942.



As discussed, in AUG 1942 *RAAF Technical Order, Aircraft General Instruction (AGI) No.C.11* was changed by Issue 4 of 31 AUG 1942, for operational aircraft to retain *Red/White/Blue* National Markings, but to delete the *Yellow* outer ring of the fuselage type-A1 roundel. The *Yellow* is still retained on the centre aircraft fuselage roundel, but has been removed from the aircraft to the right by overpainting with camouflage colours.

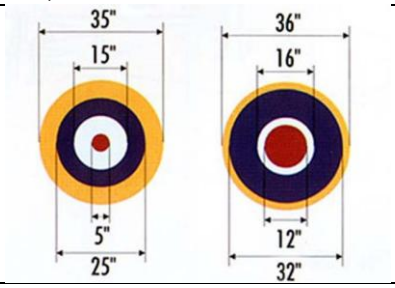
Furthermore, on the uppersurfaces the *Red* was dropped from the type-B roundel. Now the roundel was specified as *Matt White* and *Matt Dull Blue*, with the *White* diameter to be 2/5 of the *Blue* – the first directive for what we call the 'Pacific roundel'. This is shown by the uppersurfaces of all these aircraft.

On 19 SEP 1942 *Red* was dropped completely from ***all*** National Markings – with *White* and *Blue* roundels of 3:5 proportions in six positions, and a *Blue/White* fin flash.

Changing from the RAF National Marking

To achieve RAAF *Blue/White* roundels, the RAAF Vengeances received with RAF **type-A1 roundels** had the *Yellow* ring camouflaged over (as directed in AUG 1942), and then the *Red* overpainted with *White* (as required in SEP 1942). For the type-A1 roundel, this gave the 3/5th (3:5) RAAF requirement (below, left); for the type-B roundel, this gave 2/5th (2:5) which was closer to the ideal (i.e. less white to compromise camouflage).

However, this simplified change by overpainting became more complex when the RAF changed to the type-**C1 roundel** (below, right) in JUL 1942. For Vengeance production in the US, if these roundels were not changed in the factory, they would have been altered at one of the subsequent modification centres, so that *by late 1942 the type-C1 would have become the new standard*. Fighter aircraft fuselage roundels were 36" diameter *Yellow*, 32" diameter *Blue*, 16" diameter *White*, and 12" diameter *Red* [99] – therefore *Yellow* overpaint by camouflage and *Red* overpaint by *White,* gave 32" *Blue* and 16" *White*, 1:2 proportions. In general, later the Aircraft Depots (ADs), Aircraft Repair Depots (ARDs) and Repair Servicing Units (RSUs) were properly applying 32" roundels, and not overpainting. (Note that USAAF marked aircraft, i.e. with no tail markings, could have a fin flash accurately applied with equal widths.)

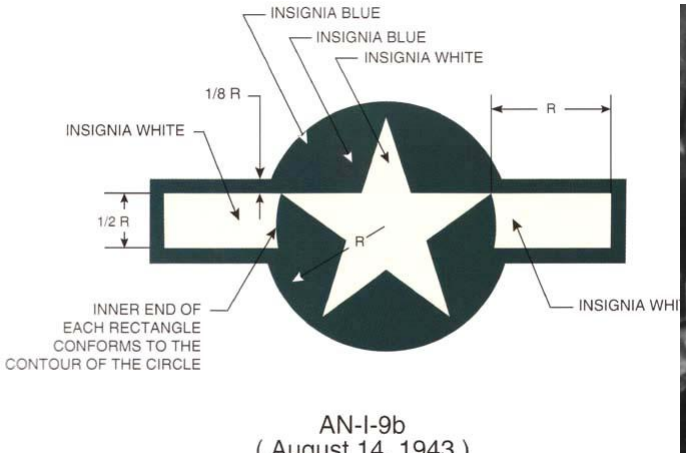
Early Type-A1 roundels	Later Type-C1 Roundels
 **Mk.II A27-276 (still as AF841) with 35" A1 roundel, *Yellow* overpaint, gives 25" *Blue* ring.** The fin flash had *Red* overpainted by camouflage – often in B&W pictures gives a dark stripe ahead of the *Blue/White* flash, with each colour 8" wide.	 **RAF Mk.III FB969 with 36" Type-C1 roundel, *Yellow* overpaint, changed from late 1942 to give a 32" blue ring.** 32" became the Vengeance standard roundel.[100] Type-C1 roundels gives a RAAF roundel not of 3:5, but closer to 1:2 proportions. Ian Baker refers to this modified C1 roundel being 3:8.[101]
	With the 24"-wide Type-C fin flash (11" – 2" – 11"), overpainting the *Red* (as demonstrated above) by the wider *White* gave slightly unequal widths (13" and 11"), until more accurately AD- or RSU-applied.

RAAF 'Pacific' Roundels		
The Vengeance roundel became 32" diameter in 3:5; later 2:5, RAAF *Blue/White* roundels re-applied at an RSU, ARD or AD. The fin flash if modified by overpainting became assymetric: 24" H x *13" White* and *11" Blue*.[102] If properly applied, 12" each colour.		
 **Vengeance 24" x 24" fin flash properly applied, equal widths**	 **3:5 Vengeance 25" roundel initially from 1942, and 32" from 1943**	 **2:5 Vengeance 32" roundel from 1944**

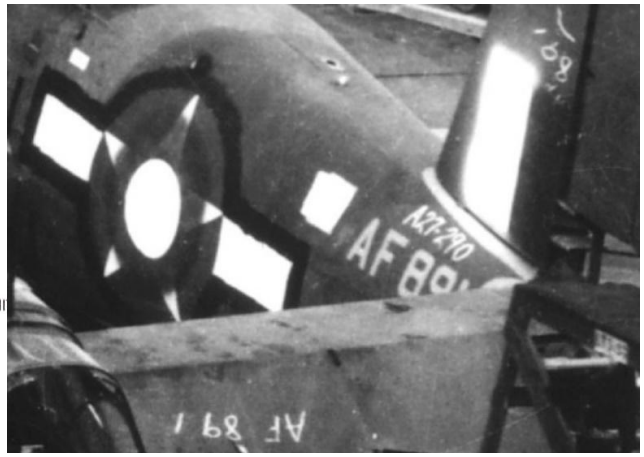
AUSTRALIAN UNIQUE COLOURS

Changing from the USAAF National Marking

In the USA in 1942, USAAF star cockade was easy enough to overpaint with the RAF type-A1 roundel, which happened with Vengeances allocated to Australian deliveries. By from 1943, as the USAAF repossessed more aircraft, Vengeances were delivered to the RAAF with the US National Marking. From AUG 1943, this had grown into the *Blue*-surrounded US 'star and bar', mandated by amendment AN-1-9b.[103] This is shown below as the star-and-bar is overpainted in OCT 1943 as AF891 is changed to become A27-290 at 1AD, RAAF Laverton.



[Archer, p.153]



[RAAF]

Below – 1 Aircraft Depot (1AD) in OCT 1943

Visible having their markings changed are Lend-Lease A-31 Vengeance Mk.IIs AF793 (which became A27-284), AF891 (A27-290), AF855 (A27-278) and AF849 (A27-296). USAAF star-and-bar cockades are being modified, and a port wing is in the foreground, with the fin flashes also being sprayed on. In 1943, standard US insignia diameters of the basic *Blue* circle was in multiples of 5 inches – i.e. 25", 30", 35" [104], so the 35" cockade was oversprayed and replaced by the 32" RAAF 3:5 'Pacific' roundel. As the fin flashes were being applied on a 'blank canvas', they would have been the now-standard 24" high and 24" wide.

Aircraft were received in RAF *Temperate Land Scheme*, with RAF serials and USAAF cockades. On the right, some A-35As are being accepted – some with RAF serials, some with USAAF serials – and some colours are *TLS*, others *Dark Olive Drab*. This is the main 1AD assembly hangar and – apart from the National Markings and serial number application – the only camouflage over-spraying taking place would be the lower application of RAAF *Sky Blue*, over the RAF *Sky* or USAAF *Neutral Gray*. By this stage, these A-35As had been allotted for target-towing modification.

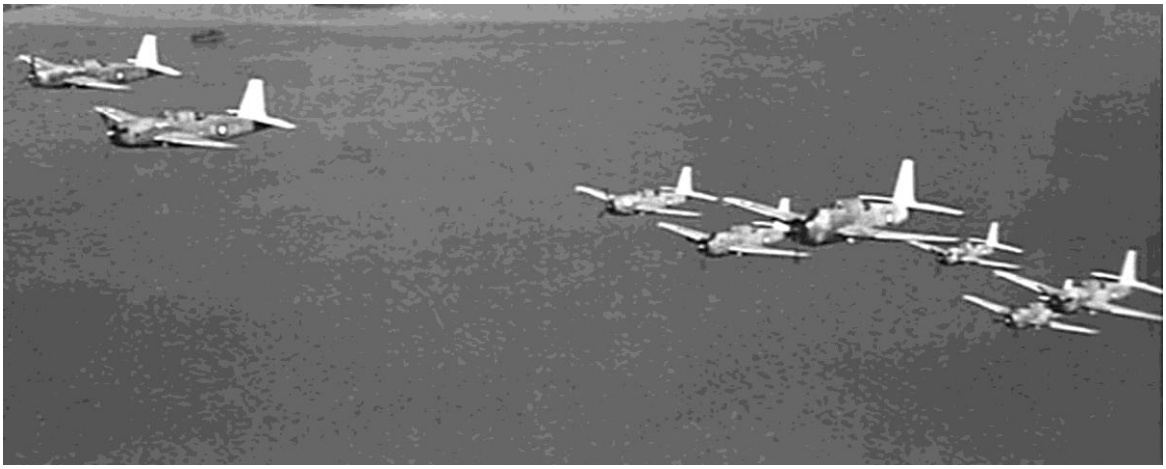
[RAAF]

[RAAF]

Left: AF793 (A27-284), AF891 (290), AF855 (278), and AF849 (296) Right: A27-413, -417, A27-292/AF921, A27-405/41-31152

Theatre Markings – White Empennage

In SEP 1943, Allied AF HQ in SWPA (i.e. by a 5th AF Instruction) decided all Allied single-engined fighter aircraft operating in New Guinea should have identification *White* tails and mainplane leading edges. The interpretation of this policy had initially been confusing – did it apply to just radial-engined 'fighters' (because of similarity to Japanese aircraft), was it all fighters, did it apply to other single-engined 'aircraft' (as Boomerangs and Wirraways would be operating in-theatre). Once that was resolved – i.e. all singled-engined aircraft which would include the Vengeance – the meaning of 'empennage' was not fully understood to include fin, rudder, and horizontal tailplane. These interpretations of "white tail" can be seen with differences between the Vengeance squadrons, and occasionally the *White* mainplane leading-edges were neglected. There was also some confusion over the fin flash (not an issue for the USAAF, of course), and only some RAAF aircraft with the *White* tails did correctly continue to carry the *Blue* rectangle of the fin stripes, but others did not.[105] In DEC 1943, as more Vengeances were arriving, Advanced HQ of 9 Operations Group reminded RAAFHQ of the 5th AF Instruction for the requirement of *White* tails and leading-edges.[106]



24SQN formation returning to Nadzab from a raid on 27 FEB 1944 *[AWM OG0652]*

24SQN aircraft with *White* tails and leading-edges, and the smaller 'GR' code letters than previously marked in Australia

However, even as late as APR 1944 aircraft were still being received from the mainland unpainted with *White*, and maintenance units again required a reminder.[107] Later that month, RAAFHQ (presumably after consultation with 5th AF through RAAF Command) directed that 82SQN Kittyhawks could be left uncamouflaged, but still required the *White* markings.[108] In MAY 1944 RAAF Command reiterated the *White* leading-edge and tail requirement, but dropped the *Blue* fin flash stated that the "tail will be without markings".[109]

After prolonged consideration, it would take until the end of the year for the *White* theatre markings requirement to be totally cancelled:

- in AUG 1944, the USAAF advised there was no requirement for uncamouflaged fighter to have the *White* identification markings,[110]
- in SEP 1944, RAAF Headquarters Melbourne (the providers) queried RAAF Command Brisbane (the operators) whether this was acceptable,[111]
- in OCT 1944, this policy was agreed by RAAF Command,[112]
- RAAF Headquarters the following week passed on this directive by signal to all Areas and Groups,[113] and
- in DEC 1944, this was finally formalised by RAAFHQ policy DTS SIG/49.[114]

New Guinea Operations

It is generally not remembered that Vengeance flew operations in New Guinea prior to their 77 Wing deployment to Nadzab in early 1944. Firstly, 12SQN had been employed in North-Western Area (NWA) at Batchelor. Early 12SQN operations were flown from Batchelor in JUN 1943, then the unit transferred to Cooktown (with NEA) in preparation for deployment to Merauke, which occurred in SEP 1943. At this stage too, 24SQN deployed from Camden to Tsili-Tsili (in Morobe province), then to Dobodura and in DEC 1943 to Kiriwina in the Trobriands. Early in 1944, 24SQN moved to Nadzab in the Markham Valley, and provided valuable support to the Australians on Shaggy Ridge, and in FEB 24SQN was joined by the other two units, 21SQN and 23SQN, to form the three-squadron 77 (Attack) Wing.

77 Wing to Nadzab

For expanded operations in North-Eastern Area, No.10 Group was formed as a new operational grouping in New Guinea with a dive-bomber wing (No.77) of three squadrons, and a fighter wing of three squadrons.[115] In NOV 1943, the Minister for Air was excited for the possibility of greater Australian involvement: "The proposed formation of No.10 (Operational) Group is especially interesting, it providing means for greater RAAF participation in the forward drive with our American Allies".[116] The prospect of a strong wing of dive-bombers, operating from Nadzab to provide pinpoint bombing in support of the land forces, did offer the prospect of heavier RAAF involvement in theatre.

When the final two Vengeance squadrons arrived to join 24SQN in the first half of FEB 1944, they were thrown into operations immediately, with each squadron launching 12 aircraft daily to provide a Wing force of 36 attack aircraft, covered by two P-40 squadrons of 78 Wing (75, 78 and 80SQNs). But this need of escorts in itself became a reason for Vengeance operations to soon cease. RAAF historian George Odgers claimed that "three factors lay behind the withdrawal of the Vengeance":[117]

- The Vengeance was inefficient, with a poor performance and better aircraft becoming available in the region.
- USAAF units were receiving more modern superior types, which were arriving in New Guinea from early 1944 and in large numbers – as at 31 MAR 1944 the USAAF had 82 squadrons.
- Such a large force of US squadrons meant Kenney wanted to free up space at forward airfields, such as Nadzab, to launch attacks on the important Japanese bases at Wewak and Hollandia, beyond the range of the Vengeance.

Kenney basically considered Vengeances were unsuitable, as Kittyhawks could now carry the same bomb load and were superior at strafing targets, plus they did not require escort. A 2008 study written by the RAAF's Air Power Development Centre challenged any views on Vengeance mechanical unreliability, claiming that 77 Wing had a good serviceability rate – arguing instead that difficulties in supplying 77WG may have been a more pressing factor.[118]

Significantly its performance shortcomings were why the Vengeance was never adopted by US for operations. The Vengeance had been produced in large numbers for the RAF, but was virtually obsolete by the time it entered service, and only served in the Far East. The first British orders were placed in the summer of 1940, when the reputation of the German *Stuka* was at its peak, but the first production aircraft did not arrive until the start of 1942, by which time it had become clear that the two-man dive-bomber was more vulnerable to enemy fighter aircraft, and that fighter-bombers were more effective. Indeed the *"Kittybombers"* were demonstrating air power flexibility with fighters undertaking ground attack that had been developed in the Western Desert. Although the Vengeance did what it was designed to do – dive bomb very accurately, and was robust with good flying characteristics – its only fault was in being built for a military tactic that was going out of favour.[119]

In APR 1944, the Minister for Air (Drakeford) advised the Minister for Defence (Curtin) that the Commander of Allied Air Forces (Kenney) "had no further use for the Vengeance in the Southwest Pacific Area". This resulted in immediate cancellation of further Vengeance deliveries from the US (which the Minister for Air understood to be "in the region of 56"), and discussions between the RAAF and US on plans for the squadrons affected.[120] He was close, as there were still 58 on order which were immediately cancelled from the RAAF total of 400 Vengeances. The last batch of A-35Bs (A27-631 to A27-640) was received in Australia on 25 MAY 1944. The Minister for Air had accordingly determined the future of the dive-bomber squadrons by MAY 1944. Basically, 24SQN would re-arm as a heavy bomber unit (with B-24 Liberators) immediately, with a second unit (either 21 or 23SQN) to begin conversion in JUL 1944. In the meantime, 21SQN would be employed on convoy and reconnaissance duties at Horn Island, 23SQN in the same role in NSW, and 25SQN in Perth (this document did not mention 12SQN).[121] The initial two dive-bomber units would be followed by two entirely *new* squadrons – but in the end, all five Vengeance squadrons would relinquish their obsolete aircraft to convert to heavy bombers, followed by the new units, 99 and 102SQNs.

But if there had been disappointment with the Vengeance, imagine if we had pressed ahead with our original preference for the Brewster Bermuda. The RAF Air Council in APR 1943 assessed the performance of the Vengeance being "markedly superior to that of the Bermuda".[122] If the RAAF fighter pilots trying to fight with the Brewster Buffalo in Singapore over 1941-42 had known these details, what may have been their reaction if they had been aware of the ongoing procurement of the Brewster Bermuda!

VENGEANCE MARKINGS

Squadron Codes

Aircraft identification marks were referred to in 1940 only as *grey*, and this list provided the single letter squadron code allocation, e.g. A for 1SQN, B for 2SQN, etc up to V for 25SQN – Vengeance squadrons, of course were yet to form. By 1942, the issue of the next AGI was more specific in colour designations, and detailed *Medium Sea Grey* K3/183 for codes in JUL 1942.[123] Squadron codes were mandated in JAN 1943 by RAAF HQ AFCO A3/43 specifying in *Sky Blue* K3/195.[124] Prior to this time, 12SQN had operated the original Vengeance Mk.Is from Batchelor in NT, but there is no evidence that these carried individual single-letter codes. The 1943 AFCO A3/43 listed two-letter squadron codes to be applied – NH for 12SQN, MJ for 21SQN, NV for 23SQN, GR 24SQN and SJ 25SQN.

Code letters were intended be applied either side of the roundel, in K3/195 *Sky Blue*, and the individual aircraft letters were to be 'A' to 'Z', with the letters 'C' and 'I' not to be used. Para.6 of this order stated: "Normally code letters are to be placed, showing the squadron code letters immediately forward of the fuselage roundel with the single individual aircraft distinguishing letter immediately aft the roundel."[125] However, as will be seen, *this did vary* – code letter sizes, styles and formats did change from one squadron to another. It was the responsibility of the squadron to apply the relevant code letters as soon as possible after receipt of the aircraft.[126] Quite often the three-letter combinations were not added by units until later in 1943, but this was not the case with the Vengeance units. The MAY 1944 AGI required codes to be marked in *Medium Sea Grey* instead of *Sky Blue.* It had been evident that *Sky Blue* soon faded to *White*, but this MAY 1944 change did not affect the Vengeance squadrons as by mid-1944 they had withdrawn to re-equip with heavy bombers.

Squadron radio callsigns during 77 Wing operations at Nadzab were: 21SQN "Pattern", 23SQN "Flanker", 24SQN "Canvas"; working with 78 Wing's 75SQN P-40s "Frolic", 78SQN "Smuttee", and 80SQN "Forceps".[127]

[colourised from AWM OG0317]

23SQN NV-A (probably A27-234) transferred and operational with 24SQN in NOV 43 at Tsili Tsili

Mixed interpretation to "*White tails*" – here with a rudder and another with a fin, probably due to the rushed transfer of the last aircraft to 24SQN to enable immediate deployment. A27-234 was damaged at Gasmala DEC 1943, and crashed landing at Kiriwina.

Vengeance Colours

Fuselage roundels were originally 'converted' from the RAF type-A1, and then the C1 to give a **32" RAAF 3:5 roundel**, *White* being 20". Colours and markings file (RAAFHQ AMEM DTS of 8 JUL 1943) shows Air Diagram 1160 applied to the Vengeance, with *Blue/White* roundels – the *White* circle being 2/5 the size of the *Blue* roundel, i.e. the **later 2:5 roundel** – in the standard six positions, with diameter of *White* 12" and *Blue* 32". The fin initially had *Red* overpainted, 24" high and 16" wide (8" *White* and 8" *Red*).[128] Later when aircraft were received with RAF type-C1 markings, the flash was quickly altered into a 24" square *Blue/White* flash – converted from type-C, *White* 13" wide, *Blue* 11"). Camouflage colours specified were *Foliage Green* (K3/177), *Earth Brown* (K3/178), and *Sky Blue* (K3/195).[129]

12 SQUADRON

12SQN was operating from Batchelor in the NT when it began to re-equip from the Wirraway with the Vengeance Mk.I in SEP 1942. Flying operations from DEC 1942, initially this was escorting of naval vessels and locating downed aircraft and their crews. Receiving the Vengeance Mk.II from APR 1943, in JUN the first offensive strike was flown with eleven Vengeances, carrying 1000 lb of bombs and escorted by 31SQN Beaufighters attacked enemy held villages in the Tanimbar Islands, some 350 miles north of Darwin. [130] At the end of JUN 1943, 12 SQN left Batchelor and NWA to stage through Cooktown for Merauke in Dutch New Guinea. However, there were no completed buildings at Merauke, and these delays held 12SQN to operate from Cooktown conducting anti-submarine patrols in NEA.[131]

Finally moving to Merauke in SEP 1943, 12SQN continued sea patrolling and ship escorting, with the occasional strike mission. At Merauke they were part of 72 Wing and supported by 1RSU. Four A-35B Mk.IV aircraft were received at Merauke in APR 1944, but full re-equipment did not occur and Vengeance operations ended in JUL 1944. All aircraft were ferried to 1AD and the unit moved to Strathpine QLD, to prepare for reformation as a heavy bomber squadron with Liberators.

12 Squadron Codes

Mk. I: 12SQN initially was equipped from OCT 1942 with ten of the first Vengeance Mk.I aircraft, which were not coded: A27-1, -2, -6, -8, -9, -11, -12, -13, -14 and -15, and these subsequently went for target towing modification or training duties with 4OTU at Williamtown when Mk.IIs arrived.

Mk.II: Vengeance Mk.IIs arrived from APR 1943, these were initially in the batch A27-200 to A27-219, operating from Batchelor, then Cooktown from JUN 1943, and moving to Merauke in SEP 1943.

Mk.IV: 12SQN received four Mk. IVs over APR to JUN 1944, which were A27-533, -534, -536 and -537. These were not used on operations, and probably not coded.

Mk.IA: As 23SQN moved south from the theatre from APR 1944, 12SQN received four of its Mk.IAs with two Mk.IIs. In JUN 1944, ten Mk.IIs were transferred from 23SQN as that unit moved to Menangle; but 12SQN then ceased ops with 27 aircraft on strength.

12SQN Code	Serial	Details and Name	12SQN Code	Serial	Details and Name
NH-A	A27-200	*"YAGOTABKWIK", "Ye Boss"*	NH-N	A27-212	
NH-B	A27-201		NH-O	A27-213	
NH-C	A27-202		NH-P	A27-215	
NH-D	A27-260		NH-Q	A27-216	
NH-E	A27-203	A27-261	NH-R	A27-218	A27-235; A27-266
NH-F	A27-204		NH-S	A27-230	
NH-G	A27-205	A27-67	NH-T	A27-219	
NH-H	A27-206	A27-287; A27-77	NH-U	A27-	
NH-I	A27-	not used	NH-V	A27-	
NH-J	A27-207		NH-W	A27-	
NH-K	A27-208	A27-217; A27-238	NH-X	A27-	
NH-L	A27-209	*"Diane"*	NH-Y	A27-	
NH-M	A27-211	*"Biddles"*	NH-Z	A27-	

References for 12SQN codes: *adf-serials* A27 database and imagery. The 34" 'NH' code was ***forward of the roundel*** both sides, the individual letter aft, and the tops of the code letters were aligned to the top of the roundel.

- 23SQN passed the following to 12SQN in **MAR 1944**: A27-44, -62, -67, -68, -287, and -293. Then in **JUN 1944** 23SQN transferred ten Mk.IIs to 12SQN: A27-243, -250, -273, -274, -279, -281, -282, -283, -284, and -292.
- 12SQN A.50 for **17 JUN 1944** lists 27 Vengeances allotted to 1AD for storage: A27-44, -62, -67, -68, -77, -200, -204, -211, -212, -214, -215, -219, -221, -230, -243, -250, -261, -271, -273, -274, -279, -281, -282, -283, -284, -292 and -293; although A27-77 and -261 did carry out a supply drop on 5 JUL 1944.

V-72 VENGEANCE Mk.II – A27-209 NH-L *"Diane"* of 12SQN 1943-1944

[colourised by RAAF PTF from AWM 073124]

A27-209 NH-L at Merauke in DEC 1943. *(A similar series of images are AWM OG0535 and OG0537, flying from Merauke on 23 DEC 1943.)* Still in delivery TLS scheme, note *Red* of the type-A fin flash is overpainted, and some touching-up with *Foliage Green/Dark Earth*). Roundel *Blue* 32" with 19"- 20" *White* disc, the required 3:5 ratio – this too has been overpainted from original 35" A1 roundel, and the overspray paint appears to be about 44" in diameter *(apparent in AWM image OG0535)*. Code letters 34"x16" in 4" strokes, in *Sky Blue*. Fin flash type-A was originally 24"x24", but with the *Red* overpainted became 24"x16" (i.e. each colour 8" wide, *before* the type-C markings made assymetric stripes).

[colourised from AWM NEA0112]

A27-209 *Dianne* NH-L was named after pilot F/L Cyril McPherson's daughter [132]

12 SQUADRON NEA – NOSE ART 1943

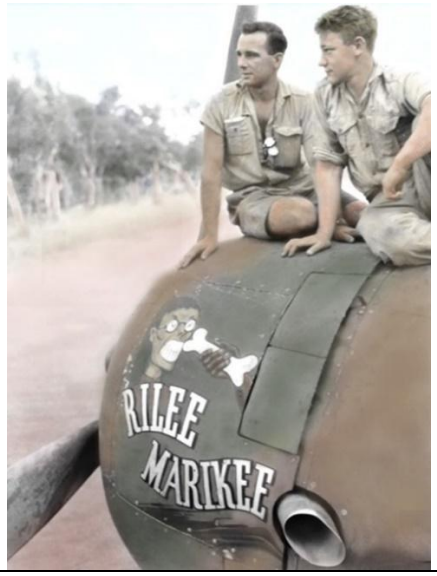
Other known examples of 12SQN nose art include A27-211 NH-M *'Biddles'* a diving girl, with particularly professional artwork A27-200 NH-A *'Ye Boss'* and *Y'GOTTABKWIK* and an unknown aircraft, *Rilee Marikee.* 12SQN obviously had a signwriter amongst their ranks. Unlike the other Vengeances based in New Guinea, 12SQN did not carry *White* tails.[133]

A27-211 *Biddles* NH-M at Batchelor in NT 1943.

A27-211 joined 12SQN in APR 1943, coded NH-M and named *'Biddles'* by its crew. At the end of operational service with 12SQN, in JUL 1944 it passed to 1AD for storage and approved for write-off in MAY 1946.

The artwork shows a diving girl, colour of her swimsuit is unknown.

[colourised from AWM NEA0108]



Serial number n.k., nose art *'Rilee Marikee'* with 12SQN at Batchelor in 1943.

The artwork is evidently a native hand 'pointing the bone' at a soldier of the Imperial Japanese Army.

[colourised from AWM NEA0092]

A27-200 NH-A *'Ye Boss'* and *Y'GOTTABKWIK.*
At Cooktown SEP 1943

Shows a devilish kangaroo, with SQNLDR rank slides on his shoulders, so the *'Ye Boss'* represents the 12SQN Commanding Officer. He is holding a bomb ready to drop.

This style of devil cartoons was popular in the Australian *MAN* magazine (the *Playboy* of the day), which also carried the Vargas girl pin-ups. Pentland claims the nose art was painted in Batchelor before 12SQN moved to Cooktown, by the Squadron's unofficial artist Noel Aldous. (Colour reference: Pentland Vol.1, p.111.)

[colourised from AWM NEA0091]

21 SQUADRON

21SQN reformed at Gawler SA, in SEP 1943 after the defeat of Singapore and Malaya, this time as a dive-bomber squadron equipped initially with 14 Vengeance Mk.IA aircraft. After initial workup, the squadron moved to Lowood QLD (14 Operational Base Unit) in DEC 1943, then embarked for New Guinea in JAN 1944.[134] The unit's aircraft strength of 18 arrived at Nadzab in the Markham Valley over 18-19 FEB 1944 and immediately commenced operations at part of 77 Wing with 23 and 24SQNs. Normally these daily strikes would comprise 12 Vengeances form each squadron – a mission of 36 Vengeances escorted by two squadrons of P-40s must have been quite a sight.[135]

77WG's last mission was flown on 9 MAR 1944. 21SQN was advised on 10 MAR that it would be withdrawn and arrived at Camden on 18 MAR. There was understandable disappointment at only completing a few operations, as the 5th AF withdrew the Vengeance wing in favour of aircraft with longer range and better payload. Based at Camden, the Vengeances undertook Army cooperation duties, one of which involved *Luftwaffe* markings to masquerade as *Stukas* for the desert war movie "Rats of Tobruk" (see MJ-A marked below).[136] Like other Vengeance units, in JUN 1944 ceased to function as a dive-bomber squadron and proceeded to Leyburn QLD to re-role with Liberator heavy bombers.

21 Squadron Codes

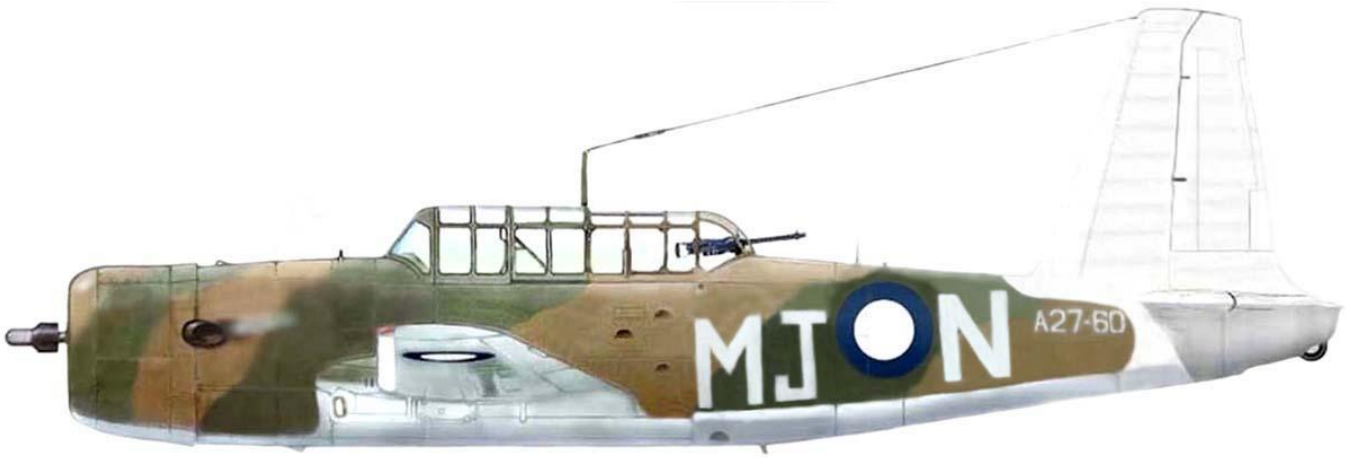
21SQN Code	Serial	Details and Name	21SQN Code	Serial	Details and Name
MJ-A	A27-54		MJ-N	A27-60	to 25SQN SJ-X
MJ-B	A27-77	to 24SQN	MJ-O	A27-	
MJ-C	A27-		MJ-P	A27-	
MJ-D	A27-		MJ-Q	A27-	
MJ-E	A27-		MJ-R	A27-	
MJ-F	A27-		MJ-S	A27-	
MJ-G	A27-		MJ-T	A27-	
MJ-H	A27-		MJ-U	A27-	
MJ-I	A27-		MJ-V	A27-	
MJ-J	A27-		MJ-W	A27-	
MJ-K	A27-		MJ-X	A27-	
MJ-L	A27-85	possible	MJ-Y	A27-	
MJ-M	A27-50		MJ-Z	A27-	

References for known 21SQN codes: *adf-serials* A27 database, imagery and *Demon to Vampire*. The 'MJ' was forward of the roundel on port side, and aft on the starboard, so it ***always reads MJ - #***. 21SQN codes show that there was no hard and fast rule on the style of lettering, being very squarish, and the code letters sloped slightly towards the nose down so as to appear horizontal when the aircraft was parked. The roundel was marked slightly higher.

- Over **15-20 SEP 1943** the following Vengeances were allotted to 21SQN: A27-35, -37, -39, -42, -49, -51, -67, -72, -75, -77, -83, -84, -85, and -86.[137] By 19 FEB 1944, 18 a/c arrived at Nadzab from Lowood. For New Guinea operations, 21SQN did not fly any of these aircraft (they all went to Depot and re-issue). The following were **flown operationally** by 21SQN: A27-28, -45, -50, -54, -55, -60, -62, -64, -65 -66, -69, -70, -82, -95, -96, -281, -285, -288 and -295.
- The following allotments were made at the cessation of Vengeance flying: **6 JUN 1944** A27-95 to 1AD; A27-28, -45, -50, -54, -55, -60, -69, -86, and -96 to 25SQN; A27-288 to CFS; then on 21 JUN A27-64 to 4AD and A27-65 to 1AD.[138]

A27-54 MJ-A at Camden in MAY 1944

V-72 VENGEANCE Mk.IA – A27-60 MJ-N of 21SQN 1944



A27-60 MJ-N at Nadzab FEB 1944. 23SQN letter codes were the same height as the 32" roundel and always read in the order MJ - #, i.e. the 'MJ' was ahead of the roundel on port side, aft of roundel on starboard side, and horizontal to the ground when parked. MJ-N shows that the roundel had been repositioned from the normal position, sitting about 6" higher. Letters were 32"x24" – in a **squarish** font style, in *Sky Blue*. Roundel 3:5 *Blue* 32" diameter with 20" *White* disc, and no *Blue* fin flash like some other Vengeance squadrons. 21SQN Vengeances carried the serial number 'last two' on the front of the port undercarriage housing, and the individual code letter on the starboard housing.

A27-60 MJ-N at Nadzab FEB 1944, in front of A27-50 MJ-M *[AWM OG0680]*

A27-60 was received at 1AD in AUG 1943, then originally served with 23SQN, and to 21SQN in NOV 1943. Paintwork appears still to be the original RAF colours of *Dark Green/Dark Earth*, but with some *Foliage Green* touch-ups and the RAF *Sky* would have been overpainted with RAAF *Sky Blue*. Later in JUN 1944, A27-60 to 25SQN as SJ-O.

MJ-L : possibly A27-85, possibly at 15ARD Ward's in the reserve pool early 1944[139] *[colourised from* 'Demon to Vampire'*, p.129]*

23 SQUADRON

23SQN's role changed from a fighter squadron to dive bombing in JUN 1943, and the first Vengeance Mk.IIs were received. Allocated as one of the RAAF's squadrons to form 77WG, at the beginning of FEB 1944 23SQN began its move from Lowood to New Guinea, and by 9 FEB 1944, all aircraft were located at Nadzab, with the first operation flown the following day. On 11 FEB, six Vengeances with a further six from 24SQN made a successful attack on villages in support of ground troops near Saidor. Operations continued in New Guinea until 9 MAR, when all the Vengeance squadrons were withdrawn to various bases on the mainland. [140] On 13 MAR 23SQN moved to Higgins Field on Cape York to join 33OBU, to be involved in Army cooperation exercises. Maintaining its strength of 18 Vengeances over APR and MAY 1944, at the beginning of JUN the ground personnel sailed for Sydney, and ten aircraft were transferred to 12SQN at Merauke. 23SQN moved to Menangle, then rearmed with Liberator heavy bombers at Leyburn in NOV.

23 Squadron Codes

23SQN Code	Serial	Details and Name	23SQN Code	Serial	Details and Name
NV-A	A27-234	probable	NV-N	A27-	
NV-B	A27-227	to 24SQN	NV-O	A27-	
NV-C	A27-		NV-P	A27-233	*"Pegasus",* to 24SQN GR-F
NV-D	A27-252	to 24SQN; A27-41	NV-Q	A27-	
NV-E	A27-		NV-R	A27-	*"Hazel"*
NV-F	A27-233	to 24SQN	NV-S	A27-48	*"Lest We Forget"*
NV-G	A27-		NV-T	A27-33	*"Snifter"*
NV-H	A27-243	to 24SQN; A27-280 "*Man O War*"	NV-U	A27-	
NV-I	A27-		NV-V	A27-	
NV-J	A27-		NV-W	A27-	
NV-K	A27-		NV-X	A27-283	
NV-L	A27-		NV-Y	A27-	
NV-M	A27-		NV-Z	A27-	

References for known 23SQN codes: *adf-serials* A27 database, and imagery.

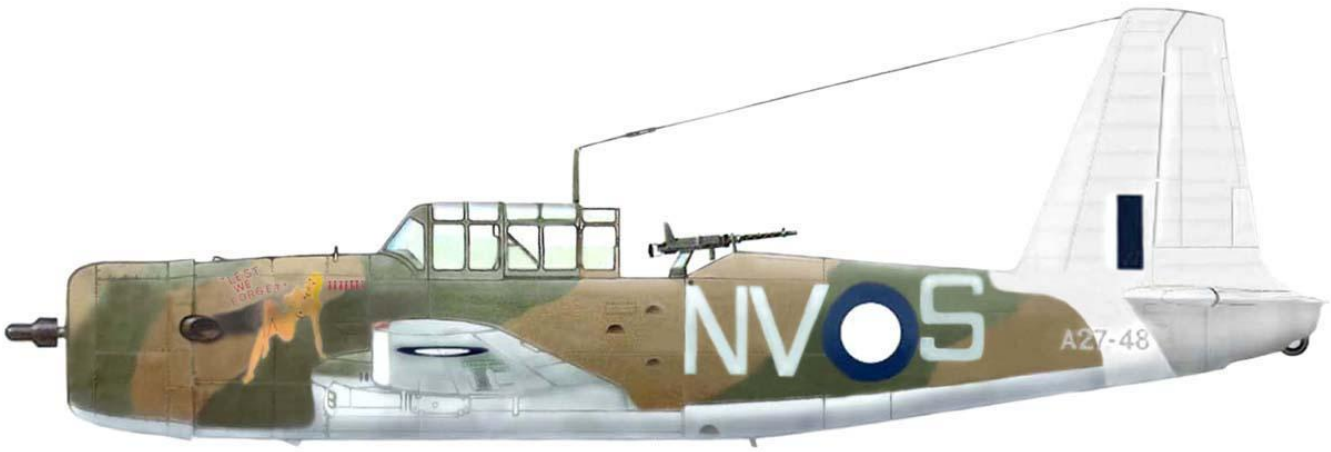
The 23SQN letter codes were the same height as the 32" roundel and always ***in NV - # format***, i.e. the 'NV' was ahead of the roundel on port side, aft of roundel starboard side. The letters that were ***aft of the roundel typically marked 6" higher*** than the roundel and the forward letter. The 23SQN letters were a ***wider*** font than the other units.

- **In AUG 1943, six aircraft were passed to 24SQN** for its New Guinea deployment: A27-227/B, 233/F, 234/A, 243/H, 248, 252/D, and generally these aircraft remained marked with their 23SQN codes.
- **23SQN deployment to Nadzab in FEB 1944** strength: A27-44 (CO's aircraft), -33, -41, -57, -62, -68, -71, -270, -271, -274, -275, -276, -277, -280, -282, -283, -285, -287. 23SQN passed the following **to 12SQN MAR 1944**: A27-44, -62, -67, -68, -287, and -293 [ex-21]. Then in JUN 1944, 23SQN transferred **ten Mk.IIs to 12SQN**: A27-243, -250, -273, -274, -279, -281, -282, -283, -284, and -292.

[colourised from Goodall website]

The hulk of A27-41 NV-D at Kalgoorlie shows the marking of 'D' higher than the other code letters

V-72 VENGEANCE Mk.IA – A27-48 NV-S *'Lest We Forget'* of 23SQN 1944



A27-48 NV-S at Nadzab FEB 1944. 23SQN letter codes were the same height as the 32" roundel and always read in the order NV - #, i.e. the 'NV' was ahead of the roundel on port side, aft of roundel on starboard side. NV-S shows that the letters aft of the roundel were typically marked ***6" higher*** than the roundel and the forward letter. Letters were 32"x20" – a *wider font* style than the other squadrons. Roundel 3:5 *Blue* 32" diameter was moved slightly aft, and most 23SQN aircraft were marked with a *Blue* fin flash.[141] Nose art colours reference 'AZ Models' AZ4813.

[AWM colourised image OG0320]

23SQN Vengeances carried the serial number 'last two' on the front of the port undercarriage housing, and the individual code letter on the stbd housing – the last digit '2' is visible below on the port housing of A27-252 / NV-D. The aircraft had a starboard wheel failure on landing. The *Blue* bar flash is marked on the *White* fin.

A27-252 NV-D, after stbd gear failure in SEP 1943 with 24SQN, was lost on ops NOV 1943 *[colourised from RAAF image]*

23 SQUADRON NEA – NOSE ART 1943-1944

Images of examples of 23SQN nose art is rare. Below is A27-280 NV-H *'Man O' War'*, unidentified NV-R 'Hazel', and A27-33 NV-T with an image of the popular wartime pooch *Snifter* with a friend.

[colourised from RAAF image]

A27-280 NV-H *"MAN O' WAR"* in 1943 prior to deploying to New Guinea

NV-H was originally A27-243, then transferred to 24SQN in AUG 1943. Replaced by A27-280, '80' on the port landing gear housing is visible; beneath the 'NV' code is a patch painted *Earth Brown*. After Nadzab, A27-280 moved with 23SQN to Higgins, and crash landed when the undercarriage collapsed in MAY 1944. The nose art is a dog riding on clouds carrying a bomb.

23SQN NV-R *'Hazel'* (serial n.k.) at Nadzab 1944, with full *White* fin and rudder and apparently elevators only, with *White* wing and tailplane leading edges. The *Blue* fin flash was common on 23SQN Vengeances. Foreground is 24SQN A27-245 GR-F. The nose art on NV-R *'Hazel'* appears to be a standing lady.

[colourised from RAAF image]

A27-33 NV-T *Snifter* and a little friend. '33' marked on the port landing gear housing, and probably 'T' on the starboard. The high number of yellow bombs on its scoreboard indicating raids show that A27-33 had served with 24SQN at Tsili Tsili, Dobodura and Kiriwina before 77WG arrived in Nadzab. Apparently 24SQN marked raids by a *Yellow* bomb, 23SQN normally by a *Red* bomb.

*[colourised Smith "*Vengeance*" p.148]*

24 SQUADRON

In JUN 1943 the rearmament of 24SQN at Bankstown with Vengeances began, and by the end of the month had ten on strength, together with Brewster Buffalos. Receiving six Vengeance Mk.IIs from 23SQN, by the end of AUG 24SQN was up to strength with 18 aircraft and crews and proceeded as a detachment to New Guinea (with its ground staff moving to Menangle). 24SQN monthly returns are largely lacking over SEP-DEC 1943, but they operated from Tsili Tsili, and then Dobodura in support of the 9th Division AIF around Sattelburg, attacking enemy supply lines from Madang, and coastal gun positions and barges.

In early DEC 1943, the Vengeances moved from Dobodura to Kiriwina to linked up with the main body of groundcrew which had arrived by sea. In JAN 1944, 24SQN moved to Nadzab in the Markham Valley, and provided valuable support to the 7th Division's assault on Shaggy Ridge; then were joined the following month by 21 and 23SQNs in forming 77 (Attack) Wing. From Nadzab the Vengeances would attack targets in wing strength, and provided with fighter cover by Kittyhawks from 75, 78 and 80 SQNs (78WG). The 24SQN A.50 records the last operation on 9 MAR as the unit's 54th mission. 24SQN moved in MAR 1944 to Lowood, and began to equip with the Liberator in JUN.[142]

24 Squadron Codes

All single-engined aircraft in-theatre were to have the *White* empennage and mainplane leading edges, and 24SQN aircraft mainly had these applied in the correct fashion – covering fin, rudder and tailplane – but some late transfers to the unit looked like hurriedly-applied whitewash. Later for New Guinea, the unit's 'GR' squadron codes were smaller, marked in *Sky Blue* complying with the extant markings policy of 1942.

24SQN Code	Serial	Details and Name	24SQN Code	Serial	Details and Name
GR-A	A27-220	*"Mustapha"*	GR-N	A27-221	
GR-B	A27-222		GR-O	A27-290	A27-83
GR-C	A27-244		GR-P	A27-225	
GR-D	A27-226		GR-Q	A27-223	
GR-E	A27-240	*"Salome"*	GR-R	A27-245	
GR-F	A27-250	A27-58, A27-233 (ex NV-P)	GR-S	A27-241	
GR-G	A27-		GR-T	A27-	
GR-H	A27-		GR-U	A27-	
GR-I	A27-	probably not used	GR-V	A27-	
GR-J	A27-		GR-W	A27-	
GR-K	A27-	pic	GR-X	A27-	
GR-L	A27-		GR-Y	A27-	
GR-M	A27-		GR-Z	A27-	

References for known 24SQN codes: 24SQN *Unit History* A.50, *adf-serials* A27 database, and imagery.

The ***'GR' was always aft*** on both port and starboard sides, initially just slightly smaller than roundel. The code letters appear as 28" high x 16" wide at Camden before deployment (below), and then ***smaller in New Guinea*** at approximately 24" x 12" – possibly some being re-applied when the tails were painted *White*.

- As 24SQN was the first after 12SQN to be deployed north to North Eastern Area (NEA), Vengeances were called in from other units to bring up to a unit strength of 18 aircraft. For instance, **in AUG 1943 six aircraft were transferred** to 24SQN from 23SQN: A27-227 (NV-B), A27-233 (NV-F), A27-234 (prob NV-A), A27-243 (NV-H), A27-248, and A27-252 (NV-D). A27-243 retained its NV-H code with 24SQN at Kiriwina in DEC 1943 – while in NOV 23SQN had re-allocated NV-H to A27-280; NV-A (probably A27-234) retained this code at Tsili Tsili in NOV 1943; and the 24SQN *Unit History Sheet, Detail of Operations*, over 27-31 DEC 1943 also show that A27-227 (NV-B) and A27-233 (NV-F) were still marked with their 23SQN codes.
- **For initial detachment to New Guinea 29/30 AUG 1943, 24SQN flew from Bankstown**: A27-220, -221, -222, -223, 225, -226, -227, -233, -234, -240, -241, -242, -243, -244, -245, -248, -250, and -252. **When 24SQN moved from Kiriwina to Nadzab in JAN 1944**, and then for operations over FEB, the following Mk.Is had been added to unit strength: A27-52, -58, -74, -75, -83, and -86.

V-72 VENGEANCE Mk.II – A27-245 GR-R of 24SQN 1943-1944

[colourised from RAAF image]

A27-245 GR-R at Bankstown 1943. Althought appearing to be in a fresh darker colour repaint (*Foliage Green/Dark Earth*) this might not be the case (the ring around the roundel where the *Yellow* has been overpainted can be seen on the original), however the Green does appear darker. Roundel 3:5 *Blue* 32" diameter with 20" *White* disc. Code letters 28"x16", then smaller when deployed in NG. Fin flash asymmetric *type-C,* 24" high, Blue 11" wide, *White* 13".

Below, A27-245 GR-R at Tsili Tsili NOV 1943 with the mandated all-white empennage and leading edges, with a national blue bar as a tail flash. The 'GR' was always aft of the fuselage roundel on both sides, and had been ***reduced*** in size (and now smaller than other Vengeance squadrons) and appear to be in 24" x 12" letters. Like some 24SQN aircraft retained the 11" wide *Blue* bar fin flash, and *White* from the fin flash is still visible with whitewashed fin.

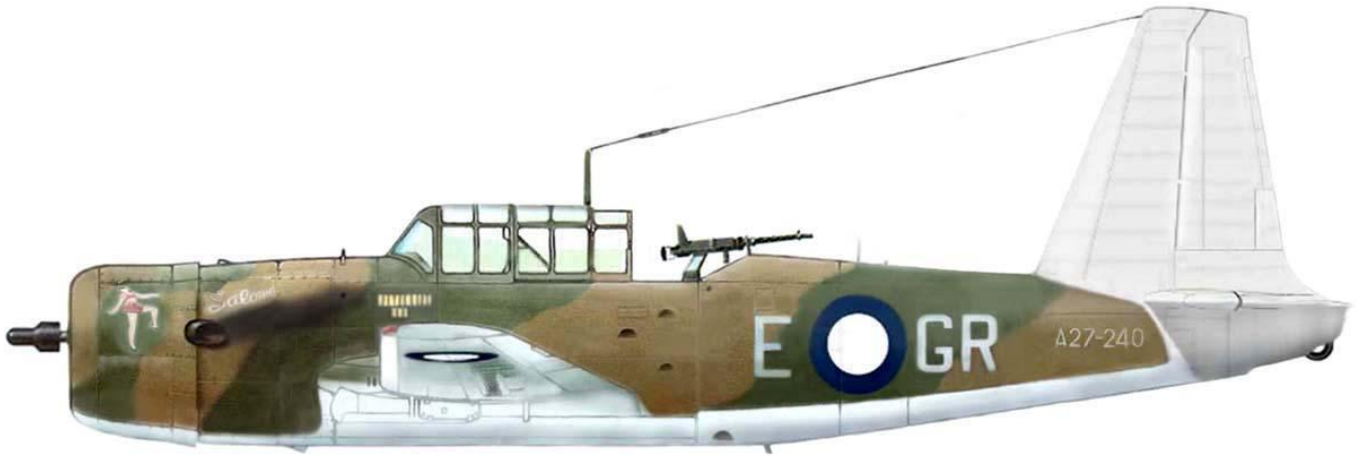
[colourised from AWM OG0210]

VENGEANCE Mk.II – A27-240 GR-E *"SALOME"* of 24SQN 1944

A27-240 GR-E *"Salome"* was an example of 24SQN 'Tivoli Girl' nose art, with nose art of dancer June McPherson

[colourised from AWM OG0653]

A27-240 GR-E had an all-white fin and rudder with no national blue bar as a tail flash, and was consistent with other 24SQN aircraft in its display of the 'GR' code. 'GR' was aft of the fuselage roundel on both sides, and was in a slightly smaller font than the other squadrons of 77 (Attack) Wing. Probably the paintwork had not been changed to *Foliage Green/Earth Brown/Sky Blue* undersides and was therefore still the original RAF colours from the Nashville factory of *Dark Green/Dark Earth*, but the RAF *Sky* would have been overpainted with RAAF *Sky Blue*. The fuselage 3:5 roundel 32" diameter; the smaller code letters 24" x 12"; some 24SQN aircraft retained a 11" wide *Blue* bar fin flash, obviously GR-E did not.



[colourised from AWM OG0939]

Original This is original photo of June McPherson, taken on a Sydney beach. Girls were keen on idea.

Painting Ground crew members of the squadron admire picture of June McPherson, one of their pin-ups painted on plane. Painting was made from original photo

PIX——Page Four

PIX article of 17 JUN 1944

The AWM caption reads FEB 1944: "Ground crew members of No.24 (Vengeance) Squadron attach a painting (nose art) of June McPherson, 'adopted' Tivoli girl performer". The name appears to be *Salome*, a biblical dancer and associated with 'The Dance of the Seven Veils' **–** a popular entertainer name and nose art at the time (perhaps used by June McPherson as a stage name?). The two-piece swimsuit artwork was a darker colour (perhaps red), and June has been painted on a different coloured background (perhaps lighter green as shown here) or maybe *Sky Blue*.

VENGEANCE Mk.II – A27-248 "*HEWETT'S REVENGE*" of 24SQN Tsili Tsili 1943

[colourised from AWM OG0212]

WOFF Hewett with his 24SQN Vengeance *"Hewett's Revenge"* on 13 NOV 1943 at Tsili Tsili in New Guinea

Hewett regularly flew **A27-248** over AUG 1943 to JAN 1944, and name recorded in *adf-serials A27* database – but Lever's 4OTU book records this as A27-227,[143] which is doubted. 'Skin' Hewett had originally been a 20-year old Wirraway pilot in the defence of Rabaul in 1942, hence the *'Revenge'*. He later flew Meteors in Korea and served as a Flight Commander on 2SQN Canberras in Butterworth.[144] Quite a gun-belt, and quite a flying career!

VENGEANCE Mk.II – A27-220 GR-A "*MUSTAPHA*" of 24SQN Nadzab 1944

A27-220 GR-A 24SQN at Nadzab in early 1944 used the mascot Disney's dog Pluto, with inscription *"MUSTAPHA"*

[colourised from Pentland Vol.2 p.78]

[an internet Pluto]

A27-220 GR-A had an all-white fin and rudder with no national blue bar as a tail flash, and was consistent with most 24SQN aircraft. 'GR' was aft of the fuselage roundel on both sides, sometimes in smaller 24" characters than the other squadrons of 77 (Attack) Wing; however not here as the codes are 28". Probably the paintwork had not yet been changed to *Foliage Green/Earth Brown/Sky Blue* undersides – it was probably still the original RAF colours form the Nashville factory of *Dark Green/Dark Earth*, but the RAF *Sky* would have been overpainted with RAAF *Sky Blue*. The fuselage 3:5 roundel is 32" in diameter, and the code 28" x 16".

24 SQUADRON NEW GUINEA – NOSE ART 1944

Tivoli Girl Nose Art

A groundcrew Sergeant of 24SQN, who had been associated with the Tivoli theatre before joining the RAAF, used his contacts there to 'adopt' the dancers as 'mascots', or perhaps more appropriately as pin-ups for nose art, for 24SQN's Vengeances. This would have occurred in late 1943 when 24SQN was based at Camden (and prior to proceeding to Kiriwina) – the nose art was taken at Nadzab in FEB 1944 by the war photographer (now part of the AWM collection). However, photographs did not appear in 'PIX' magazine until JUN 1944, by which time 24SQN was re-equipped with Liberators. The imagery shows the girls were painted on the port side of the Vengence's cowl. Of the three Tivoli girls below, only Joyce Smith has been identified with A27-52, and any tie-ups for Ronnie Elliot and Jan Rhynd remain elusive.

Ronnie Elliot Along the top of this page are three original pictures girls and underneath they are shown on planes.

Jan Rhynd Adoption of members of the ballet as pin-up girls by the airmen was arranged by Flt./Sgt. M. Pals.

Joyce Smith F/Sgt. Pals was associated with the Tivoli before joining up. He has formed a squadron concert party.

Advice F/Sgt. F. Debenham, of Canterbury, NSW, gets plenty of advice as paints a picture of Ronnie Elliot onto a plane.

Artist Transport driver LAC W. Clarke, of Moss Vale, NSW, with painting of Jan Rhynd, which he made on engine cowling.

Mascot F/Sgts. N. B. Kellett (of Victoria) and E. P. Turner (SA), take long look at mascot. Photos of squadron from Air Dept.

PIX——Page Five

END

Several other ladies from this PIX photoshoot are illustrated below. Ruby Lacey was shown in a daring contemporary two-piece (before the name 'bikini' was coined), but her aircraft is not known. In addition, June McPherson appeared on the port cowl of A27-240 (GR-E, above), which the AWM photo shows with the name *Salome.*

24 SQUADRON NEW GUINEA – NOSE ART 1944

Tivoli Girl Nose Art

Joyce Smith – in the original photograph, Joyce is leaning on a surfboard, reversed in the nose art and perhaps now holding a billiard cue. The light blue swimming costume is referenced against 'DEKL DL72049' decal sheet. Note '52' from the serial number on the port undercarriage fairing, the starboard side would show the aircraft's individual letter.

A27-52 Joyce Smith *[both colourised from AWM OG0932]*

Ruby Lacey – the original image shows Ruby throwing a beachball. On the nose art, Ruby has the 1940's style 'bikini' in a darker shade and polka dot style, coloured red from the DEKL DL72049 sheet reference.

Ruby Lacey, 24SQN Vengeance identity not known *[colourised from AWM OG0934]*

24 SQUADRON NEW GUINEA – NOSE ART 1944

Tivoli Girl Nose Art

Ronnie Elliot – in the original PIX image, Ronnie is leaning on a surfboard, and the nose art has no surfboard but her arms are still reaching up. The one-piece swimsuit is assumed to be blue and white.

[colourised from AWM OG0929]

Jan Rhynd – the PIX image shows Jan holding a beach towel, and in the nose art her bikini is one colour (assumed to be red, with red shoes), surrounded by a Tivoli theatrical art deco style border and name in script.

[colourised from AWM OG0930]

25 SQUADRON

The only Vengeance squadron not involved with overseas operations was 25SQN at Pearce. Receiving its first Vengeance Mk.IIs in JUL 1943, over the next two months built up to strength with both 'A' and 'B' Flights, and conducted anti-submarine patrols and dive-bombing practices. From APR 1944, seven Vengeance Mk.IV aircraft were received to form 'C' Flight, but these were released back to 1AD by JUN 1944 as battle-weary Mk.IA aircraft from 21SQN built up the strength.[145] Vengeance operation ceased in DEC 1944, as the unit prepared for the move to Cunderdin as a heavy bomber unit for induction of the B-24L/M Liberator.[146]

[colourised from Geoff Goodall's website [147]]

A27-249 (probably SJ-H) *Snifter* strikes again! Port cowling nose art, Snifter appears to have done his thing on a signpost (contemporary signs typically read "Tokyo" or "Tokio"), probably in 1943 as destroyed in MAR 1944 – only known 25SQN nose art.

Vengeance of 25SQN at Pearce 1943 *[AWM ART 21023]*

VENGEANCE Mk.IIs of 25SQN 1943-1944

A27-228 SJ-A, a MK.II, the first Vengeance received 25SQN in JUL 1943 for working-up as a dive-bomber squadron

[colourised from Pacific Victory Roll]

A27-228 SJ-A shows standard 25SQN markings: the 'SJ' squadron code was forward of the roundel on both sides in *Sky Blue,* still the original RAF colours from the Nashville factory of *Dark Green/Dark Earth,* but with undersides *RAAF Sky Blue*, carrying a practice bomb carrier.

A27-229 SJ-B The standard 32" Vengeance fuselage 3:5 roundel was level with the code letters, which were 32" high; fin flash 24" H x 24" W. Delivered in 1943 in RAF *TLS*, with any repairs in *Foliage Green* and *Earth Brown*.

[colourised from Geoff Goodall's website]

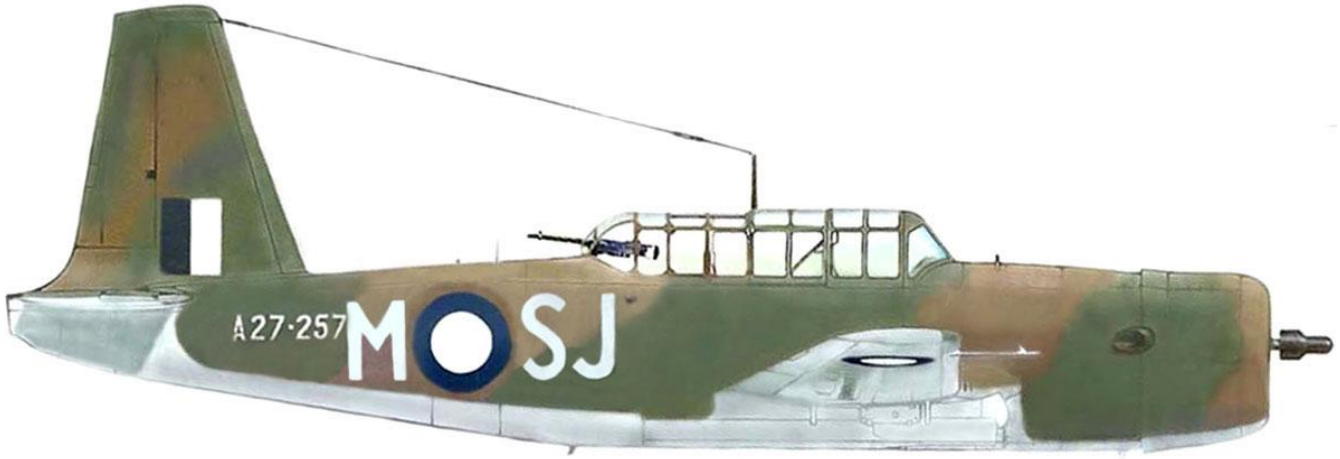
A27-229 SJ-B Vengeance Mk.II for 25SQN Nookenbah Station, in the far north of WA 1944

A27-257 SJ-M VENGEANCE Mk.II of 25SQN 1943-1944

A27-257 SJ-M was a MK.II like the other initial Vengeance allocation received by 25SQN in JUL 1943 for working-up as a dive-bomber squadron.

[colourised from Goodall website]

A27-257 SJ-M shows standard 25SQN markings: the 'SJ' squadron code was forward of the roundel on both sides in *Sky Blue,* still the original RAF colours from the Nashville factory of *Dark Green/Dark Earth,* but with undersides *RAAF Sky Blue*, and carrying a practice bomb carrier.



The standard Vengeance 3:5 roundel was 32" in diameter. Delivered in JUL 1943 in RAF *TLS*, A27-257 would have subsequently been repaired with *Foliage Green* and *Earth Brown* touch-ups, until retired to 4AD in JAN 1945.

[colourised from RAAF image]

25SQN A-35B Vengeance Mk.IV crashes at Ceduna SA 1944

25SQN was one of the two squadrons to operate of Mk.IV Vengeances (the other being 12SQN). Seven A-35B-5-VN Mk.IV aircraft were operated by 25SQN over mid 1944: A27-500, -503 (SJ-U), -504, -505, -507 (SJ-X), -529, and -530.

[colourised from RAAF image]

A27-503 crashed on take-off into trees at Ceduna on test flight in OCT 1944

A27-503 was received in Australia at 2AD in NOV 1943. Instruction RAAFHQ DTS SIG/8 of 26 AUG 1943 meant that aircraft finished in American camouflage scheme were to be accepted and not to be re-camouflaged in RAAF scheme during erection. A27-503 then received by 25SQN from 2AD in APR 1944 and coded SJ-U. Crashed on 10 OCT 1944 during ferry to RAAF Laverton from RAAF Pearce, when the aircraft crashed on take-off into trees at Ceduna on test flight. SJ-U retained its delivery *Dark Olive Drab* – evidenced by five lines of factory stencilling visible on rear fuselage above the "3" in s/n, part of which reads "FORE & AFT". 4AD was established between Kalgoorlie and Boulder, and the local Care & Maintenance Unit (Boulder CMU) disposed of 31 Vengeances, including the later A-35s: A27-406, -418, -419, -501, and -510.

[colourised from RAAF image]

A27-507 SJ-X of 25SQN Pearce which crashed taking-off at Ceduna on a test flight in NOV 1944

The A-35 chin intake is well illustrated, and the image also shows the camouflage demarcation, not overall *Dark Olive Drab*. For recovery, the ground personnel (from 5 Central Recovery Depot, 5CRD, at Port Pirie) have removed the tail as the aircraft was salvaged for conversion to components. **A27-507** had been received by 25SQN from 2AD in MAR 1944, and is unusual by being an A-35B camouflaged *FG/EB* – after the directive that overseas aircraft in AUG 1943 could retain delivery camouflage (i.e. *OD/NG*) and before the MAY 1944 AGI specifying overall *FG*. This **accident on 23 NOV 1944** was on take-off from Ceduna for a test flight, when the engine partially failed at 120mph, with pilot electing to go around for landing. But realising that he could not make a full circuit, he attempted a crosswind landing on grass. On approach, the aircraft stalled at an altitude of 5 feet, causing the port undercarriage to collapse when contacting the ground.

25 Squadron Codes

25SQN Code	Serial	Details and Name	25SQN Code	Serial	Details and Name
SJ-A	A27-228		SJ-N	A27-96	
SJ-B	A27-229		SJ-O	A27-267	A27-295, A27-60
SJ-C	A27-	probably not allotted	SJ-P	A27-264	
SJ-D	A27-		SJ-Q	A27-	
SJ-E	A27-236	probable	SJ-R	A27-	
SJ-F	A27-		SJ-S	A27-	
SJ-G	A27-247		SJ-T	A27-	
SJ-H	A27-249	probable	SJ-U	A27-503	
SJ-I	A27-	probably not allotted	SJ-V	A27-	
SJ-J	A27-		SJ-W	A27-	
SJ-K	A27-		SJ-X	A27-60	A27-507
SJ-L	A27-		SJ-Y	A27-	
SJ-M	A27-257		SJ-Z	A27-	

References for known 25SQN codes: *adf-serials* A27 database, imagery. The ***'SJ' code forwards of roundel*** both sides.

• In 1946, at 4AD, DAP offered the RAAF Boulder Vengeances for sale to the public as "aircraft remnants". These were A27-30 (ex-25), -32 (ex-25), -45 (ex-25), -54 (ex-25), -55 (ex-25), -64, -66, -68, -69, -95 (ex-25), -96/N, -228/A, -229/B, -232, -236/E prob, -247/G, -251, -255, -257/M, -258, -259, -264/P, -265, -268, -296, -404, -418, -419, -501, -504, -510.
Not listed are other ex-25SQN aircraft: A27-249/M, -503/U, -507/X, -28, -60, -267.

• 21SQN A.50: The following allotments were made at the cessation of 21SQN Vengeance flying to 25SQN: **6 JUN 1944** A27-28, -45, -50, -54, -55, -60, -69, -86, and -96.[148]

• 25SQN A50: The following Vengeances are noted on strength: APR 1944 A27-30; 10 JUN A27-32 [ex 23]; 14 JUN A27-45; 15 JUN A27-96; 16 JUN A27-28; 22 JUN A27-55 to Cunderdin for 240-hrly; 22 JUN A27-60; 25 SEP A27-54; 19 OCT A27-95.

[colourised from Geoff Goodall's website]

A27-267 SJ-O after engine failure and undercarriage failure at Pearce on 17 DEC 1943

A27-267 was received by 3AD at Amberley in JUN 1943, then passed to 25SQN at Pearce on 30 SEP 1943. On 17 DEC, experienced engine failure and the undercarriage failed to lower for landing at Pearce. Pilot carried out a successful belly landing and the crew were uninjured. To 4AD at Kalgoorlie on 26 DEC 1943, and approved for conversion to components on 31 MAY 1944. A27-295 was issued to 25SQN from 1AD the following month to become the new SJ-O.

25SQN Hulks at 4AD Kalgoorlie

4 Aircraft Depot had been formed at Pearce in MAY 1942 and moved to its permanent home, the racecourse an Boulder, just south of Kalgoorlie. Its main task was repairing and overhauling aircraft engines, airframes and ancillary aircraft equipment, mainly for RAAF units located in WA, which from mid 1943 included the Vengenaces of 25SQN.

At the end of 1944 as 25SQN was re-equipping with Liberators, its Vengeances were ferried to the Depot for storage and subsequent disposal. Ex-25SQN Vengeances still with their codes at Boulder or Kalgoorlie scrapyards included A27-96 SJ-N, A27-236 SJ-E, A27-247 SJ-G, and A27-264 SJ-P. In 1946, DAP offered the RAAF 4AD/CMU Boulder Vengeances for sale to the public as "aircraft remnants".[149]

[colourised from Geoff Goodall's website]

Vengeance Mk.IA A27-96 SJ-N

[Geoff Goodall's website]

In the background is A27-236, probably SJ-E c1949

[both Geoff Goodall's website]

Remains of Vengeance Mk.II A27-247 SJ-G at a Kalgoorlie scrapyard in APR 1965

A27-247 was received by the RAAF in APR 1943 and transferred to 25SQN at Pearce in JUL 1943, where it was coded SJ-G. Being no longer required, it was passed to 4AD at Kalgoorlie in JAN 1945 to be offered and authorised for disposal in 1946 while stored by the Care and Maintenance Unit at Boulder. Passed to the DAP in FEB 1947, it was struck off charge in JUN 1948. Surviving on display and partially assembled at the Malcolm Green Aircraft Museum at Whaleworld, Albany WA, A27-247 is now with HARS – so perhaps a second fully restored Vengeance for Australia.

COMMS UNITS

The Comms Units were based in the capital cities with a variety of liaison/transport and target-towing aircraft to provide daily availability for communications tasks. Below is a list of the CUs and bases associated with Vengeance IVs:

1CU EV Laverton 1939-48 – A27-417, -421, -610.
3CU DB Mascot 1942-46 – A27-405, -409, -414, -417, -563, -611, -626.
4CU VM Archerfield 1942-46 – A27-404, -413, -415, 504, -528, -535.
5CU KF Townsville 1942-1946 – A27-407 (possibly KF-Q), -412 KF-V, -408, -420, -508, -524, -544, -608.
6CU XJ Manbullo NG, Darwin 1942-45 – A27-411, -4116, -421, -422, -517, -527, -541, -601, -602, 613.
7CU YB Pearce 1943-46 – A27-406, -418, -419.
8CU ZA Goodenough, Madang 1943-46 – A27-408 ZA-A, A27-410 ZA-B.

[colourised from internet image]

A27-410 ZA-B of 8CU based on Goodenough in early 1944, camouflaged with *White* rudder

A27-410 / ZA-B with a variation on the mandatory *White* empennage for New Guinea – in this case marked only on the rudder. Serving with 8CU over early 1944, A27-410 / ZA-B was transferred to 4CU (Archerfield) in AUG 1944, then to storage in 1946.

Another, **A27-408 / ZA-A**, served with 8CU from JAN 1944, and in JUL was painted overall *Foliage Green* by 15ARD at Ward's, complying with the new MAY 1944 policy. Transferred to 5CU (Townsville) in OCT 1944 until 1945, and storage in 1946.

[colour image from 'Vengeance'*]*

RAF Northrop Vengeance Mk.I AP123 repossessed by the USAAF

These Vengeances, with smaller star roundels, are in US *Green 42* – which shows similarity with RAAF *Foliage Green (K3/177)*

RAAF VENGEANCE TARGET-TOWERS

The Vengeances allotted for target-towing retained their camouflage and received *Yellow/Black* striping on the undersides. TT units were the CUs or the OTUs, as shown on two Mk.Is here. These were early mods with a winch arm on port side, later the RAAF Vultee Vengeance Type B Winch installation had the winch arm and windmill on the lower starboard side. Known Mk.Is used for towing at 7OTU include A27-7, A27-9, A27-13 and A27-14.

[colourised from RAAF image]

A27-9 in TT stripes NOV 1944 with starboard-mounted 'Type B' winch arm, paint touched up later used for Beaufighter [150]

[both colourised from adf-serials *images]*

A27-13 and A27-14, original Northrop-built Mk.1s delivered in 1942 with type-A markings. In early 1944, converted to TT for CUs, then in mid-1944 to 7OTU. Working-up on Liberators, for aerial gunner training 7OTU had a dedicated Towing Flight.[151]

A27-419 was an A-35A of 7CU in the West (shown below) and an exception to the rule, being TT-striped all-over with 2:5 roundels, a scheme carried by very few of the TT Vengeances.

[colourised from adf-serials *image]*

A27-419 in an alternative TT scheme and 2:5 roundel, with 7CU based at Maylands Perth c 1945 – a scheme for those crews who really wanted to feel safe !

A-35 coverted to a target tower. The intake on the chin shows this to be a A-35, but trying to determine the wing .50 cals (i.e. four for A-35A, six for A-35B) is more difficult.

[colourised from internet]

The *Yellow/Black* striping appears to go higher up the sides than the Mk.I aircraft above. Squadron/CU codes appear to be marked on the rear fuselage (VM/4CU or KF/5CU perhaps).

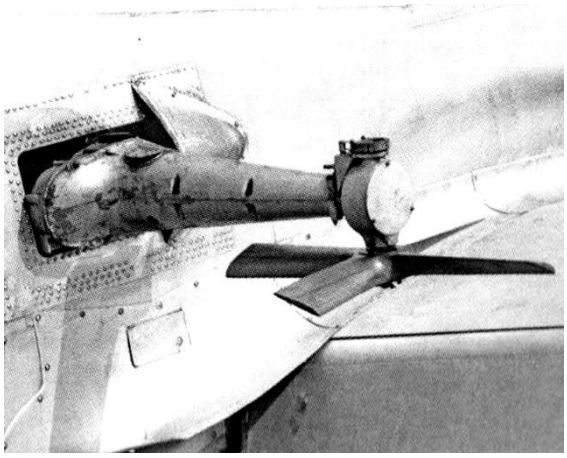
RAAF VENGEANCE TARGET-TOWERS

Powered 'Type B' Winch. The starboard-mounted 'Type B' towing winch mechanism was an arm-mounted ram air windmill, which provided power to a winch drum in the floor of the rear cockpit to wind in a deployed drogue target. Postwar, this was also fitted to TT Beaufighters of 30SQN, and also in the early 1960s to the civil Mustangs VH-BOY (A68-39) and VH-BOZ (A68-199) used on contract to the Defence Department, and presumably available from RAAF Beaufighter stocks.

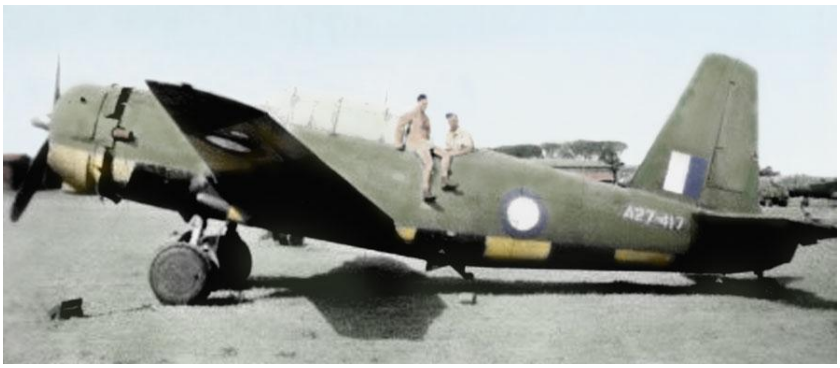
[colourised from RAAF image / AWM 067955]

KF-Q (probably A27-407, an A-35 of 5CU) in JUL 1944 at Mareeba, pulling a sleeve target from the starboard Type B winch
The winch is mounted below the rear cockpit – just visible above the code letter 'Q'. This is an A-35 – identifiable by the small lip scoop intake below the cowling. A47-407 served with 5CU at Townsville for all of 1944 and 1945.

Towing targets – providing aerial targets was for air-to-air practice for the RAAF, and for AA gunnery practice for the Army, and also for the Royal Navy who were working up two carrier task forces in Australia for the final stages of the Pacific War. Vengeance pilot then on 3CU at Mascot, provided details of the different requirements.[152] The Type B winch target towing gear was installed by Vengeance Order No.74 over 1943-44 and Target Towing Order No.12.[153]



A27-406 an A-35A Vengeance Mk.IVA, Type B winch, Pearce 1944 *[awm P01877.005]* **Type B winch arm VH-BOZ**



A27-417 Mk.IVA was allotted for Target Towing in SEP 1943, and after limited service with 1CU at Laverton with servicing by ANA at Essendon over early 1944, was issued to 3CU at Mascot in AUG 1944. Suffered a forced landing near Mascot in JAN 1945 during an Army Co-op target drogue exercise; crew uninjured. Approved for conversion to components in MAR 1945. This image is probably at Mascot in late 1944 – the aircraft appears to have retained its delivery *Olive Drab* and had TT stripes added.

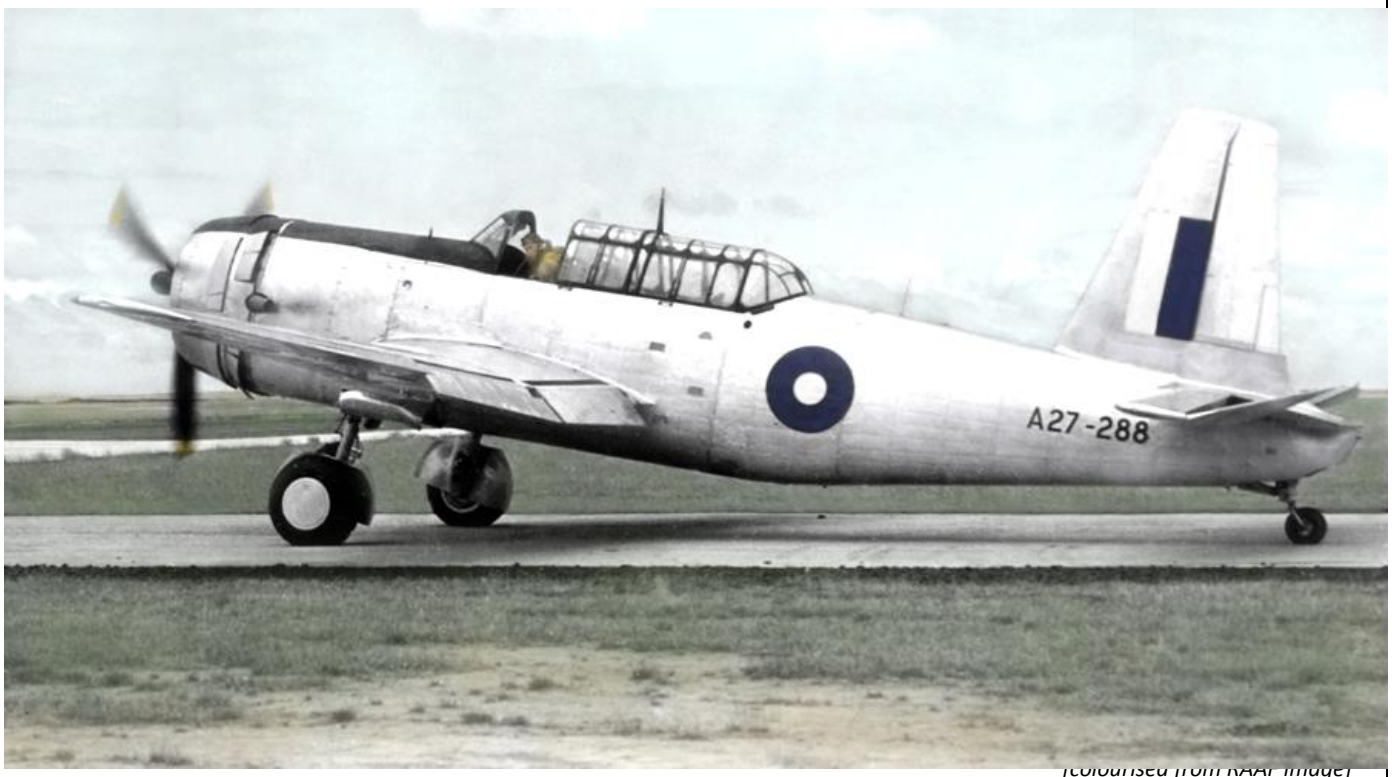
SILVER RAAF VENGEANCE Mk.II 1944-45

The only known bare metal Vengeance in RAAF service was Mk.II A27-288, received at CFS Parkes from 21SQN in JUN 1944. Camouflage was stripped back to natural metal finish with black anti-glare on forward cowl while at CFS. In SEP 1944, CFS moved from Parkes to Point Cook.

[RAAF image]

A27-288 a bare metal **Vengeance Mk.II with over-size fin flash**

A27-288 was a CFS aircraft, which had seen combat with 21SQN from Nadzab over FEB/MAR 1944.
Bare metal with the later 2:5 32” roundels, and fin flash 24” wide (12” each colour), and an incredible 45” high.

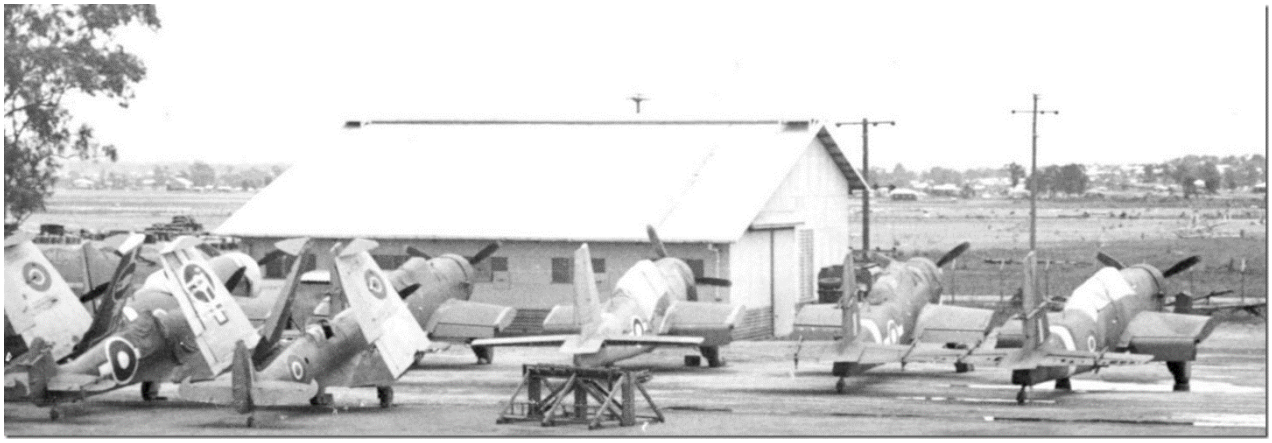


[coloursed from RAAF image]

A27-288 with CFS at Point Cook over 1944-45

POSTWAR ROYAL NAVY VENGEANCE TARGET-TOWERS

An odd postwar development was the Royal Navy Pacific Fleet request for Vengeance target-towing and spraying aircraft from RAAF stocks. Below is a late 1945 image of RN Fleet Air Arm aircraft at HMS *Nabsford* at Archerfield. Note that most have the RN Pacific roundel.



[colourised from GRBimage]

Adf-serials A27 webpages provide details of 26 RAAF Vengeance Mk.IVs modified for target-towing and allocated to the RN FAA, of which nine were actually transferred over SEP-OCT 1945 to the RN at Bankstown. These nine were A27-502, -520, -529, -539, -545, -547, -549, -619 and -625, of which one (A27-625) was returned to the RAAF at 3AD in DEC 1945. At least one, A27-619, had been modified for DDT Spraying Duties by 1APU in JUN 1945.

721 Squadron – or at this stage 721 Fleet Requirements Unit (721FRU) – was embarked in the maintenance carrier HMS *Unicorn* for Australia, and on arrival in Brisbane on 15 OCT 1945, was disembarked to the RN Maintenance Yard at Archerfield to regroup. At Archerfield the squadron resumed training prior to departing for Hong Kong – a few additional aircraft were flown the Avenger I, Seafire III and a Mosquito, but these were left behind when 721 left for Hong Kong. There was one recorded incident during this period, Vengeance HB520 ground looped after landing on 11 NOV 1945. Now with an increased inventory of 10 Vengeance TT.IVs (which probably includes the eight A27 aircraft mentioned above), 721 embarked in HMS *Speaker* for passage to HK, sailing on 28 DEC 1945. Disembarking on 11 JAN 1946 to RNAS Kai Tak – a joint RN/RAF station, the RN (West) side of the station housed HMS *Nabcatcher* – the role of 721 was fleet support, which included target-towing and the eradication of the mosquito infestation from the colony – three of the Vengeances had been modified for DDT spraying, and this commenced on 15 FEB 1946.[154]

[colourised from GRB image]

Royal Navy Vengeance TT.IV 'F' of 721SQN at Hong Kong, with 1946 Type-D roundels

This aircraft was apparently one of the original RN target-towers, as it has the Type B winch on the port side, not the starboard side as was the RAAF standard fit. The tiny 4-inch 'Royal Navy' title and serial number defies positive identification.

This 721 SQN reference also gives several Vengeance incidents over 1946: on 4 APR 1946 **A27-545** aborted take-off; **HB305** crashed landing on 8 APR; **HB439** had an emergency landing after an engine failure on 3 MAY; on 23 MAY **FD303** swung off the runway on take-off; on 24 SEP **A27-545** had an engine fire; and on 29 NOV 1946 **A27-619** suffered an engine fire and forced-landed.

VENGEANCE Mk.IA – EZ999 / A27-99 AT CAMDEN

The world's last complete Vengeance…

Saved by Harold Thomas, an instructor at Sydney Technical College at Ultimo. During its time there, it was overall *Aluminum*. Purchased for his fledgling museum at Camden, spare parts were obtained from Kalgoorlie, the ex-home of 4AD which had housed many Vengeance spares. Painted in *Foliage Green* – Thomas still had a wartime can of paint.

[Warwick Henry]

EZ999 at it home at the Sydney Technical College, Ultimo, in MAR 1960

[Hopton Collection]

Vengeance Mk.IA EZ999 owned by Harold Thomas at Camden 1965 *[Goodall]*

This shows the first attempt at wartime markings – wrongly proportioned roundel and codes, utilising only straight letters

VENGEANCE Mk.IA – EZ999 / A27-99 AT CAMDEN

[Wayne Brown]

EZ999 engine runs in 1987 at the Camden Aviation Museum, Narellan NSW.

K3/177 *Foliage Green*	**K3/178 *Earth Brown***	**K3/195 *Sky Blue***

[Wayne Brown]

Saved by Harold Thomas for his museum at Camden, then moved to nearby Narellan

[Calum Gibson]

EZ999 spurious nose art '*DINA MIGHT*' in 2013 – EZ999 was also painted with the fake 12SQN code marking 'NH-Y'

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The first Skyhawk on HMAS Melbourne and A-4G Skyhawk 888

Out at sea, on the 23rd May 1979, some 45 nautical miles (90km) east of Jervis Bay, NSW, was HMAS Melbourne conducting the recovery of A-4G Skyhawks.

Prequel reflection

HMAS Melbourne commissioned into the RAN on the 28th October 1955. After working up with her new Sea Venom Fighters and Gannet Anti Submarine aircraft, she arrived in Australia in April 1956. It was deemed by 1963 that all fixed wing flying would cease and the Carrier become a Anti Submarine Helicopter Carrier. The RAN only purchased the A-4G following the threats associated with "Konfrontation" of Indonesia with 10 (then) such aircraft ordered in October 1965.

Prior to that, the first landing of an A-4 Skyhawk on HMAS Melbourne was actually made on the 20th May 1965 as a demonstration. The US Navy Anti-Submarine Carrier *USS Bennington* whilst carrying both S-2 Trackers and Helicopters also included four A-4B/C aircraft detachments for the purpose to discourage any maritime aircraft and to provide a limited light strike role.

That was the envisaged A-4G role for the RANFAA to combat any Indonesian Badger Bombers. Additionally our A-4Gs were modified to carry four Sidewinders.

That aircraft was the US Navy's VA-113 Detachment Q's A-4B BuNo 144874[155], piloted by Lt Cdr Charles W Ward III[156] detached from the USS Bennington (CVSG-59).

It was also the first of type to be catapulted off HMAS Melbourne, though this is a banter missed wire shot

The first and only operational RANFAA Skyhawk Squadron, VF805, was commissioned at NAS Nowra on the 10th January 1968, and remained operating the A-4G until the end of RAN carrier operations forced its disbandment in July 1982. Skyhawk Operations ceased on the 30th June 1984

High over the US of A, our first A-4G N13-154903 carries the RANFAA standard four sidewinder load.

Delivery was by sea and then lighted to the shore.

By the end of the Douglas A-4G Skyhawks' 16 years of service with the RAN, exactly half of the 20 aircraft which had been delivered had been lost in accidents.

It is during this spate of six accidents in the 1979-80 period that we focus on an accident that took place on the 23rd May 1979.

A-4G "888"

Being the seventh of eight single-seat A-4G Skyhawks, N13- 154909, had been unloaded from HMAS Melbourne after its sea voyage home from the USA, onto a Navy barge in Jervis Bay on the 23rd November 1967. It was then transferred by road to Nowra, where checks and maintenance were performed, before its first Australian Flight.

A UK Defence 1966 review indicated that the Royal Navy's Centaur Class Carrier, HMS Hermes, was surplus to operational requirements and she could and was therefore offered to the Royal Australian Navy (RAN) as a early replacement for HMAS Melbourne. The offer of buying this carrier however was turned down due to operating and manpower costs.

However further on, from October 1968, HMS Hermes took part in a combined exercise with the RAN, during which the carrier was visited by senior RAN officers and Australian government officials, while RAN A-4G Skyhawks and Grumman S-2E Trackers practised landings on the larger carrier.

So during this period, the opportunity to practice A-4G landings and take off HMS Hermes off the coast of NSW were taken, including A-4G "888" sometime on the 4th November 1968. Other A-4Gs included "883" and "886".

A-4G "888" pictured after landing and later catapulting of HMS Hermes and note, the original straight offset refuelling probe. Fourteen years later, in the South Atlantic, the very type would be deemed as the enemy to HMS Hermes.

HMAS Melbourne, following her lengthy modification to be able to operate the new types, returned to sea on 3 February 1969 for sea trials and workup exercises, and a rededication ceremony was conducted on board on 14 February. Less than three months later, on 29 April, the ship celebrated her 1000th deck landing since completing her refit.

Of interest, UK RNFAA F-4K (Phantom FG1) trials were held on HMS Hermes a year later in 1969–1970 Period[157]. From the smaller HMS Hermes takeoff would be at 25knots rather than 28knots from HMS Eagle (the only operation Royal Navy Carrier to deploy them). It was optimistically believed HMS Hermes Carrier Air Group could carry eighteen F-4Ks in lieu of twelve Vixens and eight Buccaneers.

And an F-4K would have to be catapulted from HMS Hermes at much lower weight (less fuel) than from Eagle and combat air patrols possible would be 25 to 50 percent less duration than from Eagle, reduced from 2.00 to 2.30 hours to 1.00 to 1.30 hours, and only partly compensated by refuelling when airborne.

In 1983, when the proposed sale of the aircraft carrier HMS Invincible to the Royal Australian Navy was cancelled following the Falklands War, an offer again was made to sell HMS Hermes and a squadron of Sea Harriers to Australia. However the new Hawke Government decided against purchasing a replacement for HMAS Melbourne.

Editor's note: I should point out; the first F-4 Phantom that placed wheels on HMS Hermes was in fact US Navy ...an F-4B model from VF96, during a touch-and-go landing aboard HMS Hermes in early 1963. The Royal Navy eventually received its first of 28 F-4K Phantom FG1s, in April 1968.

Here pictured above, the first, U.S. Navy McDonnell F-4B-9-MC Phantom II (BuNo 149410) of Fighter Squadron 96 (VF-96) "Fighting Falcons" aboard the Royal Navy aircraft carrier HMS Hermes (R12) on 17 January 1963. VF-96 was assigned to Carrier Air Group 9 (CVG-9) aboard the aircraft carrier USS Ranger (CVA-61) to the Western Pacific from 9 November 1962 to 14 June 1963.
Another shot of 888 on HMS Hermes. Sea Vixen pictured at rear, below.

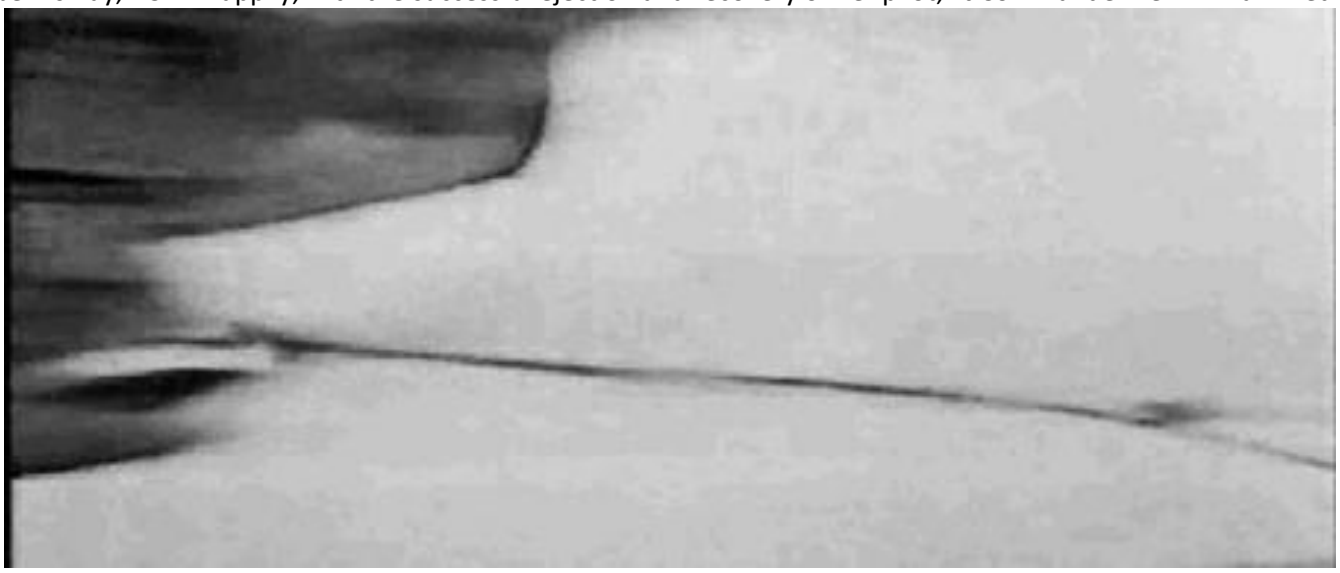
Missed trap practice (Hook up) and then high angle of attack recovery in early 70's. Photo Mark Clayton

"888" loaded with two tanks and three bombs on a central triple carriage.

A-4G "888" served primarily all of its life with VF805, though briefly in the mid seventies, it did serve with VC724.
Note replacement offset bent shorter refuelling probe now installed.

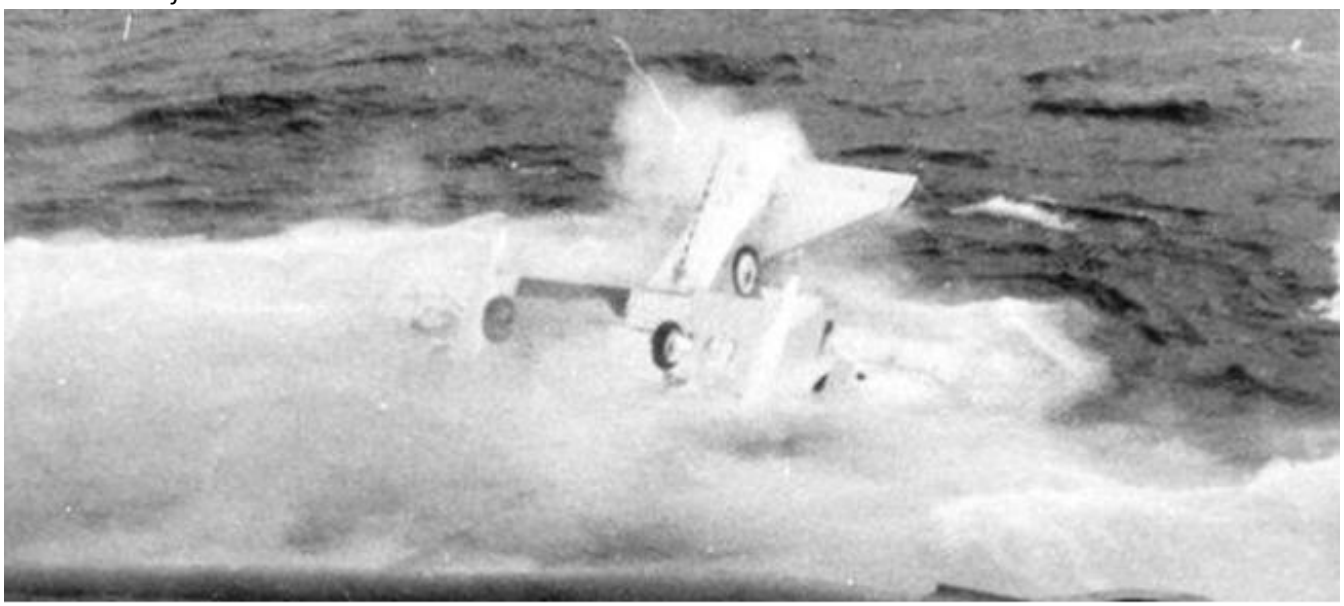
888 Eject Sequences.....

The aircraft's final deployment on HMAS Melbourne saw her demise on the 23rd May 1979 90 Kilometres east of Jervis Bay, NSW. Happily, with the successful ejection and recovery of her pilot, Lt Commander Kevin Finan lived.



The arrestor wire parted during land-on, which caused the "888" to lose directional control on deck as cable slides off in direction of undamaged wire spool.

Then in sequence; cable lets go, spools off, but still causes drag on arrester hook, "888" just has no adequate air speed to initiate an aborted go around. As it nears the edge of the flight deck, the pilot is already initiating his ejection seat escape. Canopy blows, and with sink rate increasing as it clears the deck, he is successfully ejected. It became RAN Ejection number 9.



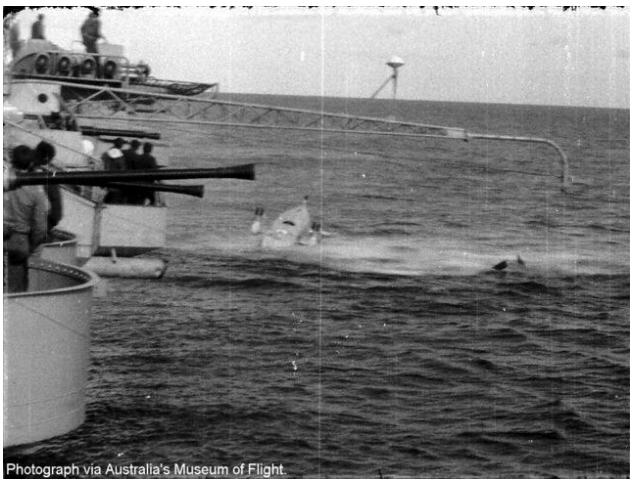
She floats still, until slowly air is displaced, causing her to slide under into Davy Jones' Locker

The Pilot
Lieutenant Commander Kevin Finan, a US Navy Aviator on exchange, was quickly recovered by the search and rescue aircraft and the HMAS Melbourne's Gemini dinghy. He flew for 3 years as an exchange officer with the Royal Australian Navy Fleet Air Arm during the late seventies.

His time in the US Navy prior included flying F-4B/J Phantoms aboard the USS Enterprise, where he completed 90 combat missions during the Vietnam War. He would later command an F-14 fighter squadron, ultimately achieving the rank of Captain. Kevin Finan left active duty in 1980.

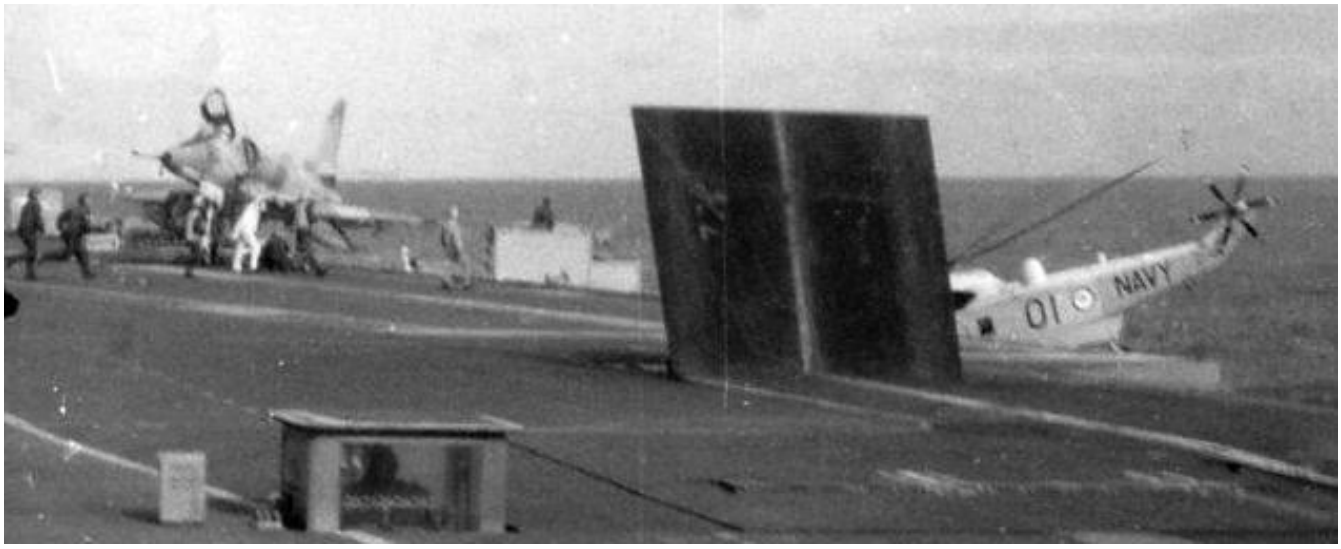
Kevin continued to fly commercially with airlines, until the mandatory retirement age of 60. He eventually retired from Alaska Airlines in 2008. Following that, Kevin worked as an independent contractor for Boeing, teaching other pilots to fly the 787 Dreamliner.

The other accident on the same day below involved a Sea King "01", and it doesn't explain why there was no SAR prior given that two Sea Kings were flying that day for 888.



While discussions were being conducted on board regarding the rescheduling of the exercise program and an investigation into "888"'s loss and the damaged arrestor system, Sea King N16-098 "01" helicopter engaged in an anti submarine exercise, reported unusual vibration and noise in the rear of the helo.

The Pilot elected to return to HMAS Melbourne and as the helo entered hover to land tail rotor control was lost as it suffered a tail shaft failure lost height and just missing the ship's side, followed by ditching into the sea, and turning upside down as it landed. The forward part of the aircraft quickly submerged leaving only the tail wheel and a small section of the aft fuselage visible on the surface.



The Crew of "01"; Pilots Lt Cdr (P) V. Battesee and LT (P) M Ogden escaped and were winched to safety by Sea King N16-125 #10. Rear crew LT (O) M Wright & Leading Seaman Skewes were picked up by HMAS Melbourne's Gemini boat.

Did they manage to re-float and salvage both of them?

Hardly...but the Gemini Crew did look forward to at least three rounds of beers on the day.

Did you know, our second batch of eight preloved A-4Gs first flew as A-4Fs with Avionics humps in 1968-1971 period! Here is BuNo 155061, which later became RANFAA's N13-155061 "874" later the RNZAF's NZ6216.

This could be the answer why our RANFAA A-4Gs were not Nuclear capable.....they may have been able to launch, but unable to return with it on landing. Distance to bottom bomb fin extremity must be better than the 2 feet and 7 inches clearance from deck after being hinged down in flight!!

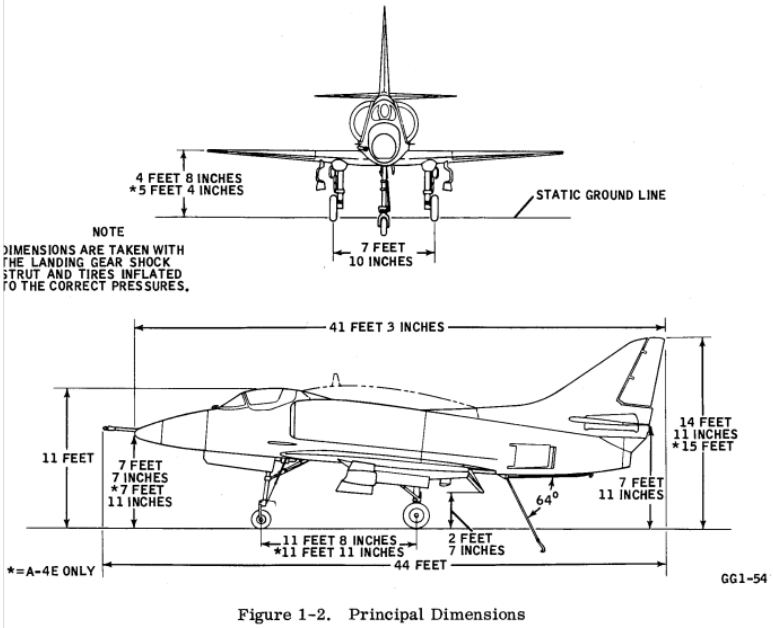


Figure 1-2. Principal Dimensions

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No 2 SQUADRON A.F.C.

by John Bennett 2019

PART II – TO THE BATTLEFIELD

> *It must seem strange that the sky, too, is about to become another battlefield no less important than the battlefields on land and sea. But from now on we had better get accustomed to this idea and prepare ourselves for the new conflicts to come...*
>
> *Major Giulio Douhet, 1909* [158]

The D.H.5 was armed with a synchronised Vickers machine-gun mounted above the fuselage in front of the cockpit, slightly to port. Gun aiming was by means of ring and bead sight, and also an Aldis telescopic sight was fitted. The Aldis sight was described by Australian pilot Leslie "Woodie" Sutherland:[159]

> The Aldis is a clever and efficient job. This is it – this tube about twenty inches long, and two inches in diameter...inside are three lenses at equal distances apart. On one of them is painted a ring with a dot in the centre. When you look through the tube, this ring appears to be hung in space. At 200 yards range it gives a diameter of approximately forty feet; that is the average wing-span of the Hun machines. The pilot's job is to get the figure of the Hun pilot cutting the rim of this circle, and heading towards the black dot. Then he presses the trigger. Theoretically, the Hun pilot and your bullets should arrive at the black dot together. When the theory works out, as it mostly does, you have some interesting information for your 'Combat in the Air Report'.

Fighting tactics had evolved since the first recorded aerial combat on 22 August 1914, when a German two-seater was shot down by rifle from an RFC aircraft.[160] Pilots grew in experience of air warfare, and distinctive classes of aeroplanes were developed. The single-seat scout was born to provide air superiority over and behind enemy lines to safeguard the slow-flying observation machines. These offensive fighter tactics against hostile aeroplanes then led to the growing realisation that the aircraft was highly effective at harassing enemy troops and communications. This was now being developed into bombing and strafing – the beginning of ground attack.

[AWM image colourised by The Diggers View*]*

68SQN D.H.5 A9245 presentation '*Australia 17 NSW 16 the Upper Hunter'*, at Harlaxton August 1917

The D.H.5 had been designed by Geoffrey de Havilland by retaining the unobstructed field of view of the pusher scouts, and grafting it upon the tractor design – representing the most ingenious compromise between excellent forward vision and aerodynamic efficiency. However, it became evident that performance came first in aerial combat, and this aeroplane was not destined to remain in service for long, giving away to higher performance aircraft such as the Camel and S.E.5. Few aeroplanes have been subjected to so much adverse criticism among pilots as the D.H.5:

> A good many accidents happened when pilots were being trained to fly this machine, and it acquired the reputation of "losing" its elevator control if the gliding speed were allowed to fall to anything approaching the landing speed of about 50mph. Partly, perhaps, on this account it was never used extensively for low aerobatics.[161]

[AWM E02656 colourised by Benjamin Thomas] *[AWM colour image A2016.360.3]*

68 SQN 'A' Flight Commanders France 1917: Wilfred McCloughry, replaced in OCT 1917 by Roy Phillipps

Fighting tactics were the prime focus for 68 Squadron's pilots during their stay at Harlaxton in mid 1917. They had soloed on Shorthorns at basic training units, typically taking two to three hours to achieve this, then flew another ten hours solo on 'Rumpeties' to qualify for advanced instruction.[162] Then more consolidated training was conducted on one of the Australian units preparing for the Front – Nos 68, 69 or 71 Squadrons – or on an RFC Reserve Squadron.[163] After this, pilots were qualified to wear their "wings",[164] and No 68 Squadron was able to concentrate on combat training. Several of the pilots were fortunate to receive extra training at the School of Gunnery at Turnberry (south of Glasgow in Scotland), at Central Flying School at Upavon, or on the Fighting Course at Spittlegate, near Harlaxton.[165] These were considered the "finishing schools" for a pilot, to learn combat manoeuvring and gain full confidence in his machine.

An ingenious development in the training for aerial fighting was the camera gun, described in a contemporary *Flying* magazine:[166]

> We now have a Lewis gun, which, instead of being fitted to fire bullets, is fitted to take photographs, and aerial battles in which one aeroplane endeavours to catch and photograph another with this photographic gun are of
>
> daily occurrence. The value of such training is obvious. In addition to this a school of gunnery has been developed, and is going on developing, in which practice from the air takes place against every sort of target, both on the ground and in the air. Targets are now towed by aeroplanes without any danger or difficulty, and these are used for actually counting the hits made from an aeroplane in the air.

As related, several of the Australian instructors with 68 Squadron at Harlaxton had come from 67 Squadron in Egypt, including Captains William Guilfoyle, Stan Muir and John Bell. Guilfoyle, a Scot, had gone to war with the Light Horse in August 1914, transferring to the Royal Artillery the following year. Late in 1915 he commenced flying training with the RFC, serving first on No 19 Squadron, then back to the desert in July 1916 to rejoin Australians in 67 Squadron in the desert. These three sailed with Watt on HT *Kingstonian* and, as founding members of 68 Squadron, served as Flight Commanders and flying instructors at Harlaxton.

Over that summer, the CO and most of the pilots were able to spend at least a month in France to gain operational experience on attachment to RFC squadrons at the Front. The first weeks over the lines were the most dangerous for an inexperienced pilot. The novices were easy prey, as they did not sense approaching danger. This benefit of building up experience levels before proceeding to the Front en-masse would prove invaluable. Most of the Australian pilots would fly the D.H.5 on their attachments, but several flew the Camel and other types.[167]

D.H.5 at Harlaxton 1917 – probably A9226 (A9336 and A9536 did not join 68SQN until NOV 1917 in France)

Lieutenant Richard Howard was attached from May until July to No 57 Squadron RFC at Boisdinghem, near St Omer, flying D.H.4 two-seaters. The adjutant of No 68 Squadron, Captain Roy Phillipps, had applied for pilot training, and by July was flying the D.H.5 at Harlaxton. At the beginning of August, he was attached to No 32 Squadron RFC at Droglandt, in Flanders, to build up his D.H.5 experience. On 6 August, he was hit by groundfire and crashed near Ypres. He was unharmed and rejoined 68 Squadron at Harlaxton in September.

Lieutenant George Matthews and two future flight commanders of the Squadron, Lieutenants Gordon Wilson and Henry Forrest, were also sent to the Front; the latter with 43 and 32 Squadrons flying Strutters then D.H.5s. On 5 August, flying D.H.5 A9380 with No 32 Squadron, Forrest crashed soon after take-off, completely wrecking his aircraft and injuring him over the eye.[168] He was able to rejoin 68 Squadron in November. Lieutenant Victor Norvill was attached to No 29 Squadron RFC to fly Nieuport 17s at Poperinghe on reconnaissance patrols prior to the Third Battle of Ypres (31 July to 10 November). In an engagement on 29 July between seven British machines and 25 German scouts, while flying Nieuport B1677, he was shot down, wounded, and taken prisoner.[169]

Among the junior pilot ranks were two from CFS at Point Cook. Lieutenants Douglas Morrison and Albert Griggs, an American living in Hobart, had been students on the Fifth Course at Point Cook, and had been posted to the second unit – No 69 Squadron (3AFC) – to be shipped from Australia. Morrison then served for four months on No 49 Reserve Squadron to complete his training, and in July went for a month at the Front with No 24 Squadron at Baizieux on the D.H.5. Griggs finished his training with No 48 Reserve Squadron, joining 68 Squadron in June. Unfortunately, they were both to die from wounds in the Squadron's first two months of combat.

Most of the pilots had returned from their attachments to France by 18 August. However, one of the new arrivals 2LT Alan Weaver, who had joined four days previously, was injured when he crashed his D.H.5 A9432 on 27 August at Harlaxton when the engine failed, and he did not proceed to France with the Squadron. Sadly, Stan Muir, the "B" Flight Commander, was killed in an accident on 12 September while demonstrating aerobatics at 500 feet over the aerodrome in D.H.5 A9275. He overstressed the wings during inverted flight, they folded, and he died instantly as the wreckage hit the ground. 68 Squadron was to dig its first grave – he was buried with full Military Honours in Harlaxton Cemetery. Muir had been popular with the groundcrew. One day an RFC training pilot was abrupt with one of the 68 Squadron riggers, which Muir had overheard. He explained to the pilot: "Don't make trouble here, that laddie can do ten times as much for you as you could do for him, and civility is free".[170]

colourised from Reckless Fellows]

D.H.5 crash Harlaxton, probably Weaver's A9432 on 27 August 1917

In anticipation of the move to the Front, 68 Squadron had been organised along the RFC lines of having three flying Flights – "A", "B" and "C" – and an administrative Headquarters Flight. Each Flight was formed with six aeroplanes and pilots, and its own establishment of groundcrew. At this stage in the RFC, the Squadron Commanding Officer was not permitted to fly on operations. It was the Flight Commander who led aircraft into combat. In addition to the daring and initiative required of an aviator, the patrol leader had literally to see everything in the sky so as never to lead his

flight into a bad position. After Stan Muir's death, Gordon Wilson was appointed to command "B" Flight, and was subsequently promoted to Captain.

On 16 September, the Squadron's advance ground party with transports left Harlaxton for France, under command of the Equipment Officer, Lieutenant Eric Tooth. They proceeded by road to Portsmouth, arriving on the 19th, and then sailed to Le Havre. Setting off then by road to Amiens, the ground personnel arrived at Baizieux on the evening of 26 September. The remainder of the groundcrew, including spare pilots, departed Harlaxton for Southampton by rail on 21 September, to provide the Squadron with a total strength of 170 ground personnel.[171]

The move of 68 Squadron's aircraft from England on Friday 21 September 1917 was the first time that a whole unit of the Royal Flying Corps was able to deploy overseas in one day. Leaving Harlaxton at 9.30am, Major Oswald Watt had led the Squadron to No 8 Aircraft Acceptance Park (8AAP) at Lympne, in Kent. Then with his "A" Flight Commander, Captain Wilfred McCloughry, they crossed on a forty minute over-water leg to France. It had been a beautiful day for the crossing, and two flights lunched at St Omer, with the last of the fifteen aircraft arriving at 5pm. The following day they flew on to Warloy, and then to their new base at Baizieux, near Albert, on 23 September. The one-day deployment to France is believed to be a record they held to the conclusion of hostilities.[172]

[colourised from AWM C01852]

To the battlefield – MAJ Oswald Watt with his 68 Squadron pilots departing from Harlaxton, 21 September

*L- R (back row):*Unidentified; Lt Douglas Morrison, Lt Richard Howard; Lt Albert Griggs, Lt Ivo Agnew; Capt Wilfred McCloughry; Maj Oswald Watt; Lt Col Burdett (OC 24th Wing); Capts John Bell, Gordon Wilson and Roy Phillips; u/i; Lt George Matthews.

DEPLOYMENT OF No 68 SQUADRON TO FRANCE

The following fifteen pilots flew from Harlaxton, via Lympne in Kent, to St Omer in France on 21 September 1917. Although established for a complement of 18 D.H.5 aircraft, No 68 Squadron possessed 15, and was issued with a further three on arrival at Baizieux from No 2 Aircraft Depot (2AD). 2AD – or its subordinate 2 Aeroplane Supply Depot (2ASD) – then resupplied aircraft to make good attrition and maintain Squadron strength at 18 aeroplanes.

Major W O Watt

Captain J Bell

Captain W A McCloughry

2/Lieutenant G C Wilson

Captain R C Phillipps

Lieutenant G C Matthews

Lieutenant A Griggs

2/Lieutenant C H James

2/Lieutenant L H Holden

2/Lieutenant R W Howard

2/Lieutenant W A Robertson

2/Lieutenant D G Morrison

2/Lieutenant F G Huxley

2/Lieutenant A J Pratt

2/Lieutenant H Taylor

The following officers proceeded with ground personnel, leaving Harlaxton on 16 and 21 September, arriving at Baizieux on 25 and 26 September.

Lieutenant E N Tooth	Equipment Officer
2/Lieutenant W A Turner	Recording Officer
2/Lieutenant L F Loder	Armament Officer
2/Lieutenant J R Y Bartlam	Flying Officer
2/Lieutenant I C F Agnew	"
2/Lieutenant R W McKenzie	"
2/Lieutenant L N Ward	"
2/Lieutenant S W Ayers	"

Another pilot to join No 68 Squadron on its arrival at Baizieux was 2/Lieutenant C C Sands.

At Baizieux, 68 Squadron formed part of the RFC's 13th (Army) Wing in support of the British Third Army. The aerodrome was forty kilometres behind the lines. With the arrival of the groundcrew on 26 September, there was minimal time for settling-in. Having prepared and tested the aeroplanes, area familiarisation flying was able to commence on the 28th. Also, the 68 Squadron identification marking was painted on the sides of the fuselages, in the form of a single white band immediately in front of the tailplane.[173] In addition, a letter or number was applied, so that individual machines and pilots could be recognised from a distance. For 68 Squadron, the side letters A to F indicated "A" Flight, 1 to 6 "B" Flight, and U to Z "C". Easy identification would be crucial as they entered the fray beyond the lines – over "Hunland".

To further assist identification, the Flight Commander would stream a pennant from a wing strut to be distinguishable to the other members of the patrol. As Squadron Commanders were expressly forbidden to fly on operations, Watt was virtually desk-bound. Each pilot normally flew his own aircraft, and the initial constitution of the three flights is shown below.

68 SQUADRON – CONSTITUTION OF FLIGHTS, SEP 1917

A FLIGHT		B FLIGHT		C FLIGHT	
A Howard	A9284	**1** Wilson	A9464	**U** Griggs	A9469
B Bartlam	A9273	**2** Pratt	A9265	**V** Bell	A9473
C Holden	A9245	**3** Phillipps	A9288	**W** Morrison	A9242
D McCloughry	A9459	**4** Huxley	A9462	**X** Matthews	A9457
E James	A9226	**5** Taylor	A9224	**Y** Robertson	A9483
F Agnew/Ward	A9271	**6** Sands	A9263	**Z** McKenzie	B377

(**October 1917**: Agnew and Ward shared A9271, but it was forced down 2 OCT and Agnew POW; A9399 became 'F' and then Ward shot down 20 NOV and became POW; by early OCT, Huxley's A9462 had been replaced by A9461; and Morrison's A9242 by A9277.)

D.H.5 A9449 coded '1' from OCT 1917 – Capt Gordon Wilson, "B" Flight Commander

The thin white band around the rear fuselage ahead of the tailplane was 68 SQN's initial squadron identification

By early 1916 the RFC had expanded from Squadrons to Wings, and Wings to Brigades – a Brigade had two Wings, an Army Wing of fighting scout squadrons and a Corps Wing of artillery cooperation/reconnaissance squadrons. The Wing was elastic, its size determined by the local activity, (but every Corps did have an artillery squadron allocated).[174] As a fighting scout squadron, operations for 68 Squadron involved flying Close Offensive Patrols (COP) to control the heights from the front-line trenches to about ten kilometres beyond, keeping the skies clear of enemy activity. The task of the Offensive Patrol was defined as:[175]

> ...whose sole mission is to find and defeat the enemy's aeroplanes. The further such patrols penetrate behind the hostile front the greater will be the moral effect of the success they gain, and the more they will interrupt the work of the enemy's machines, while enabling ours to accomplish their missions without interference.

The first air engagement by an Australian squadron in France occurred on Tuesday 2 October. A patrol of four aircraft from "A" Flight, led by Captain Wilfred McCloughry, was returning over St Quentin, south-east of Baizieux, at 10,000 feet when an enemy two-seater was spotted. They dived on the enemy aeroplane (EA), but in spite of their superior height, they were unable to catch the faster German. Fifteen minutes later they encountered another two-

seater, which Lieutenants Les Holden and Richard Howard attacked, but again the EA had superior speed. "A" Flight returned home without Lieutenant Ivo Agnew (flying A9271), who had been forced to land behind enemy lines, due presumably to battle damage. The Germans dropped a message over the lines stating that Agnew was an unwounded prisoner of war.[176] He was the first loss in battle for the Australian squadrons in France.

With the aerial war constantly being conducted over Hunland, the German groundfire was able to get plenty of practice in shooting at Allied aircraft. During 68 Squadron's patrols, not only was groundfire from machine-guns and small arms to exact their toll, but enemy artillery – "Archie" – was another hazard. As patrols were always carried out over enemy territory, with the German Air Service rarely venturing west across the lines, the black smudges of German Archie could hopefully be avoided.[177] On the Western Front, German anti-aircraft gunners were to claim 1,588 Allied aircraft.[178] Typical of these COP sorties was that recorded by "A" Flight pilot Leslie Ward:[179]

> October 10th. We were on dawn patrol this morning and it lasted for two hours. We went over the lines as far as Cambrai and Archie was very hot. He seems to have some new batteries and they are very good shots.

Returning from a patrol on 13 October, two aircraft of "C" Flight, flown by Lieutenants Douglas Morrison (A9277) and Robert McKenzie (B377), were bounced by four Albatros scouts. McKenzie got in one burst at the enemy leader, but had to withdraw with an engine problem. Morrison was shot down near Queant, and crashed between the lines in No-Man's Land, severely wounded. He was rescued by men of the 13th London Regiment while the remains of his wrecked machine was shelled by the enemy. Morrison was to die from his wounds on 29 October and was buried in Grevillers Cemetery.

Two new pilots then joined the Squadron to make good these losses. Lieutenant Robert Clark replaced Agnew in "A" Flight, and Lieutenant Clive Johnson joined "C" Flight. Clark had been trained at Richmond on the First Course in 1916, and like some others on that course and members of the Sixth CFS Course, had sailed from Australia as the Fourth Australian Squadron. He had then trained in England as a member of 71 Squadron (which was to become No 4 Squadron AFC), but soon found himself required at the Front as a replacement. His experience was typical of the pilots who then joined the Squadron in France. Clark disembarked at Boulogne on 6 October, and held at No 2 Aeroplane Supply Depot (2ASD), located thirty kilometres back from Baizieux at Fienvillers. The Depot's role was to supply aircraft and pilots to the frontline units to ensure they were always at strength. Clark was able join 68 Squadron on 14 October, but later pilots were held in the depot pool for periods of up to two months. One RFC pilot described his holding period at an ASD by these frustrated lines:[180] "I'm still in this God forsaken hole. I wish they would hurry up and post me to a squadron, as this place is as dull as ditchwater."

As the Squadron's flying hours mounted over the Front, the D.H.5 was plagued with engine problems – magneto failures and broken tappet rods being common. During October alone, the Squadron had eight crashes not due to enemy action, resulting in either write-off of the machines or their return to Depot for repair. This necessitated a continuous stream of replacement machines from No 2ASD's repair and issue sections who, with the nearby 2 Aircraft Depot (2AD) at Candas, were responsible for the aircraft supply system in the southern area of the Western Front.

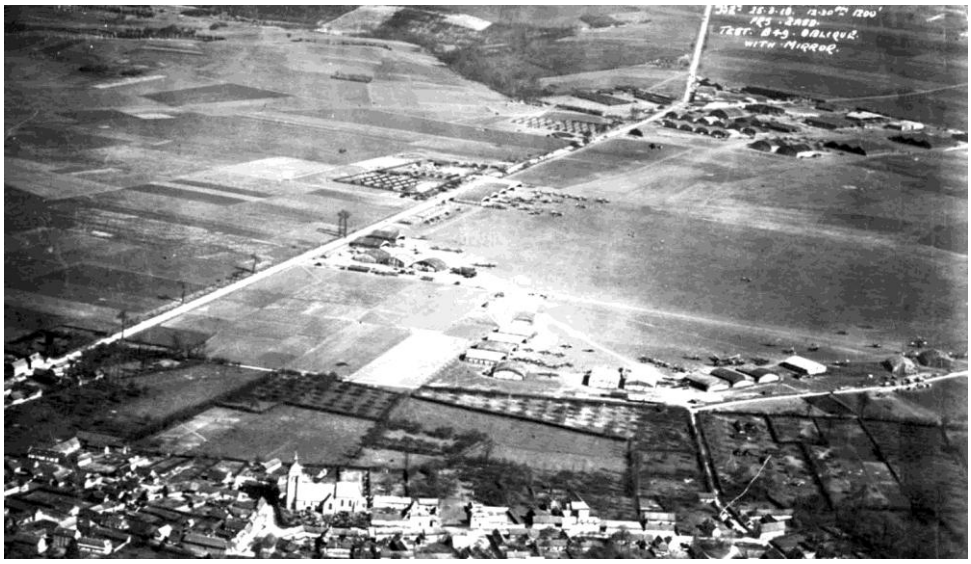
Aeroplanes were repaired on the Squadron if these could be effected within 36 hours, otherwise the machine would be passed to the AD.[181] Two Aircraft Depots – 1AD at St Omer and 2AD at Candas – were formed in 1915 to supply and repair the RFC active units of the British Expeditionary Force (BEF). ADs were supplemented in 1917 by Aeroplane Supply Depots (ASD) – 1ASD was based at Marquise, moving later St Omer, and 2ASD initially at Berck-sur-Mer, later Fienvillers (at Candas). 1AD and 1ASD supported the two northern British armies; 2AD and 2ASD supported the two southern armies. Both 2AD and 2ASD had to be evacuated in late March 1918 with the German offensive on the Somme – 2AD pulling back to Rang du Fliers, and 2 ASD to St André-aux-Bois.

AIRCRAFT DEPOTS

Squadrons inducted into the BEF would typically fly from 8AAP at Lympne in Kent, across the Channel to St Omer, the home of 1AD. The role of the AD was to ensure that each squadron was up to strength for operations – in the case of 68SQN, that meant its full establishment of 18 on-line D.H.5s. As only 15 aircraft were ferried over on 21 SEP 1917, a further three were issued by 2AD, which enabled then for 68SQN to operate from its new base at Baizieux with 18 machines. The policy was for aeroplanes to be repaired on the Squadron if that could be affected within 36 hours, otherwise the machine would be passed to the AD.

If an aircraft was unrepairable, or if lost over the lines or crashed in a forced-landing, the AD would have a pool of aircraft ready for issue, and would be despatched (generally picked up by a Squadron pilot) within the day. Similarly, if the pilot had been wounded or injured, a replacement pilot from the pool would be sent.

Two ADs – **1AD at St Omer** and **2AD at Candas** – were formed in DEC 1915 to supply and repair the RFC in France. By OCT 1917, the volume of aircraft deliveries (averaging 400 a month) and the amount of repair and salvage work had reached a level requiring the creation of separate Aeroplane Supply Depots (ASDs) alongside the main AD, and responsible for aircraft receipt, repairs, and issues.[182] Attached to each Depot was the Pilots' Pool that undertook ferry and flight test duties, as well as being a holding flight for recently arrived pilots, providing refresher and conversion flying. 1ASD was based at Marquise, moving later St Omer, supporting the two northern British armies; 2ASD initially at Berck-sur-Mer, moved later to Fienvillers (near Candas), supporting the two southern armies.[183]



Aerial image of 25 MAR 1918 of 2AD Candas at the top, lower (and below) is 2ASD beside the village of Fienvillers

3AD was established at Corban in MAR 1918 with 3ASD to service the Independent Force, and 4AD was formed at Balinghem (but not completed by the armistice) with 4ASD at Guines to support the RNAS.[184] RFC chronicler MAJ Maurice Baring recorded a visit to 3AD at Courban by MAJGEN Trenchard, Commander of the new RAF's Independent Force: "June 12th, 1918. We visited our Depot at Courban. It is a gigantic Depot, bigger than those of St Omer and Candas. It is not yet finished." [185] In Egypt, 'X' AD had been formed in late 1916 at Aboukir as part of Middle East Bde for major engine repairs and allocation of stores; 'X' Aircraft Park was established for aircraft allocation, and major repairs.[186]

On 2 November, McCloughry's patrol fought off an attack above Gouy at 10,000 feet by eight Albatros scouts of the "black-tailed circus". Again the enemy had the advantage of superior speed. In this engagement 2nd Lieutenant Howard's machine (A9284) was damaged with about 25 bullet holes, shooting through all four main wing struts, some still burning by tracer ammunition.[187] The aircraft was unrepairable and was struck off strength. In addition to the Albatros, another formidable adversary was the Fokker Dr.I triplane, known to the Germans as the *Dreidecker*, which had first appeared over the front in early September. It was very manoeuvrable and could out-turn and outclimb any of the Allied scouts.

Throughout the previous three months, the British Army had been continuously on the offensive in Flanders – the 3rd Battle of Ypres – with the aim of capturing the German-held Belgian ports. Scout squadrons were coordinated with the infantry advance by attacking enemy infantry columns and targets of opportunity with light bombs and machine-guns – for the first time large-scale ground attack operations were conducted, with devastating effects. This proved a suitable task for the D.H.5 scout squadrons. The ground attack role was dangerous and even though they suffered heavy casualties from groundfire, by September the Allies were able to gain air superiority.[188]

The offensive petered out at the end of autumn. The British had managed to secure the Passchendaele Ridge, but at enormous cost. Their forces suffered over 300,000 casualties, the Germans less than 200,000. With German forces concentrated in Flanders, an innovative plan was being developed for an assault some sixty kilometres to the south, at Cambrai.

Traditionally, offensives had been opened by massive artillery bombardments, quite often with devastating effects on the enemy, but which also resulted in destroying the roads and generally making the landscape virtually impenetrable for a speedy advance. The British Third Army wanted to break enemy defences by use of modern technology ahead of the assault. This would be the first employment of massed tanks and air power, and at Cambrai, as at Third Ypres, the successful ground attacks by bombing and strafing would become a significant factor. It was the D.H.5 scouts of Nos 64 and 68 Squadrons that were tasked with this role. In great secrecy, the tanks had been assembled, and with these the Third Army would attempt to breach the fortifications of the Hindenburg Line at Flesquieres, ten kilometres south-west of Cambrai.

In preparation for this British offensive – the Battle of Cambrai (20 November to 7 December) – the Australian D.H.5s had been training for a new role of ground attack. Two of the experienced pilots had returned to England during the month to help form the next Australian scout squadron – No 71 Squadron. McCloughry was promoted to Major and took command of this new unit on 11 November, and Lieutenant George Matthews left "C" Flight (to take command of 71 Squadron's "A" Flight). Captain Roy Phillipps then became the new “A” Flight Commander, and he commenced training and developing tactics by practice bombing and strafing at a weapons range near Baizieux. The D.H.5 was fitted with bomb racks, which could carry four 25-pound (11kg) Cooper bombs.

The Australians were then to concentrate their tactics on low-flying to deliver their weapons. It was essential to be below 1500 feet to make out the details of trenches and dug-outs, and below 1000 feet to distinguish the grey uniforms of the enemy from the brown khaki of the Allies.[189] This was quite often the way that the position of the Front could be verified, and necessitated formation flying at low level so that targets could be positively identified. Attacks would be made from the Front, to as far as twenty-five kilometres beyond the German lines, and these became known as Distant Offensive Patrols (DOP).

On the misty morning of Tuesday 20 November, the Third Army launched a heavy attack on the Front near Cambrai. As a maximum effort was required, 68 Squadron took off in three flights of six. It had not been the practice to fly in sections of this size, and when a flight of six was necessary, it would normally be flown in two ‘vics’ of three machines, the second ‘vic’ usually on the port side slightly to the rear. But on this day the visibility in the dense fog and drizzle was to prove too bad to maintain formation, so pilots were to acquire and attack their targets individually. Bell

led "C" Flight off first, followed an hour later by Wilson with "B" Flight, and Phillipps with "A" Flight. The whole of the Squadron had entered the fray, bombing and strafing from an altitude of 100 feet.

"C" Flight attacked German forces near Cambrai and immediately took losses from the hostile groundfire. The leader, Captain John Bell (A9473), was shot through the chest, and crashed beyond the lines. He was rescued but finally succumbed to his injuries on 27 December and was buried in Tincourt Cemetery. Another member of Bell's flight, Lieutenant William Robertson (A9483), was badly damaged in an engagement with EA, but was able to land at Bapaume. Here, thirty kilometres forward of Baizieux towards Cambrai, 68 Squadron's groundcrew were manning an Advanced Landing Ground (ALG). Being closer to the battle, only twelve kilometres from the Front, this forward position was intended to expedite operations.

While Wilson's "B" Flight was attacking enemy infantry and batteries, Lieutenant Harry Taylor (A9378) was brought down in No Man's Land. He climbed from the wreckage and picked up an enemy rifle to fire at snipers. He met up with an advanced British patrol collecting the wounded, then came across Bell's damaged machine. He was unsuccessful in getting it started as the fuel tank had been holed. He then went and assisted at a casualty dressing station, and was eventually able to get a lift back to the aerodrome.

Phillipps' "A" Flight made successful attacks on enemy communication trenches. Lieutenants Les Holden and Robert Clark then fired into the confusion caused by the direct hits of their bombs. Holden (flying A9278) was then attacked by an enemy fighter, and like Robertson, he too was able to coax his badly damaged machine back to the Bapaume ALG. Also flying with "A" Flight, Lieutenant Leslie Ward (A9399) attacked enemy infantry near Marcoing to the south-west of Cambrai when he was shot down. He later described his experience:[190]

> I was brought down by machine-gun fire, my leg was broken in the crash. I was carried by Germans to a dressing station where they attended to me. I stayed there for a couple of hours and was then carried for about one mile on a stretcher.

Ward was to spend the remainder of the war as a POW. The first authorities knew of his condition was after his sister received a letter explaining how he had sustained a broken leg in the crash and was taken prisoner.[191]

One of the tactics used by the D.H.5 pilots had been to crater the roads and then strafe the stranded German traffic. The boggy ground added to the congestion and the enemy's frustration. Two of "C" Flight's pilots landed at the Bapaume ALG, replenished for further attacks, and were airborne at noon. Lieutenant Frederick Sheppard (A9457), who had been at the Front for three weeks, was shot down and wounded. Lieutenant Robert McKenzie (B377) crashed when his fuel tank burst due to enemy groundfire near Queant, but he was safe.

Throughout this first day of the battle the pilots returned to the advanced landing ground, reloaded with fuel, bombs and ammunition, and disappeared again into the mist. The weather had been so bad as to mostly keep the German Air Service on the ground. Of the eighteen aircraft flown by the Australians, seven had been destroyed or severely damaged, together with three pilots as casualties. The losses of the low-flying squadrons were to average 30% on the days they were used throughout the battle.[192] The rigours of flying ground attack at tree-top height into enemy groundfire became apparent. Recognising these hazards, the General Officer Commanding the RFC in France, Major-General Hugh "Boom" Trenchard, cabled Watt with the encouraging words: "Congratulate all pilots on their gallant work under impossible conditions".

The battle was fiercest on 22 and 23 November, and three more pilots were lost to groundfire. On the 22nd, Lieutenant David Clark (A9477), who had been on the Squadron for only two weeks, failed to return from a morning mission. He had last been seen heading east over Bourlon Wood, a heavily defended enemy strong-hold seven kilometres west of Cambrai. The possession of this wood, a nest of machine-guns on the lofty Bourlon ridge, was vital to provide observation of German defences south of the Scarpe and Sensee Rivers. Lieutenant Archie Pratt (A9265) bombed and strafed a battalion headquarters in the north-west corner of Bourlon Wood before being wounded. He was able to crash to safety near the front line trenches.

That morning, 22 November, in the persistently bad weather, Lieutenant Frederick Huxley (A9461) scored the first enemy aircraft destroyed by the Australians. He was at 700 feet over Marquion, north of Bourlon Wood, having just attacked enemy infantry and saw an Albatros D.V scout below and in front of him. He pounced onto the German's tail, firing thirty rounds from fifteen metres, and saw it nose-dive into the ground. "It was a gift", he said.[193] An hour later Lieutenant Howard (A9294) drove down two others, while Captain Phillipps (A9288) drove down a third into a garden in Cambrai. Fred Huxley had become the first Australian pilot to score a victory flying for an Australian squadron. In December, he scored two more victories flying the same D.H.5.

Ground attack sorties continued on the 23rd. Lieutenant Robert Clark's Attack Report for his morning sortie to Bourlon typified the Squadron's efforts:[194]

> 2 bombs from 100 feet on troops in the Wood advancing to reinforce front line as tanks were advancing on SW edge of Wood. 200 rounds on troops opposing tanks' advance and 200 rounds on trenches SW of Fontaine which were holding up our infantry.

However, during the course of the morning's operations, Lieutenant Sydney Ayers (A9263) was shot down by groundfire over the heavily defended Wood. Although severely wounded, he was able to crash back near the lines, but died from his wounds the next day. His brother, Private Charles Ayers of the 55th AIF Battalion, had been killed at the battle in nearby Polygon Wood at Ypres, only two months previously.

To wrest back control of the air, German reinforcements were rushed to the Front. The four squadrons of Richthofen's Circus[195] arrived in the skies over Cambrai from Courtrai, in Flanders. In the heavy aerial fighting that developed, Lieutenant Les Holden's machine (A9326) was badly damaged near Bourlon Wood, but unhurt, he was able to safely return. From his own attack sorties, Captain Roy Phillipps (A9288) was able to pass on the following intelligence report:[196]

> Saw tanks NW of Bourlon valley and NE of Bourlon Wood. Fontaine Notre Dame appears to be completely ours, as British troops were seen on Eastern outskirts. Big explosion seen in Cambrai, apparently in centre, and heard above the noise of engine when 1500 yards away. 6 EA ("Black tail circus") seen at 6000 feet over Cambrai.

On the west of Bourlon Wood an enemy strong-point was holding up the Allied advance. On the afternoon of the 23rd, Lieutenant Griggs (A9428) overflew the position of the 10th Royal Irish Rifles, and made repeated strafing attacks on the German defenders. Captain Wilson saw an enemy scout attack Griggs' machine, but Griggs fought him off. He continued his strafing attacks, but was met with heavy fire, ultimately being shot down and killed. However, the support he had provided endured long after the Battle had ended. In the "In Memorial" column of *The Times* in 1918 appeared:[197]

> To an UNKNOWN AIRMAN, shot down 23rd November 1917, whilst attacking a German strong-point south-west of Bourlon Wood, in an effort to help out a Company of the Royal Irish Rifles, when other help had failed.

It was a testimony to the efforts of the ground attack pilots that the advance achieved the ground it did. Tank personnel and infantry acknowledged that the ground attack aircraft had made advance possible, when attacking troops would otherwise have been pinned down.[198]

On 26 November, Lieutenant Taylor (A9336) was flying over Bourlon Wood when he spotted an enemy DFW reconnaissance two-seater.[199] He dived on the EA and opened fire at 200 metres, to see the two-seater crash to the ground. Three days later in the same area, Lieutenant Howard (A9517) was attacked by a similar two-seater. He manoeuvred onto the enemy's tail and fired forty rounds from about twenty metres. As the EA climbed away Howard was able to score some hits from underneath, then fired another thirty rounds from abeam. This was enough to evidently fatally wound the observer, who slumped over the rear cockpit. The EA dived to the ground and was able to land intact north of Cambrai. This combat, although decisive and confirmed by another pilot, Les Holden, emphasised the difficulty for claiming enemy machines in the First War. As this EA was not destroyed, or "forced down out of

control" (which was termed as a "probable" in World War Two), the system did not allow for this victory to be added to the pilot's score. Instead, this type of inconclusive result was referred to as "driven down".

The German counter-attack at Cambrai started on the misty morning of the 30th. The pilots flew back time and again to the battle area to bomb and strafe the German onslaught. Captain Wilson (A9449) was leading "B" Flight in an attack on enemy infantry when his petrol tank was hit by groundfire. He forced-landed near an anti-aircraft battery, but was soon able to be airborne again. Over Gonnelieu, south of Cambrai, he attacked an enemy DFW two-seater. He shot the observer with his first burst, but was unable to inflict more damage as he chased his target east towards Bantouzelle. He was then surprised by a further DFW, so turned on his attacker and fired a burst which put the EA into a dive. The DFW overturned as it hit the ground, and Wilson then successfully bombed the wreckage. Returning to base he was set upon by a third two-seater, but now having his ammunition exhausted, was forced to feint an attack. This was enough for the German, who turned immediately and headed east. It had been a busy sortie for the "B" Flight Commander.

One pilot reported "an absolute melee of aircraft around Bourlon Wood – the air was thick with D.H.5s".[200] Often during that day, there were fifty or more RFC aeroplanes over the eight-kilometre Front south of Bourlon Wood, with as many of the enemy. Great difficulty was being encountered in crossing the lines owing to the enemy scouts' presence.

Richthofen's Circus was active, and found a solitary D.H.5 coming from Cambrai. British army troops witnessed two Germans chasing it along the front firing at the D.H.5 as low down as 20 feet, but the D.H.5 was able to zigzag along the road to Bapaume.[201] Perhaps this had been Lieutenant Harold Cornell, a new pilot in "A" Flight, who had replaced Leslie Ward, missing since the 20th. Cornell (A9532) had departed that morning as part of an eight aircraft formation with "A" and "C" Flights on a ground attack mission at Bourlon Wood, but became separated after attacking his target. He was then attacked by enemy aircraft, and was shot down near the lines. After spending an exciting 24 hours in a heavily shelled position, he was able to make his way back to his home aerodrome.

During the afternoon, a further eighteen sorties were flown over the lines attacking the enemy army near Bourlon, and then about fifteen kilometres to the south at Gonnelieu. A complete reconnaissance of the area was then passed to the Corps Headquarters, which enabled Allied artillery to be brought into action onto the indicated objectives.

December opened with concentrated ground attack activity south of Cambrai. "B" Flight departed at dawn and flying low in the mist at 800 feet, Lieutenant Fred Huxley (A9461) spotted an enemy reconnaissance machine over Bourlon Wood. He closed to within fifty metres of the blue-and-green Aviatik two-seater, opening fire and sending it down. On hitting the ground the machine overturned, and after the formation replenished at the ALG, Huxley returned and bombed the spectators that had gathered to inspect his earlier work.

Later that morning Henry Forrest (A9255) led "A" Flight, four-strong, to bomb enemy troop concentrations at Villers Guislain, fifteen kilometres south of Cambrai. With him were Lieutenants Robert McKenzie (A9541), Bill Robertson (A9466) and a newcomer with two weeks on the Squadron, Lawrence Benjamin (A9341). Robertson's machine was badly hit by groundfire on crossing the lines, but he was able to limp back over friendly territory to land near Bapaume. On delivering their weapons they encountered an enemy patrol. Forrest recorded:[202]

> Coming out of a dive after dropping bomb, I found 5 scouts above me, apparently escorting 3-seater. I attacked 1 scout who turned and fired a few rounds and then climbed up into the clouds. I fired 30 rounds without apparent effect till I lost him. I then dived on trenches to machine gun Infantry, and on coming out of dive, I saw the 3-seater about 400 feet above me on my left with the 2 gunners standing up and firing at me. I zoomed up under him and fired 20 rounds at him and he turned East climbing.

McKenzie was more successful in the engagement with another Albatros:[203]

> I saw 5 EA coming towards and 400 feet above me. One was lagging slightly and I zoomed up and got in a stalling burst at 50 yards range, when he immediately turned East and started a steep glide and I was unable to follow him

on account of the other 4 EA, but I saw him try to land in most unfavourable country and go nose first into a shell hole where he remained with his tail in the air.

McKenzie was credited with the Albatros destroyed, but during the engagement Benjamin's machine was hit. With his fuel tank shot through, he was able to reach the lines safely and land his damaged aircraft at an ALG near Wagholien.

Concentrated ground attack and reconnaissance sorties were maintained over the next days. With tank and air support the Third Army was able to break through German defences, but without offensive reserves was unable to exploit its advantage and was driven back from Bourlon Wood. In recognition of the air support the Australians were providing, Major-General Trenchard had written to General Birdwood, the commander of the ANZAC Corps:[204]

ADV HEADQUARTERS,

Royal Flying Corps,

22nd November, 1917.

Dear General,

I have just been to see the Australian Fighting Squadron, No.68 for the second time in the last week, and I have talked to some of the pilots who carried out the great work on the 20th, 21st and today. Their work was really magnificent and their machines, I am afraid were very much shot about, but they only lost one officer and machine missing, though several were wounded.

These pilots came down low and fairly straffed the Hun. They bombed him and attacked him with machine gun fire from 50 feet flying amongst the tree tops; they apparently revelled in this work, which was of great value.

You might like to let some of your people know that I think them really great men, and I am certain in the summer next year, they will all give a very fine account of themselves. They are splendid.

I hope to be able to come and see you after I have been home, but I have to go home as soon as I can get away.

Yours Sincerely,

(Signed) H. Trenchard.

[to:] General Sir W.R. Birdwood,

KCB, KCSI, etc.etc,

Headquarters,

ANZAC Corps.

Trenchard had left his Advanced Headquarters at Fienvillers for London on 27 November, but hastily returned to France on 1 December on the news of the surprise German counter-attack at Cambrai which had threatened the whole of the Third Army. The German thrust was held, and by 4 December the British line was reformed. That night the British Minister of Munitions, Winston Churchill, stayed at RFC Headquarters, predicting a long war. "Of course", Churchill said, "if we gave in we could have peace tomorrow".[205]

Two days later, 6 December, strong enemy attacks south of Bourlon Wood were repulsed as 68 Squadron flew wave after wave of ground attack missions. "B" and "C" Flights flew sorties in the morning around Bourlon. After Forrest's formation dropped its bombs, the D.H.5s climbed to carry out a Close Offensive Patrol to the south over Marcoing. At 7000 feet, they encountered several formations of Albatros scouts. After some inconclusive skirmishes, Lieutenant Robert McKenzie's new machine (A9544) had its aileron controls shot away. With other damage to his machine's wings and fuselage, he was able to make the lines and crashed safely at Fremicourt.

[AWM E01483]

Recovery of McKenzie's crashed A9544/Z on 6 December 1917 at Baizieux

Lieutenant Johnson's aircraft (A9279) was also found to be badly damaged on return. That afternoon, eight aircraft of "A" and "B" Flights attacked the enemy on the III Corps Front near Flesquieres, south-west of Cambrai. Lieutenant Howard (A9517) recorded:[206]

> 2 bombs OK on cross roads E of Bantouzelle which was congested with traffic. Returned to ALG for 2 new plugs. On return 100 rounds on enemy infantry in small parties close to Flesquieres, then too dark to fire.

Lieutenant Huxley (A9461) bombed the crossroads at nearby Lateau Wood then strafed enemy troops. As he climbed away to the south through 3000 feet, he saw through the haze below two enemy DFW reconnaissance two-seaters. He immediately dived on one:[207]

> As soon as I opened fire the enemy Observer opened fire also but after I had fired 30 rounds at 50 feet range he dived steeply and on striking the ground burst into flames.

The next day, 7 December, the Battle of Cambrai was over. This had been the first time the new technologies of combined warfare – armour and air – were used to support a ground offensive. Because of the deficiencies in the design of the D.H.5, the Australian scouts had been re-roled from control of the air to a new development, that of specialised ground attack.

However, when the situation had warranted, the D.H.5 flown by the tenacious Australians did have limited success in countering the superior Albatros scouts. The Germans too now adopted ground attack by so-called "battle flights", the *Schlachtstaffeln* (abbreviated as *Schlasta*). Each *Schlasta* consisted of eight machines, whose duty was to assist the advance of the infantry by support with machine-gun fire, bombs and hand-grenades.[208]

They were allotted to Armies, Corps and Divisions as circumstances demanded, and led to a considerable expansion of the German Air Service over the winter of 1917–1918.

[AWM E1436]

Officers of No 68 Squadron at Baizieux, 7 December 1917

Back row (L to R): Lt Louis Loder; Lt Thomas Grant; Capt Leslie Holden; Capt Richard Howard; Lt Lawrence Benjamin; Capt William Robertson; Lt Archibald Pratt.

Front row: Lt Lewis Truscott; Lt Frank Power; Lt Percy Lawson; Lt David Allardice; Capt Henry Forrest; Maj Oswald Watt; Lt Robert Leeuwin-Clark; Capt Gordon Wilson; Lt Clive Sands; Lt Harry Taylor.

Kneeling: Lt William Turner; Capt Frederick Huxley.

Air power had been used to effect, and exploiting new roles had demonstrated its flexibility. The D.H.5 was immensely strong, fully aerobatic, and a pleasant aeroplane to fly, but a number of training accidents led to a widespread and unfounded reputation that it had a high stalling speed with difficult spin recovery.

Flown by experienced pilots it proved quite docile, but at heights above 10,000 feet it was easily outflown by contemporary scouts such as the Sopwith Pup.[209] Historian J M Bruce recorded a fitting epitaph to the D.H.5: [210]

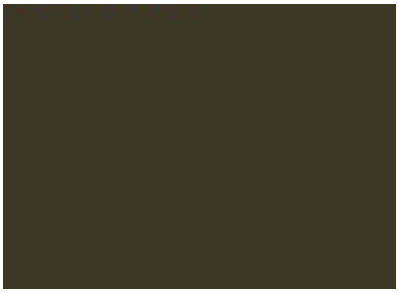
It was the D.H.5's misfortune that it suffered in performance.

It deserves to be remembered for the effective but costly ground-attack work it did at Cambrai.

MARKINGS of WWI

Overall Colours

The standard varnish from APR/MAY 1916 was *Khaki* P.C.10 (Pigmented Cellulose Spec.10),[211] with clear doped V.114 (Clear Doped Linen) undersurfaces. Lighting conditions varied P.C.10's hue between green and brown.[212]



P.C.10 *Khaki* (FS34087/34088) was a greenish-brown for upper surfaces; *Clear Doped Linen* (CDL, FS13617) [213]

Squadron Markings

Individual squadron markings were introduced initially for the Corps reconnaissance squadrons in APR 1916, and by the end of that year squadron markings were widely adopted on the Western Front. Squadrons were allocated unit markings on arrival in France: 68SQN D.H.5s were identified by a thin white vertical stripe in front of the tailplane,[214] allotted on 19 SEP 1917. From MAR 1918, these unit markings were only retained by the fighter squadrons on the Western Front. [215] Individual aircraft in 68SQN were identified by large white letters or numbers after arrival in France, and its 18 aircraft carried the following codes:

"A" Flight aeroplanes were marked A to F,

"B" Flight 1 to 6, and

"C" Flight U to Z. [216]

This letter code system then remained after 68SQN changed to flying the S.E.5a in DEC 1917, until ceasing operations at Serny on 20 FEB 1919.

'Presentation' D.H.5s

1. In addition to those in the 'Presentation' 68SQN D.H.5 list (and covered in detail in 2AFC Part I), another Australian presentation D.H.5 was A9287 "AUS No 10 NSW 9 *The Tweed*", which did not serve on 68SQN. It did fly with an AFC training squadron: 30 Trg Sqn (later 6AFC) on 16/10/17, then eventually to 1AAP 28/2/18.
2. Another Australian presentation D.H.5 not on 68SQN was A9415 "AUS No 8 NSW 7 Government Duplicating *The Mrs P Kirby & Son*" – for a very short period, again with the AFC's 30 TS, from 3/12/17 until it was immediately declared obsolete and WFS.

D.H.5 Production

In JUN 1914, Geoffrey de Havilland became the Chief Designer at the Aircraft Manufacturing Co Ltd at Hendon, the company which became known as Airco. Although his designs were generally known simple as "D.H." (and in the case of the unpopular D.H.6, uncomplimentarily known as the "Dung Hunter"), it was not until SEP 1920 that the de Havilland Aircraft Co Ltd was formed.[217] The D.H.5, because of its poor performance, was disparagingly referred to as de Havilland's "fifth effort".[218] Some 550 D.H.5s were built – 200 by Airco and the remainder by three main sub-contractors. It is notable that the first D.H.5 production contracts were in JAN 1917, but within twelve months the D.H.5 was withdrawn from operational service.

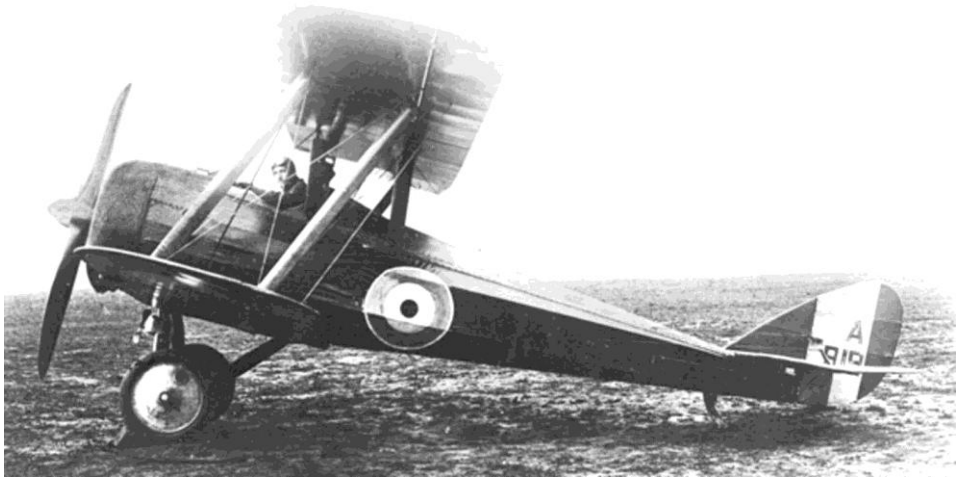
D.H.5 Serial Batch	Contractor [219]	Contract No.[220]	Remarks
A9163 – A9361	Airco – Hendon, London	87/A/1286, 13 JAN 1917	Contract only covered 199 production plus prototype A5172
A9363 – A9562	Darracq Motor Engineering Co Ltd – Fulham, London	87/A/1358, 13 JAN 1917	
B331 – B380	British Caudron Co Ltd – Cricklewood, London	87/A/1433, 7 FEB 1917	Unique serial number style for D.H.5, white rectangle on rudder 221
B4901 – B5000	March, Jones & Cribb Ltd – Leeds	87/A/1714, 30 JUN 1917	Only to B4938 completed

D.H.5 AIRCRAFT of 68 (AUSTRALIAN) SQUADRON 1917

D.H.5 aircraft were allocated to 68 (Australian) SQN from JUL 1917,[222] most delivered over JUL-AUG 1917 while the majority of the pilots were experiencing operations with RFC squadrons at the Front. The 68SQN deployment to the Front, was flown from Harlaxton, via No.8 Aircraft Acceptance Park (8AAP) at Lympne, to St Omer France on 21 SEP 1917, then on to its operational base at Baizieux on 23 SEP.[223] Codes shown in red are unconfirmed by documentation or photography, but by analysis should be accurate. The known named Presentation machines are highlighted.

"9/17* " is an assessment of the initial allotment to 68SQN over Jul-Sep 1917; while some RFC records show this as 22/9/17, which was 68SQN's "first return" of records and was the acceptance by 1AD, St Omer France, as being taken on charge in the British Expeditionary Force (BEF). To supplement the 15 aeroplanes flown to France on 21 SEP, a further three were allocated to 68SQN on 22 SEP by 2AD (A9263, A9271 and B377) to bring up to the required strength of 18 aircraft. The first 68SQN D.H.5 patrols were flown on 1 OCT, and the last on 15 DEC 1917.

RFC Serial	Date On Sqn	Sqn Code [224]	Date Off Sqn	Details
A9197	22/7/17	–	9/17	Named "AUS 17 NSW No 16 The Upper Hunter". Not deployed to France, probably returned to an RFC training squadron.



D.H.5 A9197 flown by 68SQN working-up in AUG 1917 at Harlaxton *[AWM A02176]*

A9224	9/17 *	5	17/11/17	Damaged engine failure Arras 20/10/17 (Taylor), engine failure 17/11/17 at Warloy (Taylor), to 2ASD. SOC 5/12/17.
A9226	9/17 *	E	11/10/17	Damaged engine failed Roequinqy (James), to 2AD SOC 20/10/17.
A9228	11/17	–	24/11/17	Second D.H.5 named "Shanghai Race Club No 4", evidently allotment to 68SQN cancelled, and crashed on delivery from 2ASD to 24SQN RFC 24/11/17. To 2AD and SOC 27/11/17.
A9242	3/9/17 *	W	1/10/17	Replaced A9395 as "AUS 15 NSW 14 Women's Battleplane", engine failed Honnecourt (Morrison), wrecked 2AD. SOC 5/10/17.
A9245	3/9/17 *	C	11/10/17	Replaced A9197 as "AUS 17 NSW 16 The Upper Hunter Battleplane", damaged when crashed landing Baizieux 11/10/17 (Holden), to 2AD. SOC 14/10/17.
A9255	22/11/17	V	19/12/17	Ex-41SQN RFC. Returned to 2ASD; SOC 22/2/18.
A9263	22/9/17	6	23/11/17	To BEF in 8/17, issued by 2AD in France. Shot down Bourlon Wood (Ayers later died of wounds) SOC.
A9265	9/17 *	2	22/11/17	Shot down by groundfire (Pratt wounded), SOC.
A9271	22/9/17	F	2/10/17	To BEF in 8/17, issued by 2AD in France. Forced down behind lines near Villers-Outréaux (Agnew POW), SOC.
A9273	9/17 *	B	16/10/17	Engine failure on task at Gouy (Bartlam) and crashed Bapaume, wrecked to 2AD 18/10/17, and SOC 2ASD 22/12/17.
A9275	9/17 *	–	12/9/17	Crashed Harlaxton (Muir killed) SOC.
A9277	3/10/17	W	13/10/17	First D.H.5 named "Shanghai Race Club No 4", shot down by EA Quéant (Morrison later died of wounds), wrecked and SOC.
A9278	13/10/17	C	23/11/17	Damaged by EA near Bapaume 20/11/17 (Holden), to 2ASD. SOC 5/1/18.

D.H.5 AIRCRAFT of 68 (AUSTRALIAN) SQUADRON 1917				
RFC Serial	**Date On Sqn**	**Sqn Code**	**Date Off Sqn**	**Details**
A9279	14/10/17	W	6/12/17	Damaged by EA Bourlon Wood 6/12/17 (Johnson), to 2ASD. SOC 13/12/17.
A9284	9/17 *	A	18/10/17	Damaged 16/10/17 by EA at Gouy (Howard), to 2AD for repair. To 24SQN RFC 7/12/17, SOC 25/1/18.
A9288	9/17 *	3, D	7/12/17	Returned to 2ASD. Flown to England 15/2/18.
A9292	14/10/17	E	15/12/17	Returned to 2ASD. Flown to England 27/1/18.
A9294	17/10/17	A	22/11/17	Damaged by EA, crashed landing (Howard) wrecked, to 2AD. SOC 30/11/17.
A9324	1/10/17	–	1/10/17	Damaged by engine failure landing at Estrée-Blanche on delivery (Huxley), to 2ASD.
	1/12/17	F	11/12/17	Stalled at Baizieux and wrecked (Cornell killed). To 2ASD SOC 13/12/17.
A9326	22/11/17	C	23/11/17	Damaged by EA Bourlon Wood wrecked (Holden), SOC 30/11/17.
A9336	23/11/17	5	4/12/17	Damaged by crashed landing (Taylor), to 2ASD. SOC 22/12/17.
A9338	1/12/17	2	15/12/17	Returned to 2ASD; flown to England 16/2/18.
A9341	23/11/17	X	10/12/17	Damaged 1/12/17 by EA Wagonlieu (Benjamin), to 2ASD and SOC 10/12/17.
A9344	24/11/17	C	15/12/17	Returned to 2ASD; flown to England 25/1/18.

A9344/C of 68SQN "A" Flight flown by LT Les Holden over NOV-DEC 1917

A9378	18/11/17	5	20/11/17	Shot down by groundfire (Taylor) no-mans-land, unsalvable SOC.
A9390	8/17	–	8/17	No record on 68SQN: pictured at 24th Wing Harlaxton pre-cowling modification. Not taken to France.
A9395	22/7/17	–	9/17	Named "AUS 15 NSW 14 Women's Battleplane", not deployed to France; to 63 TS and crashed taking-off at Harling Road 8/11/17.
A9399	3/10/17	F	20/11/17	Shot down by groundfire Marcoing (Ward POW), SOC.
A9402	9/17 *	–	9/17	Not deployed to France. To 45TS (23rd Wing) crashed 26/10/17 at South Carlton.
A9428	24/10/17	U	23/11/17	Ex-32 Sqn RFC. Shot down by groundfire Bourlon Wood (Griggs killed).
A9432	8/17	–	27/8/17	Named "AUS 16 NSW 15 Government Duplicating The Women's Battleplane", not deployed to France; damaged when forced landed at Harlaxton 27/8/17 (Weaver).
A9445	5/12/17	X	19/12/17	Named "Benares", ex-32 Sqn RFC. Returned to 2ASD; flown to England 15/2/18.

D.H.5 AIRCRAFT of 68 (AUSTRALIAN) SQUADRON 1917				
RFC Serial	**Date On Sqn**	**Sqn Code**	**Date Off Sqn**	**Details**
A9449	10/10/17	1	19/12/17	Returned to 2ASD; shipped to England by 1ASD 22/2/18.

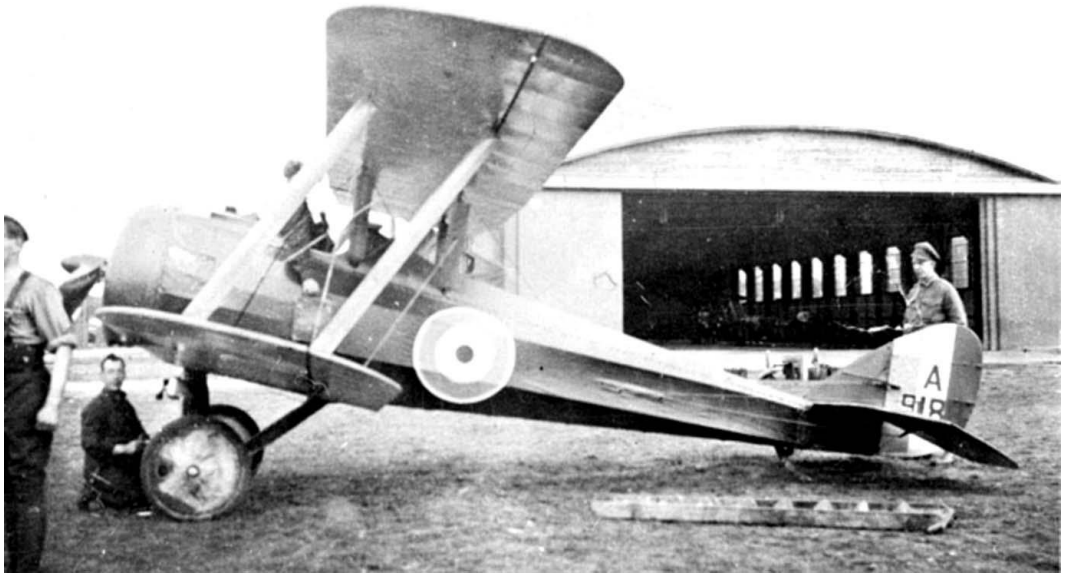
A9449 coded 1 of "B" Flt, with flight commander's streamer of CAPT Gordon Wilson c NOV 1917 *[AWM E01444]*

A9451	22/11/17	Z	30/11/17	Ex-41SQN RFC. Never satisfactory, hard to manoeuvre, war worn and centre section damaged, returned to 2ASD. SOC 10/12/17.
A9457	9/17 *	X	20/11/17	Shot down by groundfire (Sheppard wounded), wrecked and unsalvable SOC 22/11/17.
A9459	9/17 *	D, 3	19/12/17	Returned to 2ASD and shipped to England 27/2/18.
A9461	3/10/17	4	1/12/17	Named "Chicago". First claim by 68SQN LT Huxley 22 Nov 1917; damaged by EA Bourlon Wood (Robertson) 1/12/17, Returned to 2ASD; flown to England 15/2/18.
A9462	9/17 *	4	1/10/17	Crashed (Huxley) near Bapaume ALG with engine failure and wrecked, SOC 9/10/17.
A9464	9/17 *	1	11/10/17	Crashed 9/10/17 (Wilson) nr Baizieux when engine failed on airtest, wreckage to 2AD. SOC 14/10/17.
A9466	21/11/17	Y	1/12/17	Damaged by groundfire 1/12/17 (Robertson) crash landed near Bapaume and wrecked. To 2ASD and SOC 13/12/17.
A9469	9/17 *	U	24/10/17	Damaged 23/20/17 due engine fail forced landing at Baizieux (Matthews), wreckage to 2AD. SOC 29/10/17.
A9473	9/17 *	V	22/11/17	Shot down groundfire 20/11/17 (Bell died of wounds), to 2ASD. SOC 30/11/17.
A9477	17/10/17	B	22/11/17	Failed to return from Bourlon Wood (D Clark killed), SOC 30/11/17.
A9479	17/9/17	–	17/9/17	Reallotted, probably to BEF but no details known.
A9483	9/17 *	Y	20/11/17	Damaged by EA 20/11/17 nr Bapaume (Robertson), to 2AD and SOC 5/1/18.
A9495	13/12/17	–	15/12/17	Ex-24 Sqn RFC. Returned to 2ASD. Crashed when forced landed 3/1/18 at Livossart and SOC by 1ASD 9/1/18.
A9517	23/11/17	A	15/12/17	Named "Johannesburg No 1", damaged by EA Bourlon Wood 29/11/17 (Howard) but repairable on unit. Returned to 2ASD. Flown to England 15/2/18.
A9530	24/11/17	B	30/11/17	Forced landed Bapaume ALG 29/11/17 (Grant), to 2ASD and SOC 4/12/17.
A9531	23/11/17	6	19/12/17	Returned to 2ASD, flown to England 21/2/18.
A9532	23/11/17	F	30/11/17	Shot down by EA Bourlon Wood (Cornell), wrecked unsalvable.
A9535	24/11/17	U	7/12/17	Returned to 2ASD. Flown to England 27/2/18.
A9536	23/11/17	–	23/11/17	Forced landed on delivery from 2ASD at Couin (Grant), to 2ASD and SOC 30/11/17.

D.H.5 AIRCRAFT of 68 (AUSTRALIAN) SQUADRON 1917				
RFC Serial	**Date On Sqn**	**Sqn Code**	**Date Off Sqn**	**Details**
A9537	24/11/17	B	15/12/17	Returned to 2ASD, flown to England 24/2/18.
A9544	1/12/17	Z	7/12/17	Damaged 6/12/17 by EA and crashed Frémicourt (McKenzie), to 2ASD and SOC 10/12/17.
 **A9544/Z shot down by an EA on 6 DEC 1917 near Frémicourt**				
B377	22/9/17	Z	21/11/17	Named "Chiefs of Ashanti No 3", flown to BEF 3/9/17 and issued to 68SQN by 2AD at St Omer. Damaged 20/11/17 by EA near Quéant (McKenzie), to 2AD and SOC 30/11/17.
B4938	4/12/17	Y	19/12/17	Returned to 2ASD, and SOC 15/1/18.

Other known D.H.5s at Harlaxton, probably flown by 68SQN pilots in training over JUN-SEP 1917:

A9188	1/6/17	Allocated to Training, 45 TS crashed 5/10/17 into gunnery range hut (2LT Harington RFC), SOC.
A9190	1/6/17	Allocated to Training, 45 TS SOC 28/7/17.
A9252	c9/17	Allocated to Training, 63 TS crashed 11/11/17 landing Harlaxton (2LT Duffus RFC).
A9390	c8/17	AWM image [P004522] at Harlaxton mid 1917, not taken to France by 68SQN. No details known.
A9441	7/17	Allocated to Training, 45 TS crashed 17/8/17 on take-off South Carlton (2LT Brookes RFC), SOC.



[colourised from AWM H12729/08]

A9188 apparently at Harlaxton – crashed by 23rd Wing at the local gunnery range in OCT 1917

A9390 in AUG 1917 at Harlaxton – this is before modification with the six cowl stiffening ribs added to reduce vibration of the Le Rhône rotary engine, which regularly shed its valve tappet rods *[AWM P004522]*

Part III covers JAN 1918 to JUN 1918, prior to the great offensives to end the War, with a list and images of 2 SQN AFC S.E.5a aircraft

Curtiss Corner: P-40N-5 A29-524

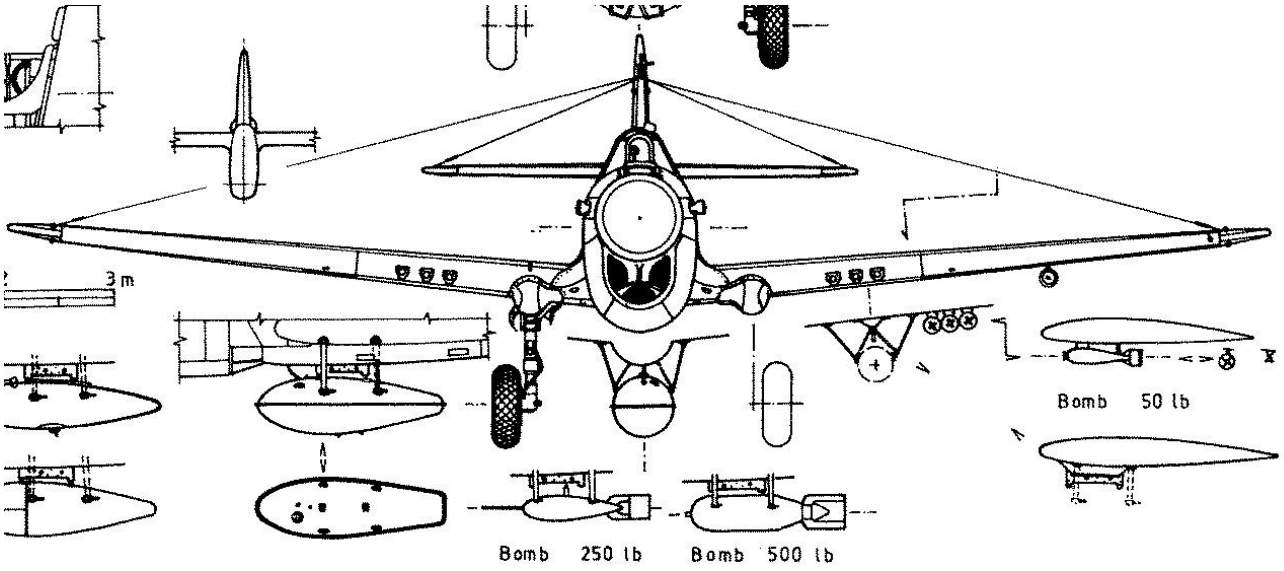
Ordered on USAAF Contract AC34423, as P-40N-5 FY42-105693. Lend Lease RAAF Case 200, Indent 2012A RFDA-322A4, Diversion 447-A, supplied as Aus18#2 as MAC Air A29-1124.

Received at Number 2 Air Depot (AD) ex USA on the 17/09/43 and renumbered as A29-524.

Received at Number 13 Aircraft Recovery Depot (ARD) Reserve Pool (RP) ex 2AD on the 31/10/43. Rec 15ARD RP ex 13ARD RP 29/11/43. Rec 75 Sqn RAAF ex 15ARD RP 08/02/44. Rec Number 11 Repair and Salvage Unit (RSU) ex 75 Sqn RAAF 13/07/44. Rec 10RSU Detachment ex 11RSU 05/08/44. Rec 22RSU Det RP ex 10RSU 09/08/44. Rec 78 Sqn RAAF ex 22RSU Det 12/08/44. Coded as HU-B?.

Operational damage 03/10/44, when strafing and dive bombing Oil Wells in Waroe Bay Area, Dutch New Guinea , the gun tubes blew out damaging the starboard mainplane. Pilot; F/Sgt A C Britton Serv#432746 was not injured. Rec 22 RSU Det ex 78 Sqn RAAF 04/10/44. Rec 82 Sqn RAAF ex 22RSU RP 10/01/45. Coded FA-Q.

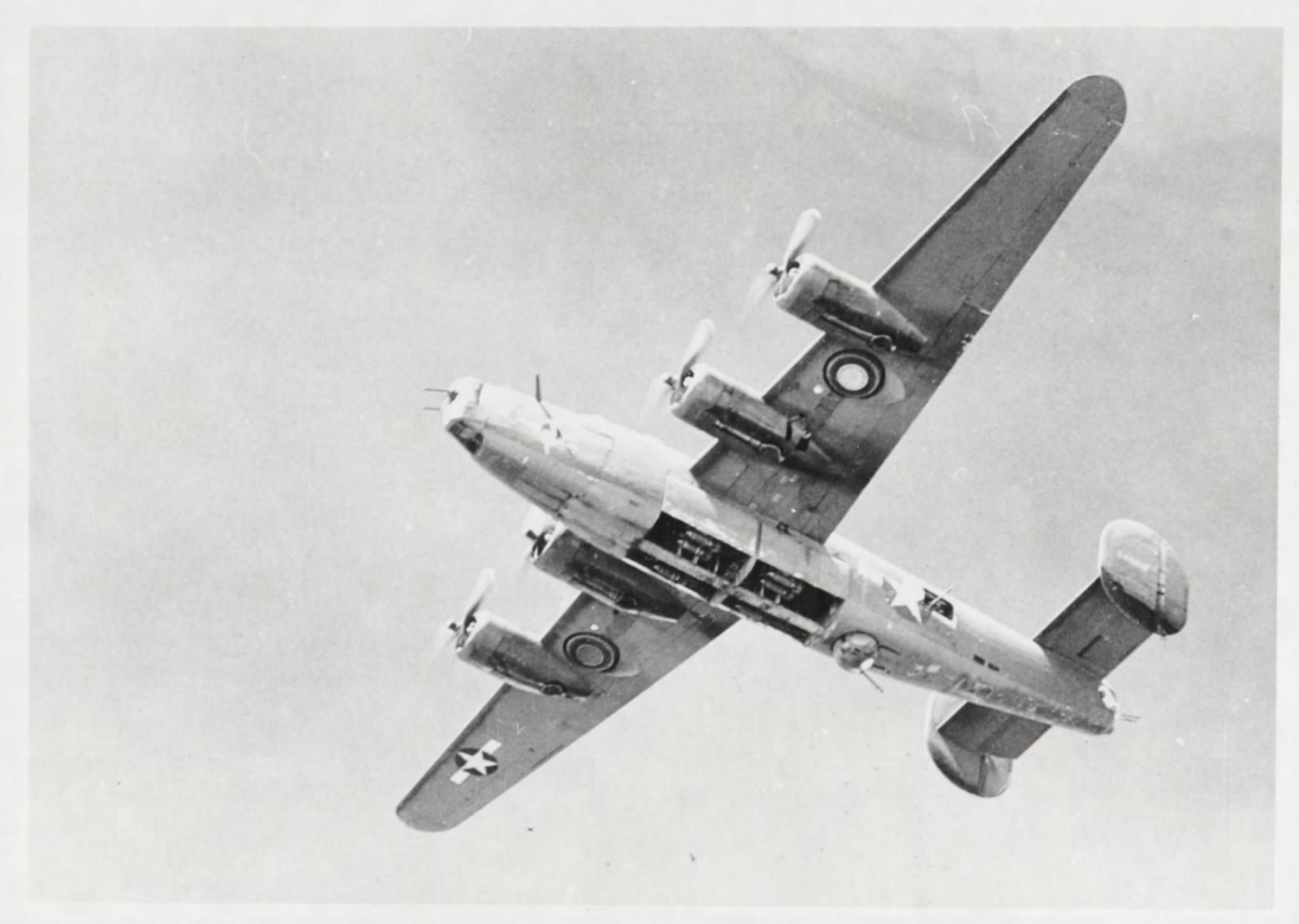
Accident 1545hrs 13/01/45 when during an engine test flight, aircraft forced landed into sea off the beach of Kamiri when piloted by 22RSU Test Pilot. Pilot; F/O R C O'Neill not injured.



This picture is often attributed to A29-624.....but that was FA-J up to August 1945 and a different location and date per its final accident. The same period August 1945, A29-676 was FA-Q. AMSE Approval to write off per File#9/16/2315 1/01/45.

Fitted with Allison V1710-81 Engine #19159.

<u>Odd Stories:</u> Loss of B-24D-135-CO 42-41117 of the 528th BS/380th BG USAAF



Background

The 380th BG (its four Squadrons being the 528th, 529th, 530th, and 531st) went overseas in April 1943 to become the second B-24 unit in the Fifth Air Force at that time after the 90th Bomb Group. Upon its arrival in Australia, the 380th immediately began combat operations.

The group arrived at Fenton Airfield, Australia, and also encompassed a part of Western Australia at Corunna Downs Airfield, a top secret airfield some 40km (30miles) south of Marble Bar, Western Australia in the Pilbara Region under the Royal Australian Air Force (RAAF) North West Area Operational Control.

The Operational Base Unit for Corunna Downs was 73 OBU RAAF, and the first two 528th Bomb Squadron B-24D's landed there on the 26th May 1943. They individually commenced their reconnaissance missions; one to Surabaya and the other to Madieon and Malang, both on Java, Netherlands East Indies (NEI).

The Command's purpose was to engage in destroying Japanese strongholds in the Netherlands East Indies. The 380th made the longest bombing missions of WWII, to the oil refineries at Balikpapan, Borneo (200 miles further than the Ploesti mission in Europe) and to those at Surabaya, Java (as long as Ploesti).

Both of these missions were done several times during the group's stay in Australia.

The first of these bombing missions to Surabaya in Java was from Corunna Downs on the 9th November 1943 with a fourteen aircraft strike under command of Major Zed Smith.

A few days later a 27 aircraft mission was successfully completed under command of Major John Henschke. Further missions were completed by the end of November 1943.

There is a RAAF's connection per Major Henschke? He piloted once or twice B-24D-65-CO 42-40489 MISS GIVING when commanding Crew #3. She had flown her first mission on the 6th November 1943 and was later transferred to the RAAF, as **A72-4**, on the 3rd March 1944.

Pictured when with the 380th BG is B-24D-65-CO 42-40489 MISS GIVING

There would be a pause after this month with no 380th BG aircraft returning until March 1944 for the last time. The next group of B-24s would be in Dec 1944, when some thirty RAAF and 380th BG USAAF B-24s would be based there temporarily.

A 380th BG B-24D taking off from Fenton in 1943

Later moving to RAAF Base Darwin, the group was placed under RAAF command, assigned to the Australian North West Area Command operating out of Darwin, Northern Territory, Australia. The 380th was placed under the control of the RAAF and assigned to train RAAF personnel on the B-24 and to secure Australia's safety against a threatened Japanese invasion along its northern coast.

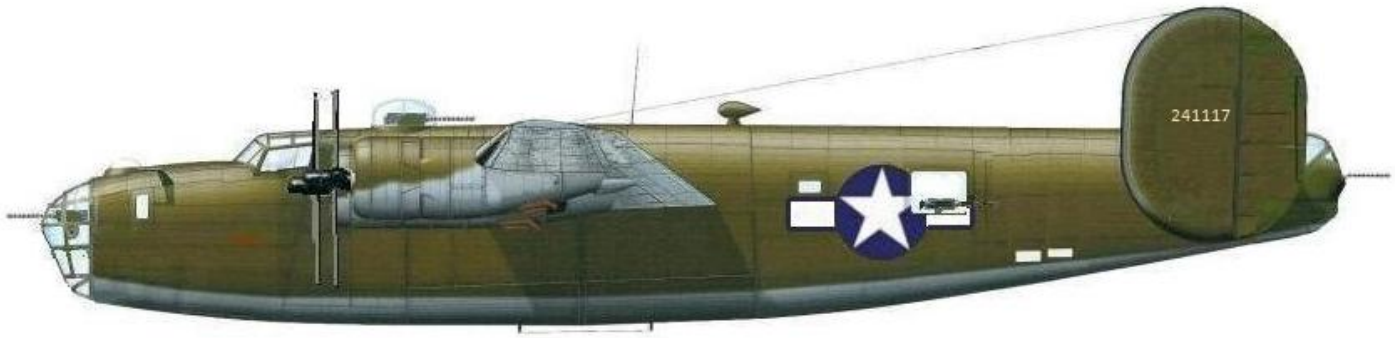
This was thus the only heavy bomber unit available to cover the whole of the Dutch East Indies (1,000,000 square miles) from July 1943 until late in 1944. In addition to attacks on the Japanese oil supply, the 380th was heavily engaged in crippling their shipping fleet to reduce the Japanese capability of supplying their far-flung forces. The group also heavily bombed the numerous Japanese airfields in the East Indies to reduce the Japanese threat to Australia and New Guinea forces.

In its service with the Australians, the 380th served longer under the operational control of an Allied country than any other Air Force unit (from June 1943 until February 1945).During April and May 1944, the 380th engaged in the most intensive and sustained operations since arrival in the southwest Pacific, neutralizing the rear bases through which the Japanese might reinforce their air force in the Wakde-Hollandia area of the Dutch East Indies.

From the end of May 1944 until it moved to Murtha Field, San Jose, Mindoro, Philippines in February 1945, the 380th concentrated on neutralizing enemy bases, installations and industrial compounds in the southern and central East Indies. As part of its duties in Australia, the 380th carried out the operational training of 52 Australian crews and their associated ground staffs so that the Australians could take over the East Indian campaign activities of the 380th when they were eventually assigned to the Philippines in February 1945.

Many of the Australians so trained did become part of the 380th Bomb Group Association, a veterans group, which showed the strong evidence of the strong ties of friendship, which developed between the two countries in their long service together. Alas, not all made it through to war's end to become a member.

The loss of B-24D-135-CO FY42-41117



At 0645hrs on the 8th May 1944, six B-24Ds of the 528th Bomber Squadron of the 380th Bombardment Group USAAF, took off from Fenton under the command of 1st Lt Roy M Parker O-465182, on a reconnaissance mission between Ceram Island and the North Western Coast of Dutch New Guinea (Mission FEN VIII-8).

Included in the crews of this B-24D formation were three RAAF Co-pilots:

- *Sqn Ldr L W Manning Serv#290489*
- *F/Lt N T Badger DFC Serv#407161*
- *F/Lt J P M Haydon DFC Serv#402352*

As the formation approached Effman Island, situated off the north western coast of New Guinea eleven Japanese fighter aircraft intercepted the formation about 1230hrs. It was stated this consisted of eight Zekes, one Hamp and two Nicks.

The lead B-24, 42-41117 [225]was hit by 37mm and 20mm cannon fire from the "Nick" aircraft, resulting in number 3 engine catching fire and number 4 engine also put out of action.

The fire in Number 3 subsided and two other B-24s of the formation, with one captained by 1st Lt Ronald D. Kemp O-675852 (B-24 42-73464 "ANGEL IN DE SKIES") nudged in closer off each wing to shield the aircraft from any further attacks.

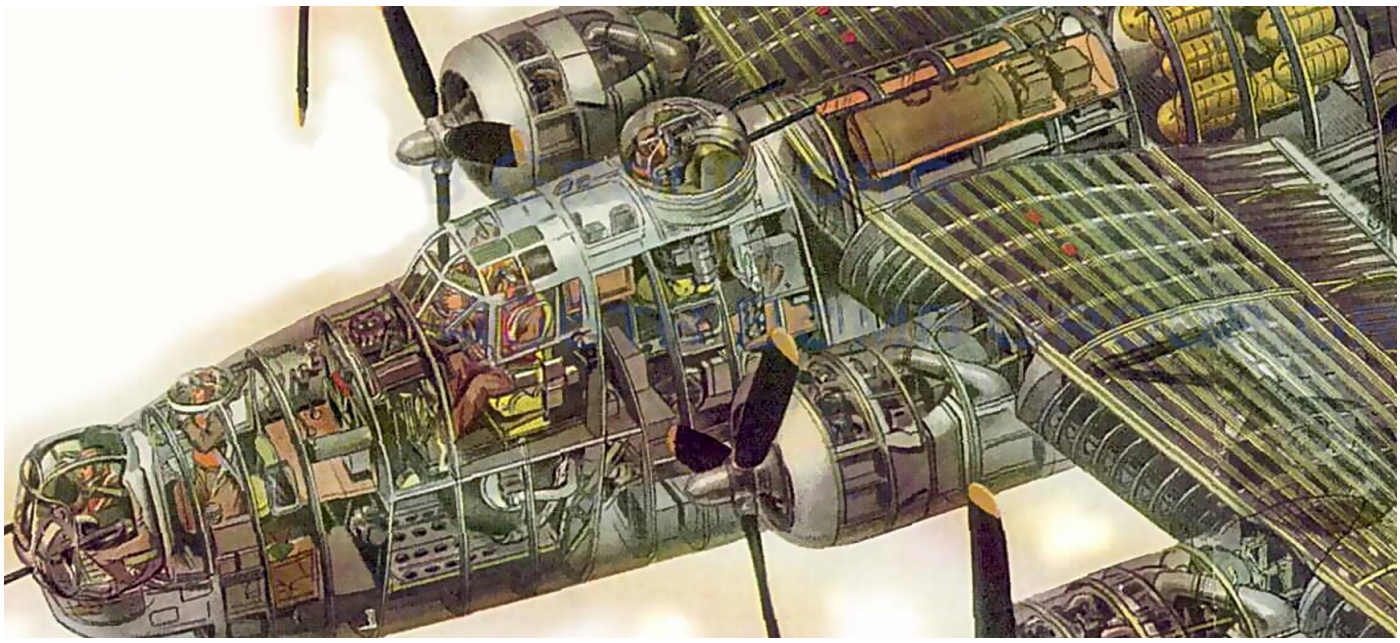
Japanese “Nick”

Despite this reassuring effort, the aircraft continued to lose altitude immediately as it flew symmetrically on its Port Wing Engines, Engine #1 and #2. At around 5000 feet, the airspeed was down to 130mph and with the enemy attacks having ceased, the crew of 42-41117 started to jettison equipment and ammunition.

Despite this, at 2000 feet, 1st Lt Roy M Parker advised the two other aircraft captains that they were going to ditch. After maintaining their wing tip positions till 1000 feet, the two escorting B-24s watched the B-24 ditch and stop shortly in relative rough seas after the rear appendage (Fuselage and tail) broke off.

The two B-24s continued to circle around the site, but after 72 seconds, the main plane and forward fuselage had gone down. No life raft was sited to have been released.

Approximately ten minutes after it sinking, two of the ten crew members were sited and lying on top one of the bomb bay tanks, and as the aircraft circled, these two survivors waved their arms. The position and applicable data was wirelessed to Base, and after some thirty minutes, the aircraft returned to base. Time was approximately 1430hrs and the nearest point of land was approximately sixty miles distant.



The following day, four 528th Bomb Squadron Aircraft, led by 1st Lt Walter D. Bousfield O-742947(captain of B-24D-20-CF 42-63989 “SATAN'S SECRETARY”), searched in the vicinity for 13 hours unsuccessfully, though an empty Mae West jacket was sighted.

Picture of B-24 42-63989 “SATAN'S SECRETARY” pictured later and fitted with nose turret

Another three B-24s returning from a mission also searched for four and a half hours without success.

On the third day, a further three B-24s, led by 1Lt Donald L. Fleming, O-681368 , captaining B-24J-20-CO 42-73167 “THE BEAUTIFUL BEAST”, searched for some fifteen and a half hours without success.

Given the location of the crews, the way and the speed the aircraft sank, it was highly improbable that any in the forward fuselage area, specifically the flight deck would have escaped or survived.

The ten man crew of **B-24D-135-CO FY42-41117** were posted missing. This included the RAAF Co-pilot of the Liberator, F/Lt Neal Thomson Badger DFC, (Serv#407161).

After the war, on the 27th November 1945, the status was changed from missing to presume killed, 08/05/44.

Crew of B-24D-135-CO FY42-41117

Parker, Roy M. 1Lt O-465182 / Acft Cmdr, Badger, Neil T.F/Lt 407161 (RAAF) / Co-Pilot, Baumann, Fredrick R. 2 Lt O-682132 / Navigator, Eggleston, John G. O-679614 2Lt / Bombardier, Farr, Bradley F. 32449314 SGT/ Flt Eng, Haga, David L. 34435878 / Asst Flt Eng, Gunner, Holt, James C., Jr. 13083496 / Radio Opr, Miller, Glenn A. 35207764 / Asst Radio Opr, Gunner, Kerns, Russell E. 34400077 / Gunner, Lewis, Donald A. 37181301 / Photographer, and Hollingsworth, Clinton L. 34474104 / Gunner,

Source:
“The Flying Circus” site: http://380th.org/380-History.html
NAA: B-24 42-41117 RAAF FL Neal Badger 08.05.44.pdf
NAA 72OBU Corunna Downs A50

<u>Odd Shots:</u> B-24 and RNFAA Oddities; and A65-62 down on the Longreach Race Track

Editor: I was fortunate that Julie Hanson was going through her dear Grandma's Album during April of this year and she had thought some pictures supplied would be interesting. She also discussed whether I could help in identifying some of the details missing in her Grandma's life. First Pic below

Julie stated It is a picture of the crew of A72-332 taken on 25/6/45.It lists out the crew names and their ranks. Unfortunately she didn't have any pictures of the actual plane.

Editor Reply: It was Squadron Leader R E Wingrove Serv#260605 and his Crew. They were based at Jondaryan Qld and were ferrying up a B-24 to Darwin a few hours later. She(Liberator A72-332) was on her way to 12 Aircraft Recovery Depot Reserve Pool (Darwin) ex 3 Aircraft Depot (Amberley) Left 25/06/45 to arrived 27/06/45.

The said Liberator became a reserve aircraft , only came into 99 Sqn RAAF on the 11/10/45. Later went to 23Sqn RAAF 05/04/46

The whole Unit of 12ARD Erks "on it" at Darwin?

The crew were part of No 99 Sqn (Liberator) Squadron RAAF based at Jondaryan Qld (a few miles west of Toowoomba) Squadron Codes on fuselages were UX-*. Other Libs of the twelve on strength were A72-301/303/304/305/307/308/309/311/<u>313*</u>/332/333/364 [226]

*There was a fatal accident per A72-313 at Amberley AFB on the 14/09/45 that resulted in a few deaths (5), so tragically soon after the end of the war.

After that date, the Squadron moved up to Darwin NT to help convey POWs and supplies to and fro to Singapore and the surrounding areas.

Thereafter the following month, returned to Tocumwal NSW to disband finally on the 5th June 1946.

6. AIR ACCIDENTS

14/9/45 A fatal accident involving the loss of 5 lives occurred at 1540 hours at AMBERLEY, QUEENSLAND, when A72-313 piloted by Flying Officer R.A. PULLIN (411050) crashed 5 miles south of the Aerodrome. The other victims were Flight Lieutenant G.A. HENDY (401441) Flight Commander "B" Flight, Flying Officer J.H. MUTTON (340046) Second Pilot, 13926 Sergeant DUREAU G.A. Flight Engineer 437876 Flight Sergeant QUINN V.J. Wireless Operator Air/Emergency, and were all buried with full Air Force Honours at the IPSWICH War Memorial Cemetery at 1300 hours 16 SEP 45.

Aircraft No. A72-313 was written off strength as a complete wipe off in accordance with No. 5 M.G. Signal Q0363 dated 15/9/45, and issued off to No. 3 C.R.D.

Julie stated she was not sure what her Grandma's connection was with this picture. Her Grandmother was born and raised in Longreach, and she knew that Longreach was used as either some sort of base or rest area during the war. She has a few other photos of planes, including a pic of a Douglas that crashed on the local race course on 1.6.45.

On that day, A65-62 VHCKO on return from Morotai to Archerfield with two medical patients, force landed in fog and crashed on third attempt at landing at 0300 hrs at Longreach Race Course, QLD with a crew of four: Pilot Sqn Ldr K S Brown 260680, Co-Pilot F/O W H Ford, Navigator F/Lt R A Curtis DFC and LAC N V Harris (slightly injured)

SO it may just be that the photo contains someone that she befriended while they were in Longreach (if they ever were). She will try and find out if she remembers where the photo comes from - though she is in her 90's now and her memory comes and goes.

Julie's Grandfather was English, and stated that he served in the RAF as a mechanic (based in Aus for at least part of the war as that is when he met Grandma), so it is possible the connection was though him.

The only information she had on her Grandad's records are that he spent 12 months in the Royal Navy and then transferred to the Fleet Air Arm as Air Fitter. He was most of the war in the UK, but ended up in Sydney in June 1945. And then in Brisbane. Discharged in Sydney approx April 1946 when rest of unit returned to England for discharge.

She also has the number FX 114679 – and she wondered whether this would be a service number? His full name was Francis Eric Pollard. So to track him down.

Editor: Checked the NAA and there was an application to migrate,..perhaps to marry a local girl

- POLLARD, Francis Eric (Navy Service No.: FX 114679) born in York on 10 August 1923; Mother: Ms POLLARD - Application dated: HMS [His Majesty's Ship] NABSFORD, 5 February 1946

Back in February 1945, the Royal Navy moved its Transportable Aircraft Maintenance Yard No.1, known as TAMY 1, to Archerfield. The Royal Navy base was known thereon as H.M.S. Nabsford.

So,...He was based at Archerfield,..same place as No 38 Squadron RAAF at that time.....so probably got the pics via there or a passenger ,..too much of a coincidence eh??????

Further details are yet to be uncovered. Anyway some TAMY I pics at Archerfield and Rocklea are below.

Note 4 to 5 ex RAAF Vengeances being prepped for RNFAA Service above pic

At 12:45 on January 18th 1946 'Clear Lower Deck' was piped, the Captain addressed the ship's company and informed them of the future programme for TAMY I.

Mid February would see the ship's complement reduced by two thirds, approximately 1000 men being drafted either home or to RN Barracks , Sydney; HMS NABSFORD was to pay off on March 31st 1946 and the 'Air Yard' closed, one year and four days after the main body of TAMY I arrived at Archerfield.

The remaining ships company of around 500 would de-store ship and prepare the various sites for handover to local authorities, further men would be sent home during the run down to closure if they qualified under the age and service scheme.

HMS NABSFORD & RN Air Maintenance Yard Archerfield paid off March 31st 1946; the various sites comprising the 'Air Yard' were returned to the Australian authorities.

Back to the forced forced landing of A65-62

The aircraft was salvaged by 3CRD (W/O Reddaway in charge) and delivered to Amberley, via Rail 09/07/45 from Ipswich. Rec 3CRD ex 38Sqn RAAF 24/07/45. She was written off per AMSE File#9/16/2633 23/07/45. Airframe TTHrs 1208.4hrs, with Eng#485969/Eng#485966 fitted at time of accident.

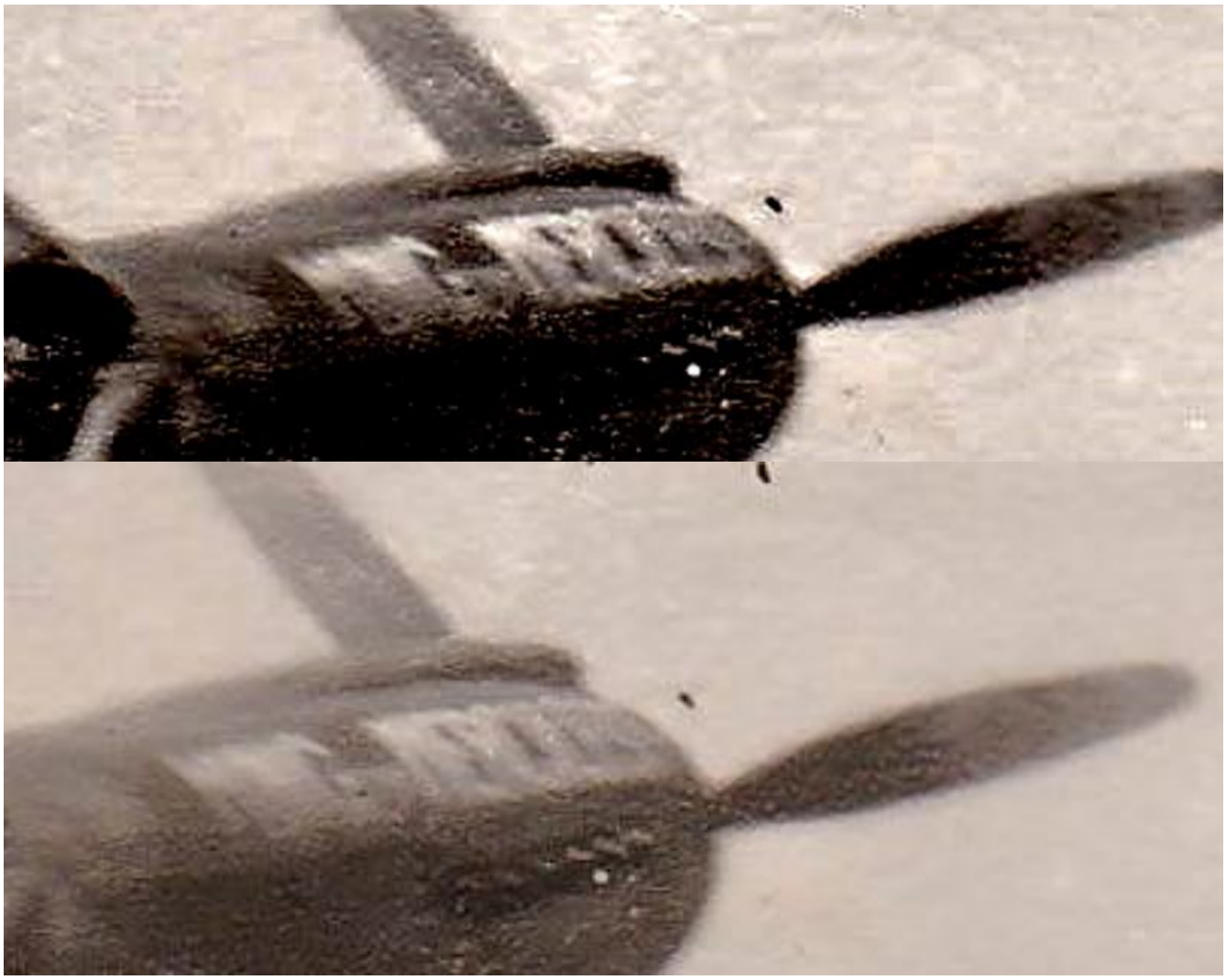
Corrections

A29-90 Name Correction: Editor

A29-90 was thought through an error of eyesight to be named “Wing Nemesis”.

In a recent Face Book post during September 2019 by Graeme Reid, he noted that his father , John Reid, had served with 76 Sqn RAAF during the post Milne Bay period when the unit was transferred to Northern Territory and Oslo Western Australia. John Reid, after joining 04/06/42,....was trained with the Recruit Training Wing, based at 1BAGS Evans Head, NSW. Then posted to 3AD Amberley,... he was with 76 "F" Sqn RAAF from 10/11/42 to 02/06/43 as AC1 Flight Rigger, thus NT and "Potshot" Onslow WA. He recalled vividly the name of the aircraft he worked on at times. He had then suffered an eye injury here and went for treatment in Perth. On their re-equipping with P-40Ms at Richmond,...he then went into No 2 Aircraft Park (2AP) at Richmond NSW to assemble further crated aircraft and flight ready them. LAC Flight Rigger. Expect later would have included further P-40M/Ns that arrived then which needed his experience. Later he served at 2AD Richmond, till war's end as LAC Fitter IIA.

His personal Album contained the following clearer picture of A29-90 top. His father’s Memory was sharp, and stated that it was actually named “Ming the Merciless” rather than “Winged Nemesis”. I must admit, it was a more suitable Aussie Name then the one first thought. Major General (Later Sir) Leslie James Morshead of the 9th Division 2AIF had this nickname.



Ladies and Gentleman..I give you vis the Reid Family,...A29-90 IH “Ming the Merciless”

Correction Details have been passed onto the RAAF Heritage

Corrections and Additions to last edition's *"Beaufighter in Colour" by John Bennett*

In response to the previous Newsletter's article on the "Beaufighter in Colour", Garry Shepherdson has provided more information on 31SQN WWII Beaus.

Firstly, he points out that the image of A19-17/EH-B has the camouflage colours transposed – i.e. the green and grey in the wrong places. This image is from the du Plessis website on WWII aircraft in colour, and is also repeated in our *adf-serials* image gallery. Shep is right – the colours are the wrong way around, but I will not attempt to re-colourise it. In addition, the image I have of A8-23/EH-C, should in fact be A8-24/EH-C. This image is from the AWM (below), and with its obliterated serial, it looked to me more like A8-23. Apologies.

AUSTRALIAN WAR MEMORIAL OG2127

AWM image EH-C, it's really A8-24 *[OG2127]*

Shep has also provided the following codes, so many thanks for this as it all adds to our knowledge base.
EH-C A8-24
EH-F A8-7
EH-H A19-149
EH-Q A19-180
EH-R A19-184
EH-X A19-203
EH-Y A8-23.
And some recently added *adf-serials* pics provide:
EH-J A8-143
EH-V A8-176.

[1] **End Notes: RAAF WWII IN COLOUR: No.2 – RAAF Vengeances** by John Bennett @2018
M Johnston, *Whispering Death, Australian Airmen in the Pacific War*, Allen & Unwin, Sydney, 2011, p.191. In return, by a SEP 1942 reciprocal agreement, Australia provided food, transport and stores to the US, repaying 80% of the US$1.4bn debt by 1946.
[2] *RAAF WWII in Colour No.1*, http://adf-gallery.com.au/newsletter/ADF%20Telegraph%202019%20Spring.pdf
[3] P C Smith, *Vengeance! The Vultee Vengeance Dive Bomber*, Airlife, Shrewsbury, 1986, pp.5-6.
[4] A Pearcy, *Lend-Lease Aircraft in WWII*, Airlife, Shrewsbury, 1996, p.24.
[5] NAA A1608, A59/2/2 Pt.2, British Supply Organisations in the US, of 15 JUL 1944.
[6] NAA A1608, A59/2/2 Pt.1, Australian Trade Commission New York cablegram I.7104, of 24 AUG 1940.
[7] NAA A1608, L17/1/2 Pt.1 message O.6244 from Aircraft Production Commission Melbourne to Australian Trade Commission NY of 30 AUG 1940; and cablegram NY1210 of 26 APR 1941.
[8] B Robertson, *British Military Aircraft Serials 1878-1987*, Midland Counties, Leicester, 1987, p.141; also J M Andrade, *US Military Aircraft Designations and Serials Since 1909*, Midland Counties, Leicester, 1979, p.34.
[9] Andrade, p.221.
[10] http://www.joebaugher.com/navy_serials/thirdseries3.html
[11] NAA A1608 L17/1/2 Pt.1, Australian High Comm London cablegram 5029 to PM (Fadden) of 5 SEP 1941.
[12] NAA A1608, L17/1/2 Pt.1 cablegram 2152 of 21 JUL 1941.
[13] NAA A1608, L17/1/2 Pt.1 cablegram 5029 of 5 SEP 1941; NAA A1608, L17/1/2 Pt.1 cablegram 2919 of 8 SEP 1941; and NAA A1608, L17/1/2 Pt.1 NY cablegram 4154 of 28 SEP 1941.
[14] NAA A1608, L17/1/2 Pt.1 cablegram 3419 from PM Dept to NY of 8 OCT 1941.
[15] D Donald, *American Warplanes of World War II*, Grange Books, London, 2000, p.37.
[16] NAA A1608, L17/1/2 Pt.1 cablegram 3682 from PM Dept to NY of 22 OCT 1941; and cablegram 3755 to NY of 27 OCT 1941.
[17] NAA A1608, L17/1/2 Pt.1, Prime Minister's Dept Canberra cablegrams I.10957 of 12 MAR 1942; Pt.2 I.19595 of 18 MAY 1942.
[18] NAA A1608, L17/1/2 Pt.1 cablegram from PMD 427 from Air Board to NY as O.1967 of 21 JAN 1942.
[19] D Gillison, *RAAF 1939-1942*, AWM, Canberra, 1962, p.484, refers to Vengeance orders as of 8 MAY 1942 at 367; in the confusion of swapping orders from direct cash contract to the Lend-Lease tab may have led to this figure, or the need to obtain credits on damaged aircraft not earlier delivered, all mean how this figure was derived is uncertain. Either way, when Australia did cancel future deliveries of 58 aircraft in MAY 1944, it was from a total of 400 and the **final delivery total was 342 Vengeances**.
[20] J Thompson, *Vultee Aircraft 1932-1947*, Narkiewicz, Santa Ana CA, 1992, p.109.
[21] Pearcy, pp.31-32.
[22] Pearcy, pp.7, 15.
[23] NAA A1608, A59/2/2 Pt.1, BPC Australian Division NY letter to Prime Minister's Dept Canberra, of 26 APR 1941.
[24] NAA A1608, A59/2/2 Pt.1, Australian Trade Commissioner cablegram NY2037, of 19 JUN 1941. At the beginning of JUL 1941, Australia was advised that all orders for defence equipment must be negotiated through Lend-Lease; NAA A1608, A59/2/2, Australian Trade cablegram NY2275, of 6 JUL 1941.
[25] NAA A1608, A59/2/2 Pt.1, Australian Commission cablegram AUSCO No.7, of 4 AUG 1941.
[26] Pearcy, p.13.
[27] NAA A1608, A59/2/2 Pt.1, *Procurement of Materials in USA and Canada*, of 11 DEC 1941.
[28] NAA A1608, L17/1/2 Pt.1 cablegram 3682 from PM Dept to NY of 22 OCT 1941.
[29] F Anderson, *Northrop, An Aeronautical History*, Wipf and Stock, Eugene OR, 1976, p.31. This initial contract was from the BPC in SEP 1940 for $17m, with Northrop paying Vultee royalties for use of design and the accompanying engineering data.
[30] **Sources**: Pearcy, pp.94-95, 158; Smith pp.8, 20-24; Andrade, p. 34; Robertson, pp.127, 141; Anderson, p.31; NAA A1608 L17/1/2 Pt.1, cablegram NY 4896 of 28 OCT 1941; NAA A1695 2/205/EQ, pg.1 para 6, Air Indent 912 of 28 OCT 1942; NAA A1695 2/205/EQ (7c) Washington Y566 of 11 NOV 1942; NAA A1695 146/209/EQ Pt.1(53A), of 20 JUL 1943; NAA A1695 146/209/EQ Pt.1 7718, of 22 SEP 1943.
[31] NAA A1608 L17/1/2 Pt.1 cablegrams PMD 427 to NY of 21 JAN 1942, and PMD 834 to London of 29 JAN 1942.
[32] NAA A1608 L17/1/2 Pt.1 cablegram NY 6671 of 1 NOV 1941.
[33] Anderson, p.31. In all, Northrop delivered 400 Vengeances from the Hawthorne plant over SEP 1941 – NOV 1943. There was a total of 1300 Vengeance built on British contracts – 600 Lend-Lease and 700 earlier on direct contracts. British Lend-Lease contracts for the 600 A-31s/A-35s were BSC145 (sometimes referred to as BAC145), BSC2647, and BSC2648.
[34] NAA A1608 L17/1/2 Pt.1 cablegram Washington W.2098 to PMD of 3 MAR 1942.
[35] NAA A1695 146/209/EQ Pt.1 (56B), *Report Receipts and Shipments*, 19 JUL 1943.
[36] J Lever, *4OTU and RAAF Vultee Vengeance Operations*, self-published, Koorlong Vic, 1999, p.7.
[37] *Units of the RAAF, A Concise History, Vol.7 Maintenance Units*, AGPS, Canberra, 1995, p.25.
[38] Smith, p.10.
[39] Du Pont equivalents to MAP Colour Standards, chart provided. I K Baker, *Aviation History Colouring Book No.51*, 'P-40 Camouflage Special', Queenscliff, 2003, p.7, provides details of Du Pont colours and equivalents.
[40] An interesting blog discusses this at http://www.ratomodeling.com/articles/AVG_cammo/
[41] I K Baker, *Aviation History Colouring Book 51, P-40 Camouflage Special*, Queenscliff, 2003, p.7, states this is likely based upon the US Spec 14057 No.27 *Light Blue*. Archer (pp. 320-323) covers *Light Blue*, which appears similar to the DuPont 71-061 *Sky Blue*, but the colour in some of these images looks even lighter.
[42] P Lucas, *Camouflage & Markings No.2*, Scale Aircraft Monographs, Guideline Pubs, Luton, 2000, p.88.
[43] Robertson, p.126. Most were handed over to the USAAF or shipped to Russia, Pearcy, p.109.

[44] Robertson, p.119.
[45] D Bell, *Air Force Colors Vol.1 1926-1942*, Squadron/Signal, Carrollton TX, 1995, p.84.
[46] *Sand 49* introduced by AAF Bulletin No.41-A, of 1 OCT 1942; R D & V G Archer, *USAAF Aircraft Markings and Camouflage*, 1931-1947, Schiffer, Atglen PA, p.1997, p.321.
[47] Bell, p.95. He states for *Dark OD* FS34087, that it is slightly redder, tending towards 34086.
[48] I K Baker, *Aviation Colouring Book 30, Updates and Oddities*, Queenscliff, 1997, p.10.
[49] Andrade, p.34.
[50] Archer, p.70. This War Dept Circular stated the red centre was to be deleted on all combat aircraft *after* 15 MAY 1942, however it had already been reduced or deleted by some units – for the same reason as the RAAF, to avoid confusion with the *hinamoru*.
[51] http://www.joebaugher.com/usaf_serials/1941_5.html
[52] Thompson, p.105.
[53] For the A-31, the angle of attack (AOA) is greater that angle of incidence; but the A-35 keeps fuselage horizontal as 4 degrees angle of incidence is sufficient for the AOA.
[54] NAA CRS A705 9/31/36(106A) *Vengeance Order No.60*, in two part: Pt I for the rear flexible guns, Pt II for the fixed wing guns.
[55] **A-35B-5-VN** A27-500 to -549; **A-35B-10-VN** A27-560 to -566; **A-35B-15-VN** A27-600 to -640.
[56] The RAF acquired 100 A-31C-VN Vengeance III from Vultee through Lend-Lease, primarily operated in Burma: 41-31048 to 41-31147 with RAF FB and FD serials; *USAAF 1941 Serials*, http://www.joebaugher.com/usaf_serials/1941_5.html7
[57] RAF serials from Robertson, p.141.
[58] Anderson, p.31.
[59] **AF745 to AF944**: Robertson p.125 states *Northrop*-built. But Smith p.175 states *Vultee*-built; as does NAA A705 series, 150/4/4215 Vengeance Instruction No.6 of 31 MAR 1944, and also 9/31/36(11A) which gives Vultee c/ns 4101 to 4599.
[60] USAAF serials from Andrade, pp.34-35.
[61] While 150/4/4215 Veng Instr No.6 gives Northrop c/ns up to 562 c/ns; NAA A705 9/31/36(11A) gives c/ns up to 600 for AP137.
[62] Thompson, p.110.
[63] I K Baker, *Aviation History Colouring Book 23, Vultee Vengeance*, Queenscliff, 1996, pp.3-4.
[64] Introduced by the Amendment to T.O. 07-1-1 of 10 JUL 1942; Archer, p.84.
[65] I K Baker, *Aviation History Colouring Book 44, Green Splotches, White Splotches*, Queenscliff, 2001, pp.3-5. Baker covers the **green splotching** on the B-17, B-24, B-25, B-26, A-20, C-47, Spitfire and the P-40K/N (the most prevalent in RAAF service).
[66] Smith, p.64.
[67] RAAFHQ AGI Pt.3 Sect(c) Instr No.1, Appendix C, 26 MAY 1944, sated colours of markings. Aircraft being received in camouflage from overseas were not required to be repainted on arrival for erection at a Depot in the standard overall *Foliage Green*, iaw DTS Message T198, SIG/8 of 26 AUG 1943.
[68] *adf-serials Newsletter* Vol.9 Issue 3, Spring 2019:
http://adf-gallery.com.au/newsletter/ADF%20Telegraph%202019%20Spring.pdf
[69] Cited in J Tanner, *British Aviation Colours of WWII*, RAF Museum, Arms & Armour Press, London, 1986, p.9.
[70] P Malone & G Byk, *Understanding RAAF Aircraft Colours*, Red Roo, Melbourne, 1996, p. 27.
[71] Cited in Archer, p.42.
[72] Cited in Tanner, p.21.
[73] Cited in Archer, p.70.
[74] RAAFHQ AMEM D/DTS 1/501/329 SAS 13552 of 8 JUL 1943, specified 32" *Blue* roundel, 12" *White*, i.e. 3:8 (approx 2:5); fin flash 24" (high), 16" wide (8" each colour). If repainted in a hurry, the type-C flash would be asymmetric with 13" *White*, 11" *Blue*.
[75] Cited in Archer p.153.
[76] RAAFHQ file 1/501/329(95A) of 18 AUG 1943 to Maintenance Groups: approval granted to retain US camouflage until repainting need; not to be re-camouflaged during erection; amended Instr No.1, AGI Part 3 Sect(c) to be issued in due course.
[77] RAAFHQ file 1/501/329(107A) of 29 OCT 1943. This was followed up by 9 Ops Gp message A.552 of 13 NOV 1943, reiterating all single-engined aircraft to have tails and wing leading-edges *White*, IAW 5thAF operational requirements, 1/501/329(118A); but by DEC 1943 was queried by RAAFHQ to 9OG by message T.457 of 10 DEC 1943, 1/501/329(124A); in APR 1944 9OG reported to RAAFHQ and RAAF Command aircraft still arriving in-theatre without *White* tails, 9OG A.281 of 9 APR 1944.
[78] Cited in Archer pp.163-172. Also covered in *adf-serials Newsletter Vol.8 No.1 Summer 2018 Supplement*, p.7:
http://www.adf-serials.com.au/newsletter/ADF%20Telegraph%202017-18%20Summer.pdf
[79] RAAFHQ file 1/501/329(103A) of 8 SEP 1943.
[80] RAAFHQ DTOR letter 1/501/329, SAS 7091, of 29 APR 1944, prior to amended AGI Pt.3 Sect(c) Instr No.1, 26 MAY 1944.
[81] RAAFHQ 62/4/93(13A) message T.20, SIG/34 of 1 MAY 1944.
[82] RAAFHQ DTS Diagram A.5524 Sheet 1 of 9 MAY 1944, reiterates fuselage size roundel for medium aircraft to be 32" diameter, but like the 8 JUL 1943 directive was still confusing by specifying *12" White* and 32" *Blue* diameters (i.e. 3:8 ratio), and by providing a diagram with 2:5 proportions; issued with the new AGI Part 3, Sect (c), Instr No.1 of 26 MAY 1944.
[83] RAAFHQ DTS/TS7 memo 392/44 of 6 APR 1944, 1/501/329(143A). RAAF HQ DTS SIG/34 of 1 MAY 44 specified fighters and attack aircraft uncamouflaged or Aluminium dope, and remaining aircraft camouflaged all-over with just one colour. In response to a query from 23SQN re dive-bombers, RAAFHQ responded by message T.247 of 19 MAY 1944 that dive-bombers were to be just one colour, *Foliage Green* on upper and lower surfaces, file 62/4/93(39A).
[84] RAAFHQ DTS Memo 392/44, 1/501(143A) of 5 APR 1944.

[85] RAAFHQ 1/501/329(162A) message QQ.457, of 2 MAY 1944. In addition to K3/316 *Azure Blue*, other 3K5 Specification colours cancelled by this message included K3/178 *Earth Brown*, K3/195 *Sky*, and K3/318 *Dark Ocean Blue*.
[86] Cited Tanner, pp.32-56.
[87] A Elias, *Camouflage Australia – Art, Nature, Science and War*, University Press, Sydney, 2011, pp.26, 30.
[88] Ian Baker, in AHCB 54, p.16, provides more precise details: around Methuen 6F4-5, between Pantone 747XR colours 462U and 4625U but a bit darker, between BS.381C colours 436 and 499.
[89] G Byk & P Malone, *RAAF Foliage Green*, HS Models Melbourne, 2001, www.clubhyper.com/reference/foliagegreenrefgb_1.htm
[90] Again Baker, in AHCB 54, p.16, provides more precise details: no useful Methuen match, like Pantone 747XR colour 5605U after some fading but stronger and darker when fresh, like BS.381C colour 224 when fresh but not quite so dark.
[91] Furthermore, this 'bottle green' hue is applied to Vengeance EZ999 at Narellan. When queried on this exact colour, Harold Thomas produced the WWII can of K3/177 *Foliage Green* that he had used. *Newsletter Winter Supplement 2016 Vol.6 No.4:* http://www.adf-gallery.com.au/newsletter/ADF%20Telegraph%202016%20Mid%20Year%20Supplement.pdf
[92] RAAFHQ DTS Memo to RTO Beaufort 348/44, 1/501/329(142A) of 1 APR 1944.
[93] RAAFHQ DTS Memo 392/44, 1/501(143A) of 5 APR 1944.
[94] DHS set up a Camouflage Section HQ on Goodenough Island, Papua, in 1943; Elias, pp.129, 158. *Jungle Green* remained the Army fighting uniform then in Korea, Malaya and until past the Vietnam War.
[95] Elias, p.44.
[96] AWM image text *REL 16500*.
[97] AWM *REL 16500* text expands on the values of these colours: Berger *Foliage Green* between Munsell 2.5GY 4/4 and Munsell 2.5GY 5/2; the RAAF *Foliage Green* is much darker, closer to Munsell 7.5GY 3/2.
[98] Elias, p.43.
[99] RAF AMO A.664 of 2 JUL 1942, para.5; cited in Tanner, p.21.
[100] (a) RAAFHQ AMEM letter 1/501/329, of 8 JUL 1943, directed HQ 2 TG to Air Diagram 1160 for the Vengeance, with 32" diameter, and this accords with imagery mensuration of roundels on other aircraft. (b) By 1942, 32" *Blue* diameter had been adopted by the RAF as the 'medium' aircraft size roundel; AMO A.664/42, para.5, of 2 JUL 1942. (c) In 1943, SEAC specified the outer size of the *Blue* ring of its new roundel (**"based on that of the RAAF"**) for 'medium' aircraft for fuselage and wings as 32", with the 'medium' fin flash 24" high x 22" wide; Air Force Order (India) No.357 *"Aircraft Identification Markings for India Command",* of NOV 1943, cited in Baker AHCB:43, p.17.
[100] The Vengeance was a "medium" aircraft, and the 32" roundel was consistent with mensuration of contemporary imagery.
[101] I K Baker, *Aviation History Colouring Book 5*, *'Roundels, Tail Stripes & Other Markings (2)'*, Melbourne, 1995, p.4.
[102] 24" square IAW AP 2656A, Ch.2 para 12, cited in Tanner, p.55. Type-C flash 24" width comprised width *Red* 11", *White* 2", *Blue* 11" – when *Red* overpainted, the *White* became 13" with *Blue* 11". (The earlier type-A was 24" wide, 8" per colour.)
[103] US amendment AN-1-9b of 14 AUG 1943, Archer p.153.
[104] T.O. 07-1-1 para. 4a, cited in Archer, p.174.
[105] Baker, *AHCB 5*, p.4.
[106] No.9 Group Adv HQ message A.694, 1/501/329(126A), of 11 DEC 1943.
[107] No.9 Group message A.281 9 APR 1944; reiterated by RAAFHQ DTS message T.834, 1/501/329(145A) 12 APR 1944.
[108] RAAFHQ DTS message T.922 of 21 APR 1944, 1/501/329 (152A).
[109] RAAF Command Cypher A.340, of 3 MAY 1944, 1/501/329(164A).
[110] HQ US Far East Air Service Command, Service Memo 44-25A-GENL of 23 AUG 1944, 1/501/329(180A).
[111] RAAFHQ DOR letter to RAAF Command SAS.23299, 1/501/329, of 23 SEP 1944.
[112] RAAF Command letter to RAAFHQ 5343 686/349, 1/501/329 of 7 OCT 1944.
[113] RAAFHQ message T.799, 1/501/329(191A), of 14 OCT 1944.
[114] RAAFHQ message T.357, DTS SIG/49, 1/501/329(205A), of 19 DEC 1944.
[115] NAA A5954, 240/7, War Cabinet Agenda Nos. 498/1943 and 516/1943 para 1.(iii), of 9 DEC 1943.
[116] NAA A5954, 240/7, letter from Minister for Air (Drakeford) to Minister for Defence (Curtin), of 17 NOV 1943.
[117] G Odgers, *Air War Against Japan 1943-1945*, AWM, Canberra, 1957, p.197, p.13.
[118] https://everything.explained.today/Vultee_Vengeance_in_Australian_service/
[119] Thompson, p.100. In G Pentland, *RAAF Camouflage & Markings 1939-45 Vol.2*, Kookaburra, Melbourne, 1989, p.120: Probably the RAAF's most experienced Vengeance pilot, Cyril McPherson (12SQN, and instructor at the OTUs) was to state that although the Vengeance was heavy on the controls, it had no vices, was fully aerobatic, could not be spun, and stalled as gently as a Tiger Moth. He also related that while with 12SQN, he once dived a Vengeance from 15,000 feet without using dive brakes and recorded over 500mph indicated, noting that even at that speed, it was completely steady and easily controlled.
[120] NAA A5954, 240/7, letter from Minister for Air (Drakeford) to Minister for Defence (Curtin), of 3 APR 1944.
[121] NAA A5954, 240/7, letter from Minister for Air (Drakeford) to Acting Minister for Defence (Forde), of 2 MAY 1944.
[122] Smith, p.110.
[123] AFHQ AGI No.C11 (issue 3), *Standard Camouflage Finishes, Markings*, para.2(b) note (i)(a) of 3 OCT 1940 (file 9/1/396) specified a *'grey'* letter on camouflage in front of the fuselage roundel. By 1942, AGI C11 (issue 4), *Standard Aircraft Finishes and Markings*, paras.2(a)(i) and 4(d) of 31 JUL 1942 (file 1/501/329), colours were specified in more detail, and identification on camouflaged surfaces were to be *Medium Sea Grey* K3/183.
[124] Air Force Confidential Orders AFCO A3/43, file 62/1/271, of 4 JAN 1943, RAAF HQ Melbourne.
[125] Para.6 of A3/43 then amplified that if there was insufficient room on the fuselage for the two-letter code in front of the roundel, then it could be transposed – with the single aircraft letter in front, and the two-letter squadron code aft.

[126] Para.8 stated the code letters to be the same height as the fuselage roundel, and horizontal when the aircraft was in level flight.
[127] 24SQN A.50 FEB/MAR 1944.
[128] **Mensuration:** Digital imagery with large monitors now makes it easier to accurately measure aircraft markings. For calibration, known dimensions are used – for instance, aircraft serial numbers are generally 8" high and 5" wide (Imperial measures are used, as that was the standard of the day), and some Orders provide roundel and fin flash dimensions. Generally, squadron code letters vary as there was no laid down standard. Such mensuration is accurate enough if the camera lens is directly perpendicular and horizontal to a flat subject. But perspective is further affected by fuselage curvature, or other curved panels, and there can be camera lens imperfections. So this is not a perfect art but, in general, sizes of aircraft markings can be provided inside a 2" margin of error.
[129] RAAFHQ Melbourne, AMEM DTS file 1/501/329(87A) of 8 JUL 1943, letter to HQ 2TG Wagga, paras 2-4.
[130] *Units of the RAAF, A Concise History, Vol.3 Bomber Units*, AGPS, Canberra, 1995, pp.35-36.
[131] 12SQN A.50 Unit History 1943-1944.
[132] Lever, p.28.
[133] Pentland, Vol.2, p.77.
[134] *Units of the RAAF, Vol.3 Bomber Units*, p.57.
[135] 21SQN A.50 Unit History FEB-MAR 1944.
[136] J Lever, *4OTU*, pp.100-101. For filming, a replica Tobruk was built at Currans Hill near Camden, and soldiers from the Army camp at Narellan were used as extras. 21SQN provided three Vengeances to be painted in German markings to represent Stukas. Flying for the film was on 29 and 30 MAY 1944 – two used were A27-55 and A27-288 [the other marked was MJ-A/A27-54].
[137] W H Brook, *Demon to Vampire, No 21 (City of Melbourne) Squadron*, Demonvamp Publications, Melbourne, 1986, p.325.
[138] 21SQN A.50 Unit History JUN 1944.
[139] During NOV 1943, an aircraft 'Reserve Pool' was formed at 15 Aircraft Repair Depot (15ARD), to supply replacement aircraft to the operational squadrons in New Guinea; *Units of the RAAF, Vol.7 Maintenance Units*, p.34.
[140] *Units of the RAAF, Vol.3 Bomber Units*, p.71.
[141] 23SQN NV-D, NV-H, NV-P, NV-R and NV-T in imagery had the *Blue* portion of the fin flash. Several model makers in their interpretation of NV-S also include the fin *Blue* bar.
[142] *Units of the RAAF, Vol.3 Bomber Units*, p.77.
[143] Lever, p.53.
[144] J Bennett, *Highest Traditions, History of 2SQN AFC/RAAF*, AGPS, Canberra, 1995, p.280.
[145] 25SQN A.50 Unit History 1943-1944.
[146] *Units of the RAAF, Vol.3 Bomber Units*, p.83.
[147] http://www.goodall.com.au/australian-aviation/kalgoorlie-vengeances/kalgoorlievengeances.html
[148] 21SQN A.50 Unit History JUN 1944.
[149] Geoff Goodall's site *The Kalgoorlie Vultee Vengeances* lists: A27-30, -32, -45, -54, -55, -64, -66, -68, -69, -95, -96, -228, -229, -232, -236, -247, -251, -255, -257, -258, -259, -264, -265, -268, -296, -406, -418, -419, -501, -510.
[150] *adf-serials* Newsletter Vol 8, Issue 2: http://www.adf-serials.com.au/newsletter/ADF%20Telegraph%202018%20Autumn.pdf
[151] J Lever, *7OTU Tocumwal*, self-published, Koorlong Vic, 1996, pp.61-63.
[152] Smith, pp.164-165.
[153] NAA A705 series 9/31/63 Pt. 1 of 1943-44, and 150/4/4651 of 1944.
[154] http://www.royalnavyresearcharchive.org.uk/SQUADRONS/721_Squadron.htm#.XcTNNnduLIU
[155] **End Notes: The first Skyhawk on HMAS Melbourne and A-4G Skyhawk 888**

What about A-4B BuNo. 142874? It still exists! And now in the RAN FAA Museum at Nowra: Mocked up with new nose to look like an A4-G '885' and painted in spurious RAN colours (late in 2007 repainted with '882' side number. It's actually on loan from the USN. Bu No. 142874 is known to have served at NAS New York, Glenview, Weymouth, NAS Lemoore (VA-125) and Alameda and VC-5 Cubi Point. Colour Spread

[156] LTC Charles W Ward III DOB was 16th December 16, 1932, retired from the Navy in May 1976 with rank of Commander, and passed away 23rd September, 2010

[157] Civil Lord of the Admiralty John Hay said in Parliament on 2 March 1964 that "Phantoms will be operated from "Hermes", "Eagle" and the new carrier when it is built. ... Our present information and advice is that the aircraft should be able to operate from "Hermes" after she has undergone her refit." This seemed optimistic, as most sources believed Victorious was the smallest carrier then in commission that the modified RN F-4K versions of the Phantom could realistically have operated from. While the Phantoms built for the RN were modified in ways similar to F-8 Crusaders for the French Navy - improving deceleration on landing - the modifications were not entirely successful. Hermes's flight deck was too short, her arresting gear as well as her catapults were not powerful enough to recover or launch the F-4K's, even though they were slightly lighter, more economical and higher performing than their US Navy counterparts. The Phantom trials held on Hermes in 1969-70 proved this out, though in the views of Minister of Defence, Denis Healey, the carrier could operate the most modern aircraft, but in too small numbers to be effective. The MOD briefly considered F-8's, and then considered the A-4M Skyhawk around 1969; the French had successfully operated the F-8 from its two Clemenceau-class light fleet carriers (which, at 869 feet (265 m) were much larger than Hermes), while the A-4 had been selected by the Royal Australian Navy to operate from HMAS Melbourne. However, both the Crusader and the Skyhawk were already considered near-obsolete by the end of the 1960s. Nevertheless, the light A-4M Skyhawks would have allowed the Hermes to carry a viable late 1970s air group of 20 Skyhawks, 6 Sea Kings and 4 Gannet AEW aircraft.

Imagine the RANFAA position...it would have required a minimum of another 12-18 A-4Gs to generate those numbers, even before attrition started. Source:http://www.seaforces.org/marint/Royal-Navy/Aircraft-Carrier/R-12-HMS-Hermes.htm

[158] **End Notes 2 Sqn Part II**

E M Emme, *The Impact of Air Power*, Van Nostrand, Princeton, 1959, p.5.

[159] L W Sutherland, *Aces and Kings*, Hamilton, London, pp.3-4.

[160] The claim was credited to Sgt-Maj Tillings of No 2 Sqn RFC. E H Sims, *Fighter Tactics and Strategy 1914-1970*, Cassell, London, 1972, p.7.

[161] L Bridgman & O Stewart, *The Clouds Remember*, Arms & Armour, London, 1972, p.102.
[162] IWM 73/235/1 and IWM 88/7/1 refer.
[163] In MAY 1917, "Reserve" Squadrons were retitled "Training" Squadrons.
[164] PRO AIR1/2038/204/356/1.
[165] Pilots who later joined the Squadron also flew at the School of Aerial Fighting at Ayr in Scotland.
[166] "Training the Military Flyer", in *Flying*, Aeronautical Society, London, 14 FEB 1917, p.89.
[167] PRO AIR1/1044/204/5/1506 "AFC in France Jul 1917-Oct 1918", CRFC 2305/1(A), of 5 AUG 1917.
[168] PRO AIR1/970/204/5/1103 "Record of Casualties of Australian Personnel 21 JUN 1917- 14 NOV 1918", p.59.
[169] F M Cutlack, *The Official History of Australia in the War of 1914-1918, Vol VIII, The Australian Flying Corps*, AWM, Canberra, 1923, p.177.
[170] F R Cox, personal diary, Museum of Army Aviation and Flying, Oakey, p.9.
[171] The groundcrew establishment for the Squadron was normally around 158 personnel. AWM 25 911/13 Strength Returns, No 68 Sqn/No 2 Sqn, 1917-1919.
[172] H C Brinsmead, "In France with the 68th (2nd Squadron) AFC", in *Oswald Watt*, Art in Australia Ltd, Sydney, 1921, p.25.
[173] PRO AIR1/867/204/5/523 CRFC 1693.G, of 19 SEP 1917.
[174] M Baring, *Flying Corps Headquarters 1914-1918*, Buchan & Enright, London, 1985, p.127.
[175] PRO AIR10/324 AP302 "Fighting in The Air", MAR 1917, p.3.
[176] PRO AIR1/970/204/5/1103 "Record of Casualties", p.58.
[177] Archie could also be used to the advantage of the flyers. While the German smoke was black, Allied shells exploded with white smoke. The enemy would use his black barrage to warn his machines of advancing Allied scouts. Also, if the enemy's Archie suddenly stopped harassing a patrol, it was a sure sign EA were about to swoop.
[178] K P Werrell, *Archie, Flak, AAA and SAM*, Air University Press, Maxwell AFB, Alabama, 1988, p.1.
[179] AWM PR 83/230, Personal diary of 2AM Ward, 10 OCT 1917.
[180] IWM 73/235/1, letter from Lt Y E S Kirkpatrick RFC, of 7 MAY 1918.
[181] H A Jones, *The War in the Air,* Vol IV, Clarendon Press, Oxford, 1934, p.358.
[182] https://www.crossandcockade.com/StOmer/TheAircraftDepot.asp
[183] Both 2AD and 2ASD had to be evacuated in late MAR 1918 with the German offensive on the Somme – 2AD pulling back to Rang du Fliers, and 2 ASD to St André-aux-Bois.
[184] P Dye, *The Bridge to Airpower*, Naval Institute Press, Annapolis MD, 2015, *Appendix B: Logistic Units 1914-18*.
[185] Baring, p.278.
[186] M Lax, *One Airman's War*, Banner, Maryborough, 1997, p.12.
[187] F R Cox, personal diary, of 16 OCT 1917.
[188] In aerial combat on 25 Sep 1917, the RFC lost only one aircraft to the German loss of nineteen.
[189] AWM25 85/16 Part 2, GHQ OB/1656, of 24 DEC 1916.
[190] Ward, 20 NOV 1917.
[191] PRO AIR1/970/204/5/1103 "Record of Casualties", p.56, citing 3rd Bde letter 3b/57/A, of 14 JAN 1918.
[192] Jones, Vol IV, p.239.
[193] GPCAPT A D J Garrisson OBE, "Number Two Has Notable Firsts", in *RAAF News*, Vol 1, No 2, FEB 1960, p.4.
[194] AWM4 8/5/1, No 68 Squadron Ground Attack Report No 9, of 23 NOV 1917.
[195] The Circus was comprised of *Jastas* 4, 6, 10 and 11. Jones, Vol IV, p.245.
[196] AWM4 8/5/1 Ground Attack Report No 12, of 23 NOV 1917.
[197] Jones, Vol IV, p.246.
[198] Jones, Vol IV, p.247.
[199] Machine produced by *Deutsche Flugzeug Werke.*
[200] Jones, Vol IV, p.254.
[201] Sims, p.49.
[202] AWM4 8/5/1 Combat in the Air Report No 21, of 1 DEC 1917.
[203] AWM4 8/5/1 Combat in the Air Report No 22, of 1 DEC 1917.
[204] No 68 Squadron AFC, Operations Record Book, AWM4 8/5/1, of NOV 1917.
[205] Baring, p.260.
[206] AWM4 8/5/1 Ground Attack Report No 34, of 6 DEC 1917.
[207] AWM4 8/5/1 Combat in the Air Report No 25, of 6 DEC 1917.
[208] PRO AIR10/111 "Handbook of German Military and Naval Aviation (War) 1914-1918", AP No 71, Air Ministry Directorate of Air Intelligence, London, OCT 1918, p.38.
[209] A J Jackson, *De Havilland Aircraft since 1909*, Putnam, London, 1994, p.83.
[210] J M Bruce, *The De Havilland D.H.5*, Profile Publications No.181, Leatherhead Surrey, 1967, p.12.
[211] B Robertson, *WWI British Aeroplane Colours and Markings*, Albatros Productions, Berkhamsted UK, 1996, p.12. Robertson also gives the date of introduction of P.C.10 as APR 1916, in his 1994 Windsock-series books on the B.E.2c and Bristol Scout. Rogers [p.18] states that the date of introducing so-called 'Protective Coating No.10' (i.e. P.C.10) was not known, but in JUN 1916 aircraft proceeding to France were to have P.C.10.

[212] P.C.10 was developed by the RFC, and would vary in tone depending on prevalent lighting conditions from green to brown, weathered and aged towards brown, and when the paint formula varied the colour could be between a lighter green through olive drab to chocolate brown. To complicate this further, the specification was apparently changed later in the War. There is an in-depth debate of the 'green-ness' vs 'brown-ness' of P.C.10 here:
http://www.theaerodrome.com/forum/showthread.php?t=41185

[213] IPMS gives the FS 595a equivalent of CDL as FS13617, and P.C.10 as FS14087:
http://www.ipmsstockholm.se/home/urbans-color-reference-charts-part-i/urbans-colour-reference-charts-united-kingdom/
Other sources give P.C.10 a gloss finish as FS34087, which is the 1956 FS 595a colour for US Olive Drab, or the 1989 FS 595B FS34088. The metal engine cowls on most aircraft were generically referred to as *Battleship Grey*, sometimes given as FS36408, but to my eye closer to FS36173.

[214] PRO AIR1/867/204/5/523, CRFC 1693G, dated 19 SEP 1917.

[215] L Rogers, *British Aviation Squadron Markings of WWI*, Schiffer, Atglen PA USA, 2001, pp.7, 132.

[216] Pilots would normally fly their allocated aircraft within their Flight; so therefore aircraft numbers can be matched to pilots and that Flight. The initial allocation of pilot/aircraft from the 68SQN War Diary on deployment on 21 SEP 1917 can then be interpolated, with the letter/number code being allocated probably after 22 SEP 1917. Fifteen aircraft deployed on 21 SEP 1917, from Harlaxton to St Omer, where another three aircraft were issued on 22 SEP (A9263, A9271 and B377). As pilots retained the same allocated aircraft – and remained in the same Flight – this assists tie-ups to the Squadron code letters (with Flight Commanders in **bold**) was:

A FLT		**B FLT**		**C FLT**	
A9284	A Howard	A9464	1 **Wilson**	A9469	U Griggs
A9273	B Bartlam	A9265	2 Pratt	A9473	V **Bell**
A9245	C Holden	A9288	3 Phillipps	A9242	W Morrison
A9459	D **McCloughry**	A9462	4 Huxley	A9457	X Matthews
A9226	E James	A9224	5 Taylor	A9483	Y Robertson
A9271	F Agnew/Ward	A9263	6 Sands	B377	Z McKenzie

The final 68 SQN code letter sequence at the end of D.H.5 flying, when the unit changed to the S.E.5a in DEC 1917, was apparently:

A FLT		**B FLT**		**C FLT**	
A9517	A Howard	A9449	1 **Wilson**	A9535	U Truscott
A9537	B Power	A9338	2 Pratt/Lawson	A9255	V **Forrest**
A9344	C Holden	A9459	3 Sands	A9495	W Johnson
A9517	D **Phillipps**	A9461	4 Huxley	A9445	X Benjamin
A9292	E Clark, R	A9336	5 Taylor	B4938	Y Robertson
A9324	F Cornell	A9531	6 Clark, A	A9544	Z McKenzie

[217] Jackson, pp.5-7.

[218] Quote by 64SQN RFC pilot in *Popular Flying*, JAN 1938, cited in Bruce, *The De Havilland D.H.5*, p.7.

[219] B Robertson, *British Military Aircraft Serials 1878-1987*, Midland Counties, Leicester UK, 1987.

[220] Bruce, *D.H.5 Profile,* provides some details; www.airhistory.org.u/rfc Award of Contracts, of 2013, appears more definitive.

[221] Robertson, *WWI British Aeroplane Colours and Markings*, pp.48-57.

[222] This list is based on Appendix 8 from my *Highest Traditions*, pp.361-363, updated by more recently available UK records.

[223] The code letters/numbers would not have been not applied until arrival at Baizieux.

[224] **Squadron codes** are determined from photographs, documents, and secondary sources and artwork. When shown in red, code is unconfirmed and assessed by pilots in known Flights and then by dates of the gaps of known allocations to and from Depots.

[225] **End Notes for Odd Stories: Loss of B-24D-135-CO 42-41117 of the 528th BS/380th BG USAAF**

This lead aircraft, when piloted by 2nd Lt Phillip S Burger had previously suffered a landing accident on the 6th September 1943 at Wichita Kansas in the US of A. It was repaired and delivered to Australia by the 25th November 1943. 1st Lt Roy M Parker captained its first mission on the 26th November 1943 to Cape Gloucester and another five times before this fateful seventh mission.

[226] John has stated to me the following Serial/Code tie ups: UX-A/A72-332, UX-G/A72-304, UX-H/A72-305, UX-J/A72-306 and later A72-364, A72-307/UX-K, A72-poss308/UX-L, A72-poss309/UX-M, A72-poss 310/UX-N, A72-311/UX-O, A72-194/UX-R.