



# ADF-Serials Telegraph Newsletter



# Welcome to the ADF-Serials Telegraph.

Articles for those interested in Australian Military Aircraft History and Serials

*Our Editorial and contributing Members in this issue are:*

***Garry Shepherdson, John Bennett and Gordon Birkett***

As stated on our Web Page; <http://www.adf-serials.com.au/newsletter.htm>

“First published in November 2002, then regularly until July 2008, the ADF-Serials Newsletter provided subscribers various news and articles that would be of interest to those in Australian Military Heritage. Darren Crick was the first Editor and Site Host; the later role he maintains.

The Newsletter from December 2002 was compiled by Jan Herivel who tirelessly composed each issue for nearly six years. She was supported by contributors from a variety of backgrounds on subjects ranging from 1914 to the current period. It wasn't easy due to the ebb and flow of contributions, but regular columns were kept by those who always made Jan's deadlines. Jan has since left this site to further her professional ambitions.

As stated “The Current ADF-Serials Telegraph is a more modest version than its predecessor, but maintains the direction of being an outlet and circulating Email Newsletter for this site”.

Words from **me**

*I would argue that it is not a modest version anymore as recent years issues are breaking both page records populated with top quality articles! John and I say that comment is now truly being too modest!*

As stated, the original Newsletter that started from December 2002 and ended in 2008, and was circulated for 38 Editions, where by now...excluding this edition, the Telegraph has been posted 44 editions since 2011 to the beginning of this year, 2020. The ebb and flow of contributions is still a major problem and concern and if it wasn't for stalwarts like John Bennett and a few recent authors who have contributed alone and by me, I'm sure new articles and public interest would have died long ago. Like other parts of the ADF Serials.com.au site, we all do this for free and to share history.

From my prospective, all research and presented articles are produced in good faith, based on thorough research with official documentation and accumulated knowledge that, in most parts is considered “air tight”, but we are always willing to include discussion should they conflict with written history, by presenting evidence, or new evidence presented.

The included Authors in each edition, are also providing their articles, based on their research that is supported by official period documentation and photos, that may provide interest and insight in lesser known subjects' or circumstances, otherwise forgotten or not fully covered by recorded History to date.

Other Stories may be of a personal account or passed down as viewed through their eyes only, and will be stated as such.

Our Bottom Line:

We do reserve the final say and do stand by our presented article's accuracy; until alternative or official documentation are provisioned to state the facts are otherwise. *We will not accept or publish any knee jerk comment or unsupportive counter arguments.*

## ADF-Serials Generic House Rules:

Please support the main ADF-Serials website with your patronage. It's free and is the product of thousands of hours of dedicated, ongoing work by our volunteer membership. Many of the answers to your questions can be found there. It is located at <http://www.adf-serials.com.au/home.htm>

The main site also includes:

- Our image gallery at <http://www.adf-serials.com.au/Gallery.htm>
- Our message board at <http://www.adf-messageboard.com.au/invboard/>
- The Aircraft of the New Zealand Defence Force website at <http://www.nzdf-serials.co.nz/nz-serials/nzaircraft.htm>
- The Aircraft of the Papua New Guinea Defence Force (PNGDF) website at <http://www.adf-serials.com/PNGDF.htm>

Any photographs posted must be your own or where possible, have the photographer's permission. At the absolute least, ALWAYS ensure credit is given.

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**Message Traffic:** Please address any questions to: [question@adf-serials.com.au](mailto:question@adf-serials.com.au)

# “Blue on Blue”; Boomerangs

Gordon R Birkett @2020

## First example of Blue on Blue

Location: Over Beach on Nassau Bay

Sergeant James Keith Collier first flew Wirraways operationally after gaining wings as a Sergeant Pilot, with No 23 Squadron RAAF from February 1941. On the 25<sup>th</sup> September 1941, he was transferred overseas to Malaya to No 21 Squadron RAAF where he arrived on at the 8<sup>th</sup> October 1941.

No 21 Squadron RAAF had moved to Sembawang, on Singapore Island in August 1940.

From the 28<sup>th</sup> August 1941, its Wirraway aircraft were gradually replaced with Brewster Buffalo fighters. By the end of the following month, some eleven aircraft were on strength. At the beginning of October 1941, they were advised to send ten Wirraways to 151 Maintenance Unit and the balance of six to be allotted to an Operational Training Unit (OTU) at Kluang for training purposes. By the end of the month, there were sixteen Buffalo aircraft on strength against an establishment of eighteen.



**Line up of No 21 Squadron RAAF Buffalo photographed during November 1941 during a display at Sembawang, Singapore to journalist and Air Officer Commanding Air Headquarters, Far East. [RAAF official].**

On the 13<sup>th</sup> November 1941, Collier was transferred to the OTU for flying instruction duties at Kluang.

On the 25<sup>th</sup> November 1941, thirteen Buffalo aircraft of No 21 Squadron RAAF moved from Sembawang, Singapore, under escort by two Hudsons of No 8 Squadron RAAF, to Sungei Patani, Malaya.

Collier returned to the squadron on the 24<sup>th</sup> November 1941 and joined the rear guard party at Sembawang before arriving at Sungei Patani, Malaya four days later by road. The Buffalo aircraft strength reached its Unit establishment of eighteen aircraft.

The Japanese arrived one week later when five bombers approached Sungei Patani and bombed the aerodrome.

A further seven bombers arrived later, which resulted in two Buffalo aircraft being destroyed and a further five damaged on the ground. The remaining serviceable aircraft, all in all just two, flew to Butterworth, and as others remaining were made serviceable, they too flew there.

As the days wore on, the squadron survivors withdrew first to Ipoh and then later to Kuala Lumpur.

Collier only managed to fly four operational sorties during December 1941, a patrol on the 4<sup>th</sup>, travelled by road to Singapore to collect and ferrying up a replacement Buffalo to Ipoh on the 10<sup>th</sup>, two defensive patrols on the 16<sup>th</sup> and 17<sup>th</sup> and a final squadron scramble on the 19<sup>th</sup>.

He became a casualty per an AHQ Far East report of the 22<sup>nd</sup> December 1941 as result of Air Actions on the 19<sup>th</sup> December 1941. He was flying **Buffalo AN181** (Which for *ADF-Serials.com.au* records is an additional un-noted RAAF machine).

*On 1100hrs 19<sup>th</sup> December 1941, following his landing during a bombing raid, after a No 21 Squadron scramble, whilst taxiing to his aircraft assigned dispersal, it was struck by fragments from a nearby high explosive bomb that exploded nearby, causing aircraft to catch on fire. Sgt Collier was wounded by shrapnel to the head and suffered burns to legs on his escape from the aircraft. He was later admitted to the Alexander Military Hospital, Singapore with scalp lacerations and first degree burns to his legs.*

With only reserve aircraft available, the unit merged with 453 Squadron to become 21/453 Squadron on the 24<sup>th</sup> December 1941.



**Flight of three RAAF Buffalos photographed during November 1941 during a display at Sembawang to VIPs and Air Officer Commanding Air Headquarters, Far East. [RAAF Official].**

No 21 Squadron RAAF excess pilots ordered on the 26<sup>th</sup> January 1942 to be evacuated to Australia, and so the once highly spirited Squadron, now quiet and gaunt battle weary band of men, climbed into trucks and left their old RAAF Station, Sembawang without choice with mixed feelings to the port of embarkation.

All sailed, including Collier on the 30<sup>th</sup> January 1942 on the SS Taklimaa to Palembang, Sumatra on the 1<sup>st</sup> February 1942, then onto Batavia, Java on the SS Ban Goen. They sailed to Australia on another ship, the SS Giang Ann, and finally arrived on our shores at Fremantle on the 4<sup>th</sup> March 1942.

Details are missing of the “in between” period, Collier emerged on roster as of the 23<sup>rd</sup> March 1942 with No 5 Squadron RAAF as a commissioned Pilot Officer, and flew his first Army Co-operation flight on the 29<sup>th</sup> March 1942.

*His file states that he was appointed as a Pilot Officer as of the 10<sup>th</sup> August 1941, yet A50 Records to November 1941 have entries as a Sergeant. He was gazetted in May 1942. He was previously promoted as a Flying Officer as of the 10<sup>th</sup> January 1942, but this was only gazetted on the 27<sup>th</sup> August 1942.*

His first connection with the 41<sup>st</sup> US Division was when he was first assigned on temporary Air Liaison duties on the 27<sup>th</sup> August 1942 when the Division was based at Rockhampton, Queensland. He then returned to No 5 Squadron RAAF on the 7<sup>th</sup> September 1942. During November 1942, "B" Flight, No 5 Squadron was deployed at Rockhampton from Toowoomba during the Division's work up prior to its deployment to New Guinea for Army-Co-Operation training. The remaining part of the squadron would move to Toogoolawah, while "A" flight remained at Williamtown, NSW.

Aircraft flown by Collier during the No 5 Squadron period included: Tiger Moths, A17-603/BF-X and A17-617/BF-A (overscore) and Wirraways, A20-549/BF-T, A20-190, A20-502/BF-O and A20-289.



**Wirraway, A20-502/BF-O, landing early 1944. [AWM OG2422].**

He was transferred to No 4 Squadron RAAF, based at Moresby and recorded his first flight there on the 29<sup>th</sup> April 1943, where he would be re-acquainted with the US 41<sup>st</sup> Division who was now in New Guinea.

#### Over at Nassau Bay, New Guinea :

Introduction Source in *italics* is this Author's edited and abridged Version per **US Army in World War II**:<sup>1</sup>

*.....The invasion of Nassau Bay was designed to ease the problem of supplying the Allied troops that were to attack Salamaua and Lae. The Australian troops operating out of Wau against Salamaua were still being supplied by air, and this placed a heavy burden on Southwest Pacific air transport and limited the number of ground troops that could be employed.*

*In order to supplement air transport the Australians had begun their road from Edie Creek at the south end of the Bulolo Valley to the headwaters of the Lakekamu River on the southwest coast of the Papuan peninsula, but the tremendous difficulties inherent in pushing roads through New Guinea mountains slowed the Australians as they had the Japanese. It was clear that the opening of the Markham Valley-Huon Peninsula campaign would be delayed beyond August if it had to await completion of the mountain highway.*

*The seizure of Nassau Bay offered a possibility of at least partially solving these problems, a possibility which fitted neatly into the pattern of plans already being prepared. Nassau Bay lies less than sixty miles from Lae, or within range of the landing craft of the 2nd Engineer Special Brigade which GHQ expected to employ, and it is just a short distance down the Papuan coast from Salamaua.*

Troops of the 3rd Australian Division AMF were operating inland from Nassau Bay at this time. Seizure of the bay by a shore-to-shore movement from Morobe, then held by the U.S. 162nd Infantry of the 41st Division, would provide a means by which the Australians getting ready to attack Salamaua could be supplied by water to supplement the air drops, and would also provide a staging point for the shore-to-shore movement of an entire Australian division to a point east of Lae.

Therefore GHQ and New Guinea Force headquarters, under General Moten US Army, decided to seize Nassau Bay on the same day that Woodlark, Kiriwina, and New Georgia were invaded. The troops seizing Nassau Bay would then join forces with 3rd Australian Division (Australian Military Forces), under command of Major General Stanley G. Savige and press against Salamaua in order to keep the Japanese from deducing that the Allies were planning a major assault against Lae<sup>2</sup>

Allied amphibious forces, MacKechnie Force, consisted of the reinforced 1st Battalion, 162d Infantry Regiment, 41<sup>st</sup> US Infantry Division, under command of General Fuller, with amphibious landings occurring during the night of 29th/30<sup>th</sup>, June 1943.

General Savige, Officer Commanding the 3rd Australian Division, had tactical command of the operations against Salamaua. Troops of the U.S. 162d Regimental Combat Team, which was assigned to Nassau Bay and subsequent operations against Salamaua, would come under General Savige's control once they were ashore.



Location Map: Huon Gulf. [Source: <https://www.ibiblio.org/hyperwar/USA/USA-P-Rabaul/maps/USA-P-Rabaul-6.jpg>].

*First an American battalion group, MacKechnie Force, would establish a bridgehead round Nassau Bay on the night 29th-30th June; second, the 58/59<sup>th</sup> AMF battalion of the 15th Brigade, including the 2/3<sup>rd</sup> Independent Company, would capture Bobdubi Ridge while small forces, Company from the 2/6<sup>th</sup> Battalion would raid the Malolo and Kela Hill area to distract attention from the attack at Bobdubi; third, a Pacific Islanders battalion of the 17th Brigade and the MacKechnie Force would attack Mubo, not later than 6th July.*

*Escorted by US Navy PT Boats, twenty-nine LCVs, including three requisitioned Japanese barges operated by the 2nd Engineer Special Brigade (US Army), and a further two Landing Craft Mechanized of the 532nd Engineer Boat and Shore Regiment (US Army) took the force, numbering some 770 men on board (A/B/D Companies, 1/162<sup>nd</sup> Regiment) at Mageri Point. The landing force was organized into three waves. Unfortunately the third wave failed to land due to conditions and confusion.*

*After landing unopposed, these units pushed north and south towards the Bitoi River and Tabali Creek, respectively 1<sup>st</sup> Battalion /162 Regiment. Troops eventually make contact with enemy forces in the Cape Dinga area S of Nassau Bay. As MacKechnie's wireless sets had been submerged during the landing and Australian forces covering the landings per the plan knew nothing about what had happened at the beach. All landing craft were clear of Nassau Bay by dawn to avoid air attacks. Time should not have been wasted by operations against any Japanese in the Cape Dinga area, as these could be contained with a minimum Australian force and dealt with at leisure.*

*Already irritated with events at the beach, particularly the lack of decision and the concentration of troops which invited air attack, Savage told Moten by telephone to issue orders to MacKechnie as to one of his own battalion commanders, and to report any failure on the American's part to obey orders. Savage also urged General Fuller, commanding the 41<sup>st</sup> US Infantry Division, to send the remainder of his engineers and artillery to Nassau Bay as soon as possible and to instruct MacKechnie that his forward elements must begin to move from the beach-head to the assembly area.....*

A reconnaissance Wirraway aircraft, **A20-328, QE-V**, from No 4 Squadron RAAF, reported at 13:15 hrs on the 30<sup>th</sup>, which 19 landing craft (actually 21) were present on the beach at Nassau Bay and that troops were clustered along the foreshore before continuing to Guadagasil area to drop supplies.

*During the previous month, the first incident of a Blue on Blue by the squadron was when **A20-395** on approach to and the whole length of Bulolo Strip was damaged by Australian AAA on the 8<sup>th</sup> June 1943. The airframe was struck by multiple rounds damaging airframe. With great luck, the pilot, F/Lt D K Matthews Serv#407004 and the Army Air Liaison Officer Major D G Daniel were not hit or injured. The same month, the first CAC Boomerangs were delivered to the unit; a new RAAF Type in the SWPac theatre.*



**A46-32 awaits collection at CAC in 1943. [CAC Files per ADF-Serials.com.au].**

*It should be noted, that the Deputy Air Force Commander, Headquarters Advanced Echelon Command, 5th Air Force, USAAF, new the type was being sent to New Guinea earlier in June 1943 and suggested that the new Boomerang be painted distinctively so that their identity may be established at a glance from considerable distance.*

*It was advised to General Kenny on the 20<sup>th</sup> June 1943: that "aircraft of his command were frequently operating in the area, and since the Boomerang greatly resembled the Japanese "Zeke" in appearance, immediate identification of Boomerang reconnaissance aircraft would prevent accidental attacks on Boomerangs...."*

*A similar problem was experienced by the recent introduction of the Republic P-47D in theatre.*

*Lt Colonel Guy Saunders Headquarters Advanced Echelon Command, 5th Air Force, USAAF, wrote to the Air Officer Commanding, RAAF Command on the 23<sup>rd</sup> June 1943, that if No 4 Squadron RAAF was being equipped with Boomerangs, it would be suggested that some experimental work may be of value to determine what type of markings would be most suitable.*

On 1st July, allied aircraft attack positions closed to Australian troop positions, which nearly caused casualties.

Later that day, Moten advised Savige that allied planes were attacking Duali and that, if they were Allied aircraft, they would "endanger our troops and prevent attack planned". Savige replied that the attack was arranged without his concurrence and promptly changed the bomb-line.

At 1000hrs he signalled Fuller: "Air attack arranged by you for 8 a .m. on targets Duali-Bitoi mouth should have been coordinated at this HQ. This attack may endanger troops of the 17th Bde who were in target area at time of attack requests for air attacks by you direct from MacKechnie must be referred here for coordination to avoid repetition today's attack ."

On examination it appeared that the Americans had acted on an information signal between Air Support Parties at the two divisional headquarters and had not used the proper procedure to obtain coordinated attacks. On receipt of Fuller's delayed signal Savige replied late that night: "Your signal now clarifies whole matter and emphasises difficulties in communications leading to misunderstandings and assumptions by reader not contemplated by sender. You have my regrets for either as may be applicable to me. "

By 2nd July a headquarters and supply dumps had still not been organised and no orders were being issued except those covering affairs of small importance. At dawn a further ten boats arrived, carrying mainly the fourth infantry company, C Company (1/162<sup>nd</sup> Infantry Regiment) and two P T boats accompanying the landing craft bombarded enemy positions at Cape Dinga.

At 13.00 hrs local, ten Japanese medium bombers bombed and strafed Nassau Bay and both sides of the mouth of the south arm of the Bitoi River. At 1510hrs local, a further eight bombers and about fifteen fighters attacked, causing a direct hit on one of the broached landing craft.

On the 3<sup>rd</sup> July, another photographic sortie was performed by a No 4 Squadron RAAF Wirraway, over Yule Island, Hood Point and Nassau Bay Areas.

By 4th July 1943, 1744 troops of MacKechnie Force had been landed at Nassau Bay. In a letter to Moten on 4th July he said that loss of over half his landing craft and his inability to get his guns, troops and supplies in as originally scheduled had materially delayed him . He considered that it would not be tactically sound to leave his base, with Japanese about, in order to concentrate all his troops eight to ten miles inland with no supplies.

It would take, he thought, three weeks, not two days, to construct the artillery road ; troops at the assembly area would be out of rations tomorrow, and there were no native carriers.

General Fuller had advised him not to embark on offensive operations unless adequately supported by artillery and heavy weapons. Moten then informed Savige of the letter and suggested that pressure would be necessary if operations were to proceed, as now planned for 7th July 1943.

The communication issues and the confused chain of command on the battlefield had by now compounded both the ground force and in most respects, the Air Forces.

On the 5<sup>th</sup> July 1943, with only a week of SWPAC Boomerangs Service, No 4 Squadron, with four on strength, sent out their only two serviceable Boomerangs; **A46-88** (Piloted by F/O James Keith Collier Serv#407114) and **A46-89** (piloted by F/O John Maxwell Utber Serv#401866) to carry out a tactical reconnaissance sortie in the vicinity of Salamaua.



No 4 Squadron Wirraway A20-103 Coded QE-D "Ugh". The crew were P/OFF John S. Archer and SGT J. L. Coulston and right is a RAAF File Picture of F/O Collier per his personal file: Note, his Serv# is listed in Picture as 407144 when in fact it is Serv# 407114 per service record. **My doubt is now placed on whether this ID picture was filed in error by RAAF in 1941 under 407114, meaning it is not Collier, refer End Notes.**<sup>3</sup> [ADF-Serials.com.au & NAA: A9300, COLLIER J K].

F/O John M Utber in the front cockpit of a Wirraway and F/Sgt Kenneth Davis Serv#431015(Observer) photographed in months previous. F/O James Keith Collier pictured Right. AWM and NAA respectively.

However cloud cover intervened and the two aircraft flight diverted and proceeded to the Nassau Bay area to complete a portion of the planned sortie in relation to the landings there.

Whilst over Nassau Bay, the MacKechnie Force landing craft mentioned were sighted on the beach. Collier decided to dive down and inspect the Landing Craft from low level.

After levelling out some two hundred feet above the beach, ground forces opened up with every weapon from beach positions, they had with such an intense barrage, that it hit his aircraft mortally.

Collier's aircraft was seen to bank and then struck the shore water and skidded over the water and the beach, until it hit the adjoining undergrowth of the jungle edge. On inspection, US Army Ground troops in their horror had not shot down a new type of attacking Jap fighter, but a curiously new RAAF Fighter, the CAC CA-12 Boomerang, which had just become the first such loss of the type in SWPAC.

Collier's body was retrieved and buried in a temporary cemetery nearby, ALDIG Number 1, New Guinea.

### **Second example of Blue on Blue**

Location; over Merauke Dutch New Guinea

On the 9<sup>th</sup> September 1943, four Boomerang aircraft of a detached flight (Black Section) from No 84 Squadron RAAF based at Merauke Dutch New Guinea, Herring in **A46-37 LB-E**, F/Sgt Adams in **A46-32 LB-K**, F/Lt Brown in **A46-71 LB-Y** and F/Sgt Johnston **A46-87 LB-V**, (Black 1 to 4 respectively) took off 1036hrs to intercept an attack on the aerodrome by seventeen Betty Bombers, escorted by 15 fighters.

They were instructed to patrol and North /South line of the base by Fighter Sector Control at twenty thousand feet.

The sighted sixteen Bombers in line astern at eighteen thousand feet over the base from the Northwest to Southeast with five fighters as top cover, with five above one side, and the balance of two slightly lower astern.

Black Section was about three miles east of the base and at twenty thousand feet.

After they made their bombing attack on the base, the formation split into two tight formations of eight aircraft in line abreast, and turned southwest to a course towards the sea at about seventeen and a half thousand feet.



**Black 1 of the day; A46-37/LB-E at Horn Island (without spinner), with A46-23/LB-Z landing (with spinner) in background. [RAAF Official].**

They then reformed into one tight formation, again in line abreast, and turned northwest parallel to the coast. High above some nine enemy fighters were sham dog fighting five hundred feet above the formation.

When the formation had turned northwest, Black Section tried to intercept. They, after dropping down to eighteen thousand feet, attempted to get into position to make a beam or front quarter attack on the main formation.

They got within twelve hundred yards on a parallel flight path but were unable to attack. At this time, fourteen No 86 Squadron RAAF Kittyhawks in three flights of four and two weavers, were attacking the fighter formations within eight hundred yards of the Section at twenty-one thousand feet.

Meanwhile, Black Section did not mingle with the enemy fighters as they were flying straight and in finger four formation, waiting for the enemy bomber formation to exit the cloud before attacking. They were at full throttle, but were managing only some one hundred and fifty-five mph indicated.

With four enemy fighters on their starboard side at a thousand yards distance, one below about five hundred feet, and three enemy fighters a thousand feet above on a parallel flight path of Black Section's flight path which had spaced out in two aircraft sections about two hundred yards apart in trail.

At this stage, the enemy formation suddenly entered a thin layer of cloud and disappeared from sight.

A single Kittyhawk was engaging two enemy fighters on the port side and slightly above, of the rear Black Section flight (Black 3 and 4), whereupon they turned towards the two enemy fighters and the single Kittyhawk which had just dived away.

One Enemy fighter then stalled turn and came around behind the Black Section and got on the tail of Black 2, which was well out of range, at one thousand yards away.

The Section had lost sight of the second enemy fighter during this manoeuvre, which as Black section made a steep turn to the left and the second enemy fighter appeared and had dived underneath their section to rejoin the enemy bomber formation.

Another four enemy fighters were seen one thousand yards away on the starboard side with a further three five hundred feet below and the balance of three one thousand feet above, on a parallel course again.

Shortly afterwards, a Kittyhawk pulled up five hundred feet above the Section and above fifteen hundred yards ahead, and turned towards Black Section with a “fine” front quarter attack.

Black 1 and 3 wagged their wings to say “we’re friendly” to no avail, whereupon a burst of six 0.50 cal rounds without any noticeable tracer rounds used to gauge where they were heading, were fired by the Kittyhawk on the two Boomerang aircraft. Black 3 immediately broke formation by sliding under the rest of the flight to the left and passed under the attacking Kittyhawk on his starboard side.

The pilot of the Kittyhawk apparently mistook the Boomerangs for the enemy fighters as they approached head on. Black 3 rejoined the Section a few minutes later. Fighter Sector Control recalled Black Section and instructed them to orbit the base at twenty thousand feet.

During this time, No 86 Squadron RAAF Kittyhawks had engaged the enemy fighters resulting in Blue 1 destroyed a Zeke, Blue 3 destroying an Oscar and Green 3 destroying another Zeke, with no loss.

An issue of gun failure was highlighted to the No 86 Squadron Armourer, whereupon, out of the eighty-six loaded 0.50cal machine guns in the total of fourteen P-40Ms, forty-one had failed in use.

Who was the offending No 86 Squadron RAAF “Blue on Blue Pilot?”

Why it was Yellow 3! None other than Ex 75 Squadron Veteran F/O Alan Whetters, piloting **A29-305 “5”** (both pictured below) and in the heat of battle, just having a “quick squirt” at a probable Japanese Oscar head on, at a thousand yards.



F/O Alan Whetters pictured left during a 86 Sqn portrait and right; P-40M A29-305 Sqn Number #05. [RAAF Official].

Without any further trouble, Black Section landed at 1255hrs. One Boomerang aircraft that was not airborne, **A46-38/LB-B**, had been destroyed on the ground by the attacking bombing force. Later that day, **A46-71/LB-Y** and **A46-37/LB-E**, flown by F/Lt Brown and F/O Herring respectively, returned to Horn Island, escorted by 86 Squadron RAAF’s P-40M, **A29-372**.

### White tails for all?

On the 23<sup>rd</sup> July 1943, discussions of what sort of markings were still undecided, when No 9 Group sent a message to RAAF Command advising that.....

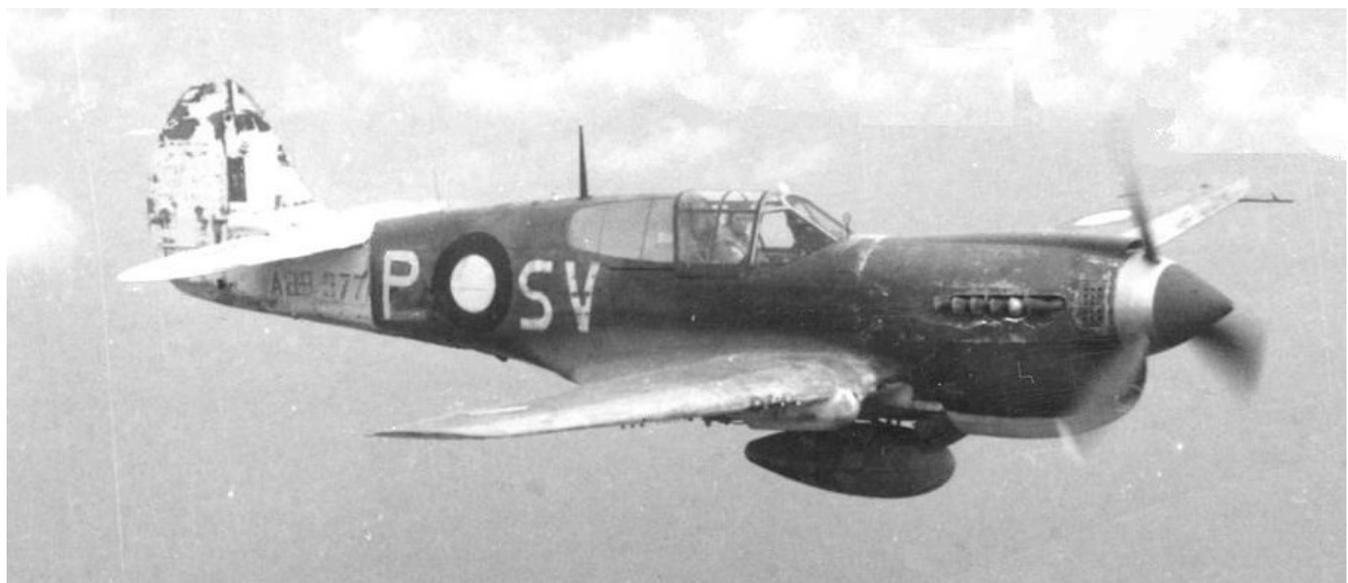
*“any special markings for Boomerangs should if possible, conform to the markings of P-47s: P47 Tail units at present White, but this considered too outstanding and Fighter command experimenting with other markings, therefore suggest no decision be made on Boomerang markings until decision reached on P-47.”*

Finally, dated 16<sup>th</sup> August 1943, Sqn Ldr Marshall, RAAF Command 74 Wing, No 9 Group was advised by No 4 Squadron RAAF that *“a telephone call from AOC to effect that Boomerang tail and leading edge are to be painted in accordance with Fighter Group requirements”* .....white.

It is undetermined when the first Boomerang was painted with white leading edges and tail unit from this date. But it is fair comment that all single RAAF aircraft in partnership with 5<sup>th</sup> Air Force Single engine fighters were directed at the same time, circa September 1943, to have all SWPAC single engine aircraft to be painted as such.



Above, 348<sup>th</sup> FG P-47D of Colonel Kirby marked as such, complete with white on leading edges. [GRB 5<sup>th</sup> AAF Collection].



Even RAAF and USAAF P-40s wore them there on, such as well worn A29-377 of 76 Sqn RAAF. [RAAF Official].



Even overhauled 7<sup>th</sup> FS P-40K-5s got them. [GRB USAAF 5<sup>th</sup> AAF Collection].



Even 79 Squadron RAAF Spitfires Mk Vc (T) such as A58-137 UP-T and other 79 Squadron RAAF got them. [Peter May Collection].

### **Third example of Blue on Blue**

Location; over Finschafen; with white tails and leading edges,..makes no different for a Boomerang "Oscar"

That being so, it is hard to believe the next Blue on Blue attack on another No 4 Squadron RAAF Boomerang, now adorned with white markings as prescribed on its allocation during October 1943 from 11 RSU, on the 15<sup>th</sup> November 1943 by a 49<sup>th</sup> Fighter Group P-38 piloted by Major Gerald "Jerry" Johnson 0-428829. He had assumed command of the 9th Fighter Squadron, after his recent promotion from Captain in September 1943.



**A46-117/QE-F, received by 4 Sqn in August 1943. Note dropped message seen under tailplane. [ADF-Serials.com.au].**

F/O Robert McColl Stewart Serv#408505 was flying A46-136 on an artillery reconnaissance sortie in the Finschafen area in company with F/O H C Munro Serv#10941 in A46-132 on his wing. His escort included a further two P-40 aircraft.

At approximately 1100hrs whilst flying at a height of eleven thousand feet and slightly north of Finschafen Strip, he was attacked by Johnson who was flying lower from the opposite direction.

Johnson had just fired a few bursts from beneath and into the port side of A46-136, the bullets hitting the mainplane and the port tailplane. A46-136 lurched to starboard and lost height. Stewart dived to port to straighten out, which he managed to regain control, when he got down to five hundred feet.

By this time, his mainplane was on fire and his 20 mm cannon ammunition was exploding and he dived to land on the Finschafen strip. He lined up the strip, but was too fast to land on it. He lifted the stalling aircraft over the river at the end of the strip and then belly landed into the adjoining scrub.

With the aircraft engulfed in flames, he managed to escape the cockpit and run.

A few seconds later the aircraft was completely destroyed by the fire. Stewart was alive, suffering from facial injuries only, however quite shaken up, suffering from shock.

He was transported to the Field Ambulance Unit Finschafen Area for dressing and medicine. He would continue to fly until April 1944 with the squadron.



**Major Gerald "Jerry" Johnson in mid 1944 left and F/O Robert McColl Stewart (right).** [[https://upload.wikimedia.org/wikipedia/en/thumb/5/51/Gerald\\_R\\_Johnson.jpeg/220px-Gerald\\_R\\_Johnson](https://upload.wikimedia.org/wikipedia/en/thumb/5/51/Gerald_R_Johnson.jpeg/220px-Gerald_R_Johnson) and NAA: A9300, STEWART R M].

It has been stated that on finding out that his quarry was a RAAF aircraft and pilot, he arrived at the Strip a few days later with a bottle of Whiskey to smooth over the incident.



**Late in the war, circa shortly before his death in 1945, Colonel Gerry Johnson stands in front of his P-38J which displays his Boomerang "kill" of 1944. Yet in late 1944, there was none.** [GRB USAAF 5<sup>th</sup> AAF Collection and [http://4.bp.blogspot.com/-HMSY11nn4Zg/T\\_OnGxOvtAI/AAAAAAAAADds/twVv8\\_bow2k/s1600/Lt+Col+Jerry+Johnson+and+P-38J+1944.jpg](http://4.bp.blogspot.com/-HMSY11nn4Zg/T_OnGxOvtAI/AAAAAAAAADds/twVv8_bow2k/s1600/Lt+Col+Jerry+Johnson+and+P-38J+1944.jpg)].

Not one to be shy or to cover up the fact that he bagged a RAAF aircraft; he asked his crew chief to paint an Aussie Flag on his aircraft, and those aircraft he flew later. Sadly he was killed in a B-25 aircraft accident soon after the war.

As for Stewart's service after this tour, he became an instructor with 11EFTS, and by the middle of 1945, became the Officer in Command of the RAAF Air Support Party, during the amphibious landings on Brunei in July 1945, where he during the initial assault, his landing crash beached itself on a sand bank, whereupon he then left it, waded to the beach and quickly established communications and directed attacking aircraft on enemy positions.

As a result of his Brunei action, he was mentioned in dispatches for his service in 1947.

Note, this was not his first aircraft prang, when during his training with 3EFTS at Essendon, the aircraft he was piloting solo, DH-82 Tiger Moth N9263, spun into the ground during a practice forced landing at Tullamarine. He received a

concussion and a probable fractured skull for his trouble which may have caused his delay in graduating as a pilot for six months.



His first pranged aircraft, Tiger Moth N9263, survived the war and was extant until 1965 VH-BEU. [Geoff Goodall Collection].

## Sources:

RAAF Unit History sheets (Form A50) [Operations Record Book - Forms A50 and A51] Number 4 Squadron Jun 40 - Mar 48; NAA: A9186, 12.

RAAF - No 84 [Fighter] Squadron - Unit history sheets [Covers operations in Queensland. Aircraft flown: Boomerangs and Kittyhawks]; NAA: A9186, 114.

RAAF Unit History sheets (Form A50) [Operations Record Book - Forms A50 and A51] Number 86 Squadron Jan 43 - Mar 46 PDF Held ex RAAF.

RAAF Squadron narrative reports - Squadrons 86, 87, 93, 100 and 120; NAA: A9652, BOX 21.

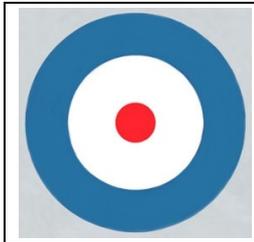
RAAF Command Headquarters - South West Pacific area - Aircraft designation - Numbers and names and aircraft generally; NAA: A11093, 452/D4.

No 4 Squadron - aircraft casualties NAA: A9695, 732.

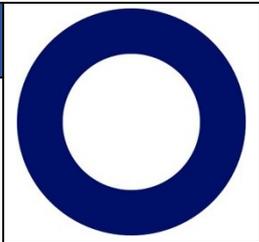
Summary of operations carried out by No 4 Army Co-operation Squadrons in Papua NAA: A9695, 736.

The History of United States Naval Operations in World War II Breaking the Bismarck Barrier - 22 July 1942-1 May 1944.

Personal File Stewart Robert McColl, 408505; NAA: A9300, STEWART R M Citation.



## 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.7 – RAAF Avro Cadets**

**by John Bennett**

The formation of the RAAF at Point Cook in 1921 had been enabled by the generous postwar “Imperial Gift” of aeroplanes and equipment from British surplus stocks from the Great War. By the close of that decade, the surviving aircraft were well and truly ‘war weary’ and in need of replacement.<sup>4</sup> The last “Gift” aircraft in service were the D.H.9As, which the RAAF Air Board in JAN 1930, somewhat ungraciously wanted retired: “The Board consequently recommends that D.H.9As and Liberty engines be no longer used. The above recommendation, if approved, will rid the RAAF of the last of the Gift aircraft equipment.”<sup>5</sup>

The trainer supplied in the Imperial Gift package had been the WWI instructional stalwart, the Avro 504K. But this type had been worn out and was replaced as the RAAF’s basic trainer by the de Havilland D.H.60 Cirrus Moth. Two early D.H.60s had been bought for evaluation and delivered in 1926 (and serialised A7-1 and A7-2), powered by the 60hp 4-cylinder Cirrus Mk.I – described as “the original light aero-engine of its type”.<sup>6</sup> The Chief of Air Staff, Air Marshal ‘Dicky’ Williams, saw the advantages of the Moth and recalled in his autobiography:<sup>7</sup>

“We obtained two Cirrus Moths fitted with dual controls to try out and found them very suitable for preliminary flying instruction but obviously they would be better with a more powerful engine. De Havillands realised the need for more power and had produced an engine of the same type as the Cirrus but with about twice the horsepower. This was known as the Gipsy.”

The strengths of the Moth as an ab-initio trainer resulted in the order of a batch of twenty D.H.60X Cirrus II Moths delivered in 1928, as A7-3 to A7-22.<sup>8</sup> An alternative had been the Avro Avian, but the D.H.60 was cheaper.<sup>9</sup> The D.H.60X were still underpowered with the Cirrus, but was just a stepping stone to larger orders that soon followed for more powerful D.H.60G Gipsy Moths. While the Moth was a simple and ideal basic trainer – as the Tiger Moth later proved too in the World War II – a more advanced “intermediate” trainer was required. Up to this stage, the Service aircraft of the Imperial Gift had assumed an instructional progression from basic training, and from 1930 after retirement of the Gift aeroplanes, this fell upon the D.H.9A’s replacement, the Westland Wapiti. While undertaking this function, the Wapiti was not an effective aircraft for a training role – a more efficient dedicated intermediate trainer was sought. This proved to be an advance on the RAF’s selection of the Avro 626 Prefect, and a development of the Avro 631 Tutor. Although this was named the Avro 643 Mk.II Cadet, in the RAAF it was simply the ‘Avro Trainer’. 34 Cadets were acquired, and operated throughout the war as intermediate trainers.<sup>10</sup>



*[Goodall Aviation site]*

**Ordered in 1935 – VH-AEJ beautifully restored as A6-8, at Hindmarsh Island SA in OCT 2009**

### RAAF Avro 643 Mk.II Cadet Orders

Order No. <sup>11</sup>	Date of Order <sup>12</sup>	C/n <sup>13</sup>	Delivery <sup>14</sup>	RAAF Serials
I.O.468	1 MAY 1935	850 - 861	DEC 1935 - MAR 1936	A6-1 to A6-12
I.O.525	18 AUG 1936	986 - 995	FEB 1938 – MAR 1938	A6-13 to A6-22
I.O.589	18 NOV 1937	1058 - 1069	JAN 1939 – APR 1939	A6-23 to A6-34
n/a	20 AUG 1938		Order for 20 aircraft later cancelled.	

In Britain, the RAF had gone through a similar selection. While the Moth had all the characteristics needed for preliminary training – an engine that could be handled in exactly the same way as those to which the pilot pass from his preliminary training, and with flying characteristics more similar to the *Service* types than those of the rotary-engined Avro 504K<sup>15</sup> – a more advanced, higher performance stepping stone was required. The RAF had progressed through the radial-engined Avro 504N, and then to the Avro 626 Prefect.

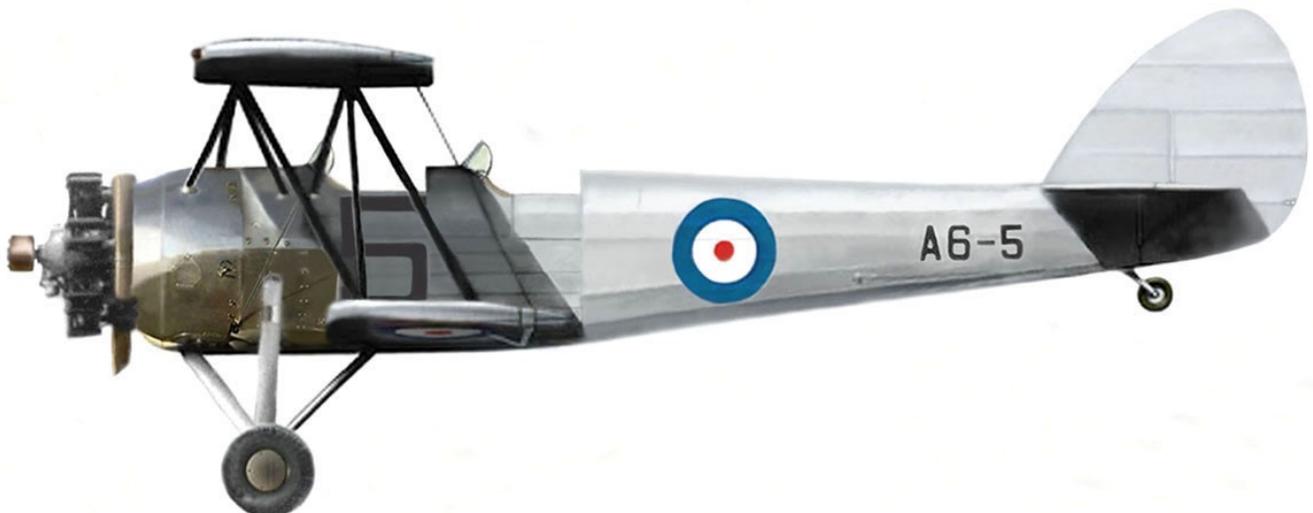
Obviously, the purpose of an “intermediate” trainer was to help prepare trainee pilots for the transition from elementary Moth machines to more advanced types. The 643 Cadet had been developed exclusively for Australia from the RAF’s 626 Prefect, and twelve were ordered in MAY 1935. The Cadet was fitted with a high performance engine for its era, and with a modified fuel system for prolonged periods of inverted flight, this new type proved ideal for close formation aerobatics.<sup>16</sup>

### RAAF ‘Avro Trainers’



[artwork Matt Dudley, ‘The Imperial Gift’]

The Avro 504K, part of the Imperial Gift, was our elementary trainer until 1928 as the RAAF’s first ‘Avro Trainer’



The Avro 643, although named ‘Cadet’ by Avro, was invariably referred to by RAAF documentation as the ‘Avro Trainer’

**A6-5 of 1FTS 1938** – all metal parts of the airframe were left in natural finish and highly polished, while the fabric-covered parts of the airframe were sprayed with *Aluminium* dope. Most aircraft carried a large *Black* training number under the front cockpit, with *Black* interplane struts and wheel hubs.<sup>17</sup> Underwing serial numbers, when applied (as on many RAF inter-war *Aluminium*-painted, single-engined aircraft) were 30” high.<sup>18</sup> Soon after arrival, all Australian Cadets were operated without cowlings.

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# 626

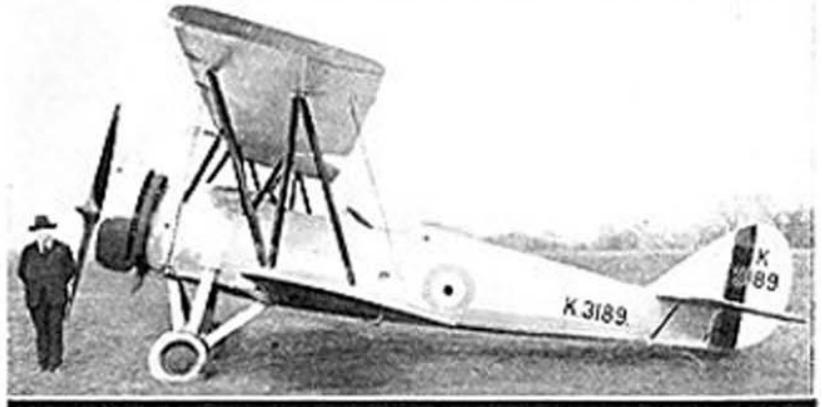
Cheetah or Lynx  
Engine



# TUTOR

Lynx Engine

The "Tutor" was selected as the standard training aeroplane of the Royal Air Force after prolonged official tests of a most exhaustive nature had been carried out over a period of three years.



# CADET

Genet Major Engine



Avro aeroplanes have been the standard training equipment of the British Royal Air Force since 1917. They are used by more than fifteen other Air Forces. The present series illustrated above, comprising the most complete range ever produced by one factory, satisfies every practical training requirement.



A. V. ROE & CO. LTD., NEWTON HEATH, MANCHESTER.

Cables: TRIPLANE, MANCHESTER.

[Flight 11 May 1933]

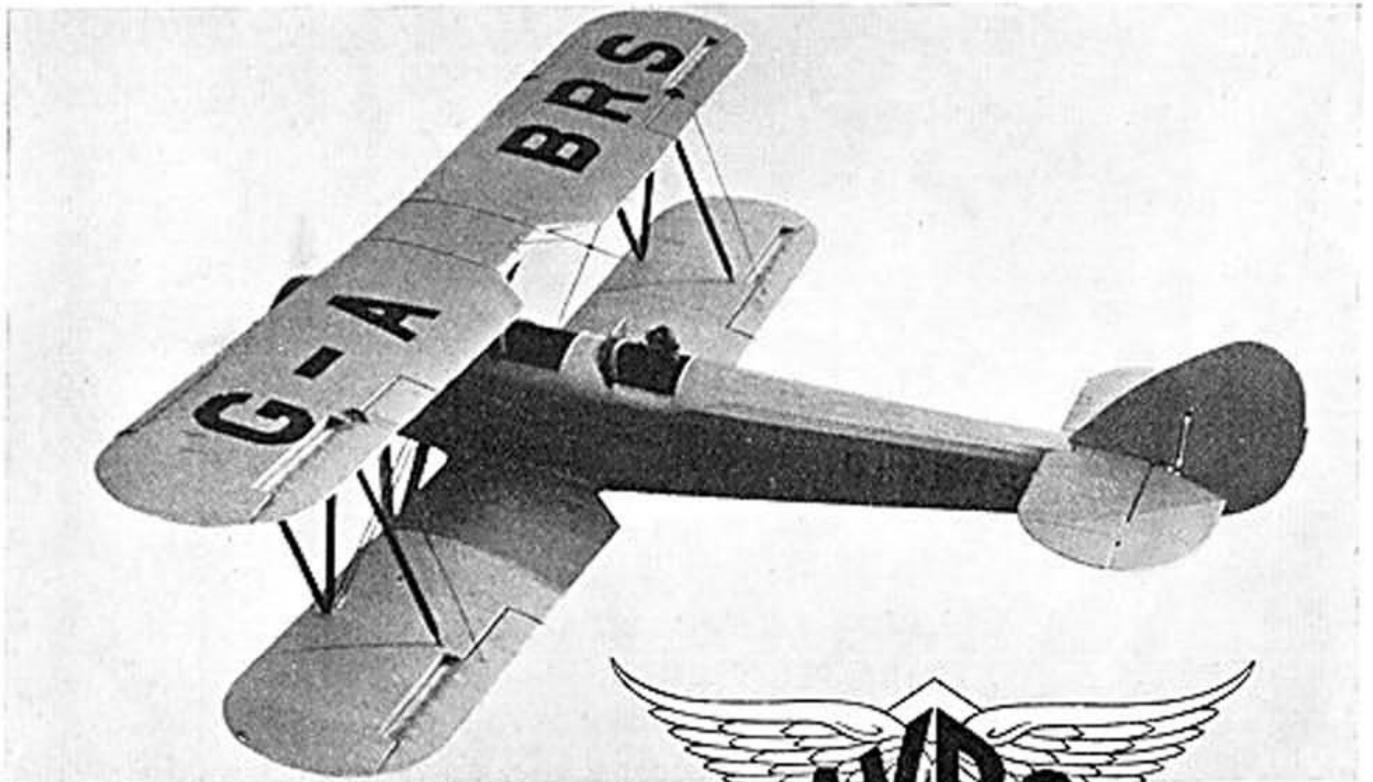


Photo. by the "Aeroplane."

## AVRO C A D E T

*"I was prepared for something very nice in the 'Cadet,' but it easily eclipsed expectations" . . . .*

*Extract from F.D.B. in the "Aeroplane."*

The 'Cadet' is virtually an Avro "Tutor" in miniature. It is smaller in dimensions and costs less but reproduces practically every feature which led to the adoption of the "Tutor" for Royal Air Force Training.

CABLES:—  
TRIPLANE-MANCHESTER

**A. V. ROE & CO. NEWTON HEATH MANCHESTER**

*[Flight Sep 1933]*

A simple comparison of the RAAF pre-war elementary trainers provided below, with very basic performance figures,<sup>19</sup> shows the RAAF requirements and the trainers that were available over the late 1920s and into the 1930s. The D.H.60-series were logical replacements from 1928, being relatively simple after the 504K.

Comparison of Early RAAF Training Aircraft				
Aircraft (Service Dates)	Engine	Endurance/Range	Max Speed	Details
Avro 504K (1921-1928)	100hp Gnome 110hp Le Rhone 130hp Clerget - all rotaries	3 hours 250 mile range	82 mph 95 mph	The only aircraft in the RAAF with a rotary engine, which required 'blipping' instead of throttle (i.e. turning the engine off and on).
D.H.60X Cirrus Moth (1928-1932)	[D.H.60 60hp Cirrus I] 85hp Cirrus II - in line	290 mile range	98 mph 14,500 ft ceiling	D.H.60X improved over D.H.60 but still underpowered, and too docile to step to the 'Service' types.
D.H.60G Gipsy Moth (1930-1944)	100hp Gipsy I 120hp Gipsy II - in line	320 mile range	102 mph 14,500 ft ceiling	More powerful, and served as an EFTS trainer into the war until replaced by the Tiger Moth and Wackett Trainer.
Avro 643 Mk.II Cadet (1936-1944)	150hp Genet Major - radial	325 mile range	116 mph 12,000ft ceiling	Increased performance was required as a niche intermediate step in flying training progression.
D.H.82A Tiger Moth (1939-1957)	130hp Gipsy Major I - in line	300 mile range	104 mph 12,000ft ceiling	Initially considered in 1935, being rejected on cost grounds for the Cadet. The main WWII elementary trainer.

In MAY 1935, the Avro 643 Mk.II Cadet was selected for training as an urgent necessity for RAAF expansion with an initial order for 12 machines placed with A.V. Roe & Company Ltd. Local production of the chosen training aircraft was being considered and the Cadet was considered favourable to the D.H.82 Tiger Moth – it had better performance with the air-cooled radial engine, and moreover de Havilland had specified a slower delivery rate at higher cost, stipulating that D.H.82s must be built in England before Australian production would be allowed.<sup>20</sup> De Havillands costed a Tiger Moth airframe at £1000, wanted 5% royalty, and required 36 to be built in England before allowing local production. Furthermore, delivery of Tiger Moths was 20 weeks as against 12 weeks for the Cadets.<sup>21</sup> Other favourable features of the Cadet were its structurally stronger fuselage making it fully aerobatic, a raised rear seat, improved parachute egress, and the new feature of tailwheel steering.<sup>22</sup> The orders for 34 Cadets in three batches were delivered over 1935-1939. A further order and local production in Australia did not eventuate, with the advent of war. The Cadets would primarily be used for training wartime flying instructors by Central Flying School (CFS).



**RAAF maintenance on a Cadet – from 1940 repair was contracted to commercial companies [RAAF 000-147-951]**

To ensure adequate engineering support for the aircraft, the RAAF obtained Genet Major engines from the Canadian Government where they had been replaced in Canadian-built Fleet Finches with Kinner radials. In addition, the RAAF reverse-engineered Genet engine spares which were manufactured locally, including pistons, piston rings, valves, valve guides and seats.<sup>23</sup> Such an effort showed the remaining Cadets were considered essential to the wartime training effort in their unique CFS role. Crash repairs and scheduled maintenance was contracted out to civil operators such as Newcastle Aero Club and Marshall Airways at Mascot. However, the majority of RAAF Avro Cadet repair and overhaul work was conducted by Clyde Engineering Co Ltd at their Granville/Lidcombe factory in Sydney.

## CADET DELIVERY – 1935-1936

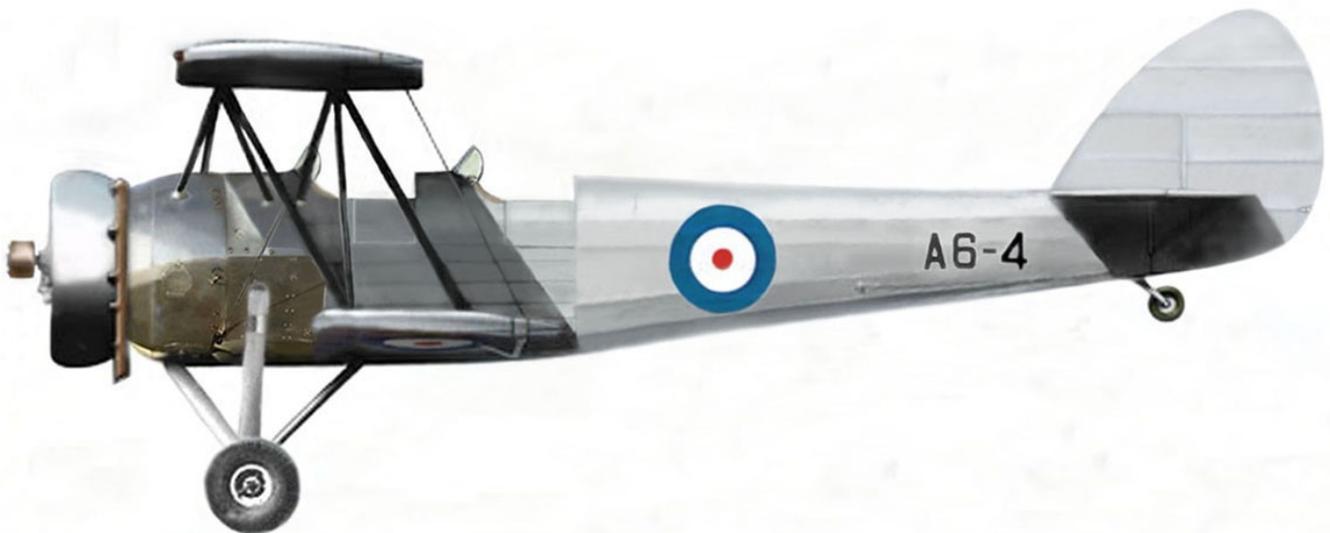
The first six Cadets arrived in Melbourne aboard SS *Nestor* on 29 DEC 1935, and were assembled by 1AD at Laverton and taken on charge on 31 DEC 1935,<sup>24</sup> and operated by 1FTS at Point Cook. With the RAAF wartime EATS training reorganisation, the Cadets briefly passed to 1SFTS, and then on to CFS for flying instructor training.



[colourised from *adf-serials*]

**1936 – A6-11, A6-8, A6-3 and A6-4 are identifiable from this 1FTS formation at Point Cook**

This is one of the few images of RAAF cadets still with engine cowls as delivered. Due to overheating of the air-cooled radial in the Australian climate, the cowls were soon removed, and not fitted again in Australian service – either with the RAAF or by postwar commercial operators.



**A6-4 shows the early 1FTS Cadet markings of 1936 – no large training number, no unit code, and no Yellow trainer band**

This represents the early National Markings of the RAAF Cadet. There were no fin flashes or rudder striping, and the 1:3:5 roundels were in the lighter *Bright Blue* colour, later replaced by a darker *Dull Blue*, detailed below. The serial number is in the original *rectangular (squared)* font, later changed to more *circular* characters.

With aeronautical technology advancing so quickly in the second half of the 1930s, it had been decided to re-equip RAAF squadrons with low-wing monoplanes. Ansons were delivered from NOV 1936 and Wirraways planned for 1939, so by JUN 1938 it was decided that most of the initial training would be carried out on monoplane trainers instead of various biplanes then in use. RAAF Spec 3/38 as set out by Air Member for Supply (AIRCDRE W Anderson) was issued for a low-wing monoplane embodying all the advantages of the Miles Magister (the low-wing monoplane under evaluation) and Avro Cadet (the high-performance intermediate trainer) for RAAF use as a primary trainer.<sup>25</sup>

The new training aircraft were to be powered by Gipsy Major engines, have tandem seating covered with a canopy, a full range of instruments in each cockpit, a strong point above the fuselage in the event of overturning on the ground, be capable of full aerobatics including good recovery from spins, and be able of being flown from either seat without the aid of ballast. On 10 OCT 1938, at the request of the Air Board, CAC submitted its design for a low-wing Wackett Trainer monoplane, and on 28 OCT approved the purchase of two prototypes at a cost of £6500. Designated CA-2 by CAC, it was fitted with a 130hp Gipsy Major engine. The first prototype (A3-1) was delivered to the RAAF on 7 OCT 1939, and the second (A3-2) was delivered on 2 MAR 1940. Both Wackett Trainer prototypes were re-engined with 200hp Gipsy Six engines (and re-serialised A3-1001 and A3-1002), but the production CA-6 (A3-1 to A3-200) were powered by 175hp Warner Scarab radials.

Meanwhile, an order for 50 D.H.94 Moth Minor low-wing monoplane trainers was approved on 21 FEB 1940, to comprise 46 imported aircraft and four locally produced.<sup>26</sup> The Moth Minor was a sporting aeroplane and was also powered by the Gipsy engine, but in this case the 90hp Gipsy Minor. Air Marshal Williams later claimed no knowledge of the Moth Minor procurement, or why they had been acquired, and he wrote:<sup>27</sup>

On examining the aircraft available for our several schools I found that we had 41 de Havilland 94s, known as Moth Minors, a very light monoplane fitted with a 90hp 4-cylinder air-cooled engine. I inquired why these aircraft had been purchased only to be told that the Air Board had never given consideration to such light aircraft and that they had been purchased by the Minister for Supply and Development, Mr Casey, when he was in London. War Cabinet Minutes record that the Minister had obtained an option from de Havilland's over 25 of these aircraft complete and 25 as components and that War Cabinet had authorised the exercise of that option without reference to the Air Board, which later received forty-one. The RAF did not consider it of any training value as it had no dual controls. When Australia purchased the whole of their stock de Havilland's shipped them, together with the jigs and tools for their manufacture, to their Australian factory. These aircraft met no service need and none were manufactured in Australia.

With no requirement, the RAAF was able to reduce the order of 50 to 46, and promptly issuing five of the first shipment to aero clubs as replacements for impressed D.H.60 Moths.<sup>28</sup> Evidently four were produced by DH at Mascot using Australian-manufactured components, but not being suitable as trainers, they served generally as a unit 'hacks'.



*[colourised RAAF image 000-147-948]*

**A6-19 returned to Point Cook from 25SQN Pearce in DEC 1939, here in front of Bessoneau hangars**

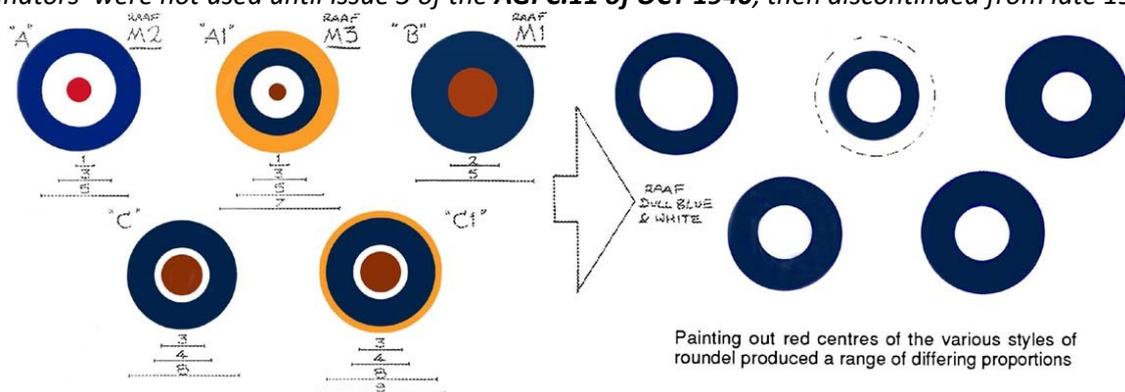
Meanwhile, the Cadet in its role as an intermediate trainer equipped the Instructors' Training Squadron (ITS) of 1FTS at Point Cook. With the declaration of War in SEP 1939, all Cadets were recalled from dispersed bases (Pearce and Laverton) for concentration at 1FTS, which in 1940 became 1SFTS. ITS was renamed CFS in MAY 1940 and relocated to Camden NSW. Subsequent CFS moves were in APR 1942 to Tamworth (operating Wacketts, Wirraways, Oxfords and Cadets), then to Parkes in JAN 1944, and finally back to Point Cook in SEP 1944 when the Cadet was retired.

## RAAF NATIONAL MARKINGS

The designation of RAF national roundels we know as 'A', 'B', 'C', etc were developed in the 1950s, for simplicity and are attributed to author Bruce Robertson (used from his early benchmark *Harleyford Aircraft Camouflage and Markings 1907-1954*). The official terminology was both cumbersome and ambiguous – the same term could apply to different roundels at different times,<sup>29</sup> so Robertson's invention simplified this. There is a discussion of this in Paul Lucas's fine book on the Battle of Britain camouflages which does use the official terminology at the expense of clarity, but the Goulding and Jones *Camouflage & Markings* uses Robertson's system comprehensively.

As the RAAF followed the RAF colours and markings policy, major changes were about to occur from 1939. The Munich crisis, in SEP 1938, saw the RAF adopt camouflage finishes for the majority of its front line aircraft, and also the *Red* and *Blue* roundel on wings and fuselage as the wartime National Marking.<sup>30</sup> The RAF formalised this on **27 APR 1939** as **AMO A.154/39 – Identification Markings on Aircraft of Operational Units**.

RAF AMO A.154/39 in its revision of the National Markings for all British military aircraft included a Yellow surround for roundels on camouflaged aircraft and introduced Red/White/Blue stripes on the fin.<sup>31</sup> National Markings of RAAF aircraft, using AMO A.154/39 as a basis, were then changed soon after declaration of war with Germany. On 12 SEP 1939, Directorate of Technical Services in RAAFHQ advised that for top surfaces and fuselage the roundel would be Red/Blue (i.e. what would become the "Marking M.1"), and roundels on undersides would be Red/White/Blue ("M.2").<sup>32</sup> While this was formalised by the policy **Aircraft General Instruction (AGI) No.C.11 of 22 SEP 1939**, these 'M-series designators' were not used until Issue 3 of the **AGI C.11 of OCT 1940**, then discontinued from late 1942.



Painting out red centres of the various styles of roundel produced a range of differing proportions

Coloured from Ian Baker's AHCB #5, Roundels, Tail Stripes & Other Markings (2)



[Colourised from RAAF image]

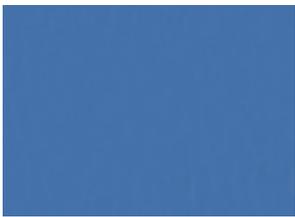
### 1939 Changeover – RAAF Cadet with the 1FTS 'Y' unit code and new type M.1 roundel

The RAAF "M.1" was the RAF type-B, the "M.2" was the standard red-white-blue type-A, and the "M.3" marking was the M.2 with a Yellow ring around the outside (like converting the RAF type-A to the type-A1). The fin flash was also designated by a number – the "M.4" red-white-blue flash. The **M.1 was in a 2:5 ratio**<sup>33</sup>, **M.2 was 1:3:5**. The M.1 was converted by using the outer Blue edge as a marker, and extending the Red out to 2/5th diameter. But the RAAF fuselage roundel soon reverted from the M.1 back to M.2,<sup>34</sup> mirroring and lagging the RAF NOV 1939 Policy, with the reversion to the RAAF Red-White-Blue M.2 roundel from APR 1940.<sup>35</sup> This applied to the Cadet at 1FTS: changing to the M.1 roundel in **SEP 1939** and back to the M.2 in **APR 1940**.

## RAAF 1930s ROUNDEL *BRIGHT BLUE*

The roundel colours of the RAAF into the 1930s had followed on from the Imperial Gift aircraft, themselves relics of the Great War. Roundels were carried in the standard six positions of the RAF, as was rudder striping. From the end of 1916, the roundel *Red* was V.R.2, a vermillion colour that was found to be more durable than the original V.R.1. The early *Blue* V.B.1 faded quickly, and after a new range of ultramarine pigments were formulated, a the darker *Blue* V.B.2 became standard. The white dope, which had been changed to a zinc oxide base, became *White* V.W.3. The final change to these colours came in MAR 1918, when a more durable red pigment was formulated. The bright *Red* was V.R.3 (similar to FS 21105), and this with *White* V.W.3 and the outer ring *Blue* V.B.2 (a colour lighter than today's roundel blue and similar to FS 15183) were the standard RAF and RAAF national markings until the mid-1930s.<sup>36</sup>

Ian Baker's early works provide colour chips of this lighter shade *Blue*.<sup>37</sup> These colours had carried over from the RAAF Equipment Standing Orders Part 3, dated circa 1922, which listed the following colours that would carry through into the 1930s: *Aluminium* (V.84), *Red* (V.R.3), *White* (V.W.3), *Blue* (V.B.2), and *Black* (V.Bl.4).<sup>38</sup> Probably the closest Federal Standard approximation is today's FS 15183 *Bright Blue* which appears too light – however, of course British colours were used, and probably may have been a close match to today's British standard of BS381C-175 *Light French Blue*.



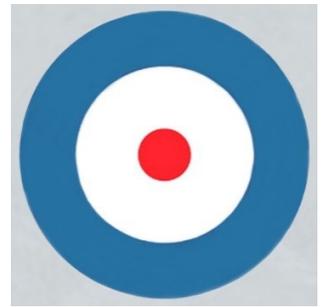
Ian Baker's chip of RAAF inter-war roundel *Blue*



US Federal Standard 595 FS 15183 *Bright Blue*



British Standard BS381C-175 *Light French Blue*



[colour image from *adf-serials*]

### RAAF Demon A1-17 22SQN Richmond 1937-1938

These roundels, with the matching colour 22SQN unit fuselage bands, appear to have a slight *Greenish* hue to the *Blue*. Any number of variables could account for this – the early type of colour film used, discolourisation to the print over the years, or variation in our PC monitors. But these unit bands were the same colour as the roundel *Blue*. In RAF style, the spinner and the wheel hubs are painted to indicate a Flight colour – for Demons forming the Demon Flight, in the 22SQN *Blue* stripes colour.

## RAAF DARKER ROUNDDEL *DULL BLUE*

The RAAF had always adopted RAF colours and markings. With the introduction in UK in 1936 of camouflage, some changes were made to RAF National Markings with “dull” shades of *Blue* and *Red* toning down the roundels so as to not compromise the camouflage finish.<sup>39</sup> At the time of the ‘Munich Crisis’ in SEP 1938, the toned down *Red/Blue* type-B roundel was introduced onto wings for the same reason, while paradoxically the *Yellow* outer ring was added to the fuselage for improved visibility, the type-A1 roundel. However, all RAF operational aircraft were directed to be hurriedly camouflaged with type-B roundels on upper wings *and* fuselage<sup>40</sup> – formalised in APR 1939 by RAF Policy AMO A.154/39.<sup>41</sup>

These dull ‘night’ roundel shades became the colours used for all roundels.<sup>42</sup> Ian Baker’s colours and markings research found that the RAAF’s *Dull Blue* was apparently not quite as dark as similar British and US dark insignia blues, and then steadily faded back to something much lighter.<sup>43</sup>



RAF (Ministry of Aircraft Production) *Matt Blue* from MAP colour chart



US-made Du Pont 71-012 *Dull Blue* to match RAF (MAP) *Matt Blue*



Spartan Paints (Australia) colour chart for RAAF K3/197 *Dull Blue*



[colour image, RAAF PR]

### RAAF Demon A1-8 restored by RAAF Museum at Point Cook

A1-8 shows this darker *Blue* roundels, as the Museum’s restored Cadet A6-34 also shows. At some stage in the late 1930s (1938-1939), the Cadet inherited fuselage roundel proportions where the *Blue* was wider than the hitherto 1:3:5 proportions.

With regard rudder striping and fin flashes, these had not been marked on the Cadet. While the Imperial Gift aircraft had all carried tri-coloured rudder stripes (with *Blue* leading against the rudder post), in AUG 1930 the RAF changed the order of the colour with Red leading to avoid confusion with the identity of the French Air Force.<sup>44</sup> In OCT 1930, the RAAF followed suit, with the instruction that all aircraft were to have markings changed by 1 JAN 1931.<sup>45</sup> This would soon become unnecessary as technology was evolving – rudder striping was then abandoned by the RAF in AUG 1934, as improved aircraft performance demanded smoother control surfaces free of paint.<sup>46</sup> This followed in the RAAF, although not immediately with the existing fleet, but from 1935 with new deliveries from UK – Demons (APR 1935), Cadets (DEC 1935) and Ansons (NOV 1936).

All Cadet fuselage roundels appear to be 20” in diameter (from mensuration as no documentation has been found). The wider outer *Dull Blue* roundel ring apparently appeared in the late 1930s, and the colours were not in the correct 1:3:5 ratios – appearing to be oddly proportioned with *Red* smaller, and *White* half diameter of *Blue*.<sup>47</sup>

## RAAF EATS TRAINING

As related in earlier articles on the RAF-supplied Anson<sup>48</sup> and Oxford,<sup>49</sup> under the EATS the Commonwealth countries undertook aircrew training, which was initially to supply trained aviators to the RAF. Accordingly, a variety of Schools were established around Australia for pilot, navigator/observer, air gunner and wireless operator/air gunner training, along the lines of the RAF syllabi. For pilots, after basic flying training at an Elementary Flying Training School (EFTS) on Wackett, Moth and Tiger Moth trainers, students were passed on to the intermediate and advanced training at a Service Flying Training School (SFTS). The SFTS would grade and then specialise in either single-engined tuition (on Wirraways) for prospective fighter pilots prior to an OTU, or twin-engined (on Anson and Oxfords) for progression to the larger multi-engine aircraft. Central Flying School (CFS) was formed out of this reorganisation to train Qualified Flying Instructors (QFIs).

To organise the EATS (which Canada was known as the British Commonwealth Air Training Plan, BCATP or ‘The Plan’), the conference in London in NOV 1939 agreed all the various dominion training responsibilities – Australia, Canada and New Zealand – with Australia to provide 40 percent of the output from the dominions. Among those commitments for the RAAF was the establishment *inter alia* of eight Service Flying Training Schools (SFTS).<sup>50</sup> In addition, was the overarching instructor training school, CFS.

Training Establishment	Number of Units
Initial Training School (ITS)	5
Elementary Flying Training School (EFTS)	12
Service Flying Training School (SFTS)	8
Air Navigation School (ANS) <sup>51</sup>	3
Air Observer School (AOS)	2
Bombing and Gunnery School (BAGS)	3
Wireless Operator-Air Gunner School (WAGS)	3

The original finishing date of the EATS had been MAR 1943, but the conference in Ottawa in MAY 1942 extended this to MAR 1945.<sup>52</sup> For the Australian training commitment to the scheme, a variety of RAF aircraft were being imported mainly for training – Ansons, Oxfords, Battles and Tiger Moths,<sup>53</sup> all of which retained their RAF serial numbers and were generally delivered camouflaged. The throughput planned for the RAAF contribution to EATS was to provide 1120 crewmen every four weeks – 336 pilot trainees for the EFTS, 280 pilot trainees for the SFTS, 184 observers and 320 WAG trainees.<sup>54</sup> In addition to the original three dominions, Southern Rhodesia also joined the scheme to establish four EFTS, four SFTS and a combined AOS/WAGS unit.<sup>55</sup> RAAF pilots could complete their pilot training at an SFTS in Australia, Canada or Southern Rhodesia.

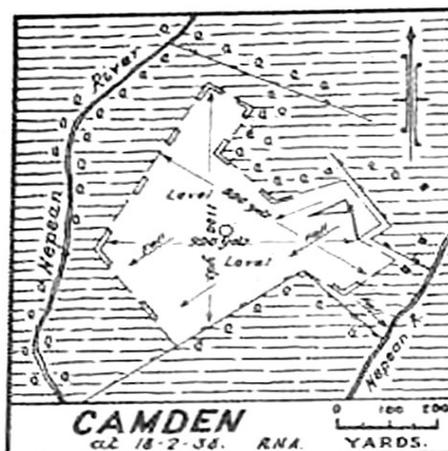
1FTS – the original “home of RAAF flying training” at Point Cook, and formed in 1921 – was renamed as an EATS unit in MAY 1940 as 1STFS, inheriting the RAAF’s fleet of Avro Cadets. However, the Cadets had not been required by 1SFTS and were transferred immediately to CFS (itself formed from Instructors’ Training Squadron, 1FTS ITS). CFS then moved up to Camden, a new training base near Sydney, established as part of the Expansion Plan. The role of CFS was to train flying instructors for all the dispersed EFTS, SFTS and OTU establishments, undertake pilot type refreshers, and implement standardisation of flying training throughout these widespread units. In addition to its initial complement of Cadet, Anson and Wirraway trainers, during 1940 CFS also received Tiger Moths, Wackett Trainers and Oxfords.

CFS conducted two types of flying instructors’ courses – the Elementary Flying Instructors’ Course and the Service Flying Instructors’ Course. The Elementary FIC typically ran for six weeks with the graduates posted to instruct at an EFTS. The longer Service FIC lasted approximately ten weeks, being a more advanced syllabus with the extra length devoted to a “Service term” for the SFTS.<sup>56</sup> On 18 APR 1942, all CFS aircraft transferred north again from Camden to Tamworth to take over the aerodrome and facilities vacated on the disbandment of 6EFTS – with the CFS fleet of 18 Cadets, in addition to Wackett , Wirraway and Oxford trainers.<sup>57</sup>

## CAMDEN AERODROME

Camden had been surveyed by FLGOFF Brian Eaton, an instructor with 1FTS Instructors' Training Squadron (which was the forerunner of CFS), in OCT 1939 as a new airfield for the RAAF's Expansion Plan, which was required to achieve the demands of the EATS. Its suitability was then recommended by Director of Training WGCDR Fred Scherger on 22 DEC 1939, and the order to develop the base was given on 1 FEB 1940 by Assistant Chief of Air Staff WGCDR George Jones... "Central Flying School is to be established at Camden as shown in the Development Programme".<sup>58</sup> Camden aerodrome, known as 'Macquarie Grove', was privately owned by Mr E Macarthur-Onslow and ideally situated only a mile north-west of Camden township, and the owner was willing for the site to be used by the RAAF, even offering his residence as officers' quarters. This 1938 NOTAM advised that it was a "good grassed surface, suitable in all weather", with fuel and workshops available, a telephone, and landing fees from 2/6 (25 cents).

CIVIL AVIATION BOARD      DEPARTMENT OF DEFENCE      AUSTRALIA  
**NOTICE TO AIRMEN**      **NO. 71/1938**  
 ("MACQUARIE GROVE") CAMDEN, N. S. W.



**CLASS OF GROUND:** Aerodrome licensed for all types of landplanes.  
**PROPRIETOR:** E. Macarthur Onslow, "Macquarie Grove", Camden, N.S.W.  
**POSITION:** About one mile NW of Camden.  
 Lat: 34° 3' S; Long: 150° 41' E.  
**MAGNETIC VARIATION:** 9½° E.  
**LANDMARKS:** Camden to the south east. Aerodrome situated in a large bend of the Nepean River.  
**MARKINGS:** White circle and wind indicator. Fence posts to the south east painted white; white boundary marks elsewhere.  
**SURFACE:** Good grassed surface, suitable in all weather.  
**DIMENSIONS:** N-S: 1,100 yards; E-W: 990 yards; NW-SE: 900 yards.  
**HEIGHT ABOVE SEA LEVEL:** 200' approx.  
**APPROACHES:** North - over trees; south - over trees and fence; east - over house and trees; west - over river and trees.  
**SURROUNDING COUNTRY:** Generally open and suitable for forced landings.  
**PETROL, OIL & WORKSHOPS:** At Camden.  
**WATER SUPPLY:** At house adjoining.  
**HANGAR ACCOMMODATION:** Nil.  
**NEAREST TELEPHONE:** At house adjoining (Camden 13).  
**NEAREST TOWN & RAILWAY STATION:** Camden, one mile south east.  
**CHARGES:** Per landing - 2/6d for single engined aircraft, and 5/- for multi-engined aircraft.  
**REMARKS:** This aerodrome is not available for use for pageants or passenger flights without permission of owner.  
 Relative stripmap No. 75.

*S. H. Crawford*  
 Secretary,  
 Civil Aviation Board.  
 [NAA A9716/231]

Z-441 8.525 P.1215

**NOTAM 71/1938 for Camden (Macquarie Grove) Aerodrome**

Camden was home to CFS from MAY 1940 until the move to Tamworth in APR 1942. Used by USAAF fighter workups, later RAAF Camden would house seven Bellman 120ft x 100ft hangars, and the sealed runway was under construction when surveyed by the 5thAF in NOV 1942 to assess future US use.

## CENTRAL FLYING SCHOOL (CFS) – 1940

CFS inherited the Avro Cadets from 1SFTS (as 1FTS had been retitled as part of the EATS scheme). CFS had re-formed on 29 APR 1940 from the Instructors' Training Squadron of 1FTS at Point Cook, and with the expansion of 1SFTS, CFS headquarters moved to Camden on 14 MAY 1940.<sup>59</sup> At this stage, all Cadets had been transferred to CFS into 'A' and 'B' Flights (retaining the 'Y' code marking of 1FTS), while 'C' FLT had Ansons, and 'D' FLT Wirraways.



**1940 – 1SFTS A6-19 at the time of transfer to CFS in MAY 1940 (16"x10" training number, 'Y' code, Yellow trainer band)**

These 1FTS markings were retained by CFS at Camden until reconditioning. CFS Cadet overhauls were carried out initially by Clyde Engineering in Sydney, nearby to Camden, from JUL 1940 where the aircraft were reconditioned and painted in their new overall training Yellow.



[colourised from RAAF image]

**MAY 1940 – A6-26, A6-32, A6-31, A6-12, A6-24, A6-2 on CFS's arrival MAY 1940, looking over the Nepean towards Camden**

**Training numbers** for the Cadet were applied soon after delivery to Point Cook, from 1936-1937. This was the standard RAAF training practice, and followed on from the large "last two" numbers on the forward fuselage as used on Moth and Wapiti trainers. These early 'larger' squat *squared* training numbers (24" high x 18" wide<sup>60</sup>) gave way in 1939-1940 to the smaller *circular* style number (16" x 10"). However, when aircraft were subsequently painted overall Yellow over 1940-1941 the larger rectangular numbers were again initially used.

**Unit Code** – the 'Y' unit code for 1FTS had been introduced by the AGI C.11 in SEP 1939, to be in *Black on Aluminium*.<sup>61</sup>

**Trainer bands** on the fuselage and mainplanes of RAAF Cadets were introduced by Amendment List No.5 (A/L 5) to this AGI in JAN 1940 as an interim marking to be "Yellow bands three feet in width".<sup>62</sup>

## CENTRAL FLYING SCHOOL (CFS) – 1940

The CFS Cadets were transferred from Point Cook to Camden in two deployments – on 18 MAY 1940, 13 Cadets of 'B' FLT arrived; followed the next day by 14 Cadets of 'A' FLT. It was an unfortunate first night at Camden, as the new RAAF base was hit by 70mph gale forces winds, and A6-3, A6-15 and A6-23 were damaged. All three were dispatched to 2AD the following week for repair, and then contracted to Clydes Engineering in Sydney for refurbishing. CFS 'C' FLT with Ansons arrived on 21 MAY, and 'D' FLT with Wirraways on 23 MAY.<sup>63</sup>



[sepia coloured RAAF image]

### MAY 1940 – Another image of the CFS arrival at Camden in MAY 1940

Identified are A6-27, A6-11, A6-18, A6-33, A6-14; next row is the line-up in the previous image (with A6-26) A6-32 and A6-31.

CFS at Camden then had a contractor arranged for overhauls; the Clyde Engineering Company at Granville, from JUL 1940, reconditioned and repainted Cadets in overall training *Yellow*. The local Pittman transport company moved the completed Cadets between the factory and RAAF Bankstown or Richmond for acceptance test flights, using a truck loaded with the wings, towing a specially-built trailer for the fuselage. The overall *Yellow* was applied when Cadets were cycled through overhaul at Clydes over 1940-1942. This *Yellow* scheme had originally been specified for "Elementary Training Types" in Amendment List No.5 (A/L 5) to AGI C.11 on 26 JAN 1940. But by OCT 1940, this was extended to all trainers by the policy AGI C.11 *Issue 3* into "Scheme E.1 – Training Aircraft Finishing Scheme",<sup>64</sup> where the "entire airframe is finished in yellow". This policy still continued *Yellow* trainer bands as an interim scheme only, with overall *Yellow* as the new permanent finish. Interestingly, when Cadets were reconditioned by Clydes, they still retained the non-standard fuselage type-A roundel with the wider outer *Blue* ring.



[coloured from MAAS image 88/289-145]

**OCT 1940** – A6-15 was the first Cadet re-assembled in Clyde aircraft shops after refurbishment, here on 14 OCT 1940

## CFS AT CAMDEN – 1940-1942

The CFS flying instructors' courses undertaken at Camden comprised the six-week Elementary Flying (EF) Instructors' Course, concurrently with the 10-week Service Flying (SF) Instructors' Course.<sup>65</sup> The instructors below of 9EFIC with a Cadet typify the wartime CFS flying training effort, and during the war CFS retrained 3600 service pilots as QFIs.<sup>66</sup> Courses also had a concentration on "blind flying" – Cadets were fitted with a hood for instrument flying.



*[colourised from camdenhistorynotes site]*

### **The graduates of No 9 Elementary Flying Instructors' Course at CFS Camden on 10 MAY 1941**

No 9 EFIC had started the six-week course on 24 MAR 1941 with 36 students,<sup>67</sup> with 27 graduates on 10 MAY 1941.

CFS at Camden was rather tardy in removing the 1FTS 'Y' code from the Cadets. When the first three were delivered to Clydes in Sydney in JUL 1940 for repair and overhaul (and repainting), they all still carried the 'Y' code, but this was removed in the repaint to *Yellow*, and the only markings applied were National Markings with serials and, in some cases, the training number. Subsequently those at Camden would have had the 'Y' removed, as the AGI C.11 *Issue 3* of OCT 1940 reallocated 'Y' from (the now defunct) 1FTS to "Communication Flight".<sup>68</sup> The image below also shows some CFS Ansons, one still marked with the 6SQN 'F' code – during MAY 1940, 6SQN was re-equipping with Hudsons, and their last four Ansons were ferried to Camden for CFS on 28 MAY 1940.<sup>69</sup>



### **The newly-constructed Duty Pilot's Tower at Camden, probably MAY 1940**

*[colourised RAAF image]*

A6-30, A6-32, A6-25 and A6-22 in the line-up. On 27 FEB 1942, USAAF P-40E '15', working-up at Camden, crashed into the Pilot's Tower and ending up wrecked in the 'A' FLT hangar,<sup>70</sup> and seriously injuring both its pilot and the RAAF Duty Pilot from the tower.

On 18 APR 1942 all CFS aircraft transferred north again, this time to Tamworth to take over the aerodrome and facilities vacated on the disbandment of 6EFTS – the CFS inventory now consisted of 18 Cadets, 14 Wackett Trainers, nine Wirraways and eight Oxfords.<sup>71</sup> In NOV 1942 13 Operational Base Unit (OBU) was formed at Camden to maintain the facilities and installations.<sup>72</sup> By that stage, 32SQN Hudsons and 73SQN Ansons had moved into Camden, and were joined briefly by 457SQN Spitfires before their move to Darwin.

## EVOLUTION OF RAAF CADET MARKINGS

In past articles in this series, individual aircraft camouflage and marking details for the RAAF from 1939 have been covered, with the changes up to 1945, often resulting from the origin of the aircraft. Below is a chronology of RAAF policy for generic, and Cadet specific markings (prewar all-over *Aluminium* Cadets, all-over *Yellow* 1941-1942, and the CFS camouflaged trainers over 1943-1944), so this can be followed in a logical timeline. The overall *Yellow* scheme for all trainers was adopted by AGI C.11 Issue 4 in OCT 1940. A6-15 was the first *Yellow* Cadet – interesting features were interplane and undercarriage struts were also painted *Yellow*, and the non-standard *Blue* proportioned fuselage roundel was retained (and probably was until replaced by *Blue-White* 3:5 Pacific roundels from SEP 1942). From 1943, the CFS Cadets were camouflaged.

**Prewar.** Deliveries of Cadets to the RAAF were from DEC 1935 until APR 1939. All were delivered in overall *Aluminium* dope with highly polished natural metal. From 1937 the large two-digit training numbers were applied, initially in large *squared* figures, later smaller *circular* figures. In the late 1930s (1938-1939) a unique fuselage roundel appeared, with a wider *Blue* ring, no longer being in the accepted 1:3:5 proportions.



*[colourised RAAF image]*

**1939** – Cadets in standard all-over *Aluminium* finish, before the *Yellow* trainer band was introduced in JAN 1940. The unique roundels – standard 1930s *Bright Blue* colour, but with the outer *Blue* ring broader, so not exactly in the 1:3:5 ratio.

Year	Change	Policy and References
<b>1939</b>	<p>Introduction of the 2:5 type-B to RAAF aircraft fuselages and uppersurfaces (becoming the M.1 roundel in 1940) – applied to Cadet fuselage and upper mainplane.</p> <p>RAAF aircraft finishes, identification markings, and squadron code letters – training aircraft <i>Aluminium</i>.</p> <div style="text-align: center;">  </div>	<p><b>RAAFHQ DTS 9/1/442 of 12 SEP 1939.</b></p> <p><b>RAAFHQ Aircraft General Instruction No. C.11, of 22 SEP 1939, 9/1/396(13A).</b></p> <p>Drawn largely from <b>AMO A.154/39 of 27 APR 1939.</b><sup>73</sup></p>
<b>1940</b>	<p>RAAF colours for 'Service' aircraft were <i>Camouflage Green</i> and <i>Camouflage Brown</i>, copies of RAF <i>Dark Green/Dark Earth</i> colours. Cadets remained <i>Aluminium</i>.</p> <p><b>JAN 1940.</b> Introduction of <i>Yellow</i> trainer bands, and overall <i>Yellow</i> for <i>Elementary Trainers</i>.</p> <p><b>APR 1940.</b> National Marking reverts to 1:3:5 <i>Red-White-Blue</i> (M.2) roundel.</p>	<p><b>AGI No. C.11 A/L.5, of 26 JAN 1940, 150/4/658.</b></p> <p><b>RAAF HQ Minute from CAS to AMOE 1/501/329(36A) of 29 MAR 1940.</b></p>

<p><b>1940</b></p>	<p>National Markings changes lagged by five months the similar decision by the RAF over OCT/NOV 1939.</p> <p><b>OCT 1940.</b> Policy <b>AGI No C.11 Issue 3</b> specified trainer schemes E.1 (overall <i>Yellow</i>), E.2 (36" <i>Yellow</i> bands) and detailed National Markings:</p> <ul style="list-style-type: none"> <li>○ <i>Marking M.1</i> – a <i>Blue</i> ring surrounding a red centre, the diameter of the <i>Red</i> to be 2/5 of the <i>Blue</i> circle, on upper wings (i.e. type-B roundel).</li> <li>○ <i>Marking M.2</i> – a <i>Blue</i> ring surrounding a White ring surrounding a <i>Red</i> circle, the proportions to be 1:3:5 (type-A roundel).</li> <li>○ <i>Marking M.3</i> – three colour circle (i.e. <i>M.2</i>) surrounded by a <i>Yellow</i> ring, proportions as for <i>M.2</i> and the <i>Yellow</i> the same width as the <i>Blue</i> circle, i.e. 1:3:5:7 proportions (type-A1 roundel).</li> <li>○ <i>Marking M.4</i> – <i>Red</i>, <i>White</i> and <i>Blue</i> stripes on the fin, stripes the same widths as the rings of the roundel, <i>Blue</i> nearest rudder (Seagull only).</li> </ul> <p><b>NOV 1940.</b> The <b>RAF's Aircraft Design Memorandum (ADM) No.332</b> specified Air Diagrams for camouflage schemes for different types of service aircraft. The <b>RAF Temperate Land Scheme (TLS)</b>, had been mandated by <b>RAF AMO A.926 in DEC 1940</b> – upper surfaces in Ministry of Aircraft Production (MAP) <i>Dark Green</i> and <i>Dark Earth</i>, and undersides MAP <i>Sky</i> – <i>Sky</i> not adopted by the RAAF.</p>	<p><b>RAF telegram A.949/39 30 OCT 1939</b>; followed by others on <b>5 NOV 1939</b> and <b>10 NOV 1939</b>, and advising of updated AMO A.154/39 (Goulding &amp; Jones, p.104). <b>RAAFHQ Aircraft General Instruction No C.11, Issue 3, of 3 OCT 1940</b>, AFHQ file 1/501/329. Para2(i) stipulated grey serial number and code letters on camouflaged aircraft.</p> <p><b>RAF ADM 332 (Issue 3) of 15 NOV 1940, External Colour Schemes of Aircraft</b>, RAAFHQ file 150/4/852 AGI C.11, <i>Standard Finishes and Markings</i>. Air Diagram A.D.1169 "Camouflage Single-engined Biplanes" applied to RAAF Tiger Moths, but not to the Cadet until 1942.</p> <p><b>AMO A.926/40 of 12 DEC 1940 replaced A.154/39.</b><sup>74</sup></p>
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[colourised from MAAS image 88/289-147]

**1941 – A6-17 of CFS in JAN 1941 after overhaul and a Yellow repaint by Clyde Engineering in Sydney, IAW AGI C.11 Issue 3**

<p><b>1941</b></p>	<p><b>JAN 1941.</b> The RAF cancelled the requirement for "mirror" camouflage schemes in JAN 1941 and manufacturers then selected only one pattern as standard.</p> <p>The RAAF adopted 1941 policy of the RAF Directorate of Technical Services (DTS) in <b>DTS 368/41</b>, and also for the first time laid out the RAAF's standard overland camouflage scheme; specifying <i>Foliage Green</i> (K3/177, to replace RAF <i>Dark Green</i>), <i>Earth Brown</i> (K3/178 to replace RAF <i>Dark Earth</i>), and <i>Sky Blue</i> (K3/195 instead of RAF <i>Sky</i>).</p>	<p>Merging of the 'A' and 'B' schemes occurred from 15 JAN 1941.<sup>75</sup></p> <p><b>RAAFHQ DTS directive 368/41, file 150/4/852(53A) of 23 DEC 1941</b>, letter S.A.S.9984, paras.2 and 4.</p> <p><b>RAF ADM 332 (Issue 3) of 15 NOV 1940, External Colour Schemes of Aircraft.</b></p>
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<p><b>1942</b></p>	<p><b>JUN 1942.</b> Deletion of <i>Yellow</i> from RAAF roundels (i.e. discontinuation of M.3).</p> <p><b>AUG 1942.</b> The <i>RAAF Technical Order, Aircraft General Instruction (AGI) No.C.11</i> was changed by <i>Issue 4</i> of 31 AUG 1942, for operational aircraft retained <i>Red/White/Blue</i> National Markings, dropped the <i>Yellow</i> outer ring, but there were still unintended consequences.</p> <ul style="list-style-type: none"> <li>○ Upper surfaces – <i>Red</i> was dropped, the roundel was specified as <i>Matt White</i> and <i>Matt Dull Blue</i>, with the <i>White</i> diameter to be 2/5 of the <i>Blue</i> – the first directive for what we call the ‘Pacific’ Roundel. <i>Red</i> had been deleted because of an attack on 26 JUN 1942 by a USN fighter on a RAAF Catalina confused by the <i>M.1</i> roundel <i>Blue/Red</i> roundel (with faded <i>blue</i> it showed as a <i>red</i> disk).</li> <li>○ Fuselage sides – <i>Dull Red</i>, <i>White</i>, and <i>Dull Blue</i> roundels in the 1:3:5 proportions.</li> <li>○ Undersurfaces – the same <i>Dull Red</i>, <i>White</i>, and <i>Dull Blue</i> roundels but only for day fighters and trainers, but not for bombers or seaplanes.</li> <li>○ Fin markings – all aircraft marked with <i>Dull Red</i>, <i>White</i> and <i>Dull Blue</i> stripes of the same width, with red leading.</li> </ul> <p>This <i>Issue 4</i> of the AGI, in addition to reiterating the 36” <i>Yellow</i> trainer band requirements, also directed that “Training and Communication Aircraft” were to have <i>Yellow</i> undersurfaces, not applying to aircraft with Reserve squadron commitments and OTUs.</p> <p><b>SEP 1942.</b> On 19 SEP 1942 <i>Red</i> was dropped completely from National Markings – <i>Blue</i> and <i>White</i> roundel with <i>Blue</i> not to exceed 48”, with the <i>White</i> diameter 3/5 (3:5) of the <i>Blue</i>. Roundels were to be in the six positions, with <i>Blue/White</i> fin stripes – specified colours <i>Matt White</i> K3/170 and <i>Matt Dull Blue</i> K3/197. The <i>Yellow</i> surround of the A1 fuselage roundel had been overpainted in AUG 1942 with camouflage paint.</p>	<p><b>RAAFHQ DTS 280/42 of 18 JUN 1942</b>, filed on 1/501/329(63A); 1TG signal T.670 19 JUN 1942; Signal School Point Cook A.50, 29 JUN 1942.</p> <p><b>RAAFHQ Technical Order AGI No.C.11 (Issue 4) of 31 AUG 1942.</b></p> <p>Colours were specified as <i>Matt Dull Red</i> K3/214 or K3/199, <i>Matt Dull Blue</i> K3/196 or K3/197.</p> <p><b>RAAFHQ message T520, file 0947/19 (30A), of 19 SEP 1942.</b></p> <p><b>USAAF War Dept Circular #141, 12 MAY 1942</b>, had removed <i>Red</i> from the US National Markings.</p>
<p><b>1943</b></p>	<p><b>JUL 1943.</b> Some roundels applied to aircraft imports from Britain were 1:2 ratio, from converting type-C1 roundels. RAAFHQ AMEM specified that the roundel <i>White</i> circle was to be smaller, 2/5 the size of the <i>Blue</i>, the 2:5 roundel.</p> <div style="text-align: center;">  </div> <p><b>‘Pacific Roundel’ ratio of the <i>White</i> to <i>Blue</i>, 3:5 and 2:5</b> The Pacific Roundel applied to Cadets was in 3:5 ratio.</p>	<p><b>RAAFHQ AMEM DTS 1/501/329 SAS 13552, 8 JUL 1943</b>, adopted from RAF AMO A.664/42, of 2 JUL 1942. Further, in NOV 1943 SEAC specified the size of its new roundel (<b>based on that of the RAAF</b>) 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” <i>Blue</i> roundel, 12” <i>White</i>, i.e. 3:8 (approx 2:5) and fin flash 24”x16”.<sup>76</sup></p>
<p><b>1944</b></p>	<p><b>MAY 1944.</b> Revision of AGI “Camouflage Schemes and Identification Markings” with Appendix E <i>Yellow</i> applicable for trainers – except for OTUs and GRS, which were camouflaged. The AUG 1942 AGI C.11 <i>Issue 4</i> had instructed <b>camouflage</b> for Cadets at CFS, which was then carried through 1943-1944. With the Cadet to be retired in SEP 1944, probably the MAY 1944 AGI 3(c)1 was too late to warrant a complete scheme change back to <i>Yellow</i>.</p>	<p><b>RAAFHQ T.O. AGI Pt 3(c), Instruction 1, file 150/4/5056 (1A), of 26 MAY 1944.</b> <b>Also issued as DTS Special Instr Gen/34, 1 MAY 44.</b></p>

## CADET MAINTENANCE

Training units away from operations were able to conduct their own maintenance (including 240-hourly inspections), with the domestic commercial aviation infrastructure for deeper maintenance. CFS conducted its unit maintenance, and outsourced overhauls to the civil sector – primarily Clyde Engineering in Sydney over 1940-1943, and Newcastle Aero Club (NAC) at Broadmeadow over 1941-1944. In extreme cases, airlines were contracted, with A6-28 being overhauled by ANA at Mascot in 1942, and A6-19 by Marshall at Bankstown in 1943.



**First Cadets (A6-3, A6-23 and A6-15) delivered to Clyde Engineering, Granville, in JUL 1940** [colourised from MAAS 88/289-969]

Damaged by the gale winds at Camden on 18 MAY 1940,<sup>77</sup> these were repaired and overhauled JUL-DEC 1940. Even though they had been with CFS for two months, they were still marked with the “Y” code of 1FTS and carried the larger squared training numbers. At Clydes, they were all repainted overall Yellow as required by the AGI C.11 *Issue 3* of OCT 1940.

### CADET OVERHAULS AT CLYDE ENGINEERING COMPANY

Dates	Aircraft	Details
12 JUL 1940 - 18 DEC 1940	A6-3	Damaged by windstorm MAY 1940, returned to CFS Camden
12 JUL 1940 - 12 OCT 1940	A6-15	Damaged by windstorm MAY 1940, returned to CFS Camden
12 JUL 1940 - 29 NOV 1940	A6-23	Damaged by windstorm MAY 1940, returned to CFS Camden
2 DEC 1940 - 27 JAN 1941	A6-17	Forced landing SEP 1940, repaired by Clyde, returned to CFS Camden
FEB 1941	A6-29	Heavy landing MAR 1940, components issued as spare parts to Clyde
10 MAR 1941 – 10 MAY 1941	A6-13	Stalled FEB 1941 and repaired by Clyde, returned to CFS Camden
23 FEB 1942 - 29 OCT 1942	A6-33	Returned to CFS Tamworth
23 FEB 1942 - 28 OCT 1942	A6-34	Returned to CFS Tamworth
30 MAR 1942 - 15 DEC 1942	A6-21	Returned to CFS Tamworth
30 MAR 1942 - 15 DEC 1942	A6-25	Returned to CFS Tamworth
30 MAR 1942 - 22 MAR 1943	A6-27	Returned to CFS Tamworth
13 APR 1942 - 29 MAR 1943	A6-7	Returned to CFS Tamworth
13 APR 1942 - 16 NOV 1943	A6-3	Returned to CFS Tamworth
13 APR 1942 - 14 DEC 1943	A6-32	Returned to CFS Tamworth
12 APR 1943 - 6 SEP 1943	A6-2	Returned to CFS Tamworth
17 APR 1943 - 15 OCT 1943	A6-12	Returned to CFS Tamworth
12 JUN 1943 - 14 DEC 1943	A6-23	Returned to CFS Tamworth
29 JUL 1943 – 21 FEB 1944	A6-11	Returned to CFS Parkes
12 AUG 1943 - 25 AUG 1943	A6-19	Marshall Bankstown unable to repair, components authorised DEC 1943

This induction of the first three Cadets was significant as it not only marked the beginning of commercial contracting, but here at Clyde during this maintenance was also when the change of Cadet colours occurred, as directed by the OCT 1940 AGI, to overall *Yellow*. Technical Order AGI No C.11 *Issue 3* had just been released and mandated the new training scheme – Scheme E.1, as a permanent marking of all training aircraft with the entire airframe to be finished in *Yellow*. The previous Instruction amendment – AGI C.11 *Issue 1* A/L 5 of 26 JAN 1940 – had only stipulated that *elementary* trainers were to be overall *Yellow*, so intermediate trainers like the Cadet had only been required to carry *Yellow* trainer bands (which was now classified as an interim finish, and known as Scheme E.2).<sup>78</sup>

## CLYDE ENGINEERING COMPANY

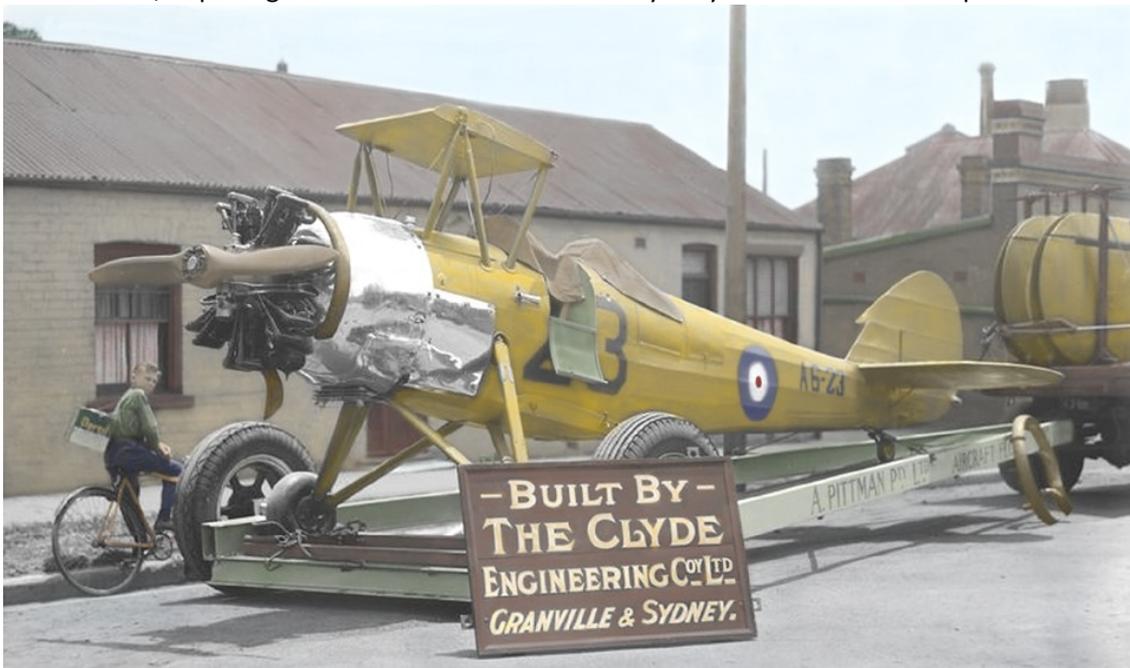
In 1898, the newly formed Clyde Engineering Company took over the Granville factory of Hudson Brothers, which had gone into receivership. In 1901, soon after it had become Clyde Engineering Ltd, the company began making carriages for the Federal Government, in 1903 began making them for the West Australian Government, and in 1905 won a major contract with the NSW Government to make locomotives. Given the new company arose out of the old Hudson Brothers, it is not surprising to find Clyde Engineering adopted a phoenix as its logo, rising out of the ashes of the old. By 1950, Clyde Engineering had become the largest engineering enterprise in NSW.<sup>79</sup>



*[coloured from MAAS 88/289-146]*

**OCT 1940 – A6-15 was the first Cadet repaired and repainted by Clyde Aircraft Shops**

The first RAAF contract for the overhaul of CFS Cadets commenced in JUL 1940, as the image of A6-3, A6-15 and A6-23 shows. Clyde Engineering at Granville, for its time, made a significant contribution to its workers and to the social fabric of NSW. By 1923, Clyde had 2200 employees working round the clock on eight-hour shifts. Some employees lived in houses specially built by the company in Granville and the factory had its own fire brigade, ambulance service, gun club and was home to Australia's first soccer club. During the Second World War it was an integral part of 'Workshop Australia', and Clyde Engineering took on a new field, the repair of RAAF aircraft. This would involve Avro Cadets, Tiger Moths, Wirraways and Hudsons. The Museum of Applied Arts & Sciences photographic collection of Clyde Engineering are almost all glass plate negatives and were taken at the Clyde works in Granville, depicting the workers and the machinery they manufactured or repaired.



*[coloured from MAAS 88/289-1186]*

**DEC 1940 – A6-23 finished overhaul and ready for return to CFS, with training number '23' applied**

## NEWCASTLE AERO CLUB

Newcastle Aero Club (NAC) at Broadmeadow, Maitland, also undertook deep maintenance of the CFS Avro Trainers from late 1941. CFS was at Camden at this stage, but soon moved north in APR 1942 to the aerodrome at Tamworth, with conveniently Maitland only 200km to the south. Typically, after the Clyde or NAC contractors had completed an overhaul, the RAAF flight acceptance was undertaken by either 2AD at Richmond or 2AP at Bankstown.

For two years over 1942-1944, NAC refurbished these aircraft listed below, and the painting to *Yellow* would have occurred through 1942, and then presumably to disruptive camouflage in 1943. The experience in maintaining Cadets obviously influenced the Club's decision to buy five from CDC auctions in MAR 1945 and establish its foundation of postwar civilian flying training.

CADET OVERHAULS AT NEWCASTLE AERO CLUB		
Dates	Aircraft	Details
8 NOV 1941 - 30 MAR 1942	A6-1	Returned to CFS Camden
8 NOV 1941 - 2 MAR 1942	A6-22	Returned to CFS Camden
8 NOV 1941 - 28 MAY 1942	A6-26	Returned to CFS Tamworth
1 JUN 1942 - 22 MAR 1943	A6-17	Returned to CFS Tamworth
5 NOV 1942 - 3 MAY 1943	A6-4	Returned to CFS Tamworth
12 NOV 1943 - 2 MAR 1944	A6-16	NAC unable to complete overhaul; to 2CRD Richmond to components
22 NOV 1943 - 28 APR 1944	A6-24	NAC unable to overhaul; 2CRD for conversion to components 5 JUL 1944
22 NOV 1943 - 8 JUN 1944	A6-5	Returned to CFS Parkes
29 NOV 1943 - 1 AUG 1944	A6-18	Returned to CFS Parkes
3 DEC 1943 - 9 MAR 1944	A6-3	NAC unable to complete overhaul; to 2CRD Richmond
12 JAN 1944 - 9 MAR 1944	A6-20	NAC unable to complete overhaul; 2CRD to components 9 JUL 1944
12 JAN 1944 - 9 MAR 1944	A6-22	NAC unable to complete overhaul; 2CRD to components 9 JUL 1944



*[newcastleherald.com]*

**Newcastle Aero Club at Broadmeadow immediately postwar, with four Avro Cadets in the line-up**

**OCT 1940.** Release of AGI C.11 *Issue No.3* stipulated two training schemes. **Scheme E.1** was to be the permanent scheme for training aircraft, with the entire airframe to be finished in *Yellow*. **Scheme E.2** was an interim finish comprising “a *Yellow* band three feet in width” around the fuselage and around the mainplanes.<sup>80</sup> These 36” E.2 trainer bands had been introduced in JAN 1940 by an amendment to the previous AGI for trainers (those not elementary trainers, which were to be overall *Yellow*). When the latest AGI *Issue 3* was released on 3 OCT 1940, three CFS Cadets were in refurbishment at Clyde Engineering in Sydney – these becoming the first to receive an E.1 overall *Yellow* finish.

**OCT 1940.** Training Numbers. AGI C.1 *Issue 3* also covered: “training aircraft are to have the last two numbers of their identification numbers painted on both sides of the fuselage forward of the national markings”. There were some caveats: one digit could be used if serial number was under 10; if more than one aircraft in the unit had the same ‘last two’, then three numbers could be used; numbers were to conform to the size of squadron code letters, i.e. under 48” in height.<sup>81</sup> This was simply implemented for the Cadet as they had carried the training number as the last one or two digits of the serial number, as had been the case from 1936-1937.

**DEC 1941.** RAAFHQ AMOE Letter S.A.S.9984 to all flying training establishments detailed colour schemes and camouflage of *second-line* aircraft, which at this stage did not include the Cadet. The RAF camouflage colours were replaced by RAAF *Earth Brown* (K3/178) and *Foliage Green* (K3/177); and specified undersides were to be *Sky Blue* (K3/195), noting that *Yellow* and *Aluminium* finishes were no longer to be used (primarily because of Reserve squadron responsibilities).<sup>82</sup>

**DEC 1941.** Reserve Squadrons. After a query from 51(R)SQN, the unit was advised that there was no requirement to have *Yellow* trainer bands.<sup>83</sup>

**JAN 1942.** RAAFHQ noted that *Yellow* painting was “gradually being implemented”, with recommendation from DTS to DCAS “to adopt the English scheme for training aircraft” of *Yellow* undersides with camouflage on the upper surfaces.<sup>84</sup> *Yellow* undersides were implemented for some camouflaged trainers – Wacketts, Tiger Moths, Oxfords – but not so much with the Anson, because of its ‘Service Aircraft’ requirement to revert to Reserve squadrons. Avro Cadets were overall *Yellow*, all being in service with CFS, with no Reserve commitment.

**JUN 1942.** DTS noted the removal of the *Yellow* ring from the fuselage roundel, “IAW instructions issued by the Allied Air Command”<sup>85</sup> – this deleted the RAAF M.3 roundel, reverting to the M.2. These designators were made redundant by the imminent dropping of *Red* from National Markings in SEP 1942.

**AUG 1942.** Release of AGI C.11 *Issue 4* formalised some of the earlier decisions that had been discussed, inter alia *Foliage Green/Earth Brown* upper surfaces and *Sky Blue* lower surfaces; the 36” *Yellow* trainer band around the fuselage and wings; and, on Ansons and Oxfords, a 9” wide *Yellow* band longitudinally around the nose and on wing leading edges out to the engines.<sup>86</sup> But other aspects of this order were apparently not necessarily implemented:

- the “training number” was to be in *Medium Sea Grey*, but up to this stage training numbers were *Yellow* (and it is difficult to distinguish *Yellow* and *Grey* from black-and-white imagery), so some training numbers were *Yellow*, others *Grey* [which was the case for OTUs and CFS];
- also policy stated that for Trainer and Communication Aircraft “the undersides are to be camouflaged *Yellow* (K3/185)” – this did not apply to second-line aircraft because of Reserve squadron commitments, but there were anomalies [as apparent with some Ansons and Oxfords, and *Yellow* undersides apparently did not apply to camouflaged CFS Cadets];
- at OTUs the RAAF followed the RAF policy of using operational colours and markings; and
- some camouflaged Oxfords had *Yellow* cowls (particularly 1SFTS) although this was not the requirement that it was for single-engined trainers [however, when Cadets were camouflaged, they retained the highly-polished metal finished nose].

**MAY 1944.** The next major revision of RAAF camouflage and markings was AGI Part 3, Section (c), Instruction No.1. The different roles of aircraft were detailed in the appendices: Appendix “E” ***Yellow*** applied to all training aircraft, with training numbers (or letters) in *Black* to be placed forward of the roundel.<sup>87</sup> But with the imminent retirement of Cadets in SEP 1944, the repainting of camouflaged aircraft back to overall *Yellow* probably was not warranted.

## A6-13 – A YELLOW CADET

**A6-13** was the first of the second batch of Cadets and received by 1AD in FEB 1938, then in DEC 1938 it was transferred from 1FTS to 21SQN at Laverton. With war, in NOV 1939 it was returned to 1FTS for the increased flying training, and was badly damaged in JAN 1940 which required extensive repairs. On completion, it passed to 2AD in AUG 1940 for immediate issue to CFS, which had moved to Camden. The image below is probably at that time.



[colourised RAAF image]

**1940 – Cadet A6-13 with Yellow trainer band introduced in JAN 1940, and 1:3:5 roundel re-introduced APR 1940**

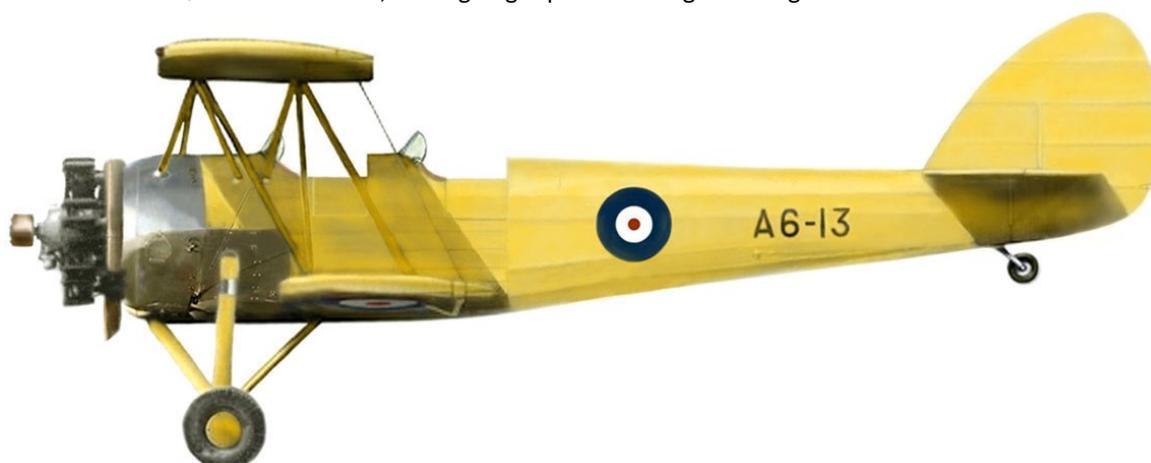
On 27 FEB 1941, A6-13 stalled at Camden from 10ft damaging longerons, and in APR 1941 was transferred to Clydes for repair.



[colourised from MAAS 88/289-1249]

**MAY 1941 – Cadet A6-13 at Clyde Engineering now in overall K3/185 Yellow (introduced in OCT 1940)**

Several marking aspects of this are interesting. It has the non-proportioned 1:3:5 roundel with a wider *Blue*, so these must have been the proportions provided by the RAAF to Clydes. The serial number (as in the top image too) is in the later *circular* style of font. Behind A6-13 is 13SQN Hudson A16-10, undergoing repair following a landing accident at Darwin in DEC 1940.



## RAAF CAMOUFLAGE

As war arrived, colours changed virtually overnight for the RAAF's 'service' aircraft. First, roundels were toned-down to *Red/Blue* at the end of 1939, and camouflage replaced the *Aluminium* – introduced by the **AGI No. C.11 of 22 SEP 1939** (the first RAAF policy on markings). For service types, such as the Anson, the AGI specified "Scheme 2", later introducing Diagrams A-1733 and Z-1152<sup>88</sup>, which were reprints of the 1939 RAF Air Ministry Diagram A.D.1159 for 'Twin Engined Monoplanes'. This AGI also specified the use of *Red/Blue* roundels (for the fuselage and upper surfaces) and *Red/White/Blue* below the mainplanes, and also assigned single code letters to designated units (e.g. 'A' to 1SQN, 'B' to 2SQN etc).

Trainers were at this stage not required to be camouflaged, and the AGI specified "Training Types" to be finished in *Aluminium V.84*. However, roundels on all aircraft were to be *Red/Blue* – later in 1940 designated "M.1". Soon in 1940 it was determined that *Red/Blue* roundels on camouflage were too difficult to see, and CAS himself decided – like the RAF had done – to re-introduce *White* to the fuselage roundel, and the RAAF did by APR 1940.

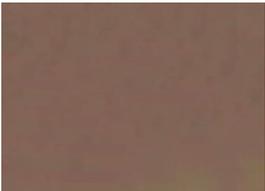


*[colourised from RAAF image]*

### A6-16 of 'B' FLT arrives at Camden in the CFS move from Point Cook on 18 MAY 1940

Markings of interest are roundels on the upper surfaces of some aircraft are still M.1 *Red/Blue* having only been changed the previous month; 1FTS 'Y' unit code retained on the fuselage sides; *Yellow* trainer bands are around the fuselage and mainplanes.

Camouflage across the RAAF 'service' aircraft had, **by JUL 1940**, been applied, but where the RAAF did depart from RAF policy was with undersurface colours – the RAF used *Sky*, or "duck-egg blue" for the European haze, but *Sky Blue* (K3/195) was adopted here, as the richer blue was required for the Australian clearer and brighter atmosphere. Overland camouflage for RAAF aircraft were the RAF colours *Dark Green* (DG) and *Dark Earth* (DE) with *Sky Blue* undersurfaces, and the National Markings were *Red* and *Blue* colours in *dull* colours.<sup>89</sup>

		
RAAF K3/216 – RAF <i>Dark Green</i>	RAAF K3/209 – RAF <i>Dark Earth</i>	RAAF K3/195 <i>Sky Blue</i>

### 1940 RAAF camouflage colours for RAF Temperate Land Scheme (TLS)

RAF colours were identified by the name, but for inventory had stock numbers which varied with the amount that was ordered.<sup>90</sup>

## RAAF CAMOUFLAGE

As seen from the RAF colours in use in Australia in the early war years, the RAF gave a *name* to the colour while the RAAF also added a *designator* in the **RAAF 3K5 Specification**. In Australia, initially the green/brown RAF colours were termed *Camouflage Green* (K3/216) and *Camouflage Brown* (K3/209).<sup>91</sup> The RAAF AGI C.11 *Issue 3* (OCT 1940) did not specify the camouflage colours, but referred to the associated diagrams – Drawings A-1732 and A-1813 (and now not the earlier 1939 *Issue 1* A-1733 and Z-1152), the equivalents of the RAF A.D. series, and also adding the Australian CAC CA01-01001. These diagrams, over 1940-1941, were annotated with *Camouflage Green* and *Camouflage Brown*. From 1941, stronger and richer colours were introduced and received unique Australian names. These colours for camouflage were clarified in DEC 1941. The RAAF Directorate of Technical Services DTS 368/41 for the first time laid out the RAAF's standard overland camouflage colours: specifying *Foliage Green* (K3/177, to replace RAF *Dark Green*), *Earth Brown* (K3/178 to replace RAF *Dark Earth*), with the earlier-introduced *Sky Blue* (K3/195).<sup>92</sup> The change of names and BALM (the paint manufacturer) numbers are shown below.<sup>93</sup>

<p>The "<i>Camouflage Green</i>" of 1940 had by 1941 been named "<i>Camouflage Finish, Foliage Green</i>" and identified by paint manufacturer BALM under its stock number S13983.</p>	<p>The "<i>Camouflage Brown</i>" of 1940 had by 1941 been named "<i>Camouflage Finish, Earth Brown</i>" and identified by paint manufacturer BALM under its stock number S13982.</p>
 <p><b>K3/177 RAAF <i>Foliage Green</i></b></p>	 <p><b>K3/178 RAAF <i>Earth Brown</i></b></p>

### 1941 changeover of RAAF camouflage colours

While the RAAF AGI C.11 *Issue 3* in OCT 1940 specified which aircraft were to be camouflaged – or in alternate training colours (i.e. for the Avro Cadet to be in overall *Yellow* K3/185) – it was not until the AGI *Issue 4* in AUG 1942 that specified a camouflage finish for the Cadet. This was the same biplane trainer scheme as the Tiger Moth, Air Diagram A.D.1169. Also this latest AGI reiterated Australian camouflage colours as *Foliage Green* (K3/177) and *Earth Brown* (K3/178). (*Foliage Green* is close to FS24092, and *Earth Brown* to FS20097).<sup>94</sup>

There has been much recent discussion on modeller sites querying the methods involved in applying WWII camouflage. Was the pattern freehand or were masks/templates/mats used, were these rubber mats, or hessian? Did the colours have hard edges, or blended? The RAAF direction on applying camouflage is provided, *inter alia*, below from the AUG 1942 **AGI C.11 Issue 4 Appendix 6**:<sup>95</sup>

### APPENDIX No. 6

#### SCHEME FOR CAMOUFLAGE FINISH FOR AIRCRAFT

1. Camouflage finishes shall be sprayed on all surfaces in accordance with the drawings listed for the particular type of aircraft under Aircraft General Instruction No.C11, Issue 4.
2. The outlines of the camouflaged patterns are to be lightly drawn on the aircraft surfaces with chalk. An endeavour is to be made to follow the lines of the drawing as accurately as possible without the use of templates, etc.
3. The edges of the coloured pattern shall be merged with a spray gun finish and not lined with a brush.
4. Camouflage finishes shall be thinned down for spraying. This proportion is approximately equal parts of finish and thinner (Ident No. K3/180). All surfaces must be thoroughly dry before the camouflage finish is applied.  
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8. Identification colour markings are to be applied by brush or spray, employing matt nitro identification colour finishes. Letter markings are to be applied as outlined in AGI C.11, Issue 4.

## RAF AIR DIAGRAM CAMOUFLAGE SCHEMES

RAF Aircraft Design Memorandum No.332 (Issue 3) of 15 NOV 1940, referenced as CD44/41,<sup>96</sup> listed the Air Diagram Numbers for camouflage schemes for the different types of aircraft. The design of camouflage, or other external colour schemes, had to be in accordance with the appropriate Air Diagram.

Below, the RAAF examples are added from RAAFHQ messages SAS.9984 (DTS 368/41) in DEC 1941 (D.C.2, Anson, Wirraway, Battles), then additionally SAS.7396 (DTS 280/42) in JUN 1942 (Hudson, B-17).<sup>97</sup> This final list was consolidated for all types by AGI C.11 (*Issue 4*) in AUG 1942.<sup>98</sup> However, there was still a shortage of the drawings in Australia at this stage, and the AGI directed that some aircraft should use the closest drawing available.<sup>99</sup> When camouflage was added to the Cadet the appropriate **A.D.1169** (Single-engined biplanes – communications aeroplanes, trainers), as per the Tiger Moth, was used.

Air Diagram No.	Types of Aircraft	RAAF Examples
A.D.1157	Twin-engined monoplanes – bombers, general reconnaissance, transports (span 75' and over)	Douglas D.C.2, D.C.3
A.D.1158	Cancelled, and included in A.D.1160	
A.D.1159	Twin-engined monoplanes – bombers, general reconnaissance, transports, army co-op aircraft (span less than 75')	Anson, Hudson, Beaufort, Beaufighter
A.D.1160	Single-engined monoplanes – army co-op aircraft, fighters	Wirraway, Battle, Hurricane <sup>100</sup>
A.D.1161	Four-engined monoplanes – bombers, general reconnaissance, transports	B-17 Fortress
A.D.1162	Single-engined biplanes – army co-op aircraft, fighters	Demon
A.D.1163	Four-engined monoplanes – general reconnaissance (flying boats)	
A.D.1164	Twin-engined monoplanes – general reconnaissance (flying boats)	Catalina
A.D.1165	Twin-engined biplanes – general reconnaissance (flying boats)	Seagull V
A.D.1166	Twin-engined biplanes (sesquiplane) – general reconnaissance (flying boat)	
A.D.1167	Single-engined monoplanes – communications aeroplanes, trainers	Wackett
A.D.1168	Twin-engined monoplanes – communications aeroplanes, trainers	Oxford
A.D.1169	Single-engined biplanes – communications aeroplanes, trainers	Tiger Moth



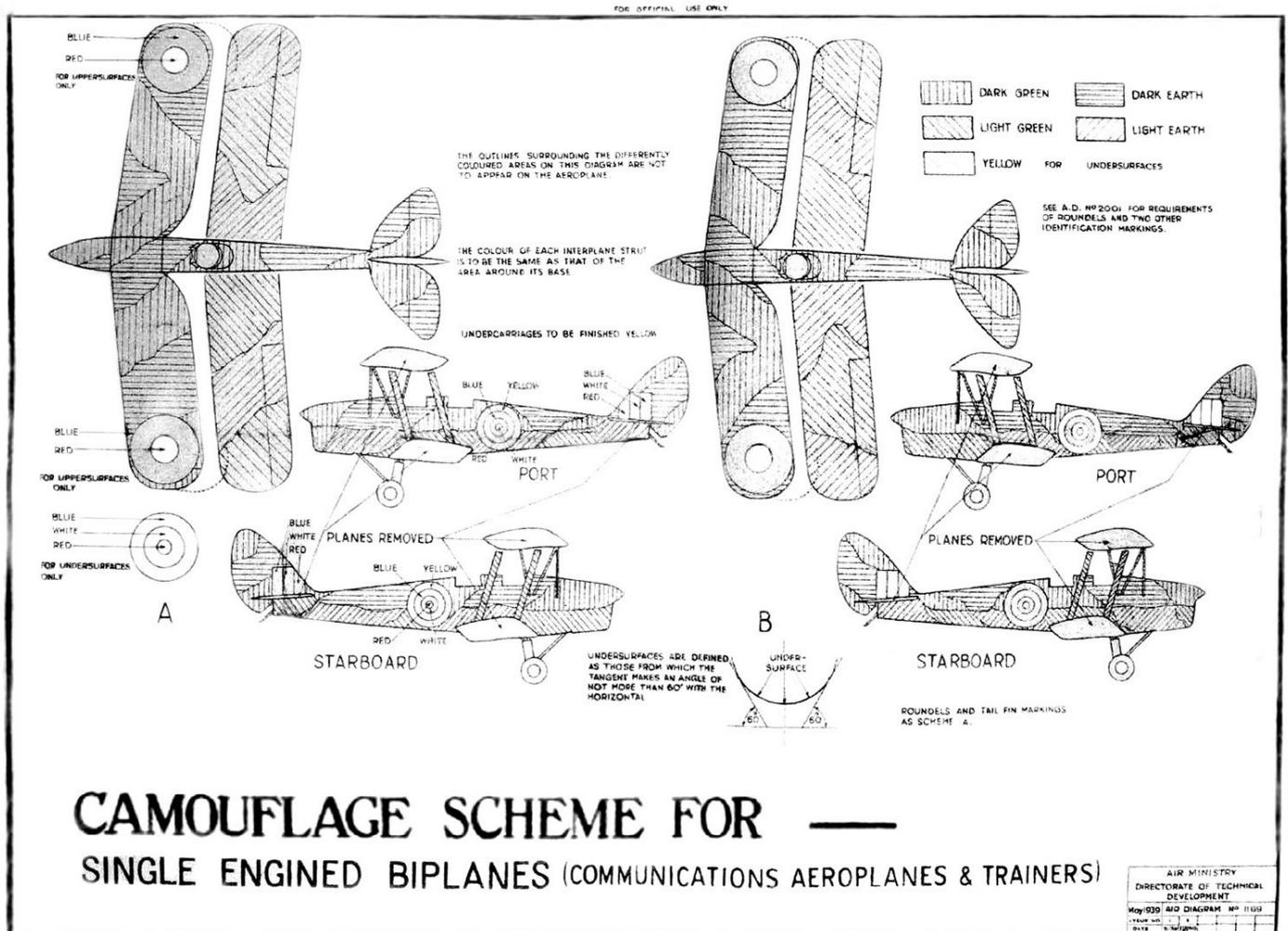
**RAAF Tiger Moth A17-494 in Northern Territory 1942 – A.D.1169 'B' pattern**

*[du Plessis Colour Collection]*

A.D.1170	Single-engined monoplanes – target towing	
A.D.1171	Single-engined biplanes – target, pilotless aeroplanes	
A.D.1172	Single-engined biplanes – Fleet Air Arm	
A.D.1173	Single-engined monoplanes – Fleet Air Arm	
A.D.1174	Single-engined biplanes – general reconnaissance, FAA	
A.D.1175	Twin-engined biplanes – communications aeroplanes, trainers	
A.D.1176	Cancelled, and included in A.D.1159	
A.D.1291	Four-engined biplanes – communications aeroplanes	D.H.86

**Mirror Images.** Where the Air Diagram shows two variations of the scheme, being mirror images of one another, the variations must be allocated to aircraft as directed in the contract instructions. Often the first aircraft of a production batch had the 'A' scheme pattern, but this was not always the case.<sup>101</sup> Discontinued in JAN 1941.

# AIR DIAGRAM A.D.1169



[coloured from NAA A11083 21/4/AIR]

**A.D.1169 Air Ministry Diagram for Single Engined Biplanes<sup>102</sup> – Communications Aeroplanes and Trainers**

A.D.1169 of MAY 1939 was issued like all Drawings at the time in Scheme 'A' and the mirror Scheme 'B', and also with the lighter 'shadow compensating' colours, discussed in our previous articles. These compensating and mirror markings were discontinued by the beginning of 1941, and for this Drawing only the 'A' scheme was retained. The scheme comprised RAF Dark Green and Dark Earth with the elementary trainer Yellow undersurfaces, and RAAF Tigers had Yellow trainer stripes on the fuselage and upper surfaces. However, when aircraft were on strength at some advanced training units – OTUs and CFS – the colours schemes adopted did not include Yellow undersurfaces, trainer bands or training numbers, buy the more 'operational' Sky Blue undersurfaces and Medium Sea Grey training numbers.



[Warpaint 101, 'D.H.82 Tiger Moth']

RAF Tiger Moth T6645 in a variation of A.D.1169 'A' Scheme

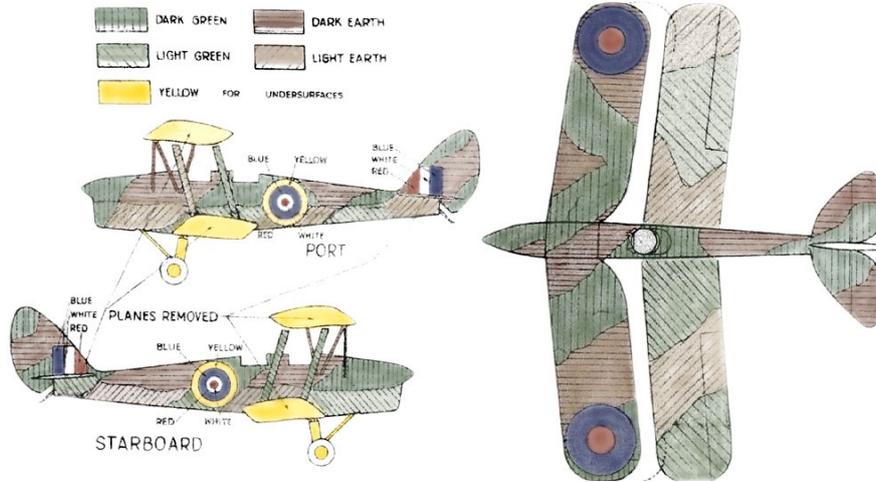


[Phil Vabre Goodall Aviation site]

Restored Cadet A6-17/VH-AGH in 2010 in A.D.1169 'B' Scheme

## CADET CAMOUFLAGE – AIR DIAGRAM A.D.1169 SCHEME ‘A’

**A.D.1169 was used for single-engined biplane trainers** – Tiger Moths, Moths and Cadets. Shown here, the ‘A’ camouflage colours of this scheme sloped forward on the port side (when looking from the top of the fuselage side), and sloped aft on the starboard side. The ‘B’ scheme, discontinued in 1941, was the opposite. When camouflage was introduced to the Cadet in 1943, the ‘A’ pattern of A.D.1169 would then have been the only scheme in use.



**1943-1944 – A rare image of A6-22 with CFS, A.D.1169/‘A’ camouflage, possibly Tamworth late 1943 with faded 3:5 roundel 1942 AGI C.11 (Issue 4) camouflage:** 3:5 fuselage roundel, Foliage Green/Earth Brown, Sky Blue undersides, Medium Sea Grey serials and training number. This serial is larger than the standard 8” x 5”, roughly painted at about 10” x 7” characters in 1½” strokes, and the smaller-style training number is 16” x 10” in 2” strokes. The camouflage pattern slopes forward – indicating the A.D.1169 ‘A’ pattern, as at this late date different “mirror” ‘A’ and ‘B’ schemes had been discontinued. Although not shown in this image, it is probable that fin flashes were added (in line with the A.D.1169 pattern) – the first time in the Cadet’s service.



The restored **VH-AGH** has been lovingly painted as a camouflaged **A6-17**, which truly looks spectacular. The camouflage pattern used – as evidenced by images of both sides of the fuselage and upper surface – is in the A.D.1169 ‘B’ scheme (which would not have been in use as late as 1943-1944 when the Cadets were camouflaged) and was probably copied from restored Tiger Moths.

In SEP 1944, with a reorganisation of RAAF flying training, the Cadet was retired and CFS moved again, with the main CFS party arriving from Parkes at Point Cook on 19 SEP 1944.<sup>103</sup>

## CDC DISPOSAL

In SEP 1944, the newly formed Commonwealth Disposals Commission (CDC) requested the RAAF catalog the types and quantities of aircraft likely to be released postwar. The RAAF had determined that all Cadets and Ryans were surplus to requirements and reported that as at 15 SEP 1944, 17 Avro Trainers were available.<sup>104</sup> As CFS now retired the Cadet, these 17 were stored with 8OTU at Narromine (8OTU having abandoned that base, replacing CFS at Parkes). When the RAAF provided a fuller disposal list of surplus aircraft available – primarily Gipsy Moths, Moth Minors, Cadets and Ryans – the only type listed with all aircraft serviceable was the Cadet, truly a testament to the ruggedness of this intermediate trainer.<sup>105</sup> A RAAF census on 16 NOV 1944 listed 17 Cadets with engines *all* serviceable in storage at Narromine, and 25 spare Genet Mk.IA engines *all* serviceable at 2AD Richmond.<sup>106</sup> The Cadets were ferried from storage at Narromine at the end of the year to RAAF Narrandera, the home of 8EFTS, where they appeared on the first tender issued by the CDC, which closed in FEB 1945. Of the 32 at the outbreak of war: four Cadets were lost in accidents; 11 aircraft were reduced to components; and, the remaining 17 aircraft were available for disposal. All 17 were sold by APR 1945, and their civil registrations, with buyers and sale prices are listed below.<sup>107</sup>

Serial	c/n	Initial Reg	Sale Date	Details <sup>108</sup>
<b>A6-2</b>	851	VH-APV	APR 1945	J.H. Alessio £150; to Newcastle Aero Club MAR 1946
<b>A6-5</b>	854	VH-AEG	MAR 1945	Newcastle Aero Club £250
<b>A6-8</b>	857	VH-AEJ	MAR 1945	Newcastle Aero Club £150; flying as VH-AEJ/A6-8 current D. Hill
<b>A6-10</b>	859	VH-AMM	MAR 1945	J.H. Alessio £100
<b>A6-11</b>	860	VH-AFW	MAR 1945	C.J. Wynne £255
<b>A6-12</b>	861	VH-AFX	MAR 1945	J. Bindt £250; current on register as VH-AFX H. Jones
<b>A6-17</b>	990	VH-AGH	APR 1945	T.T. French £25; flying as VH-AGH/A6-17 current C. Ashton-Martin
<b>A6-18</b>	991	VH-AEH	MAR 1945	Newcastle Aero Club £250, 1958 <b>VH-PRV</b> (Proctor's Rural Services)
<b>A6-21</b>	994	VH-AFZ	MAR 1945	A Cummings £150; 1954 <b>VH-RAC</b> (Robby's Aircraft Repair Co)
<b>A6-23</b>	1058	VH-AHH	MAR 1945	S/L F. Robilliard £150
<b>A6-25</b>	1060	VH-AEI	MAR 1945	Newcastle Aero Club £150; 1958 <b>VH-PRU</b> ; 1997 to USA, <b>N643AV</b> – extant display in Florida at Kermit Weeks' Fantasy of Flight Museum
<b>A6-27</b>	1062	VH-AHW	MAR 1945	C.J. Wynne £150
<b>A6-28</b>	1063	VH-APW	MAR 1945	J.H. Alessio £150
<b>A6-31</b>	1066	VH-AFY	MAR 1945	J. Lennon £150
<b>A6-32</b>	1067	VH-AGC	MAR 1945	J.R. Cleary £150; 1956 <b>VH-BFS</b> ; 1958 <b>VH-PRT</b> ; 1972 Drages Air Museum (Airworld) Wodonga; current on register as VH-PRT D.Hill
<b>A6-33</b>	1068	VH-AEL	MAR 1945	Newcastle Aero Club £150
<b>A6-34</b>	1069	VH-BJB	MAR 1945	S/L F. Robilliard £100; 2000 <b>VH-RUO</b> – last flight Tyabb-Point Cook JUN 2003, extant display RAAFM as A6-34



*[Phil Vabre, Goodall Aviation site]*

### Two Long-serving Disposals

**A6-17/VH-AGH at Temora NSW in APR 2008 following its 15-year restoration, providing a wonderful sight with A6-8/VH-AEJ**

## SURVIVORS

The 17 Cadets were sold by CDC tender, meaning an aircraft was sold to the highest bidder, with no reserve. Dept of Civil Aviation (DCA) approval was given for Cadets to be sold to civilian operators and bought onto the Australian Civil Register, initially flown by aero clubs and private owners. An interesting comment was in the RAAF 'WINGS' magazine of 6 MAR 1945, stating that tenders had closed on 20 FEB 1945, "but CDC may consider late applications from members of the RAAF".<sup>109</sup> Two were sold to an RAAF SQNLDR.

Most Cadets performed well for their owners for many years, and found a new role in aerial agriculture, when a number were fitted for dusting and spraying, with two (A6-12/VH-AFX and A6-31/VH-AFY) being re-engined with the more powerful American 220hp Jacobs R-755 radial. Cadets survive to this day in Australian skies and of the 17 aircraft that survived the war, four are airworthy and several are in pieces that may or hopefully become complete aircraft in the future.<sup>110</sup> One Cadet (A6-34/VH-RUO) is beautifully restored on static display at the RAAF Museum Point Cook. Of the flyers, three are airworthy in Australia (A6-8/VH-AEJ, A6-17/VH-AGH, A6-32/VH-PRT), with one (A6-25/N643AV) in Florida, USA.



**A6-8 VH-AEJ at Temora**

*[Glenn Alderton, Warbirdz.net]*

**A6-8/VH-AEJ** is currently registered to Darryl Hill of Adelaide. He also owns ex A6-32/VH-PRT which had been displayed at Airworld Wangaratta: the VH-PRx serials had been used by the aerial agriculture company Proctor's Rural Services in Victoria, and applied to A6-18/PRV, A6-25/PRU and A6-32/PRT. Similarly, Robby's Aircraft Repair Co Ltd, Parafield, had operated A6-21/VH-RAC.



**A6-17 VH-AGH at Melton Airshow 2010**

*[James Sheppard, adf-serials]*

**A6-17/VH-AGH** has been registered to Clinton Ashton-Martin of Morangarell NSW since MAR 2003.



**A6-25 VH-PRU at Kermit Weeks Fantasy of Flight in Florida, has US reg N643AV** [Goodall site]

**A6-25/VH-PRU** had been displayed at the RAN Aviation Museum, Nowra, until sold in 1997 to Kermit Weeks for his Fantasy of Flight collection at Polk City, Florida, and registered N643AV in JUN 1998. It remains airworthy on the US register until MAR 2023.



**A6-32 as VH-PRT at Wagga in 1961** [Kurt Finger, adf-serials]

**A6-32** had been displayed as VH-PRT at Airworld at Wangaratta airport, and when closed was bought in 2003 by Darryl Hill of Adelaide (who also flies A6-8/VH-AEJ). He has it under restoration and registered as VH-PRT on the CASA register. Geoff Goodall's Aviation site records that another Avro Cadet aficionado, Howard Jones of Morwell, has three: **VH-AEL (A6-33)**, **VH-AHW (A6-27)** and **VH-APW (A6-28)**, and he plans to complete one, leave one as a long-term project and possibly offering the third for sale as a restoration project – the three fuselages under restoration are side by side in his workshop at Clarkes Road, south of Morwell.



**A6-34 static display at RAAF Museum Point Cook in 2003 from Tyabb as VH-RUO** [RAAF]

**A6-34** had been sold by Disposals for £100 in 1945 and registered VH-BJB, later becoming VH-RUO. It flew for the last time from Tyabb Vic on 19 JUN 2003 on delivery by owner Graham Hosking to RAAF Museum Point Cook for static restoration as A6-34.

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# The Loss of 1PRU F-4 Lightning, A55-2. 20<sup>th</sup> November, 1942.

Garry Shepherdson

Lightning A55-2 had a short career with the RAAF. It was received at 1AD from USAFIA (the United States Army Forces In Australia) on September 4<sup>th</sup>, 1942, and then by 1PRU (No.1 Photographic Reconnaissance Unit) on October 16<sup>th</sup>. It arrived at Hughes on October 31<sup>st</sup>. E/E.88 recording showed it as being serviceable on the 2<sup>nd</sup> of November, unserviceable on the 9<sup>th</sup> and serviceable again on the 15<sup>th</sup>. On November 20<sup>th</sup>, having flown no more than 3 operations, it crashed about 2 miles west of Livingstone Strip, killing the pilot.<sup>111</sup>

The facts, as related in the Confirmatory Memorandum, were that the aircraft had departed Hughes at 10am local time for the purpose of performing an engine test at heights up to 30,000 feet. At approximately 11:20am, it was sighted above Hughes Strip, at an estimated height of 5,000 feet circling the airfield with the starboard propeller feathered. The aircraft, after two orbits, joined the circuit on cross-wind, lowering its flaps and undercarriage. One approach to land was then made during the course of which, at a height of “a few hundred feet [the pilot] ... put on engine and turned to the west”. At approximately 11:40am Darwin time, the aircraft impacted the ground in a vertically nose down attitude at a point said to be 2 miles west of Livingstone Strip. The aircraft burnt and the pilot killed.<sup>112</sup>

The pilot, Flight Lieutenant, Acting Squadron Leader, Alan Cridland, had learnt to fly prior to the outbreak of hostilities and held a “B Licence” (Commercial Aviation Licence). His civil flying experience, amounting to some 275 hours,<sup>113</sup> encompassed a number of aircraft types including DH60 (Moth), Avro Avian (single engine biplane), Westland Widgeon (single engine parasol monoplane), DH87B (Hornet Moth), DH82 (Tiger Moth), DH80 (Puss Moth) and Waco YQC (single engine sesquiplane).<sup>114</sup> All of these types were single engine, fixed pitch and fixed conventional undercarriage aircraft.

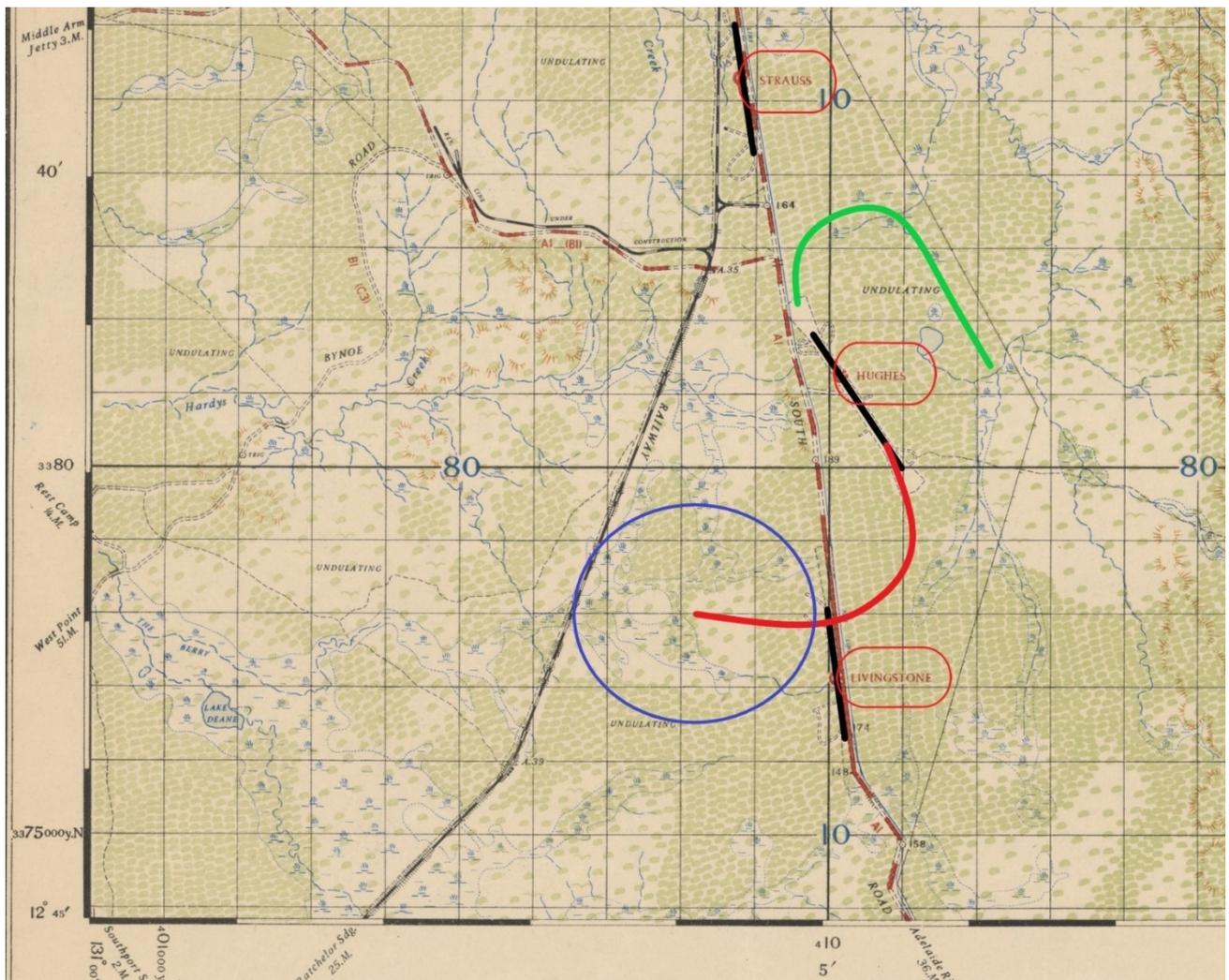
Alan’s RAAF flying experience commenced as a student on No.2 Flying Instructors Course at 1FTS (No.1 Flying Training School) Point Cook flying Avro Cadets (3 months, early January, 1940 to mid-March, 1940), then as a Flying Instructor at 2EFTS (No.2 Elementary Flying Training School), Archerfield (3 months), 5EFTS, Narromine (7 months), 9 EFTS, Cunderdin (9 months) and 12EFTS, Bundaberg (6 weeks) all flying and instructing on Tiger Moths.<sup>115</sup> Shortly after joining 9EFTS, his total flying time amounted to some 905 hours of which 375 hours had been accumulated in the previous 6 months.<sup>116</sup> From 12EFTS, he was posted to CFS (Central Flying School) at Camden to undertake No.10 Service Flying Instructors Training Course flying Wirraway and Oxford aircraft. This was his introduction to complex and relatively high-performance aircraft and his first exposure to multi-engine aircraft. He successfully completed the course and was then posted to 1SFTS (No.1 Service Flying Training School) at Point Cook as a Flying Instructor on Oxford’s (4 ½ months). This was followed by his posting to 1PRU where he was introduced to Buffalo aircraft and, later, the F-4 Lightning.<sup>117</sup>

As at the time of his death, A/SQNLDR Cridland had 1445 hours flying experience and had been assessed as above average on elementary and single engine service types, and average on multi-engine types. At 1PRU, he had similarly been assessed as above average on the units’ single engine types and average on multi-engine.<sup>118</sup>

An examination of the wreckage revealed that both throttles were in the full-open position. Both propellers were in the fully fine position. Both coolant gill levers were in the fully open position. The flap lever was in the neutral position. The flaps were thought to have been retracted. The undercarriage was down. The rotor of the starboard turbocharger had completely disintegrated and had evidently damaged the right wing in several places. None of the 142 blades could be found.<sup>119</sup> There was no mention of the positions of the mixture levers or the ignition switches.



The remains of A55-2. [Photo John Hopton via [adf-serials.com.au](http://adf-serials.com.au)].



This is a cropped image from the contemporaneous (1943) Humpty Doo 1:63,360 (one inch to the mile) chart included here for basic orientation purposes. I've circled the general area of the crash site in blue; possible ground tracks in green for the approach and red for the final phase of flight. "2 miles west of Livingstone" could be anywhere west of Livingstone airstrip and east of the (now old) railway line. [NLA obj-234340592].

The Confirmatory Memorandum lacks precision with regard to a number of points.

What was the exact purpose of the flight? Was the purpose of the engine test simply to take off, climb to various altitudes and then, after attaining the maximum briefed altitude, return, descend and land; with no planned asymmetric flying? Taking the Confirmatory Memorandum at face value, this seems to have been the most likely case. Or, was there an intent to engage in deliberate single-engine flying – that is, was the pilot required to shut down one or the other of the engines for the purposes of testing the performance of the remaining engine? Was the pilot expected, or at least permitted, to perform single-engine flying during the course of, but outside, the test phase of the flight so as to improve or enhance his experience on type? Or, had the starboard engine actually failed during the course of the flight? The answers to these questions would help determine if the orbiting approach with the starboard propeller feathered was a pre-planned activity or not. For practice engine-out operations, it was recommended to shut down the right-hand engine because the left-hand engine had the aircraft's only generator attached to it so, an observation that the starboard propeller was feathered, being typical for practice single engine flying, would not necessarily indicate a problem.

What was the configuration of the aircraft when it joined the circuit through until its landing approach was discontinued? After the aircraft was sighted overhead with its starboard propeller feathered, was the remainder of its circling descent, the joining of the circuit, the reconfiguration of the aircraft for landing and then the approach also flown with the starboard propeller feathered? Again, taking the Confirmatory Memorandum at face value, this seems to have been the case. However, the comment that "... [the pilot] ... put on engine and turned to the west" could equally mean that that the pilot applied power to the good engine OR to both. This has significance because there seems some confusion in the Confirmatory Memorandum as to whether the starboard propeller was actually feathered or if it was in the maximum RPM configuration. What about when the overshoot was commenced, was the right-hand propeller still feathered, or not? Was the prop un-feathered during the go-around? The Confirmatory Memorandum states that a witness observed the right-hand prop feathered when the aircraft was conducting its orbits, but the assumption seems to have crept in that, because it was seen to be so some minutes earlier at an estimated 5,000 feet, that it must therefore still have been the case when the aircraft hit the ground.

The wording of the claim that, on examination of the wreckage, both propellers were in the fully fine position suggests a comment as to the position of the blades however, other items in the paragraph were referring specifically to the position of various levers in the cockpit so, what was being referred to, the blades or the levers? This is further confused when it was remarked later that,

Both throttles were in full open position. (As the starboard engine was feathered it is obvious that the engine was switched off and throttle opening would not effect the engine).<sup>120</sup>

Single engine performance when clean was good with typical single engine cruise power settings of 31/2300 [31" of manifold pressure and 2300 RPM], and climb power settings of 37/2600 up to 20,000 feet. It was claimed that this model (P-38D-G/F4) could achieve 205 mph [182 kts] at 20,000 feet on one engine.<sup>121</sup> These figures are largely validated by reference to the Flight Operation Instruction Chart – Single Engine for P-38D, P-38E and F-4 model Lightnings which gives the single engine cruise power setting of 31/2300 as being appropriate for economical cruising from sea level up to 6000 feet. This setting could be expected to return an indicated airspeed of between 160 to 180 mph [138 to 156 kts] depending on altitude. The single engine Maximum Continuous Power setting was quoted as being 37/2600 for all altitudes up to 20,000 feet. The claim of single engine performance at 20,000 feet of 205 mph wasn't replicated in performance charts for F-4 aircraft, however. The cruise power settings quoted in the performance chart for single engine flying at 20,000 feet was for 36/2550 which was expected to return an indicated airspeed of 165 mph [143 kts].<sup>122</sup> Never the less, it is clear that the F-4 version of the Lockheed Lightning could fly comfortably on one engine at any altitude up to 20,000 feet including being able to climb from lower altitudes up that height.<sup>123</sup> To repeat, this was in the clean condition (that is, with wheels and flaps up).

Whilst this model of Lightning had sufficient performance to climb to 20,000 feet on one engine when clean, its single engine performance with gear down would have been marginal. Later model Lightnings, with more powerful engines operating within the same weight range, could barely maintain altitude in that condition at rated power (44"/2600

RPM) so, this early marque is not likely to have been materially better. With gear AND flaps down, the aircraft could not maintain altitude.

[O]nce committed to landing, it is impossible to go around again with both landing gear and flaps down.<sup>124</sup>

So, the statement that the aircraft joined on crosswind, lowering flaps and undercarriage, could only mean that, if the starboard propeller was still feathered, that the rest of the circuit and the approach must have been flown by continuously losing altitude.

The recommendation for inexperienced pilots practicing single engine landings was, rather than feather the propeller (and therefore stop the engine), to instead retard the throttle on the simulated dead engine and pull the corresponding propeller lever fully back (to the decrease RPM position) which would coarsen the pitch and create a similar amount of drag, thus aerodynamically simulating a failed engine, but allowing the engine to still be running. In the event of a go-around the pilot could simply advance the prop lever and then open up both throttles (gradually – being careful not to advance throttle rapidly from any reduced setting to full power) and happily climb away.

P-38 aircraft, of which this aircraft was a version of, had contra-rotating propellers, the propeller attached to the number one (left-hand) engine rotated anti-clockwise (when viewed from behind the propeller disk) and the propeller on the number 2 (right-hand) engine rotated in the “normal” clockwise direction. That is, the propellers both rotated away from the fuselage. For the number 1 engine – which rotated anti-clockwise – at high power and at low airspeed, the torque reaction would be to the right. If the aircraft was also at a relatively high angle of attack – so, high power, high angle of attack and low air speed – the left-hand side of the propeller disk (the side with the propeller blades going downwards) would “bite” more air than the upward side of the disk, therefore generating more thrust on the left-hand side – which would add to the already right-hand turning moment; then the fact the left-hand engine was out to the left of the centre of gravity would exasperate the tendency to turn to the right. So, at high power and low airspeed, everything about the live engine is trying to force the aircraft to turn towards the dead engine; that being the case, allowing the aircraft then to wander in the direction of the dead engine could be catastrophic.

To “feather” a propeller means to turn the blades side-on to the airflow, which stops the propeller from rotating and produces the minimum possible drag; “fully fine” means the propellers are in the minimum pitch or maximum RPM position, that is, the propeller blades present the lowest angle of attack to the propellers relative airflow thus allowing the engine to turn at maximum RPM.

Was the go-around a pre-planned action or did the pilot reject the landing for some reason. One must question why the pilot, if the aircraft had suffered an engine failure earlier in the flight, would go-around unless he was overshooting so badly that it was not possible to land on the remaining runway or even in the over run or was unable to land due to a runway incursion.

Having rejected the landing was the engine restart procedure completed or performed correctly? Advancing the propeller lever from feather to full fine and opening the throttle to full power without re-starting the engine would only cause prop to windmill whilst other engine is producing full power.

*... NEVER FLY ON ONE ENGINE WITH THE OTHER PROPELLER WINDMILLING IN LOW PITCH, i.e. with the throttle closed and the propeller control in any position but full rearward. The reason for this is that a propeller windmilling at a speed in excess of 1000 rpm (Engine speed) causes so much drag on one side of the airplane that rudder control is seriously affected and climbing performance materially reduced. If circumstances do not permit feathering the propeller on the inoperative engine, at least place the propeller control in the full high pitch position, “REARWARD” as soon as the throttle is closed.<sup>125</sup>*



**Visual prompt to highlight the importance of taking the correct action. [T.O. 01-75F-1].**

To un-feather the propeller and re-start the engine:

... pull [the] applicable feathering switch to “NORMAL” position and hold selector switch ... in “INC-RPM” position until tachometer shows at least 800 rpm with throttle cracked and mixture control “IDLE CUT-OFF”. Turn fuel selector valve to tank containing fuel and turn “ON” fuel boost pump if fuel pressure doesn’t come up. Turn ignition switch “ON”, move mixture control to AUTO RICH and engine should start.<sup>126</sup>

Even if correct re-start procedure was used, if the turbocharger didn’t have any blades, the engine would not produce any meaningful power. A condition, in either scenario, that could easily lead to uncontrolled roll and yaw in the direction of the inoperative engine.

Do not use full power on live engine under 120 mph [105 kts]. Apply corrective rudder action promptly so as to positively prevent the airplane from yawing excessively (skidding). Excessive yaw will result in stalling of the vertical tails, the rudder forces will reverse and it will be necessary to materially reduce the power of the operating engine and apply considerable rudder force to regain control.<sup>127</sup>

This cautionary note is repeated in the paragraph titled “Engine Failure During Flight”,

Do not use full power on the live engine under 120 mph [105 kts]. When one engine fails during climb, cruise, or descent, there is seldom need for emergency maximum power from the live engine.<sup>128</sup>

This warning could have been made more assertively; as was done in the similar, but later, P-38H aircraft, the Pilot’s Operating Instructions for which warned that “directional control [was] impossible below 120 mph [105 kts] with one engine operating at more than 45” Hg and 3000 rpm”.<sup>129</sup> And that would have been with a feathered prop, not a windmilling one.

If, during the go-around, the pilot was not able to control roll and yaw, the only way to regain control would have been to cut power to the live engine which would have removed the aerodynamic forces caused by high asymmetric power on the live engine side and catastrophic drag on the failed engine side.

It was found that both coolant gill levers were in the full open position, which suggests that the actual shutters were also fully open – the right-hand one would have been shut for deliberate single-engine operation. These observations suggest that the right-hand engine had been restarted and that, accordingly, the propeller would have been in the

maximum rpm position and NOT feathered. But, if the turbocharger had already disintegrated, restarting that engine would surely only result in a propeller turning at a speed not materially different from a wind-milling one – with the same massive drag penalty.

It is clear – that is, the remarks made in the Confirmatory Memorandum do not contradict themselves – that the rotor of the starboard turbo-charger had suffered a catastrophic failure and that that failure resulted in all of the 142 blades of the turbine rotor becoming separated from the hub and the starboard mainplane suffering physical damage. The Confirmatory Memorandum stated that the rotor had a speed of 21,300 RPM (at altitude), the inference being that it had to have exceeded that speed for failure to have occurred.<sup>130</sup> It seems reasonable to assume that the damage referred to was as a result of some of the separated turbine blades impacting the wing in various places.

A brief word on turbochargers. Superchargers and turbochargers do exactly the same thing. They both compress (that is: pressurise) air by way of spinning impellor(s). The pressurised air is then fed into the engines carburettor or fuel control unit (for turbochargers, typically via an intercooler). The benefit being that higher-pressure air can be supplied to air breathing piston engines and mixed with fuel when the ambient air pressure is lower (for example being able to provide sea-level air pressure at much higher altitudes or conditions of high heat/humidity). But they do it differently. A supercharger's impellor is turned mechanically. It is driven directly from the engine by way of a belt, chain, driveshaft or gears. The advantage being that the power so derived is instantaneous. The disadvantage is that, like any engine driven accessory, it draws power from the engine. A turbocharger's turbine is turned by exhaust gas. The advantage here is that it is "free" power – the gases have already been extracted from the engine. The disadvantage is that there is a lag before the pressurised air is available to the induction system. The already very hot exhaust gases, get even hotter by the process of compression might have to travel a relatively long distance through the intercooling system before getting back to the engine. P-38's had both. The engine driven supercharger was fed with pressurised air from the turbocharger.

Number 1 Photographic Reconnaissance Unit had many serviceability issues with its Lightnings.

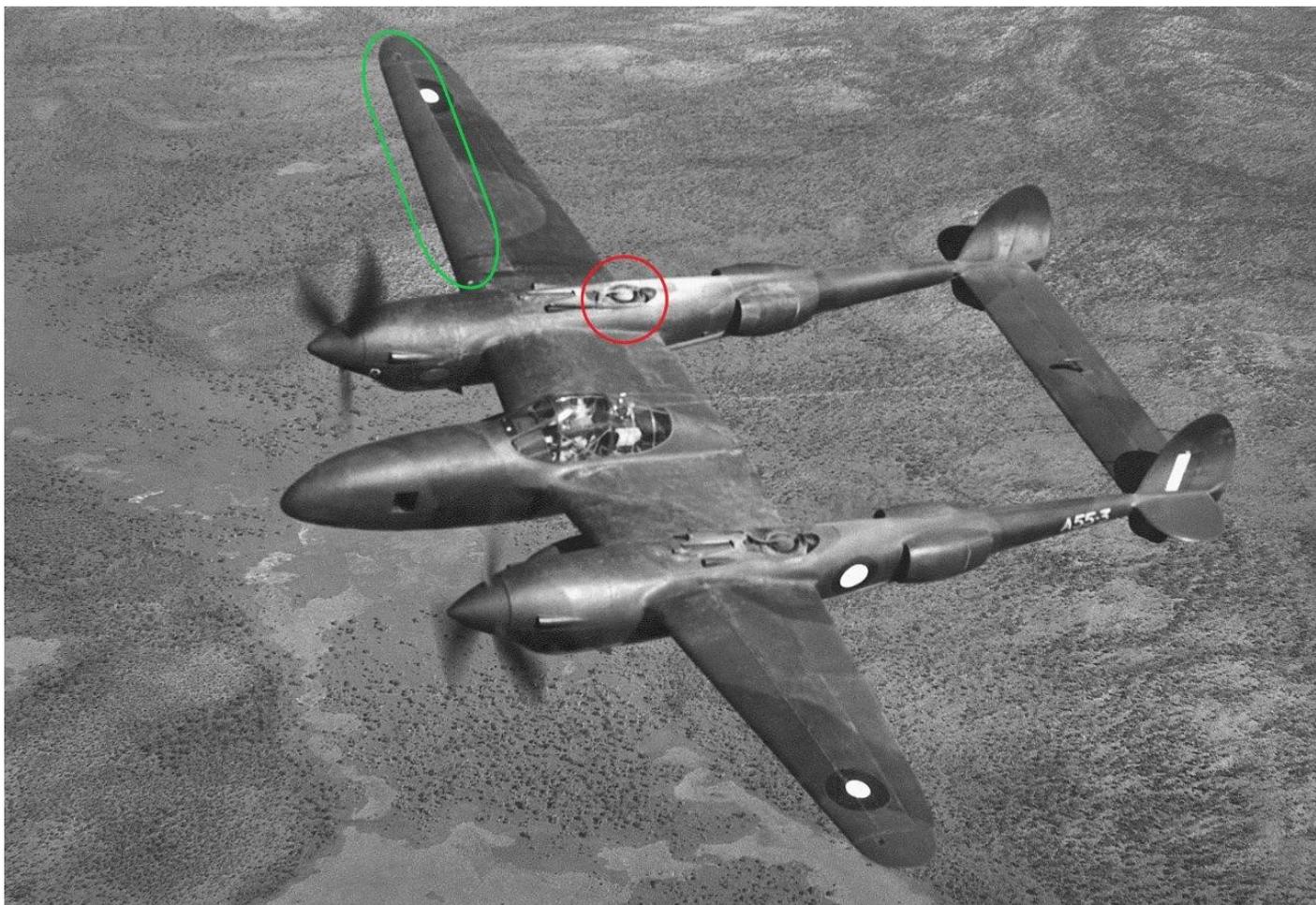
The primary cause of most of the unserviceability is the intercooler system. This intercooler is operated by forcing the hot compressed air from the turbo super-charger to the wing tip of the aircraft and back to the engine induction system through a double leading edge of the mainplane. This is done to cool the air before going to the carburettor and thus give a better engine performance. The real and false inside leading edges are only rivetted together, without packing between the two metals, and as there is a fair pressure inside this intercooler there are a great amount of leaks, which are accentuated as the pressure inside becomes relatively greater as altitude is increased, thereby forcing the turbo to speed faster to maintain boost pressure, until finally the turbo overspeeds and disintegrates.<sup>131</sup>

Later training material for Pilots converting to P-38 aircraft made a point of reminding pilots that,

turbo speed increases with an increase of altitude and throttle. The critical altitude at which the superchargers will maintain sea level ratings for the engines is determined by the rpm limitation of the turbos. If you exceed this rpm limitation by using more than the prescribed manifold pressure, the turbos overspeed and serious material damage can result.<sup>132</sup>

Some subsequent variants of the P-38, such as the P-38L and later versions of the P-38J were equipped with a turbo regulator which prevented the turbo rotor from spinning at rates beyond its safety limit.<sup>133</sup>

When did the turbocharger fail? Did it fail at altitude during the test phase of the flight, or did it fail after the pilot had restarted the right hand engine and was in the process of executing the go-around? The comment in the Confirmatory Memorandum that none of the blades could be found suggests that an effort was made to look for them and that suggests that the failure may have occurred at low altitude over the airfield however, no witness comments to such an occurrence was included. If the turbochargers rotor had failed at altitude, why was the starboard engine re-started with a failed turbocharger and why wasn't the undercarriage retracted?



This is 1PRU's A55-3, which wasn't delivered to 1PRU until after A55-2's loss. Circled in red is the starboard turbocharger rotor. Its proximity to the wings is apparent but note also, for example, its position relative to the cockpit. Given the rotational speed of the bucket, each of the 142 blades broke away with a calculated departure speed in excess of 700 feet per second. Circled in green is the panel beneath which was mounted the intercooling system. This particular aircraft has apparently had issues with its starboard intercooler too as the panel has evidently been replaced. [RAAF image 000-148-630].

Regardless of whether the discontinued landing approach was pre-planned or of necessity and whether the subsequent go-around was performed with two fully functioning engines or not, all of the contemporaneous literature points to the priority of retracting the undercarriage as soon as possible.

According to the Confirmatory Memorandum, the flaps were thought to have been retracted at impact and the flap lever was in the neutral position – the correct position for the lever once the desired flap position (up or down) had been reached. However, the undercarriage was still down – a condition not in keeping with a normal take-off or go-around with *BOTH* engines operating normally, let alone a single engine one.

The normal go-around procedure in an Oxford, the only other multi-engine aircraft the pilot had flown and the type he (by far) had most multi-engine experience on, required the undercarriage to be raised, a climb speed of 85 mph (74 kts) to be established and flaps to be retracted in stages after attaining an altitude of 300 feet.<sup>134</sup>

Being a fixed pitched twin-engine aircraft, its single engine performance wasn't particularly good.

Height can barely be maintained below 8,000 feet on one engine at full throttle, and it may be necessary to put the mixture lever at TAKE-OFF (and the throttle through the EMERGENCY gate if the boost control is set at the lower rating).<sup>135</sup>

A single-engine landing was apparently straight forward enough. Regardless of which engine had failed, a left-hand circuit was recommended with speed to be monitored so as not to decrease below 95 mph (82 kts) indicated with gear and flaps up. Lowering of the undercarriage was to "be left as late as practicable" consistent with the gear being

locked down before straightening out on to finals. The live engine was to be used carefully to regulate rate of descent, keeping speed not below 85 mph (74 kts) and then, when landing was assured, flaps could be set full down, power reduced and a landing made.<sup>136</sup>

The Pilot's Notes for Oxford aircraft didn't offer any specific advice regarding the execution of a single-engine go-around, but gave the assurance that, in the event of an engine failure during take-off, that the aircraft could be held straight with take-off power set on the live engine and that the aircraft could climb, slowly, at 85 mph (74 kts). Perhaps more pragmatically, it then went on to suggest that "[u]nless there is ample room to clear obstacles, close both throttles and land straight ahead".<sup>137</sup>

With P-38 type aircraft, whether performing a single engine go-around or a go-around with both engines operating normally, it was a requirement to retract the undercarriage as soon as possible.<sup>138</sup> Whilst the P-38D-G/F-4 manual doesn't give specifics, later models of the P-38, with more powerful engines claimed that climb performance on one engine with the undercarriage down was marginal at best – again, that was with a feathered prop.

However, with the gear retracted,

The airplane climbs well on one engine operating at normal power if the flaps and landing gear are retracted. The best speed for single engine climb is approximately 140 mph [122 kts].<sup>139</sup>

Accelerating prior to climbing was required with one engine inoperative,

Gain as much speed as possible in level flight before attempting to climb.<sup>140</sup>

The pilot had joined 1PRU on formation of that unit, which during the month of June, was equipped with six Buffalo aircraft.<sup>141</sup> During July, one Wirraway aircraft was added.<sup>142</sup> The unit moved from Laverton, Victoria, to Hughes, Northern Territory during August<sup>143</sup> and from 2<sup>nd</sup> October to 30<sup>th</sup> October, 1942, the pilot occupied the post of Temporary Commanding Officer.<sup>144</sup>

As mentioned previously, the pilot was a well-regarded, reliable type, who had achieved an "above average" assessment at 1PRU on their single engine aircraft types. His actual multi-engine experience isn't known but couldn't have been more than a few hundred hours prior to joining 1PRU – and that experience, in its entirety, being on a relatively simple and basic multi-engine training aircraft which didn't have constant speed propellers. His experience on complex, high performance, multi-engine types was restricted to the F-4 Lightning and his time on it must have been very limited (I estimate at no more than 25 hours but probably much less) since the fatal accident occurred within three weeks of the aircraft type first arriving at Hughes.

Although the specific dates weren't recorded, during November, it was noted that FLTLT Cridland and SQNLDR Law completed their conversion onto the F-4 Lightning.<sup>145</sup> This is likely to have been completed by the 8<sup>th</sup> because operations commenced on the 9<sup>th</sup>. 1PRU's A50 states that 5 operational flights were made between 10<sup>th</sup> and 19<sup>th</sup> November<sup>146</sup> however, six were actually flown. They were HUG40/9 (Hughes 40 of the 9<sup>th</sup>) to Dilli, HUG42/10 (Dilli again), HUG46/13 (Koepang), HUG49/16, HUG2/17 and HUG3/19 (all to Dilli). It is believed that A55-1 flew the first three of these operations and A55-2 the last three. Another of the units pilots, FLTLT Talberg, flew the first two and the sixth; it isn't known who flew the other three. These six operations accounted for 25 flying hours. The total flying hours for the two Lightnings for November amounted to 49.4 hours.<sup>147</sup> That leaves 24.4 hours for the conversion of the two pilots plus any maintenance or other training flights shared by at least three pilots. Even if the pilot had flown the three missions whose actual pilot isn't known, that would still only have contributed 15 hours on to the few hours of conversion training (maybe 5) and perhaps a few extra training hours (perhaps up to 5).

If the turbocharger had failed at altitude, witness statements confirm that the pilot had already successfully secured the engine by the time he had arrived overhead the airfield. It must therefore be reasonable to assume, in the circumstance of making a single engine approach – with a failed engine – that the decision to go-around was based on operational necessity; the pilot must of assessed that, for whatever reason, he could not prudently continue with the approach. The aircraft, if configured correctly, had ample performance to climb away on one engine – with the

inoperative engine already secured. It accordingly seems inconceivable that any attempt would be made to restart the failed engine because such an action simply wouldn't make sense. However, failure to retract the undercarriage would have had a significant impact on performance. That, in itself though, shouldn't have resulted in the pilot evidently losing control of the aircraft and it subsequently crashing vertically into the ground.

If the turbocharger didn't fail at altitude, the sighting of the aircraft overhead the airfield with the starboard propeller feathered could only mean that the pilot was practicing single engine operations. The termination of a practice single engine landing approach at "a few hundred feet" and the application of power would therefore have been entirely normal. If the turbocharger had then failed early in the go-around process, it seems possible that, in the circumstance of low airspeed, with full power on the live engine and a now windmilling propeller and effectively no power on the "dead" engine coupled with the failure of the undercarriage to retract that very little opportunity would have been available to regain control (i.e. close both throttles) before the catastrophic result was unavoidable, regardless of what corrective actions were then taken and especially so if the disintegrating turbocharger had not only damaged the wing but incapacitated the pilot and/or caused a hydraulic system failure.



**Alan Thomas Cridland in the cockpit of one of 1PRU's Buffaloes at Hughes not long before his death. [AWM image P03775.001].**

CO 1PRU, Squadron Leader Law, conveyed his sympathy and condolences to Alan's wife, expressing his personal friendship for him, his high professional regard and his belief that Alan Cridland would have been SQNLDR Law's successor as CO 1PRU.<sup>148</sup>

Alan Cridland's name was to have been honoured by his name being given to a proposed aerodrome, the advice of which was made at the same time as those of Cambell (AKA Campbell or Argyle Downs) and Riding.<sup>149</sup> Unfortunately, the location of the proposed Cridland aerodrome within North Western Area isn't known at this time.

On Sunday, 29<sup>th</sup> November, 1942, Alan's wife, Margaret, gave birth to a daughter.<sup>150</sup>



This is A55-1, 1PRU's other F-4 Lightning. [Bob Livingstone Collection via [adf-serials.com.au](http://adf-serials.com.au)].

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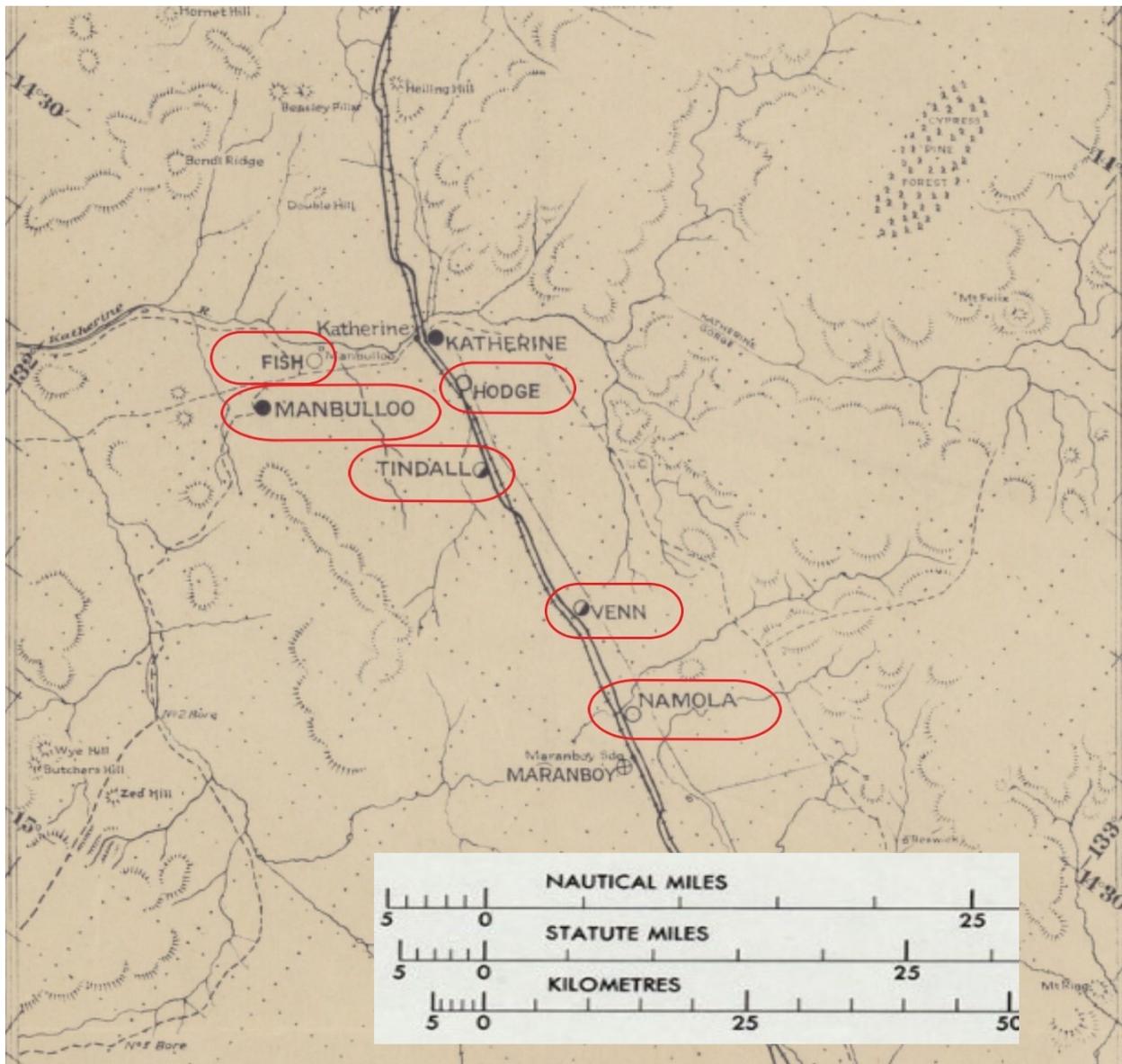
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# Former RAAF Aerodromes along or near the Stuart Highway

## Part 4, Katherine Region

Garry Shepherdson

Of the six airfields in this instalment, only 3 were commenced. Of those, 2 were completed (or largely so) and just 1 received any wartime use.



Portion of Drawing No. 42/43/2914, here showing the airfields covered by this instalment. [NLA; obj-233091255].

District	Name	Location	Position
Katherine	Hodge	4 ½ miles E of Katherine	14°28'S 132°20'E
	Tindal	8 miles S of Katherine	14°32'S 132°23'E
	Fish	7 miles SW of Katherine	14°33'S 132°12'E
	Venn	18 miles S of Katherine	14°34'S 132°31'E
	Manbulloo	10 miles SSW of Katherine	14°36'S 132°11'E
	Namola	3 ¾ miles NW Maranboy	14°36'S 132°35'E

HODGE  
14°28'S 132°20'E

Named after Flight Lieutenant Parker Henry Russell Hodge, Number 2 Squadron, RAAF, who failed to return from operations in Hudson A16-46 against Manado near Namlea, 12<sup>th</sup> January, 1942.<sup>151</sup> This was the same operation that Gorrie and his crew also failed to return from.<sup>152</sup>

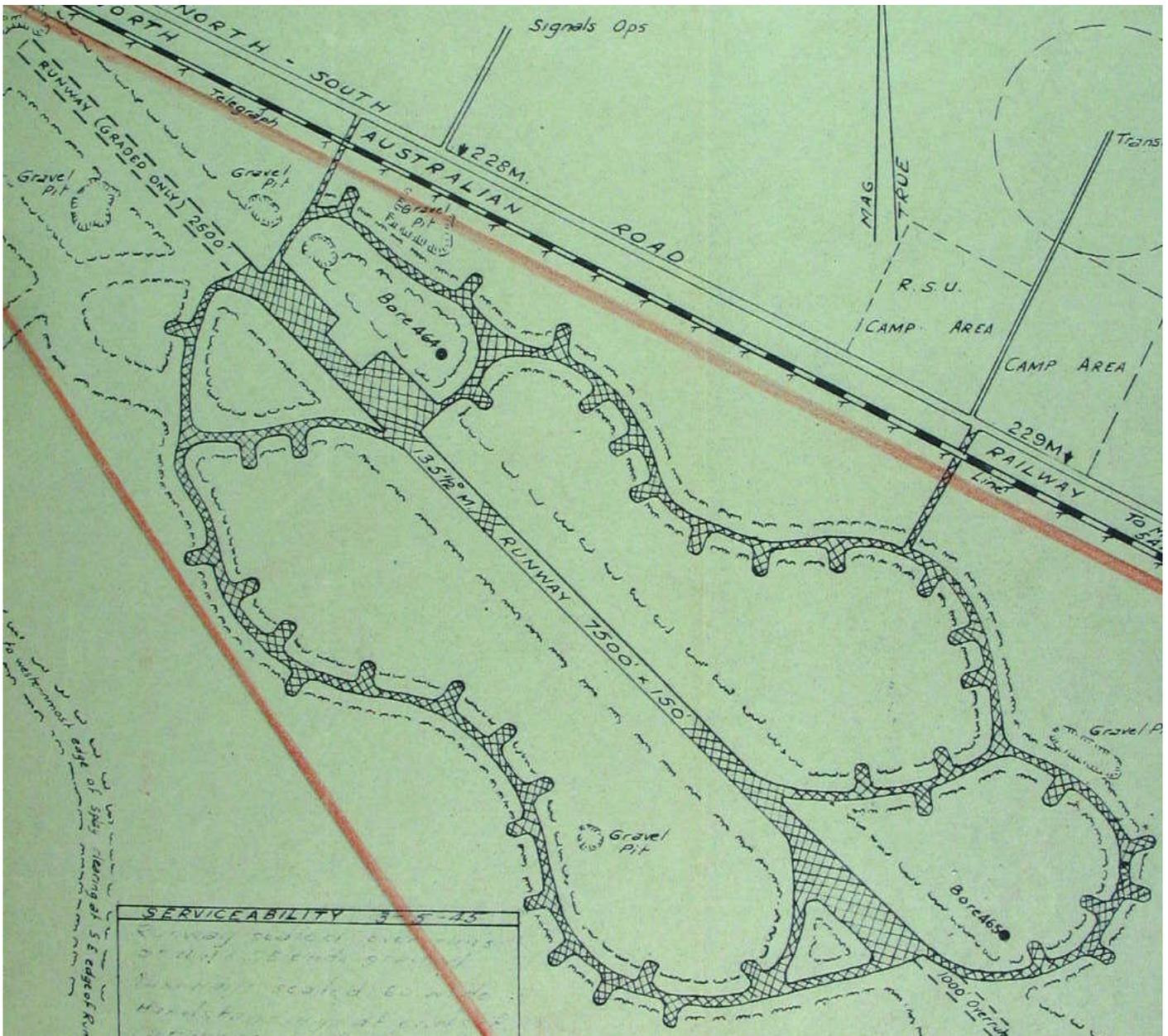


**Google Earth image as at 27<sup>th</sup> May, 2020. No visible evidence of a former wartime airfield. [Google Earth image].**

A proposed airfield, no other details known.<sup>153</sup> Unfortunately, no aerodrome diagram or layout plan has been located.

TINDAL  
[Carson or Kit Carson]  
14°32'S E132°23'E

Named after Wing Commander Archibald Tindal, Armament Officer, North Western Area Headquarters, killed at Darwin whilst firing at attacking Japanese aircraft from the ground with a sub-machine gun, 19<sup>th</sup> February, 1942.<sup>154</sup> Many contemporaneous records record the name as "Tindall". The correct spelling is with one "L".



RAAF Landing Ground Tindal, Drawing No. 42/43/644D. [NAA: A431, 1948/84].

The first 10% or so of construction was completed by the 43<sup>rd</sup> United States Engineer Regiment, with civilian contractors completing the remainder.<sup>155</sup> Listed as an Operational Base, under construction, suitable for Heavy Bombers in all weather conditions. Its elevation was quoted as being 550 feet. It consisted of a single runway (bearing 135°M) of 6,000 feet length. It was planned to have 24 Dispersal Bays. Construction was deferred then postponed.<sup>156</sup>

However, the serviceability statement (dated 3<sup>rd</sup> May, 1945) in the above diagram, remarked that, in addition to the runway, the alert hardstandings and taxiways being sealed, that 40 sealed inserts (not 24) were also provided. The perimeter of the airfield had been highlighted in red pencil. This indicated that the area within that marking (i.e. the entire aerodrome) was considered serviceable so, construction deferral must have referred to other aerodrome facilities.



**“Tindall Strip” taken by 87SQN on 30<sup>th</sup> August, 1945, from 30,000 feet. Red arrow at bottom right indicates the direction of north. [National Library of Australia, Australian Aerial Photographs, D 53 9 106, nla.BibID 5714799].**



**"Tindall A/F"** taken by 1SQN on 25<sup>th</sup> February, 1960, from 14,000 feet. The movement area at this time was apparently still in excellent condition although the graded, 2500-foot, runway extension had become over-grown. Even the path of the future dispersal taxiway, at left, was still clearly visible. Red arrow at top left indicates the direction of north. [*National Library of Australia, Australian Aerial Photographs, D 53 9 106, nla.BibID 5714725*].



Portion of RAAF Base Tindal –image dated 27<sup>th</sup> May, 2020. Most of the 1980’s (and subsequent) redevelopment has been to the east and south east. The modern runway was constructed on top of the original but the RWY14 end was placed several hundred meters further down the old runway. The original western dispersal taxiway is still visible running from the old RWY14 threshold, through the GA, before it then meanders to the south east outside of the western edge of the runway strip (circled in red) to a point adjacent to the TWY C and V1 intersection which would have been the original RWY32 end (circled in blue). Even some of the dispersal bays remain faintly visible in this image. To the east of TWY A, in the vicinity of the Air Traffic Control tower, very faint remains of portions of the south-eastern loop is visible (circled in green). The original alignment of the Stuart Highway (thick black line) and the North Australia Railway line (thin black line) are visible. [Google Earth image].

During the early 1960’s it was felt that an additional RAAF airfield was necessary in the Northern Territory. It was put forward that the operational needs of the air force at that time was for an additional base to be located not less than 100 nautical miles, but not more than 200 nautical miles from Darwin. It had to be sited in close proximity to established lines of transport and communication, have access to suitable supplies of water and electricity and be on geologically and pedologically stable ground of low relief which was also close to suitable airfield construction materials.<sup>157</sup>

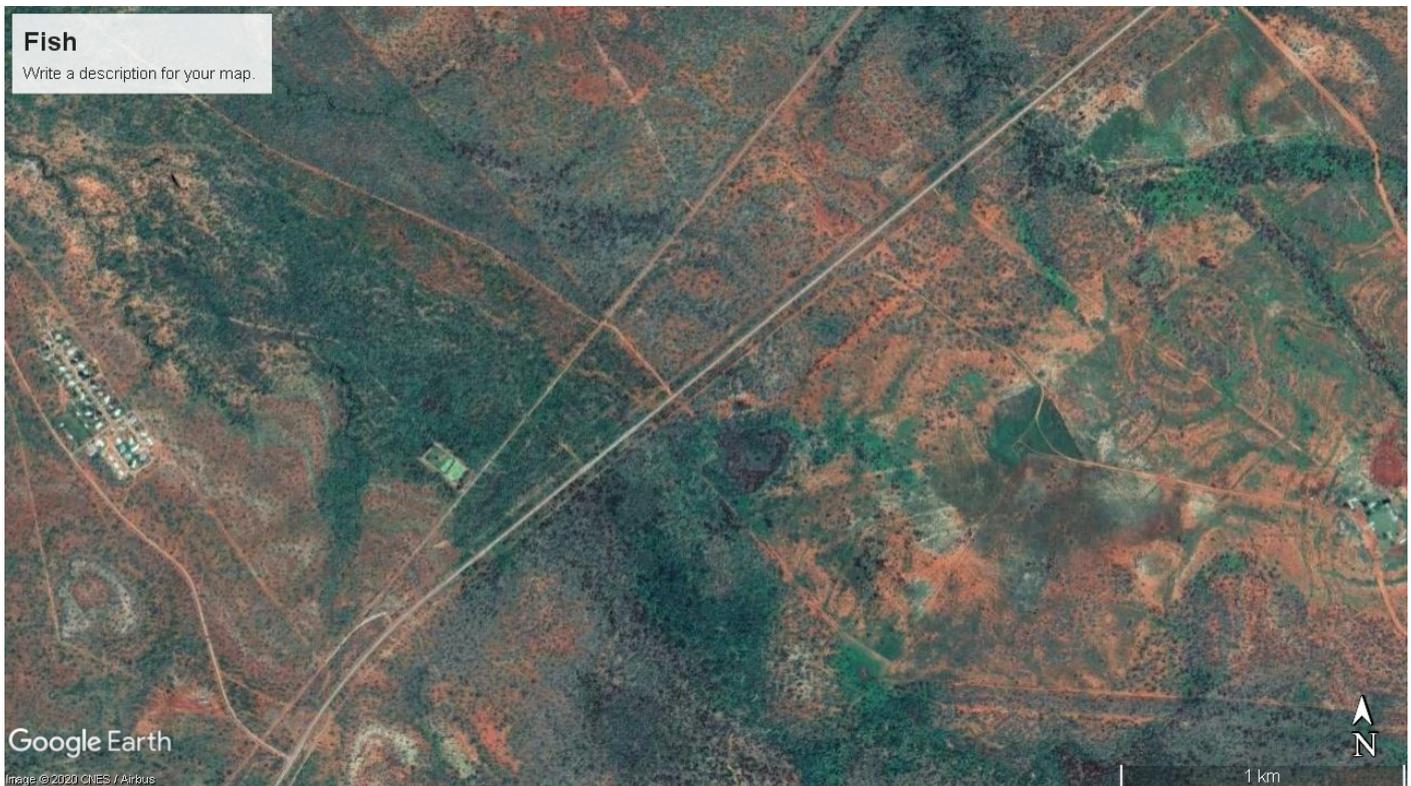
Investigations during July, 1962, of former airfields near Katherine for their potential for future development included assessments of Manbulloo, Tindal and Venn.<sup>158</sup> Venn was eventually discounted due to subsurface anomalies being detected which was compounded by drilling results showing geological instability in the area which was thought to be “unsatisfactory for the development of a permanent airfield of the type [being] proposed”.<sup>159</sup> Manbulloo was noted to have suffered from some instances of localised runway collapse. These were not considered serious and it was thought that the danger of solution cavities in the underlying limestone was not as likely as either Tindal or Venn. However, the runway at Manbulloo was uneven and appropriate levelling would require excavation of bed rock.<sup>160</sup>

Tindal got the “nod” and a “Bare Base” facility was developed on the old wartime site by 5ACS (No.5 Airfield Construction Squadron). Further development was undertaken during the 1980’s so as to house a permanent, resident, flying squadron.

As you might be able to guess from the Google Earth image above, Tindal is a current, active, RAAF Base and unauthorised entry is prohibited.

FISH  
[Ronald]  
14°33'S 132°12'E

Named after Second Lieutenant Owen R. Fish, pilot 8<sup>th</sup> Pursuit Squadron, 49<sup>th</sup> Pursuit Group, killed in action near Darwin, 27<sup>th</sup> April, 1942.<sup>161</sup> He was flying P-40E, 41-5329, attempting to intercept Japanese aircraft during Raid 19. Also lost during that raid was Strauss, who's name was honoured with a completed – and used – airstrip.



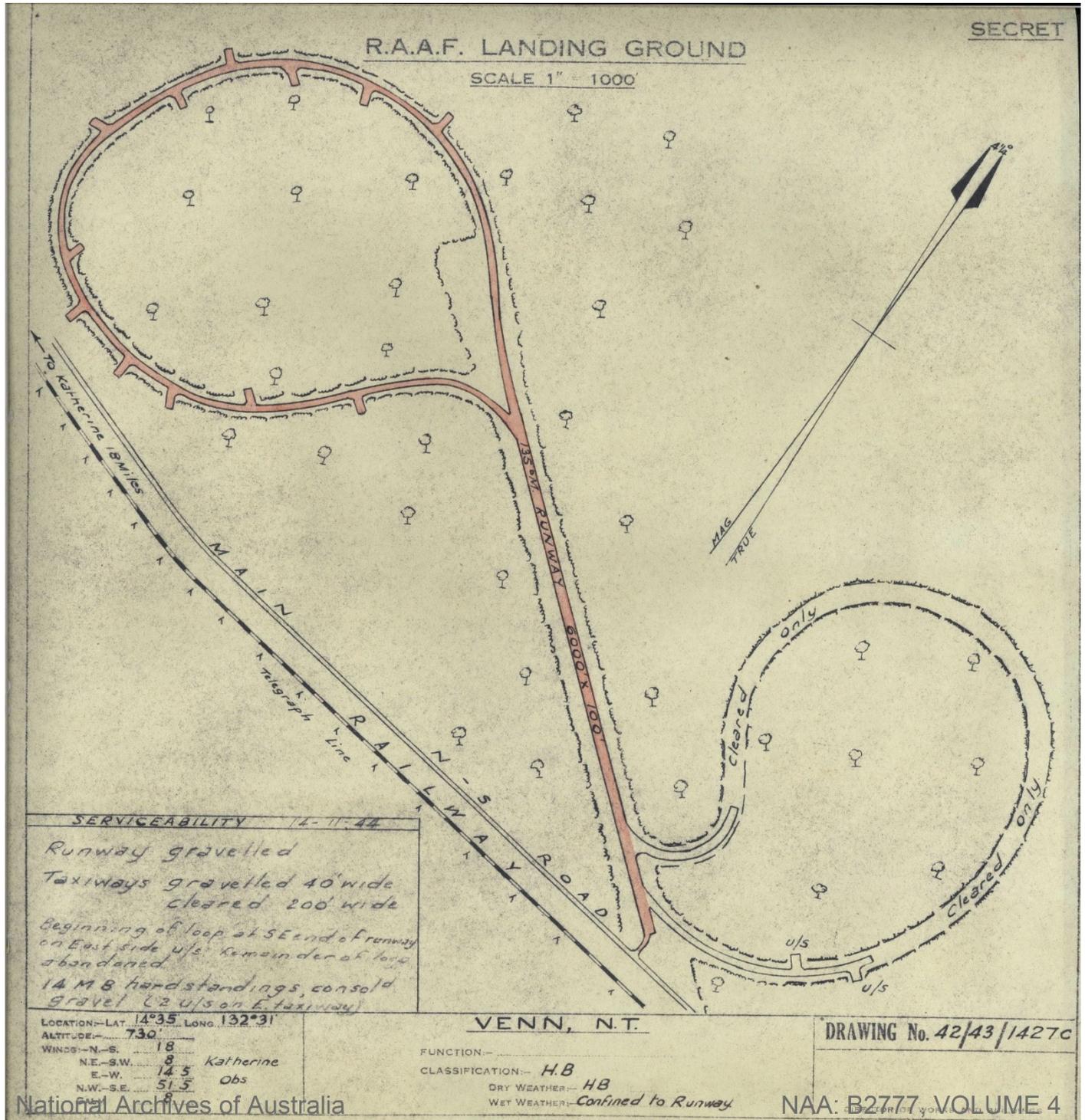
Google Earth image as at 27<sup>th</sup> May, 2020. No visible evidence of a former wartime airfield. [Google Earth image].

A proposed airfield that had been noted in 1942 as having been surveyed. No other details known.<sup>162</sup>

VENN  
14°34'S 132°31'E

Named after Pilot Officer John Hester Venn, Number 2 Squadron, who, with his crew, failed to return from operations on 13<sup>th</sup> May, 1942,<sup>163</sup> whilst flying Hudson A16-196.

Listed as an airfield under construction as an Operational Base suitable for Heavy Bombers in all weather conditions. Its elevation is 730 feet. Consisted of a single gravel runway (bearing 135°M) of 6,200 feet length. It was planned to have 14 Dispersal Bays.<sup>164</sup>

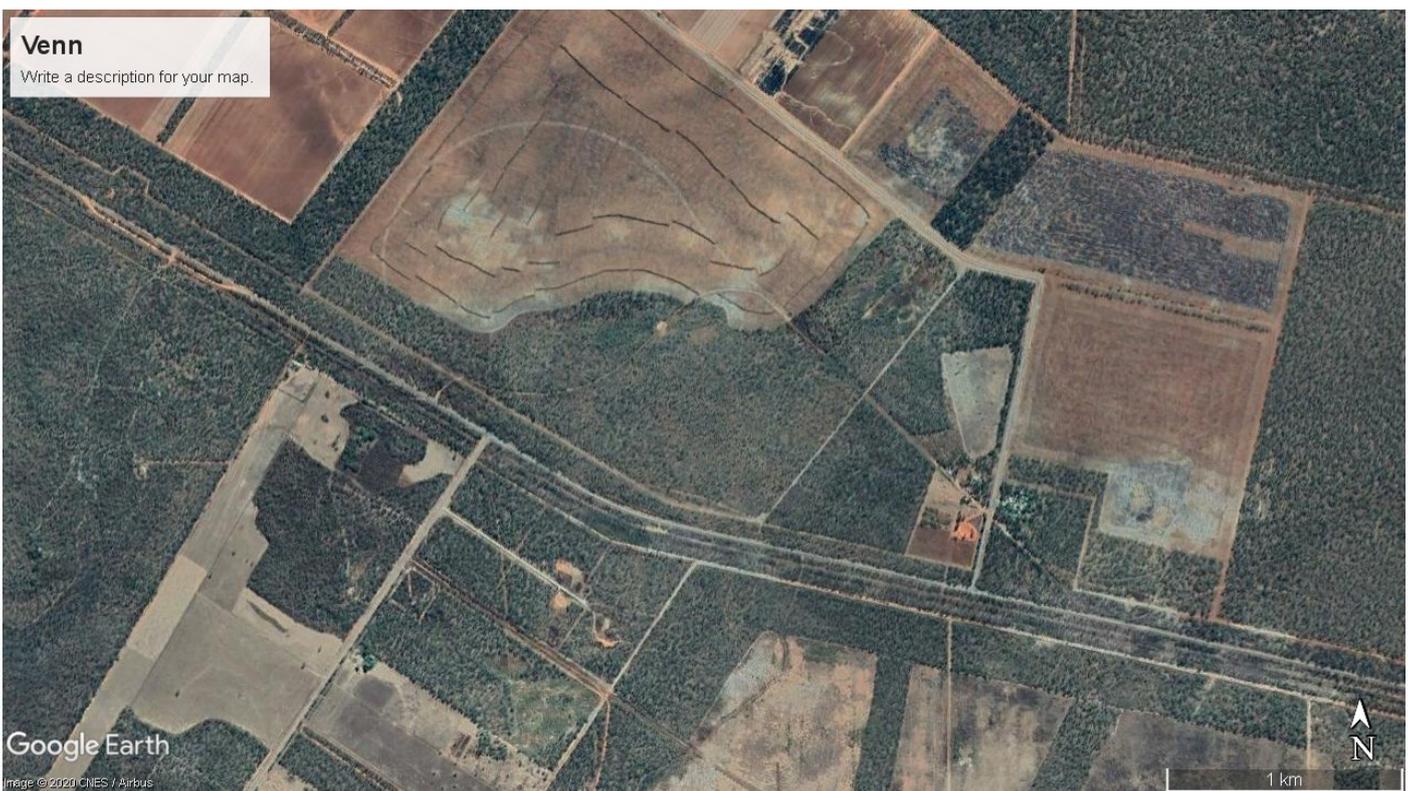


RAAF Landing Ground Venn. [NAA: B2777, VOLUME 4].

Constructed by the 43<sup>rd</sup> United States Engineer Regiment, was about 80% complete before work ceased.<sup>165</sup>



Venn – Google Earth image dated July 27<sup>th</sup>, 2013. [Google Earth image].



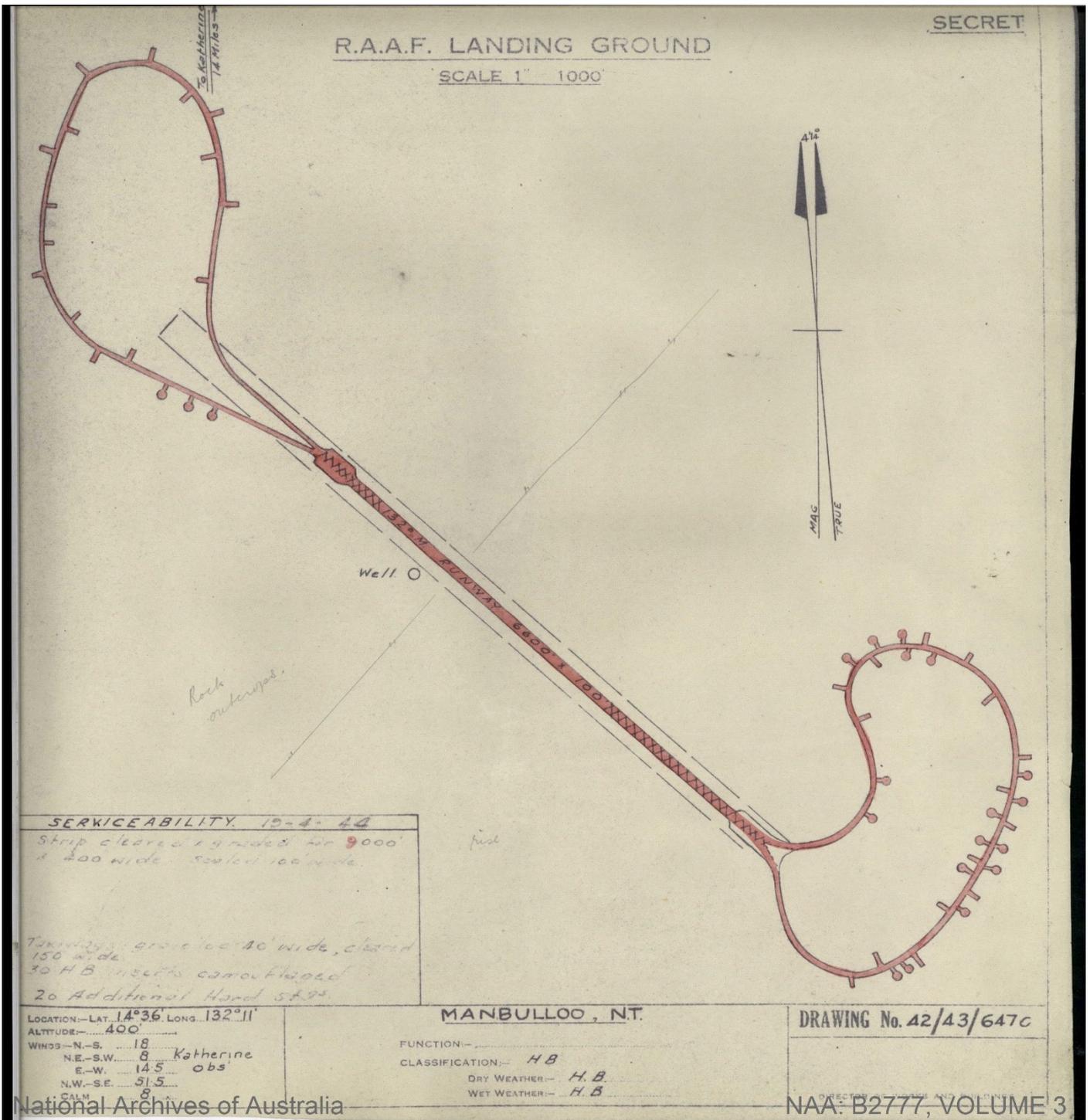
I've included this additional image to show how rapidly changes can occur, especially if a former airfield is on private property, like this one. Google Earth image as at 27<sup>th</sup> May, 2020. [Google Earth image].

Venn was considered for redevelopment during the early 1960's which consideration lost out to Tindal. See the Tindal entry for some further, brief, details.

The site is on private property.

MANBULLOO  
 {MAN}  
 14°36'S 132°11'E

An Operational Base suitable for use by Heavy Bomber's in all weather conditions it was expected to be ready for use by December 1<sup>st</sup>, 1942. Consisted of a single 6,600 feet long runway aligned 132°M with 18 Dispersal Bays projected.<sup>166</sup>



RAAF Landing Ground Manbulloo. [NAA: B2777, VOLUME 3].

The runway and taxiways were built by the 43<sup>rd</sup> United States Engineer Regiment, with the runway being sealed by the Department of Main Roads and runway strips graded by the RAAF.<sup>167</sup>

Number 1 Repair and Salvage Unit (1RSU) was an early resident at Manbulloo, commencing operations there during June, 1942. They were joined by 34SQN in August.

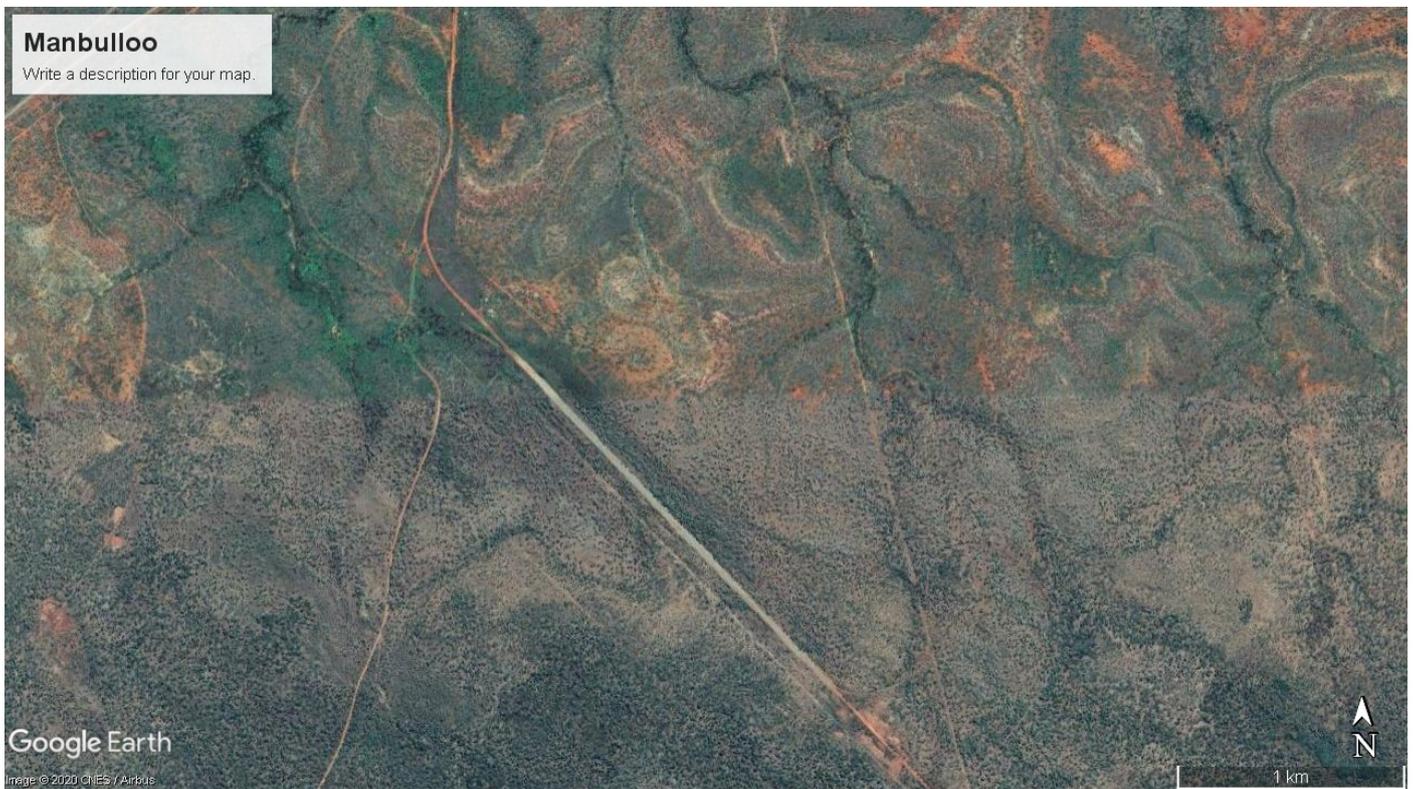
34SQN handed their aircraft over to the newly formed Number 6 Communications Flight (6CF) during early December, 1942. 6CF, who became known as "Fenton's Flying Freighters" after their CO, SQNLDR "Doc" Fenton, moved to Batchelor at the end of February, 1943 and Manbulloo's only air traffic for the next few months was restricted to the comings and goings of aircraft in and out of 1RSU. Later in 1943, Manbulloo hosted two of the 380<sup>th</sup> BG's four B-24 squadrons and, during June, 1944, 24SQN moved in with their B-24's; remaining there until space became available at Fenton.



**Manbulloo Northern Dispersal Loop** photographed by 87SQN on 18MAY49 from 6000 feet. The 18 dispersal bays on this loop (10 out side and 8 in side) are already very difficult to see. Red arrow points roughly north. [NLA MAP Aerial Photograph Collection D 53 9 106, BibID 5714762, frame 5112].



**Manbulloo Southern Dispersal Loop** photographed by 87SQN on 18MAY49 from 6000 feet. As with the previous image of the northern loop, the 32 dispersal bays on the southern loop are already fading from visual history. Again, the big red arrow is pointing roughly north. [NLA MAP Aerial Photograph Collection D 53 9 106, BibID 5714762, frame 5116].



**Google Earth image as at 27<sup>th</sup> May, 2020. The Northern Dispersal Loop is still quite clearly visible, however, the Southern Loop is very difficult to see.** [Google Earth image].

Manbulloo was considered for redevelopment during the early 1960's which consideration lost out to Tindal. See the Tindal entry for some further, brief, details.

Like many of these former wartime facilities, the former Manbulloo airfield is on private property.

NAMOLA  
14°36'S 132°35'E

Named after Second Lieutenant Chester T. Namola, pilot 8<sup>th</sup> Pursuit Squadron, 49<sup>th</sup> Pursuit Group, missing – failed to return after action near Darwin, 12<sup>th</sup> January, 1942.<sup>168</sup>

A proposed airfield to act as a satellite for Venn. Namola was 600 feet above sea level and was planned to have a single 6,000 feet long runway aligned 135°M.<sup>169</sup>



Google Earth image as at 27<sup>th</sup> May, 2020. [Google Earth image].

It seems that Namola remained a proposal only and that, aside from some survey work, actual construction was never commenced. The fact that contemporaneous documentation was able to record the length and alignment of the proposed runway suggests that a layout diagram had been prepared – even if only an elementary one without any taxiway and dispersal point information. However, if one existed, copies have not yet been found.

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# Notes Regarding No. 13 Squadron Hudson's Squadron Code Letters

Garry Shepherdson

## Introduction

This is the first of a few "Notes Regarding ..." articles. They are, basically, the summary sections of manuscripts that I was compiling my research into. The purpose of the research was to find, collate and present evidence in a tabular form which proved serial number and code letter associations for certain aircraft – primarily strike and reconnaissance type aircraft – operating under the operational control of the RAAF's North Western Area between late 1942 and mid(ish) 1945.

I remember wondering, when I was much younger, having seen colour aircraft profiles, reading text and photograph captions in certain books from the 1970's, how did these authors know the identities – that is the serial number and individual identification letters – of all of those aeroplanes that they quoted identities for? Did they get that information exclusively from photographs? Certainly, some photos showed both serial number and code letters clearly enough, but most others didn't. I just assumed that the authors had access to more photographs that proved an aircraft's identity, but, for whatever reason, those photos didn't make it into print. But it was always in the back of my mind – how did they really know?

Much more recently, I came to realise that it wasn't all that uncommon to come across photograph captions in published material, online sources and even museum collections, that made identification claims that weren't supported by the image they referred to – in that the image either didn't show the serial number of the aircraft that the image claimed to depict or didn't show the aircraft's individual identification letter (or both) – and that the identification so claimed, turned out to be incorrect. Another shortcoming that has cropped up from time to time are photographs of a wartime aircraft in which both the code letters and the serial number are clearly visible, but that the assumption seems to have been made that the aircraft had always carried those code letters when, in some circumstances, it didn't.

Typically, if information appears in print or online, then it is very frequently taken at face value as being reliable and gets quoted and reused. However, if some of that information happens to be wrong, then the historical record becomes altered and incorrect information becomes perpetuated as historical fact.

A few years ago, just to pass the time, I decided that I might as well try and find a way of proving the individual identities of some of those aircraft. I stopped wondering how did *they*, the authors of those books, do it, but how would *I* do it?

Not having any special access to contemporary photographs and because of their relative scarcity, I thought I'd leave them alone as a method of proving an association between a serial number and an identification letter. Personal log books – far too limited in availability. Finding and interviewing veterans – too few survivors and recollections of events from so long ago was more than likely unreliable and useless in so far as the accuracy of what I wanted to achieve. No, what I required was contemporaneous primary source material from official, but not public relations or propaganda type, sources. Official information that wasn't for public dissemination. Unit History Sheets – some contained identification information (serial number AND identification letters), but the vast majority didn't. Aircraft Status Cards – no. These primary sources would be of critical importance for cross-referencing, but they didn't (by and large) provide the information themselves. Post mission Narrative Reports – some yes, but most, no. But even those that did have identification information, some of them didn't seem reliable enough.

After a short search, I found exactly the sort of primary source documents that provided the information that I needed; these were definitely not meant for public release (at the time). All I had to do, was to extract as much information from these sources that could be compared directly with information contained in the relevant unit records so as to establish, beyond reasonable doubt, that a certain serial number was (or at least was most likely to be) a particular

identification letter; that is to provide evidence of each time the information from the primary sources matched the unit records AND each time it didn't.

Whilst I do not plan to present the tables here, these "Notes Regarding ..." articles are, as I mentioned at the start, adapted from the summary sections of some of the volumes. So, here we go with 13SQN Hudson's.

## General

Beginning with mission Hughes 30 of 16<sup>th</sup> August, 1942, Number 13 Squadron began recording W/T call sign information in their Forms Mauve. For that mission, those call signs, in duty number order, were: 6R7D, 6R7K, 6R7G, 6R7Q, 6R7A, 6R7X, 6R7S, 6R7E and 6R7F. The use of seemingly random suffix letters suggested one of two things. Either the suffix letters were actually random or, they indicated a specific aircraft.

Suffix letters though were never random. In cases where W/T call sign suffix letters did not indicate a specific aircraft, those letters always followed a pattern. Either they commenced daily with "A" and worked forward through the alphabet, or at "Z" and worked backwards, or the letter matched the duty number (duty 5 having the fifth letter of the alphabet), or were issued in sequential blocks of letters (e.g. duties 1, 2 and 3 having the letters "A", "B" and "C" and duties 4, 5 and 6 having the letters "L", "M" and "N" or some other similar type of sequence). W/T call sign suffix letters only ever gave the appearance of being random when they indicated a specific aircraft. The fact that they started using apparently random letters and that those letters began to match specific serial numbers suggested that 13SQN had assigned individual identification letters to their aircraft. Whether Hughes 30 of 16<sup>th</sup> August, 1942, was the first time that they had flown with those identities or whether they had been assigned at some earlier time isn't yet known. No photographic evidence has surfaced either to indicate whether these single letters were applied to an external surface of any of their aircraft.

A squadron's RAAF Form A51 usually recorded the serial number(s) of aircraft partaking in operations as well as the name of the aircraft's captain. 13SQN did not compile an A51 for August or September, 1942. Often though, a squadron's A50 would include similar core information (such as date, mission number, aircraft serial number and crew – or at least aircraft captain's name). During this period, 13SQN's did not. So, despite having found a large amount of call sign information providing individual identification letter allocations, the lack of serial number information means that the association of individual identification letters to specific 13SQN airframes from mid-August through until the end of September, 1942, is not supported by sufficient evidence to prove a correlation.

## 13SQN Individual Identification Letter Allocations, Prior to October, 1942

To deal very briefly with possible allocations prior to October – according to their E/E.88's, the following Hudson aircraft were on 13SQN strength during August, 1942:

A-28-LO Hudson Mark IVa:	A16-118, -138, and
A-29-LO Hudson Mark IIIa:	A16-156, -166, -199, -204, -212, -219, -224, -225, -226, -227 A16-233, -235, -236, -243, -245, and -247.

Individual identification letters (from W/T call sign suffix letters) for 13SQN during the second half of August, 1942, were:

A B D E F G K Q R S T U V and X.

The following suggestions are offered as possibilities:

A16-156 may have been "F", which matches later evidence,  
A16-199 may have been "D" which matches later evidence,  
A16-204 may have been "A", which matches later evidence,  
A16-219 may have been "V", which matches later evidence,  
A16-224 may have been "E", which matches later evidence,  
A16-225 may have been "K", which matches later evidence,  
A16-226 may have been "B", which matches later evidence,  
A16-227 may have been "X", which matches later evidence,  
A16-233 is believed to have been "R", which matches later evidence,  
A16-235 may have been "S", which matches later evidence,  
A16-236 may have been "Q", which matches later evidence,  
A16-243 was probably "G", it failed to return from an operation on October 1<sup>st</sup> (as "G"),  
A16-245 may have been "T", which matches later evidence and,  
A16-247 may have been "U", which matches later evidence.

That leaves A16-166 and -212, plus the two Mk IV's A16-118 and A16-138.

A16-166 was away from 13SQN until 20AUG and may not have been used operationally. Later evidence suggests it was "J". A16-212 was noted as being U/S on the 18<sup>th</sup> and 24<sup>th</sup>, so may not have been used operationally. It might have been "C", which if so, matches later evidence.

Identification letters for the Mk IV's, A16-118 and A16-138, is not known at present.

For September, 1942, the following Hudson aircraft were on 13SQN strength:

A-28-LO Hudson Mark IVa:	A16-118, -134, and
A-29-LO Hudson Mark IIIa:	A16-156, -166, -192, -199, -204, -212, -219, -224, -225, -226, A16-227, -233, -235, -243, -245, and -247.

Individual identification letters (from W/T call sign suffix letters) for during September, 1942, were:

A B D E F G J K N R S T U and V.

Of the Mk III's listed above, the following suggestions are offered:

A16-156 may have been "F", which matches later evidence,  
A16-166 may have been "J", which matches later evidence,  
A16-199 may have been "D" which matches later evidence,  
A16-204 may have been "A", which matches later evidence,  
A16-212 may have been "C", which matches later evidence,  
A16-219 may have been "V", which matches later evidence,  
A16-224 may have been "E", which matches later evidence,  
A16-225 may have been "K", which matches later evidence,  
A16-226 may have been "B", which matches later evidence,  
A16-227 may have been "X", which matches later evidence,  
A16-233 is believed to have been "R", which matches later evidence,  
A16-235 may have been "S", which matches later evidence,  
A16-243 was probably "G", it failed to return from an operation on October 1<sup>st</sup> (as "G"),  
A16-245 may have been "T", which matches later evidence and,  
A16-247 may have been "U", which matches later evidence.

That leaves A16-192, plus a couple of Mk IV's and the letter "N". There is no evidence to indicate the serial number identity for "N". It does seem likely though that the letter "N" was allocated to A16-192 because it was re-coded during October – which means it must have been some other identity before then.

Like August, no identification letter allocation for A16-118 could be identified for September, 1942; A16-134 is believed to have been "L" during October, so may have been so during September.

So, from the start of October, 1942, thru to late January, 1943, each 13SQN aircraft seems to have been allocated an individual letter by which it was operationally identified during its period of service. It is not known if these letters were applied to any external surface of any of these aircraft.

Those allocations apparently changed between the 28<sup>th</sup> and 30<sup>th</sup> January, 1943. Prior to the 28<sup>th</sup> of January, the letter allocations were scattered throughout the alphabet, but after the change, the allocations utilised all the letters from "K" onwards (except "X"). I believe that this change was bought about by the application of full squadron "SF" codes as required by AFCO A3/1943 which had been promulgated a few weeks earlier on January 4<sup>th</sup>.

The last operational flights with the "old" letters occurred on January 27<sup>th</sup> (HUG26), and the first operational flight with the "new" letters was on January 31<sup>st</sup> (HUG27). During the period in which the change seems to have taken place only three non-operational flights were recorded in 13SQN's A51 (HUG82, 83 and 84). The first two of these were flown by A16-156 and the third flight was an away trip in A16-227 which had it away from Hughes for 5 nights, returning on February 4<sup>th</sup>. Such a reduction in activity would seem to allow an opportunity for a change of letters – if individual letters had been marked on the aircraft – or for the application of them if they weren't.

An interesting observation when comparing ex-13SQN machines that later served with 2SQN shows that on a number of machines, the later 2SQN individual letter allocations either carried over from or reverted to the previous 13SQN identity:

<u>Serial</u>	<u>Last 13SQN Letter</u>	<u>2SQN Letter(s)</u>
A16-156	<b>Q</b>	(KO-G) then <b>KO-Q</b>
A16-192	<b>U</b>	<b>KO-U</b>
A16-204	<b>S</b>	N, KO-N then <b>KO-S</b>
A16-219	<b>M</b>	W, KO-W then <b>KO-M</b>
A16-227	<b>O</b>	<b>KO-O</b> later KO-P
A16-233	<b>N</b>	E, KO-E then <b>KO-N</b>
A16-235	<b>W</b>	I then <b>KO-W</b>
A16-236	<b>Y</b>	V, KO-V then <b>KO-Y</b>

Of these eight aircraft, the allocations given to six of them by 2SQN was initially different to their previous 13SQN identity, yet they all – after a period – reverted to their 13SQN letter. The two exceptions both started their 2SQN careers retaining their previous 13SQN individual letters. For that to happen in one or two aircraft would be nothing more than coincidence, but to happen, effectively, on all eight of these aircraft that were transferred from 13SQN to 2SQN suggests that the previous identity was known to 2SQN – and *that* suggests that it was actually marked on the aircraft at hand-over.

To date, I have only seen photographic evidence of two of 13SQN Hudson's wearing full three-letter codes: A16-233/SF-N and A16-156/SF-Q, but I believe that they were worn on at least several other machines and possibly all of 13SQN's Hudson's in service during that period.

There is a sequence of photographs, several of which also appear in the Australian War Memorials photographic collection, which depicts a formation of five 2SQN Hudson's, four of which were former 13SQN machines:



**Image 1.** The leading aircraft is A16-160. A16-236 “*Foo*”, is in echelon port to the leader (that is – on the right of the image) and is identifiable by its serial number, the name on its nose and the rather unique metal plug on the tip of its nose transparency. The aircraft immediately to the right of the leader, in echelon starboard (that is – at left, second from the top), is A16-235/W “*Houdini*”, identifiable by its name “*Houdini*” on the nose, the letter “W”, clearly visible aft of the fuselage roundel and its serial number, which, although illegible in this reproduction, is discernible in the original. The farthest aircraft is A16-202. A fifth aircraft, A16-233/N, is out of frame off to the right. In this shot, “*Foo*” displays evidence of the overpainting of the letters “SF” immediately forward of the fuselage roundel – it’s not too clear in this version, but is more so in the original image, the sheen of the relatively fresh paint over the letters stands out. Notice also the combination of astrodomes and open cupola with wind deflector. All except A16-160 were former 13SQN machines. [AWM image NWA0242].



**Image 2.** Here, A16-233/N is closest to the camera, then A16-236/Y “*Foo*”, with A16-160 at the extreme left of shot, A16-235/W “*Houdini*” is in echelon starboard to A16-160 and the farthest aircraft is A16-202. We know from photographic evidence that A16-233 (right foreground) was marked with full “SF-N” codes (see photo elsewhere in this article), but at the time of that photo, it wasn’t equipped with ASV – here only the individual identification letter “N” remains, but ASV has now been installed which means that this image post-dates the other one; little or no evidence of the “SF” codes having been overpainted is visible – but we now know that it must have occurred. “*Foo*” shows clear evidence of repainting forward and aft of the roundel and “*Houdini*” has a large re-painted area immediately forward of its roundel. There doesn’t seem to be any evidence of an individual identification letter on A16-160 but notice that it has been partially repainted – the green about the centre section of the fuselage is much darker than the similar band around the aft fuselage. Notice also, “*Foo*” displays much smaller white centres to its wing roundels than the others. [AWM image NWA0452].



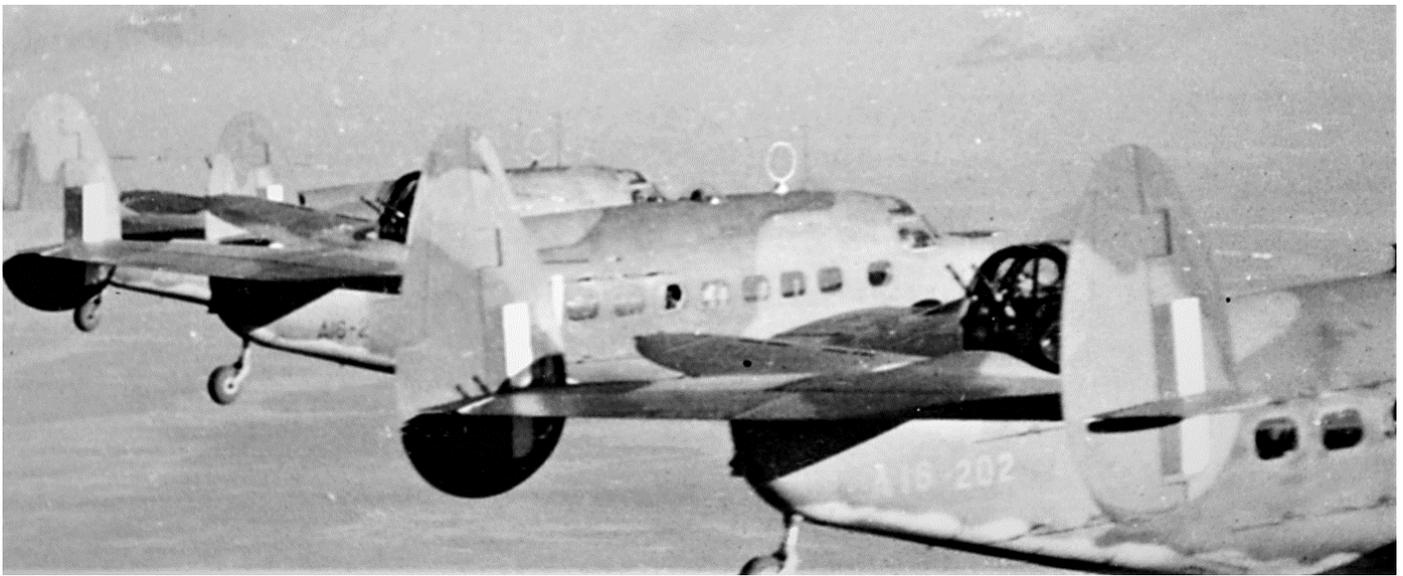
**Image 3.** Three of the aircraft in Vic formation. The leader, A16-160, with A16-236/Y "Foo" in echelon port and A16-233/N now in echelon starboard. In this image, the repainting of the "SF" forward of the roundel and the individual letter "Y" aft of the roundel on "Foo" is quite clear. As mentioned in the previous caption, no evidence of identification letters on A16-160 is apparent here; what appear to be two vertical lines immediately forward of its fuselage roundel are merely the edges of the crew access door. The small "2:5" proportions of Foo's wing roundels, instead of the usual "3:5", is also evident here. [AWM image NWA0245].



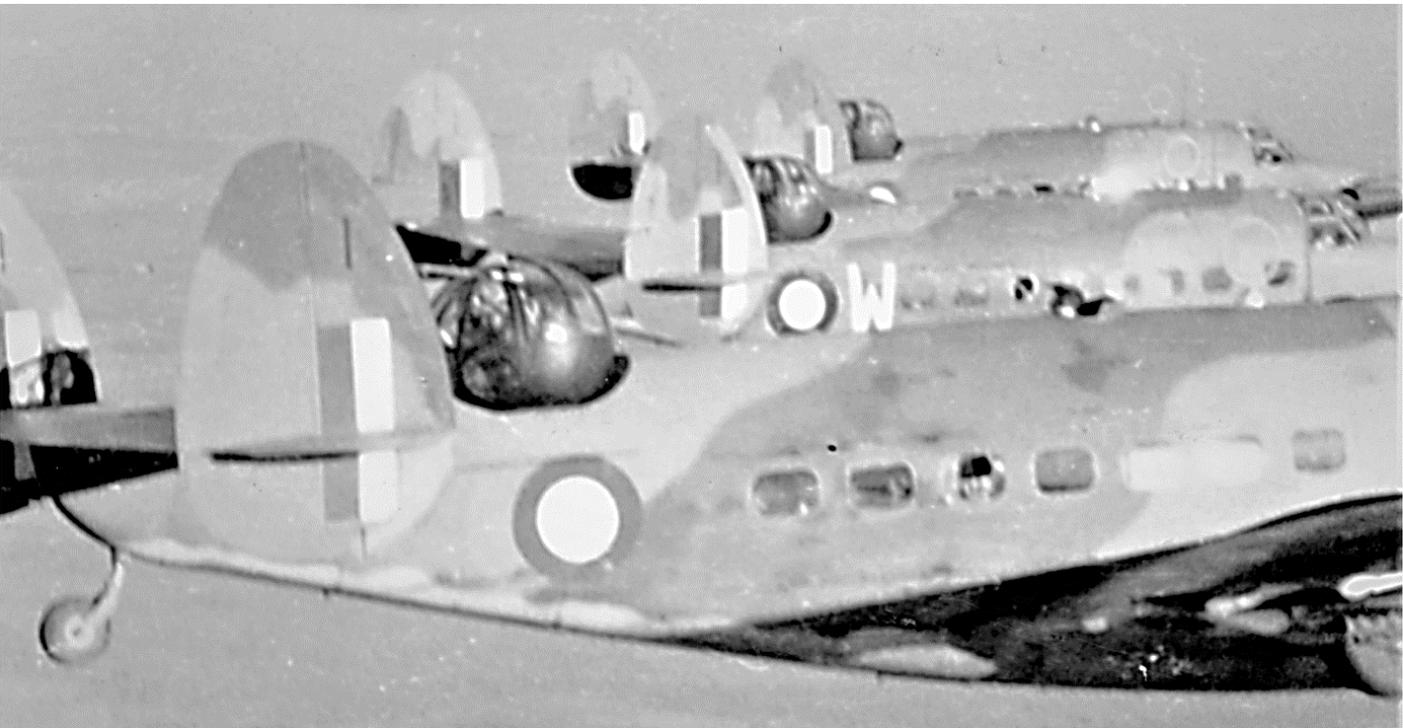
**Image 4.** This is the same formation, but with everybody now in echelon starboard. A16-236/Y "Foo" is bringing up the rear as number 5, with A16-233/N in the number 4 position, number 3 is A16-202 and number 2 is A16-235/W "Houdini"; number 1 is A16-160. Over-painting of 13SQN's "SF" letters aft of the fuselage roundel is particularly evident on "Foo", and "Houdini" in this shot. [Aviation Heritage Museum of WA image P026817 via Mike Mirkovic].



Image 5. The same formation, this time from above. Repainting aft of the fuselage roundel on “Foo” and “Houdini” is much more apparent in this image. [AWM image NWA0453].



**Image 6.** This shot shows A16-202 in echelon starboard to A16-235/W “Houdini”. Again, the over-painting of 13SQN’s “SF” code letters aft of Houdini’s roundel is obvious and has actually obliterated the last two digits of its serial. [Aviation Heritage Museum of WA image P015829 via Mike Mirkovic].



**Image 7.** A16-202 with open cupola and wind deflector and A16-235/W with astro-dome. There doesn’t appear to be any clear evidence of identification letters having been removed from A16-202. [Aviation Heritage Museum of WA image P015828 via Mike Mirkovic].

A16-202 left 13SQN for 1RSU on March 9<sup>th</sup>, 1943, having been consistently operationally identified by the letter “P” since the end of January. It wasn’t handed over to 2SQN until April 10<sup>th</sup>, which therefore provides the earliest date that this sequence of photographs could have been taken. It’s new 2SQN identity was “KO-J”, but it wasn’t identified (operationally) with those letters until April 24<sup>th</sup>. It ceased flying with 2SQN, according to its E/E88, around the middle of May, 1943, providing the latest possible date that this formation sequence of photographs could have occurred.

A16-233/N was fully marked (on the port side at least) as “SF-N” (photographic evidence – without ASV) and had been operationally identified by the letter “N” since February 6<sup>th</sup>, 1943. It was sent to 1RSU towards the end of February and returned to 13SQN on March 20<sup>th</sup> and it then continued to be operationally identified as “N” for the rest of that month. It seems likely that ASV was installed during that four-week period at 1RSU. A16-233 was one of the direct transferees being handed over to 2SQN on April 4<sup>th</sup>, 1943. Another image of this aircraft, obviously taken during this

same formation sequence, was published in the early 1990's. It was taken whilst the aircraft were all in echelon starboard and was a close view of A16-233 and A16-236. In that image, A16-233's serial number was clearly visible as was the over-painting of the individual letter "N" on the starboard fuselage side, forward of the roundel (so too was A16-236's serial, dark repainted area aft fuselage and the name "Foo"). Unfortunately, when I approached the publisher of that work for a copy of the image and permission to use it, they weren't able to offer any help as they no longer had any copies of the image and couldn't say where it had come from. It doesn't seem to appear in the AWM's collection or in that of the Aviation Heritage Museum of WA. A16-233 was operationally identified as "KO-E" from April 15<sup>th</sup> until April 26<sup>th</sup>, 1943. From May 7<sup>th</sup>, it was identified as "KO-N" up until it failed to return from operations on September 8<sup>th</sup>, 1943.

A16-235/W "*Houdini*" had been operationally identified by the letter "W" since January 31<sup>st</sup>, 1943. It's E/E88 recorded that it was at 1RSU from March 4<sup>th</sup> until March 20<sup>th</sup>; then from March 23<sup>rd</sup> it resumed operational activities with 13SQN and was again identified by the letter "W". This machine was another one of the April 4<sup>th</sup> direct transferees. In the foregoing images, it can be seen that A16-235 retained its 13SQN individual identification letter on both sides of the fuselage and that both sides of the fuselage showed clear evidence of its former squadron letters having been over-painted. From April 9<sup>th</sup> until the 13<sup>th</sup>, it was operationally referred to by the letter "I" by 2SQN and was sent off to 1RSU again on April 23<sup>rd</sup>. Given the presence of A16-202, these photographs must have been taken either during the period from April 10<sup>th</sup> to 23<sup>rd</sup>, or after A16-235 returned to 2SQN from 1RSU on May 5<sup>th</sup> but before A16-202 was damaged around mid-May. A16-235 was operationally identified as "KO-W" from May 9<sup>th</sup> right up until it left 2SQN towards the end of September, 1943.

A16-236/Y "*Foo*" was at 1RSU from January 28<sup>th</sup> until it was handed back to 13SQN on March 8<sup>th</sup> so, wasn't operationally identified by the letter "Y" until flying its first post-maintenance operation on 15<sup>th</sup> March. It was consistently identified by that letter until being handed over to 2SQN on March 27<sup>th</sup>, 1943. During its first week with 2SQN, it was identified by the letter "V", becoming "KO-V" on April 15<sup>th</sup>. On May 3<sup>rd</sup>, it made its first appearance as "KO-Y" and kept that allocation until leaving the Squadron in September, 1943. In the preceding photographs, A16-236 was still carrying its individual identification letter "Y" on the starboard side of its fuselage with a large, obviously repainted, area immediately aft of the roundel. On its port-side, a large repainted area is visible forward of the roundel masking the letters "SF" and aft of the roundel; the letter "Y", although over-painted, is still visible in image 3.

Each of the three ex-13SQN aircraft still carrying individual letters in this sequence of formation photographs were direct transferees to 2SQN and appear in the preceding list of eight aircraft. Of the other listed aircraft, one was a direct transfer – A16-192 also on April 4<sup>th</sup> – the other four went via 1RSU. Given this photographic evidence of 13SQN code letters and the fact that a fourth aircraft in that list was known to have carried full 13SQN codes (A16-156), I believe therefore, that it would be reasonable to assume that each of the eight previously listed machines had full three-letter codes applied by 13SQN.

Although eight of the fourteen aircraft transferred from 13SQN either retained or reverted to their previous individual identities after joining 2SQN, the remaining six machines didn't and their individual identification letters changed permanently:

<u>Serial</u>	<u>Last 13SQN Letter</u>	<u>2SQN Letter(s)</u>
A16-186	R	C, KO-C, KO-J
A16-197	L	A
A16-199	V	(K), KO-F
A16-202	P	KO-J
A16-226	T	KO-G
A16-247	Z	N

A16-186, -197, -199 and -247 were each direct transferees; A16-202 (who appeared in the previous formation sequence) and -226 both went via 1RSU.

A16-186 "*The Saint*" would have had to relinquish its former identity of "R" because another new arrival at 2SQN, A16-211 "*The Tojo Busters*", which had arrived a day or two before "*The Saint*", had been allocated that letter.

A16-197 was a different case. It only joined 13SQN after maintenance at 1RSU on February 22<sup>nd</sup>, having previously been a 2SQN machine. With 13SQN it was then consistently identified operationally as “L” until being handed back to 2SQN on April 4<sup>th</sup>. It was then identified by 2SQN as “A” and then “KO-A” until it was lost on operations on April 20<sup>th</sup>. Perhaps it would have reverted to “L” on or shortly after May 1<sup>st</sup>, because the letter “L” was vacant with 2SQN. It was no coincidence that the letter allocated to it by 2SQN was “A”, however. It had been identified by that letter from November 30<sup>th</sup>, 1942, until January 28<sup>th</sup>, 1943.

A16-199 had been operationally identified by the letter “D” by 13SQN since at least October 2<sup>nd</sup>, 1942. It was first noted by its new letter “V” on January 31<sup>st</sup>, 1943. Its last 13SQN operation was on March 31<sup>st</sup> and it was handed over to 2SQN on April 4<sup>th</sup>, picking up the interim identification of “K” because the letter “V” had already been allocated to an earlier transfer – A16-236 “Foo”.

From November, 1942, thru to the middle of April, 1943 and in the same way as 13SQN, each 2SQN aircraft seems to have been allocated an individual letter by which it was operationally identified during its period of service. Whether or not they were marked externally on any aircraft isn’t known. I believe that, like 13SQN, each airframe had an alphabetical identity by which it was always referred to operationally.

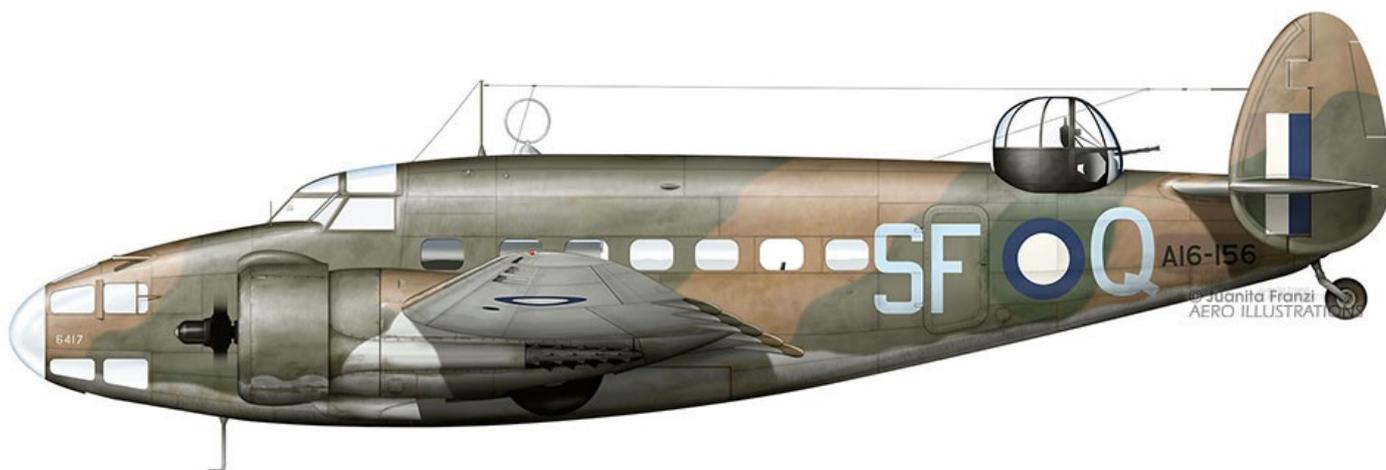
Full three-letter “KO” codes were quoted in 2SQN’s Forms Mauve from mid-April, 1943. 2SQN’s Hudson’s underwent a change of individual identification letter allocations on or about May 1<sup>st</sup>, 1943. That this same type of change had occurred at 13SQN at the end of January and apparently heralded the physical application of full three-letter squadron codes on their aircraft, I believe that the May 1<sup>st</sup> change for 2SQN also marked the same event for them.



This is 13SQN’s A16-233/SF-N. Note the absence of the ASV Search Array on the fuselage side. [AWM image NWA0074].

The assignment of aircraft specific, individual code letters, in 13SQN between the start of October, 1942 and the end of March, 1943, looks like this:

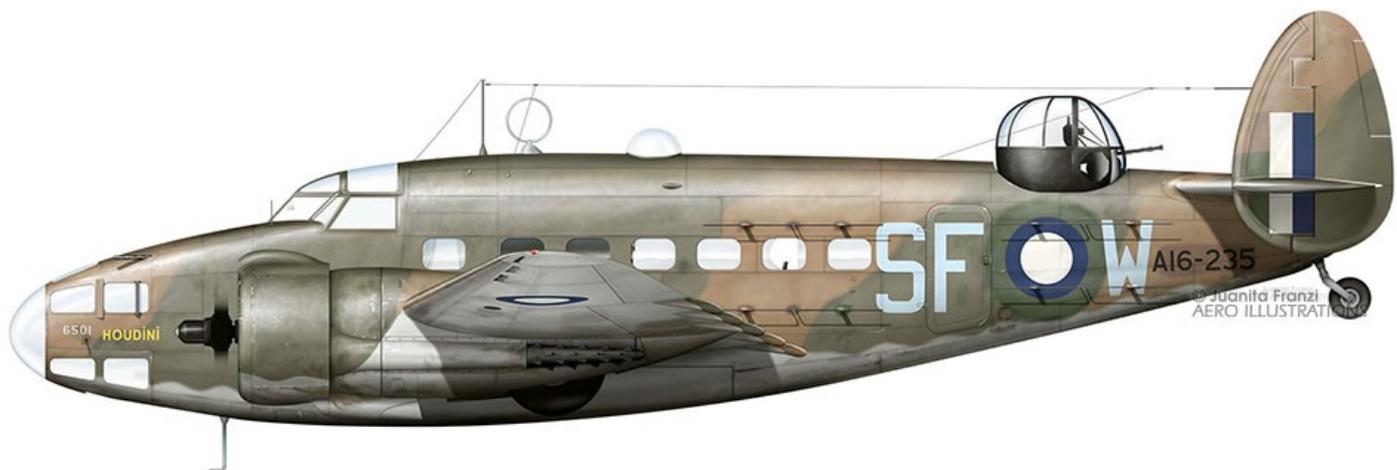
Letter	Pre AFCO A3/43 Allocations		Post AFCO A3/43 Allocations
	Oct-Dec 1942	Jan 1943	Jan-Mar 43 SF-
A	204	226	-
B	226	-	-
C	212	212	-
D	199	199	-
E	224	186	-
F	156	-	-
G	243 / 192	192	-
H	235	-	-
I	-	-	-
J	166	-	-
K	225	-	118
L	134	-	197
M	202	202	219
N	-	-	233
O	-	-	227
P	-	204	202
Q	236	236	156
R	233	233	186
S	235	235	204
T	245	-	226
U	247	247	192
V	219	219	199
W	-	-	235
X	227	227	-
Y	-	-	236
Z	-	-	247



**A16-156/SF-Q.** It wasn't clear from the reference photograph if this aircraft had been fitted with ASV or not so, the decision was made to illustrate it without. [Juanita Franzi, Aero Illustrations, LHUD3041].



**Illustration of A16-233/SF-N prior to the installation of ASV.** [Juanita Franzi, Aero Illustrations, LHUD3061].



**A16-235/SF-W "HOUDINI".** [Juanita Franzi, Aero Illustrations, LHUD3071v2].

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 RAAF Unit History Sheets Number 13 Squadron Jun 40 – Dec 45. NAA: A9186, 35.

**Special thank you to Juanita Franzi, Aero Illustrations, for preparing these profiles and giving permission for them to be included in this edition of ADF-Serials Telegraph.**



# Curtiss Corner: P-40E-1 A29-99#2

Gordon Birkett



**A29-99** pictured on its way up in July 1942, at Horn Island. [All Photos are part of Neville Rourke's Atherton Family Collection as supplied to GRB unless otherwise stated].

A little background first.

Surprisingly, P-40E-1 41-25177 was the first allotted A29-99#1 as allotted and received by 2AD on the 26 April 1942, having been supplied under Netherlands Contract. It was however returned to the USAAF. These NEI Contract aircraft were part of a 36 aircraft batch transferred by the USAAF for the Netherlands East Indies in February 1942. Only eighteen arrived in Australia, with only about four actually assigned and used by the RAAF, with most, if not all of the remaining eighteen of the balance were redirected and shipped to Africa on SS Siranger to the RAF Desert Air Force some weeks later (ranging from ET511 to ET532).

These were not part of some 141 RAF P-40E-1 Transfers from their allocations to Australia as per an agreement with the United Kingdom, at no charge.

RECORD CARD—AIRFRAMES, AERO ENGINES, MECHANICAL TRANSPORT AND MARINE CRAFT. <span style="float: right;">R.A.A.F. Form E/E. 88. (June, 1938.)</span>					
Type	KITTY HAWK	No.	A29-99	Chassis	} Fitted ALLISON
Order No.	LATE P40-41/25177	Engine			
Received from	U.S. In 311 No. 2012A	Date Received			
HISTORY (MOVEMENTS, CASUALTIES, Etc.).					
Date.	Details.	Authority.	Date.	Details.	Authority.
26-4-42	Received 2AD ex USAFIA	84715 26/4			
26-4-42	Allotted 2OTU ex 2AD	84716 26/4			
	Above allotment cancelled + 2A returned to USAFIA				

Excerpt from the record card for A29-99 (#1) which displays its original allotted serial (P40-41/25177) and shows details of being received by 2AD (No.2 Aircraft Depot) ex USAFIA (United States Army Forces in Australia) via RAAF Supply Indent Number 2012A. It was allotted to 2OTU (No. 2 Operational Training Unit). The last entry shows the aircraft being returned to USAFIA. [NAA: A10297, BLOCK 212].

By a quirk of fate, it actually became A29-95#2 later after it was reassigned back to the RAAF, ex USAAF Allocation on the 13<sup>th</sup> May 1942 after being received by 2 Aircraft Park, Bankstown.

**RECORD CARD—AIRFRAMES, AERO ENGINES, MECHANICAL TRANSPORT AND MARINE CRAFT.** R.A.A.F. Form E/E.88. (June, 1938)

Type **KITTY HAWK** No. **A29-95** Chassis } Fitted **ALLISON** No. \_\_\_\_\_  
 Airframe }  
 Engine }  
 Order No. **LATE 41/25177**  
 Received from **U.S.A.** Date Received \_\_\_\_\_

**HISTORY (MOVEMENTS, CASUALTIES, Etc.)**

Date.	Details.	Authority.	Date.	Details.	Authority.
13-5-42	Rec 2AP cc Allotted 76 SQD cc 2AP	Q4672 13/5	18-11-42 19-1-43	Shipped to 37D ex 15 RCU/Murray Recd 37D ex 15 RCU AMSE approve Conversion	15ASQ068 18/11 3 Q81 5/2
14-5-42	Issued " " " "	BQ425 14/5			
18-5-42	Rec " " " "	TQ361 18/5			
18-5-42	E at 76 SQD	TQ361 18/5			
25-5-42	C " " " "	TQ434 25/5		File 9/16/855 minute No 11 H.Q. QO 793 July 6 <sup>th</sup>	
7-8-42	V/s at 76 SQD.	76Q 14 7/8			

E/E.88 portion for A29-95 (#2), showing its original serial number (41/25177) as received from the United States. The went to 76SQN (No.76 Squadron) via 2AP (No.2 Aircraft Park). [NAA: A10297, BLOCK 212].

That had followed after the Original Serial Allocation of A29-95 was P-40E-1 41-25185, also under Netherlands Contract, had been returned to the USAAF and entered service with the 8<sup>th</sup> Fighter Squadron, 49<sup>th</sup> Fighter Group as #48 "Sissy".<sup>170</sup>

**RECORD CARD—AIRFRAMES, AERO ENGINES, MECHANICAL TRANSPORT AND MARINE CRAFT.** R.A.A.F. Form E/E.88. (June, 1938)

Type **KITTY HAWK** No. **A29-95** Chassis } Fitted **ALLISON** No. \_\_\_\_\_  
 Airframe }  
 Engine }  
 Order No. **LATE P40-41 / 25185**  
 Received from **U.S.A.** Date Received \_\_\_\_\_

**HISTORY (MOVEMENTS, CASUALTIES, Etc.)**

Date.	Details.	Authority.	Date.	Details.	Authority.
26-4-42	Received 2AD ex USAFIA	Q4715 26/4			
26-4-42	Allotted 20TU ex 2AD	Q4716 26/4			
28-4-42	Above allotment cancelled	Q4762 28/4			
28-4-42	Issued back to USAAC	Q4762 28/4			

This is a portion of A29-95's (#1) E/E88, showing its original serial number (41/25185) as received from the US via RAAF Supply Indent Number 2012A. It shows the aircraft as being received by 2AD, then being allotted to 20TU. That allotment was cancelled and the aircraft issued back to the USAAC (United States Army Air Corps – which had actually become the USAAF (United States Army Air Force) on 20<sup>th</sup> June, 1941). [NAA: A10297, BLOCK 212].

This was the same date when P-40E-1 41-35974/ET620, a deferred RAF Defence Aid Contract (DA3) to Australia that was shipped out of Newport News ex Curtiss Wright on 4 April 1942, was allotted as A29-99 #2 and received by 2 Aircraft Park at Bankstown on 13 May 1942 and allotted to No 75 F Squadron RAAF.

No 75 (F) Squadron RAAF had just one operational P-40E by this time left. It itself was flown by F/Lt Les Jackson who had made its way to Horn Island on 10 May 1942, closing the initial operations of 75 F Sqn at Port Moresby. On the 15th May 1942, the 154 Officers and men of 75F Sqn disembarked off the SS Taroona at Townsville to camp at the Bohle Strip, before finally moving to Kingaroy for re-equipping.

On 13 May 1942 F/Lt Les Jackson had flown to collect the first replacement aircraft from Bankstown. Details are non-existent as to whether Jackson was flying this aircraft, but A50 History sides on this as he was the only pilot of the squadron at Bankstown on this date.

That said, after collection and its ferry flight north, the aircraft was accidentally tipped on its nose while landing at Kingaroy Qld. Repairs were performed over the next month within the Squadron. After repairs, it sported a dark spinner. Thereafter it became the personal aircraft of F/O Geoffrey Charles Atherton Serv#408030, and carried the Squadron Letter of "P" and additionally, the name "Cleopatra" was displayed on the starboard Cowl, just under the exhaust ports. Atherton had been in action at Port Moresby from March 1942 into May 1942. Aircraft flown in combat during April 1942 were A29-31 and A29-43 "P".

Originally graduating from SFTS at Point Cook in March 1941, he became a Sergeant Pilot and was posted No 25 Squadron RAAF, Pearce RAAF Station. Later, he was commissioned as a Pilot Officer on 10 September 1941. By 27 January 1942, he was posted to No 24 Squadron RAAF, which was based at Townsville RAAF Station after its Rabaul ordeal, as a replacement pilot. On 15 March 1942, he was posted to No 75 F Squadron RAAF, then forming there.



**Geoff Atherton with "Cleopatra" at Kingaroy, July 1942.**

An initial party of 75 Sqn consisting of F/O Matson and 18 airmen arrived at Fall River by Flying Boat on 22 July 1942. Squadron aircraft, in two flights, Jackson (23rd) and Atherton (24th) were ferried up to Port Moresby via Horn Island with each flight being escorted by a Hudson Bomber (Jackson's Flight by Wg Cdr Kingwell and Atherton's Flight by P/O Pennyquick).

All arrived by 25 July 1942. Ground personnel and spare pilots arrived by sea on the SS Anhui and disembarked at Gilli Gilli Wharf on 30 July 1942 and encamped about a half a mile on the north side of Strip No 1, Gurney Field.

The first air to air combat that Atherton in A29-99 was involved in took place on 11 August 1942 when a flight of 16 P-40Es engaged between 8 and 12 "Zeros". Atherton engaged Zero which was damaged with a four second burst from the rear at 150 yards at 2000 feet. Sadly F/O Sheldon in A29-123 was lost in combat, and Sgt Shelly in A29-100 was posted as missing.

The next recorded air to air combat for A29-99 was on 24 August 1942, with F/O D L Pank during an interception of seven Zeros over Fall River. Prior to take-off, he bogged the aircraft and missed his own B Flight, but managed to be

the last aircraft off and attached himself with A Flight. At about 10000 feet he noticed belly tanks that were falling after being dropped by Zeros. On sighting them 2000 feet above, he performed a 180 degree climbing turn to sight and fired a short burst at extreme range, then nearing a stall, then dived away.

The following day, escorted by six other aircraft, seven enemy barges were attacked south east of Goodenough Island by a further three aircraft, with Atherton leading in A29-99. On sighting the barges on Cape Watts, an attack was made over the hill from the land side of the beaches through clouds and left at least five barges burning and sinking, before taking up top-cover while the second formation attacked.



**No 75 Sqn P-40E/E-1s taxiing for takeoff.**

The operational sortie was repeated the following day when another seven barges were one and a half miles from KB Mission. For the next few days, the Japanese Invasion of Milne Bay was battled, with the ebb and flow requiring P-40E/E-1s attacking almost immediately on take-offs.



**Les "Pixie" Winton and Geoff in mid 1943.**

The next recorded flight of A29-99 was on 11 September 1942 when F/Lt Les "Pixie" Winton flew her to Port Moresby to 15RSU for its 240 hour service. She had been hard used over the last two months. It would not be until the 19 October 1942 when she was serviceable with No 75 F Squadron RAAF. The Battle of Milne Bay was over. A29-99 remained on No 75 F Squadron RAAF strength until 12 October 1943 when the Squadron exchanged their P-40E/E-1s for P-40Ns. She was transferred to No 82 Squadron RAAF based at Bankstown NSW.



**A29-99 "Cleopatra" on retraction of its landing oleos after take-off in 1943.**



**His new No 75 F Squadron RAAF mount was A29-459, also named "Cleopatra", and coded GA-P until he left 27 October 1943.**

The Squadron was transiting from Airacobras to a mixed batch of P-40M/Es over the preceding three months. By October 1943, the unit was standardised on the P-40E/E-1 model with some 19 aircraft on strength. The Airacobras were progressively returned to the USAAF, with A53-7 being the last on strength by month's end.

Her first sortie in No 82 F Squadron RAAF's service was on 22 October 1943 with F/Lt R A Stott in control. On 27 December 1943, Sqn Ldr Geoffrey Atherton took command of No 82 F Squadron RAAF.

His first flight in the squadron was in P-40E A29-33 on 2 January 1944. After flying several other P-40E/E-1s, it was until 7 January 1944 that he flew A29-99 again after a long break on a squadron formation flight. That day he flew her twice.

Again the pair re-ignited their bond and he regularly flew her on:

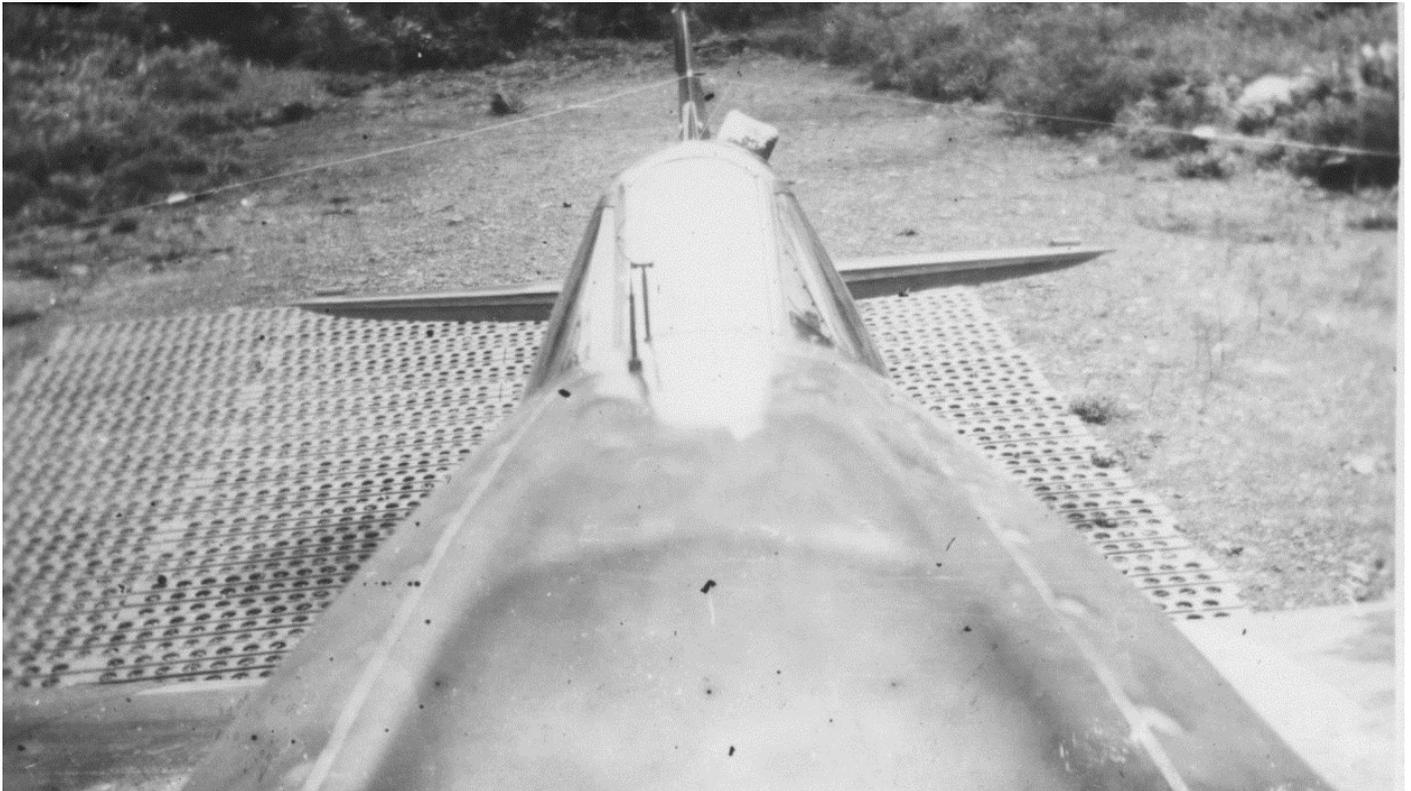
- 13/14/17/18/20/22/23/24/27/28/31 January 1944,
- 3/5/6/8/9/12/15/16/17/21/22/23/24/25/26/27/29 February 1944,
- 1/5/7/8/9/10/13
- And making his last flight in A29-99 on 14 March 1944.

He arrived at 2 Aircraft Park on attachment from 15 March 1944. Thereafter the Unit was equipped with P-40N-20. He would then rejoin No 82 Squadron RAAF from the 20 July 1944 as the temporary Commanding officer, whilst posted with 78 Wing.

F/Sgt Bladwell had the privilege of completing her last No 82 F Squadron RAAF sortie on the 31 March 1944. A29-99 was to remain with the unit until 10 April 1944 when she was transferred to 2OTU.

On 15 May 1945, at Mildura, the engine cut out during approach with the pilot trying to make the air strip. With other aircraft on the threshold, he landed outside the northern boundary some 200 yards short of the air strip. Stated that a E/E24 Accident report was completed per 2OTU A50 History, no name offered per entry... but no such on A29 Accident records held, thus the name of the pilot eludes us.

AMSE Approval dated 23 May 1945, to convert to components per File#9/16/2593 at 1CRD after issue on the 7 June 1945 which stated P-40E-1 A29-99, ex 41-35974, CW#1081 Msn 19807 "Cleopatra" now passed into history by 15 June 1945.



**Unusual aspect; photo taken of front of a P-40E-1. Note offset external sights, the HF aerial wire stretching from both wing tips back to the vertical stabiliser and the Marsden Pierced Steel Planking.**



Atherton leaning on the prop of A29-99, "Cleopatra".



A29-99/P "Cleopatra", photographed later at Goodenough Island, showing later RAAF markings.



Swimming towards a USAAF 2<sup>nd</sup> ERS (Emergency Rescue Squadron) OA-10A, 44-33879, after ditching an 80SQN P-40N, A29-647 in Kaoe Bay. Perhaps he wasn't flying an incorporated last "9" digit aircraft at the time, thus he broke his good luck run? An OA-10A was a USAAF version of the PBV-5A and was used by them for Air Sea Rescue duties.



Atherton resumed flying in A29-629/BU-B "Cleopatra III". "B" for "Boss" and "III" for third time lucky!

## Sources

Operations Record Book, 75 Squadron; NAA: A9186, 95.

RAAF Squadron Narrative Reports – Squadrons 75 and 76; NAA: A9652, BOX 21.

RAAF – No 80 Fighter Squadron – Unit History Sheets; NAA: A9186, 111.

RAAF – No 82 Fighter Squadron – Unit History Sheets; NAA: A9186, 112.

Aircraft Status Cards – Kittyhawk A29-1 to A29-99; NAA: A10297, BLOCK 212.

Personal File, Atherton Geoffrey Charles, 408030; NAA: A9300, ATHERTON G C.

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## End Notes

### Blue on Bluey

<sup>1</sup> Condensed Version per **US Army in World War II** <http://www.ibiblio.org/hyperwar/USA/USA-P-Rabaul/USA-P-Rabaul-5.html>

<sup>2</sup> This and the next two subsections are based on Morison, *Breaking the Bismarck Barrier* - 22 July 1942-1 May 1944 (History of the United States Naval Operations in World War II - Volume VI) Publisher: Little, Brown & Co.; 1st edition (1984) ASIN: B000HD7PMQ is one of the Volumes within **The History of United States Naval Operations in World War II**. This Volume is part of a 15-volume account of the United States Navy in World War II, written by Samuel Eliot Morison and published by Little, Brown and Company between 1947 and 1962.

<sup>3</sup> Picture taken from NAA File: COLLIER JAMES KEITH : Service Number - 407114 : Date of birth - 07 Jul 1921 : Place of birth - BRIGHTON VIC : Place of enlistment - ADELAIDE : Next of Kin - COLLIER DAVID NAA: A9300, COLLIER J K Item barcode 5380552 *rather than* Title: WOOLLACOTT ROY HERBERT : Service Number - 407144 : Date of birth - 08 Aug 1910 : Place of birth - ABERDEEN SA : Place of enlistment - ADELAIDE : Next of Kin - WOOLLACOTT MYRTLE Contents date range:1939 - 1948 Series number A9300 Control symbol WOOLLACOTT R H Citation NAA: A9300, WOOLLACOTT R H Item barcode 5259840 Location Canberra



From Collier File first picture and Woolcott File per the following

### RAAF WWII in Colour, No.7 – RAAF Avro Cadet

<sup>4</sup> J Bennett, *The Imperial Gift*, Banner Books, Maryborough, 1996, p.29.

<sup>5</sup> Air Board Agenda No. 1368 of 29 JAN 1930, approved by the Minister for Defence on 4 FEB 1930.

<sup>6</sup> C D Coulthard-Clark, *The Third Brother*, Allen & Unwin, Sydney, 1991, p.173.

<sup>7</sup> AM Sir Richard Williams, *These Are Facts*, AWM, Canberra, 1977, p.175.

<sup>8</sup> B A Winley, *Aussie Moths*, self-published, Kiama, 1997, p.182.

<sup>9</sup> Williams, p.176.

<sup>10</sup> R J Francillon, *The RAAF & RNZAF in the Pacific*, Aero Pictorials 3, Aero Publishers, Fallbrook CA, 1970, p.5.

<sup>11</sup> Indent Order (I.O.) No. from A6 Aircraft Status Cards E/E.88.

<sup>12</sup> N Parnell & T Boughton, *Flypast*, AGPS, Canberra, 1988, p.141; C D Coulthard-Clark, *The Third Brother*, Allen & Unwin, Sydney, 1991, p.182.

<sup>13</sup> A J Jackson, *Avro Aircraft since 1908*, Putnam, London, 1990, p.309.

<sup>14</sup> A6 Aircraft Status Cards E/E.88.

<sup>15</sup> Williams, p.184.

<sup>16</sup> Coulthard-Clark, p.182.

<sup>17</sup> G Pentland, *RAAF Camouflage & Markings 1939-45 Vol 1*, Kookaburra, Melbourne, 1980, p.14.

<sup>18</sup> J Goulding & R Jones, *Camouflage & Markings RAF Fighter Command 1936-1945*, Doubleday, New York, 1971, p.51.

<sup>19</sup> Quoting generic performance figures like this is fraught as always needs to be placed in context with the specific powerplant, but this basic/'even' comparison is from the Putnam series books.

<sup>20</sup> <https://www.goodall.com.au/australian-aviation/avrocadet/avro-cadet.htm> Goodall points out that a planned Australian production line for the Cadet was never established, but there is evidence that British factory jigs and forgings were brought to Melbourne in preparation. Also, the British civil training company Air Service Training Ltd at Hamble offered its fleet of second-hand same model Avro Cadets to the Australian Government, but the offer was declined.

<sup>21</sup> Parnell & Boughton, p.141.

<sup>22</sup> <http://www.adf-serials.com.au/2a6.htm>

<sup>23</sup> Goodall Aviation website.

<sup>24</sup> Parnell & Boughton, p.141.

<sup>25</sup> Parnell & Boughton, p.175.

<sup>26</sup> Parnell & Boughton, p.175.

<sup>27</sup> Williams, p.270.

<sup>28</sup> Goodall Aviation site:

<https://www.goodall.com.au/australian-aviation/dh94/dh94mothminor.htm>

<sup>29</sup> For example, official references for roundels were generally a description of the colours, but from OCT 1944 referred to roundels as Type I, Type II, Type III, etc (which related to the postwar invented 'non-official' references B, C, C1 respectively); AP 2656A Vol 1 Sect 6 Chap 2, and Chap 2 Table 1 of OCT 1944, Tanner pp.49-56.

<sup>30</sup> Lucas, p.13.

<sup>31</sup> The *Yellow* was introduced to the RAF roundel on 1 MAY 1940; P Lucas, *Camouflage & Markings No.2*, Scale Aircraft Monographs, Guideline Pubs, Luton, 2000, p.45. The RAAF policy AGI C.11 of SEP 1939 used AMO A.154 as a main reference, which introduces the Type-B roundel to fuselages (which would become the RAAF "M.1" roundel) in 1939; AMO A.154/39 of 27 APR 1939, cited in Tanner, p.1. The RAAF revised AGI C.11 policy of OCT 1940 introduced the outer *Yellow* ring to the "M.2" as the "M.3" roundel, and the tri-colour fin flash as the "M.4" marking. *Yellow* shows as a light colour on panchromatic film, but as a dark colour on orthochromatic.

<sup>32</sup> RAAFHQ DTS 9/1/442 of 12 SEP 1939.

<sup>33</sup> *RAF 2:5 type-B wing roundels varied in size with aircraft type, and with some as 25":63", 22":56", 20":50", or 16":40"; Goulding & Jones, Camouflage & Markings 1936-1945, Doubleday, New York, 1971. For the Walrus, this was typically 24":60"*

<sup>34</sup> The 1940 policy changed the M.1 roundels, in general, back to the M.2 – the only exception was for the Wirraway which retained the M.1 on upper wings. This was mandated by AGI C.11 *Issue 3* (note that *Issue 2* earlier in 1940 has been unavailable); RAAFHQ AGI C.11 *Issue 3*, of 3 OCT 1940, filed on 1/501/329.

<sup>35</sup> RAAF HQ Minute from CAS to AMOE 1/501/329(36A) of 29 MAR 1940. In this Minute from CAS (Burnett) to AMOE (Williams), CAS observes that for the roundel “a white circle is required” as the RAF has just done, and directs the RAAF “should conform with what has been decided in United Kingdom”.

<sup>36</sup> Bennett, *Imperial Gift*, p.195. In this book, I originally referenced V.B.2 being similar to Federal Standard 15056 *Blue* – but this colour is too dark, it should be closer to today’s FS 15183 *Bright Blue*, and of course using British colours, may have been close to today’s British standard of BS381C-175 *Light French Blue*.

<sup>37</sup> I K Baker, *Aviation History Colouring Book 1, Westland Wapiti*, Melbourne, 1995. I K Baker, *Aviation History Colouring Book 3, Hawker Demon*, Melbourne, 1995.

<sup>38</sup> NAA CRS A705/1 69/4/126 Pt.5. In addition, Air Board Agenda No 268, of 28 JUL 1922, provided similar details to amend Technical Order No 11.

<sup>39</sup> P Lucas, *Camouflage & Markings No.2*, Scale Aircraft Monographs, Guideline, Luton, Beds, 2000, p.13.

<sup>40</sup> Goulding & Jones, p.5.

<sup>41</sup> AMO A.154/39 of 27 APR 1939, cited in J Tanner, *British Aviation Colours of World War Two*, Arms & Armour Press, London, 1986, p.1.

<sup>42</sup> I K Baker, *Aviation History Colouring Book 4, Roundels, Tail Stripes (1)*, Melbourne, 1995, p.3.

<sup>43</sup> I K Baker, *Aviation History Colouring Book 12, Avro Anson (1)*, Melbourne, 1995, p.2.

<sup>44</sup> Bennett, *Imperial Gift*, p.196.

<sup>45</sup> RAAFHQ Routine Order No 248, of 24 OCT 1930.

<sup>46</sup> I K Baker, *Aviation History Colouring Book 66, RAAF Colour Schemes & Markings Part 2*, Queenscliff Vic, 2009, p.4.

<sup>47</sup> From mensuration, the *Blue* is 20” diameter, *White* is half that diameter at 10” when in 1:3:5 ratio it was 12” and thereby making the *Blue* 2” wider, and *Red* appears smaller at 3” diameter instead of 5”. No surviving documentation supports this.

<sup>48</sup> <http://www.adf-gallery.com.au/newsletter/ADF%20Telegraph%20Vol%2010%20Issue%203%20Winter%202020.pdf>

<sup>49</sup> <http://www.adf-serials.com.au/newsletter/ADF-Serials%20Telegraph%20Vol%2010%20Iss4%20v1d.pdf>

<sup>50</sup> Williams, pp.269-270.

<sup>51</sup> The syllabus of an air observer school included dead-reckoning navigation, signalling (morse and visual), reconnaissance, etc; the air navigation school gave the trained observer (who had survived the air observer and bombing-and-gunnery courses) a further four weeks’ instruction on astro-navigation. D Gillison, *RAAF 1939-1942*, AWM, Canberra, 1962, p.83.

<sup>52</sup> J Herington, *Air War Against Germany & Italy 1939-1943*, AWM, Canberra, 1962, pp.530-1; Williams, pp.300-1. This Ottawa Conference also recast the original EATS, greatly empowering Canada’s size and influence within the scheme, which probably accounts why they prefer reference to ‘The Plan’, and not to EATS.

<sup>53</sup> Australian-produced Wacketts, Wirraways and Tiger Moths also served on EATS and SFTS units.

<sup>54</sup> N M Parnell & C A Lynch, *Australian Air Force since 1911*, Reed, Sydney, 1976, p.54. From initial training, Australia would hand over 194 trainees per month for further training in Canada.

<sup>55</sup> J Forsyth, *The D.H.82A Tiger Moth in Australia*, Skyline, Melbourne, 1995, p.xxiii.

<sup>56</sup> CFS Unit History A.50 1940-1941.

<sup>57</sup> CFS Unit History A.50 18 APR 1942.

<sup>58</sup> NAA A9716/231 RAAFHQ Minute ACAS to DWB of 1 FEB 1940.

<sup>59</sup> *Units of the RAAF, Vol.8 Training Units*, pp.137-138.

<sup>60</sup> **Mensuration:** These larger, squat training numbers of 24” high x 18” in 3” strokes are determined by mensuration – the sizes of some aircraft markings are often provided here from mensuration (as there are no surviving technical documents to provide this). Similarly, the smaller training numbers are measured at 16” high x 10” in 2” strokes (i.e. doubled from the standard serial number characters 8” x 5” in 1” stroke). The fuselage roundels are measured at 20” diameter. Digital imagery, with large monitors, now makes it easier to accurately measure markings. For calibration, known dimensions are used and extrapolated – for instance, aircraft serial numbers are generally 8” high and 5” wide (Imperial measures used, as that was the standard of the day), and some Tech Orders provide roundel and fin flash dimensions. Generally, squadron code letters vary, applied by the unit, and no laid down standards survive. Such mensuration is accurate if the camera lens is directly perpendicular and horizontal to a flat subject. But perspective is further affected by fuselage curvature, or other shaped panels, and there can be camera lens imperfections. So while an imperfect art, in general sizes of aircraft markings can be provided inside a 2” (50mm) margin of error.

<sup>61</sup> RAAFHQ Technical Order AGI No. C.11 *Issue 1*, of 22 SEP 1939, RAAF file 9/1/396 based on RAF AMO A.154.

<sup>62</sup> AGI No. C.11 *Issue 1*, A/L 5, of 26 JAN 1940, RAAF file 150/4/658.

<sup>63</sup> CFS Unit History A.50 MAY 1940.

<sup>64</sup> RAAFHQ Technical Order AGI No. C.11 *Issue 3*, of 3 OCT 1940, filed as 150/4/852.

<sup>65</sup> CFS Unit History A.50 1940-1941.

<sup>66</sup> *Units of the RAAF, Vol.8 Training Units*, pp.137-138.

<sup>67</sup> CFS Unit History A.50 24 MAR 1941.

<sup>68</sup> RAAFHQ Technical Order AGI No. C.11 *Issue 3*, of 3 OCT 1940, para.4(a).

<sup>69</sup> 6SQN Unit History A.50 28 MAY 1940. E/E.88s identify these four Ansons for CFS as A4-18, A4-40, N4941 and N4977.

<sup>70</sup> GRB P-40 archives identifies that ‘15’ could possibly have been 41-24802.

<sup>71</sup> CFS Unit History A.50 18 APR 1942.

<sup>72</sup> *Units of the RAAF, Vol.1 Bases*, p.4.

<sup>73</sup> Cited in Tanner, p.1.

<sup>74</sup> Cited in Tanner, p.9.

<sup>75</sup> The Hurricane ‘B’ scheme was abandoned in JAN 1941 and future Hurricanes were produced in the ‘A’ scheme only. Goulding & Jones, p.64. For the Spitfire, on 14 JAN 1941 the ‘A’ and ‘B’ mirror scheme merged to become the ‘A’ scheme only; Morgan & Shacklady, p.624. However, the choice of which pattern to use as standard was left to individual companies, and for the Oxford in 1941 the ‘B’ scheme became the sole pattern.

<sup>76</sup> 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 hurriedly repainted, the type-C flash would be asymmetric with 13” *White*, 11” *Blue*.

<sup>77</sup> CFS A.50 Unit History, 18 MAY 1940.

<sup>78</sup> RAAFHQ AGI No. C.11, *Issue 3*, para 1(a) *Training Aircraft*, 3 OCT 1940 – subpara (i) covers *Scheme E.1*, subpara (ii) *Scheme E.2*.

<sup>79</sup> Museum of Applied Arts & Sciences website: <https://collection.maas.museum/>

<sup>80</sup> RAAFHQ AGI No. C.11, *Issue 3*, para. 1(a) *Training Aircraft*, of 3 OCT 1940.

<sup>81</sup> RAAFHQ AGI No. C.11, *Issue 3*, para. 4(b) *Training Aircraft*, of 3 OCT 1940. This Instruction also left to the discretion of the Station CO to allot different coloured numbers for identification to different units operating at the base.

<sup>82</sup> RAAFHQ AMOE Letter S.A.S.9984, DTS 368/41, of 23/12/41 filed as 1/501/329(53A). This directive referred to the troop carrier D.C.2 to comply with A.D.1157, the Anson to A.D.1159, and Wirraways and Battles to A.D.1160.

<sup>83</sup> RAAFHQ Letter 36/501/244 to CO 51(R)SQN, cDEC 1941, files as 1/501/329(56A).

<sup>84</sup> RAAFHQ file 1/501/329 Minute Sheet, *Minute 2* DTS to DCAS of 6 JAN 1942; *Minute 3* DCAS agreement same date.

<sup>85</sup> RAAFHQ Letter S.A.S.7396 DTS.280/42, filed as 1/501/329(63A), from DTS for AMEM to all Area HQs, of 18 JUN 1942.

<sup>86</sup> RAAFHQ AGI No. C.11, *Issue 4*, of 31 AUG 1942, filed as 150/4/852(1A). This AGI lists all the A.D. numbers (in Appendix I) for the various types.

<sup>87</sup> RAAFHQ T.O. AGI Pt 3(c), Instruction 1, file 150/4/5056 (1A), of 26 MAY 1944.

- <sup>88</sup> RAAFHQ AGI C No.11 of 22 SEP 1939, filed as 9/1/396(13), and which referred to the RAF AMO A.154.
- <sup>89</sup> RAAFHQ S.A.S. 2699 1/501/329(55A), undated but c JUL 1940.
- <sup>90</sup> Lucas, p.79. The MAP 33B/ stores reference series are stock numbers with the last three digits identifying the size of the paint can – so on the RAF Directorate of Technical Development (DTD) 314 scale, *Dark Green* 33B/201 was for a half-gallon can of varnish, 33B/202 a one-gallon can, and 33B/203 a five-gallon container. Similarly, the various size cans for *Dark Earth* were 33B/198 to 33B/200. The DTD specifications for compliance were DTD 314 (matt pigmented oil varnishes), DTD 308 (matt cellulose finish), or DTD 83A (aeroplane doping schemes); *Aircraft Design Memorandum No.332 (Issue 3)*, CD44/41, para.4, of 15 NOV 1940, filed on RAAFHQ 150/4/852(12).
- <sup>91</sup> I K Baker, *Aviation History Colouring Book 68, RAAF Colour Schemes & Markings Part 4a*, Queenscliff Vic, 2009, 'late news' inset.
- <sup>92</sup> RAAFHQ DTS directive 368/41, file 150/4/852(53A) of 23 DEC 1941, letter S.A.S.9984, paras.2 and 4.
- <sup>93</sup> AHCB 68, p.8.
- <sup>94</sup> AHCB 68, p.10; G Byk & P Malone, *RAAF Foliage Green*: [www.clubhyper.com/reference/foilagegreenrefgb\\_1.htm](http://www.clubhyper.com/reference/foilagegreenrefgb_1.htm)
- <sup>95</sup> RAAFHQ Aircraft General Instruction No.C.11 (*Issue 4*), Appendix 6, of 31 AUG 1942, NAA file A705 150/4/4400.
- <sup>96</sup> RAF ADM.332 (*Issue 3*) filed as RAAFHQ 150/4/852(12).
- <sup>97</sup> RAAFHQ file 1/501/329(53A), SAS.9984 also listed as DTS 368/41, of 23 DEC 1941. This message also directed that RAAF *Earth Brown* (K3/178) and *Foliage Green* (K3/177) be used instead of RAF *Dark Earth* and *Dark Green*. RAAFHQ file 1/501/329(63A), SAS.7396 also listed as DTS 280/42, of 18 JUN 1942
- <sup>98</sup> RAAFHQ AGI C.11 (*Issue 4*), Appendix I, of 31 AUG 1942.
- <sup>99</sup> Appendix I of the AGI noted that: A.D.1164 (twin-engined flying boats) be used for Sunderland and Empire, as no separate scheme for 4-engined flying boats was available (this was A.D.1163); A.D.1165 (twin-engined biplane flying boats) be used for Seagull V (Walrus), as no separate scheme for single-engined flying boats was available; A.D.1291 (4-engined biplanes) be used for Gannet, D.H.84 and D.H.89 as no diagram for these types was available (for the biplanes this was A.D.1175).
- <sup>100</sup> Neither the Kittyhawk nor Vengeance were listed.
- <sup>101</sup> Goulding & Jones, p.2.
- <sup>102</sup> NAA A11083 21/4/AIR, *NEA HQ Camouflage of Aircraft*, pp.73-74.
- <sup>103</sup> CFS A.50 Unit History, SEP 1944.
- <sup>104</sup> NAA A705 73/21/1050, RAAF file 1/501/398(8A) O.579/44, of 18 SEP 1944, pp.3,5.
- <sup>105</sup> NAA A705 73/21/1050(5A), of 26 SEP 1944.
- <sup>106</sup> NAA A705 73/21/1050, RAAF file 1/501/398(16A) Appendix D, of 20 NOV 1944, disposition as at 16 NOV 1944.
- <sup>107</sup> Sale prices from E/E.88s where marked; and NAA file A705 73/21/1050 RAAF file 8/101/1073(44A), of 21 MAR 1945, sheet 1.
- <sup>108</sup> Details from E/E.88 cards, and Geoff Goodall Aviation site.
- <sup>109</sup> 'WINGS' magazine, RAAF, Melbourne, 6 MAR 1945, p.10. This article "The Commonwealth Disposals Commission has 87 for sale", also mentions 20 Moth Minors, 5 Gipsy Moths, 23 Ryans, and the odd Dolphin, Waco and Gannets being available.
- <sup>110</sup> <http://www.adf-serials.com.au/2a6.htm>

## The Loss of A55-2

- <sup>111</sup> RAAF Form E/E.88 Record Card – Airframes, Aero Engines, Mechanical Transport and Marine Craft for A55-2 in Aircraft Status Cards Lockheed Lightning A55-1 to A55-3; NAA: A10297, BLOCK 364.
- <sup>112</sup> Confirmatory Memorandum – Casualty F/LT. A.T. CRIDLAND-424 in Lockheed Lightning A55 Accidents; NAA: A9845, 95.
- <sup>113</sup> RAAF Form P/P29A, Confidential Report (Officers) for Cridland Alan Thomas in Personal File Cridland Alan Thomas 260424; NAA: A9300, CRIDLAND A.T.
- <sup>114</sup> RAAF Form P/P, Application for a Commission in the Citizen Air Force for Cridland Alan Thomas, *ibid*.
- <sup>115</sup> RAAF Form P/P64, Record Sheet – Officers and Airman Pilots for F/O Alan Thomas Cridland, *ibid*.
- <sup>116</sup> RAAF Form P/P29A, Confidential Report (Officers) for Cridland Alan Thomas, *ibid*.
- <sup>117</sup> RAAF Form P/P64, Record Sheet – Officers and Airman Pilots for F/O Alan Thomas Cridland, *ibid*.
- <sup>118</sup> Confirmatory Memorandum – Casualty F/LT A.T. Cridland 424, dated 27 Nov 1942, enclosure 22a in Casualty Repatriation File Cridland Alan Thomas 260424 20 November 1942; NAA: A705, 163/26/288.
- <sup>119</sup> *Ibid*.
- <sup>120</sup> Confirmatory Memorandum – Casualty F/LT. A.T. CRIDLAND-424 in Lockheed Lightning A55 Accidents; NAA: A9845, 95.
- <sup>121</sup> Lockheed Aircraft Corporation training film *P-38 Flight Characteristics*, monologue delivered by Lockheed's then Chief Engineering Test Pilot, Milo Burcham (n.d.).
- <sup>122</sup> T.O. 01-75F-1, *Pilot's Flight Operating Instructions for Army Models P-38 Series, F-4 and F-5 Series* (1942), Section III, Models P-38D, P-38E, F-4, Sheet 4 of 12, Flight Operation Instruction Chart, Single Engine, Weight 15,500 to 13,700 pounds.
- <sup>123</sup> Provided the inoperative engines propeller was feathered.
- <sup>124</sup> T.O. 01-75F-1, *Pilot's Flight Operating Instructions for Army Models P-38 Series, F-4 and F-5 Series* (1942), Section II, para 21 (j).
- <sup>125</sup> *Ibid*, Section II, para 10 (c), sub-para (1) (d).
- <sup>126</sup> *Ibid*, Section II, para 12 (e), sub-para (4).
- <sup>127</sup> *Ibid*, Section II, para 10 (c), sub-para (1) (a).
- <sup>128</sup> *Ibid*, Section II, para 14 (a).
- <sup>129</sup> T.O. 01-75FF-1, *Pilot's Flight Operating Instructions for Army Models P-38H Series, P-38J-5 and F-5B-1* (1943), Section II, para 19 (d), sub-para (1).
- <sup>130</sup> *Ibid*.
- <sup>131</sup> Memorandum from Headquarters, North Western Area to Headquarters RAAF Command titled "Photographic Reconnaissance Unit Aircraft", dated 2<sup>nd</sup> April, 1943, in RAAF Command Headquarters – Photographic Reconnaissance Units – Policy; NAA: A11093, 320/6Z.
- <sup>132</sup> AAF 51-127-1, *Pilot Training Manual for the Lightning P-38* (1945), Superchargers and Throttle, p26.
- <sup>133</sup> *Ibid*, Superchargers and Throttle, Turbo Supercharger Regulator, p27.
- <sup>134</sup> AP1596A & B-PN (2<sup>nd</sup> Ed), *Pilot's Notes for Oxford I & II, Two Cheetah X Engines* (1944), Part II, para 60 (iii) and (iv).
- <sup>135</sup> *Ibid*, Part IV, para 71 (i).
- <sup>136</sup> *Ibid*, Part IV, para 72 (i), (ii) and (iii).
- <sup>137</sup> *Ibid*, Part IV, para 70 (i), (ii) and (iii).
- <sup>138</sup> T.O. 01-75F-1, *Pilot's Flight Operating Instructions for Army Models P-38 Series, F-4 and F-5 Series* (1942), Section II, para 9 (j).
- <sup>139</sup> *Ibid*, Section II, para 10 (c), sub-para (2) (c).
- <sup>140</sup> *Ibid*, Section II, para 10 (c), sub-para (1) (e).
- <sup>141</sup> RAAF Form A50, Operations Record Book of No.1 Photographic Reconnaissance Unit, entry June 1942 in RAAF Unit History Sheets 1 PRU Number 87 Squadron Jun 42 – Oct 53; NAA: A9186, 118.
- <sup>142</sup> RAAF Form A50, Operations Record Book of No.1 Photographic Reconnaissance Unit, entries for July 1942 in RAAF Unit History Sheets 1 PRU Number 87 Squadron Jun 42 – Oct 53; NAA: A9186, 118.
- <sup>143</sup> RAAF Form A50, Operations Record Book of No.1 Photographic Reconnaissance Unit, entries for August 1942, *ibid*.
- <sup>144</sup> RAAF Form A50, Operations Record Book of No.1 Photographic Reconnaissance Unit, entry titled "Change of Command", *ibid*.
- <sup>145</sup> RAAF Form A50, Operations Record Book of No.1 Photographic Reconnaissance Unit, Sheet No.6, November, 1942, "Training", *ibid*.

- <sup>146</sup> RAAF Form A50, Operations Record Book of No. 1 Photographic Reconnaissance Unit, entry for "Photographic Survey and Operations" of November, 1942, *ibid*.
- <sup>147</sup> RAAF Form A50, Operations Record Book of No.1 Photographic Reconnaissance Unit, November, 1942, "Lockheed Lightning", *ibid*.
- <sup>148</sup> Enclosure 23b, Letter from Lloyd Law to Mrs M Cridland, dated 23 November, 1942, in Casualty Repatriation File, Cridland Alan Thomas, 260424, 20 November, 1942; NAA: A705, 163/26/288.
- <sup>149</sup> Enclosure 31a, Advise to Next of Kin Re Naming of Aerodromes, dated 22<sup>nd</sup> January, 1943, *ibid*.
- <sup>150</sup> Enclosure 20a, Letter from Frank Cridland (Alan Cridland's father) to The Secretary, Department of Air, dated 30<sup>th</sup> Nov. 1942, *ibid*.

#### **Former RAAF Aerodromes, Part 4**

- <sup>151</sup> North Western Area Aerodromes and Landing Strips (Existing and Projected) Named After RAAF and USAAC Pilots Killed or Missing During This War. NAA: A9695, 18.
- <sup>152</sup> RAAF Landing Ground Gorrie will appear in Aerodromes, Part 5.
- <sup>153</sup> RAAF and Civil Official Lists of Aerodromes, Emergency Landing Grounds and Flying Boat Bases Australia and Territories. NAA: A9716, 1555.
- <sup>154</sup> North Western Area Aerodromes and Landing Strips (Existing and Projected) Named After RAAF and USAAC Pilots Killed or Missing During This War. NAA: A9695, 18.
- <sup>155</sup> Memorandum "Lease:Lend Expenditure – North Western Area" dated 23/MAR/44 in RAAF Emergency Landing Ground Pine Creek NT. NAA: A705, 7/1/1578.
- <sup>156</sup> RAAF and Civil Official Lists of Aerodromes, Emergency Landing Grounds and Flying Boat Bases Australia and Territories. NAA: A9716, 1555.
- <sup>157</sup> Cabinet Submission No.844, "Construction of an Additional Airfield in the Northern Territory", dated 25<sup>th</sup> July, 1963 in RAAF Tindal NT – Construction of Airfield. NAA: A703, 589/27/4 PART 1.
- <sup>158</sup> Folio 2, document titled, "An Examination of Runway Sites, Katherine Area", nd but examinations were conducted on the 24<sup>th</sup>, 25<sup>th</sup> and 26<sup>th</sup> July, 1962 in RAAF Tindal NT – Construction of Airfield. NAA: A703, 589/27/4 PART 1.
- <sup>159</sup> Letter to the Secretary, Department of Air, "New Airfield in the Northern Territory", dated 5<sup>th</sup> December, 1962 in RAAF Tindal NT – Construction of Airfield. NAA: A703, 589/27/4 PART 1.
- <sup>160</sup> Folio 2, document titled, "An Examination of Runway Sites, Katherine Area", nd but examinations were conducted on the 24<sup>th</sup>, 25<sup>th</sup> and 26<sup>th</sup> July, 1962 in RAAF Tindal NT – Construction of Airfield. NAA: A703, 589/27/4 PART 1.
- <sup>161</sup> North Western Area Aerodromes and Landing Strips (Existing and Projected) Named After RAAF and USAAC Pilots Killed or Missing During This War. NAA: A9695, 18.
- <sup>162</sup> RAAF and Civil Official Lists of Aerodromes, Emergency Landing Grounds and Flying Boat Bases Australia and Territories. NAA: A9716, 1555.
- <sup>163</sup> North Western Area Aerodromes and Landing Strips (Existing and Projected) Named After RAAF and USAAC Pilots Killed or Missing During This War. NAA: A9695, 18.
- <sup>164</sup> RAAF and Civil Official Lists of Aerodromes, Emergency Landing Grounds and Flying Boat Bases Australia and Territories. NAA: A9716, 1555.
- <sup>165</sup> Memorandum "Lease:Lend Expenditure – North Western Area" dated 23/MAR/44 in RAAF Emergency Landing Ground Pine Creek NT. NAA: A705, 7/1/1578.
- <sup>166</sup> RAAF and Civil Official Lists of Aerodromes, Emergency Landing Grounds and Flying Boat Bases Australia and Territories. NAA: A9716, 1555.
- <sup>167</sup> Memorandum "Lease:Lend Expenditure – North Western Area" dated 23/MAR/44 in RAAF Emergency Landing Ground Pine Creek NT. NAA: A705, 7/1/1578.
- <sup>168</sup> North Western Area Aerodromes and Landing Strips (Existing and Projected) Named After RAAF and USAAC Pilots Killed or Missing During This War. NAA: A9695, 18.
- <sup>169</sup> RAAF and Civil Official Lists of Aerodromes, Emergency Landing Grounds and Flying Boat Bases Australia and Territories. NAA: A9716, 1555.

#### **Curtiss Corner**

- <sup>170</sup> Per GRB 49<sup>th</sup> FG research per held file, KITTYLITTER-Master 22-03-2019.xls. P-40E-1 41-25185 CW#970 Msn 19696 RAF ET509 Ex A29-95, 49<sup>th</sup> FG Group Number #48, 8<sup>th</sup> FS/49<sup>th</sup> FG, NYC Netherlands contract. Sent 9/03/1942, Rec 22/07/1942, 8<sup>th</sup> FS as #48 and named "Sissy". Shipped New York City to Australia Proj X 08/03/42 to RAAF as A29-95 26<sup>th</sup> Apr 1942. Returned to USAAF after only 4 days. Wrecked 22/07/42, 1 mile NE of Livingstone Strip, NT. Lt Arthur Fielder. Stalled, crashed and burned. A29-95 later allocated to 41-25177.