



# The Territory Remembers

## The Discovery of RAAF Spitfire A58-92 in Darwin Harbour's West Arm

By Dr Silvano Jung

**The 53rd Japanese air raid on Darwin on 15 March 1943 comprised 22 Betty bombers and an escort of 27 Zero fighters. To intercept them, the Royal Air Force and Royal Australian Air Force scrambled 27 Spitfires from Nos. 54, 452, 457 Squadrons. It was the largest aerial battle over Darwin and the first over Darwin Harbour since the devastating 19 February 1942 air raids. The Allies suffered the loss of four Spitfires and the Japanese lost one Zero in aerial combat. One of the Spitfires was reported to have crashed in Darwin Harbour's West Arm.**

It is believed that the wreck is that of RAAF's 452 Squadron's Squadron Leader (S/Ldr) Raymond Thorold-Smith, Distinguished Flying Cross (DFC), who flew in Spitfire Serial Number A58-92.

A Spitfire was seen to have crashed in the vicinity of West Arm on the day of the battle and aircraft were dispatched to search the area, but no trace of it, or its pilot was found.<sup>1</sup>

It was not until the 1960s that the first report of a wreck having been found in West Arm was made. The Aviation Historical Society of the Northern Territory subsequently identified the wreck in the 1980s. The pilot, however, was missing, adding speculation to one of Darwin Harbour's great mysteries. The site first drew archaeological attention when, in 2002 aboard a Robinson R44 (VH-ZLG), an aerial survey was undertaken by the author to record all exposed wreck sites in Darwin Harbour during the lowest tide of the year.

Darwin Harbour's tidal variations are immense, with tides varying as much as 7.8 metres.<sup>2</sup> During king low-tide events, shallow water shipwrecks and World War II aircraft wrecks are exposed. The target site in Darwin Harbour's West Arm, the Spitfire, was not found. In the intervening years, subsequent research found site location data by previous site visitors and it was decided that another attempt would be made to locate the wreck during the king low tide on 10 October 2014. This time, the wreck was found. This article brings the wreck into mainstream archaeological research by providing a verifiable site location with GPS coordinates and recording a basic site description to see how much the site had changed from it was last recorded to have been visited in 1987 – a 27 year interval. The results of this survey are a contribution to understanding the Northern Territory's rich maritime and aviation archaeology.<sup>3</sup>

### Historical background

The Australian National Shipwreck and Aircraft Wreck database lists more than 100 aircraft wrecks in the Northern Territory, most of which occur in the sea.<sup>4</sup> Of those submerged sites, only six Catalina flying boat wrecks, a B-25 Mitchell bomber and that of a C47 Dakota have been located. The West Arm Spitfire is the only fighter aircraft that has been found in Darwin Harbour.

There is at least one other Spitfire said to be exposed at a king low tide near Charles Point, which is thought to be that of Spitfire A58-26 flown by Sgt Cavanagh, but no accurate site location has yet been recorded and it is not known if



it is still there. No. 7 Repair and Salvage Unit (No. 7 RSU) inspected the site by boat and minor salvage work was carried out. They identified the wreck as that of BS293, but this may be in error. Further attempts were made to reach the site by land when it was practicable, but there is no further mention in the RAAF Unit History Sheets that they returned to salvage the aircraft entirely.<sup>5</sup>

### Pilot biography

Squadron Leader Raymond Edward Thorold-Smith (Service number 402144) was born in Manly, Sydney, on 30 June 1918, but it is recorded that the family had lived in the country town of Young, NSW, for a period of time. He was the only child of Mr and Mrs Joseph P Thorold-Smith. He was educated at Christian Brothers in Manly and Waverly where, in his final year, he won a scholarship to enroll at St Johns College, University of Sydney. Just prior to the war, he was in his final year of medicine and excelled at many sports such as cricket, swimming, and athletics. He rowed in the college eight (a competition between the eight colleges of the University of Sydney) and played water polo. A keen Surf Life Saving member, his main sports interest was Rugby Union, where he was awarded University and Australian Universities Blues for outstanding sporting achievements. While in the University Regiment he transferred to the Australian Imperial Force (AIF) Ordnance Transport Corps and was quickly promoted. He enlisted in the RAAF on 27 May 1940 and was chosen as one of the first entrants in the Empire Air Training Scheme. In NSW he trained at RAAF Base Richmond and RAAF Bradfield Park.

He was posted to the United Kingdom and arrived via Canada on 7 February 1941. Six days later, he was attached to Number 57 Operational Training Unit. Within his training period and operations service, Thorold-Smith flew a diversity of aircraft type including Tiger Moth, Anson, Harvard, Wirraway, Ryan, Master (Miles) Magister, Hurricane and Spitfire. On 18 April 1941 he joined No. 452 Sqn. RAAF, the first Australian Spitfire Squadron, and flew combat missions against the Luftwaffe for a couple of months, and in that time claimed five and a half kills.

Promoted to Flight Lieutenant on 15 October 1941, he was awarded the DFC on 22 November 1941 for gallantry in air operations. Quickly rising through the ranks, he was made Squadron Leader of 'A' Flight of No. 452 Sqn. on 17 March 1942. The squadron embarked for Australia on 18 June 1942 and arrived 13 August 1942. They were posted to Batchelor Airfield and finally to Strauss Airfield from 2 February 1943.

At the time of his death he was regarded as a popular figure in the squadron. He was described as: "tall, rangy and loose jointed, very calm and collected". As Gavin McEwin, the duty controller at Batchelor, remembered he "always looked as though he had fallen into his clothes rather than dressed". (Alford, 2001:99)

His assessment of his flying abilities, however, records that he was an exceptional pilot when he served in No. 452 Sqn. His loss was greatly felt by all in No. 1 Fighter Wing and a blow to morale. He was seen as

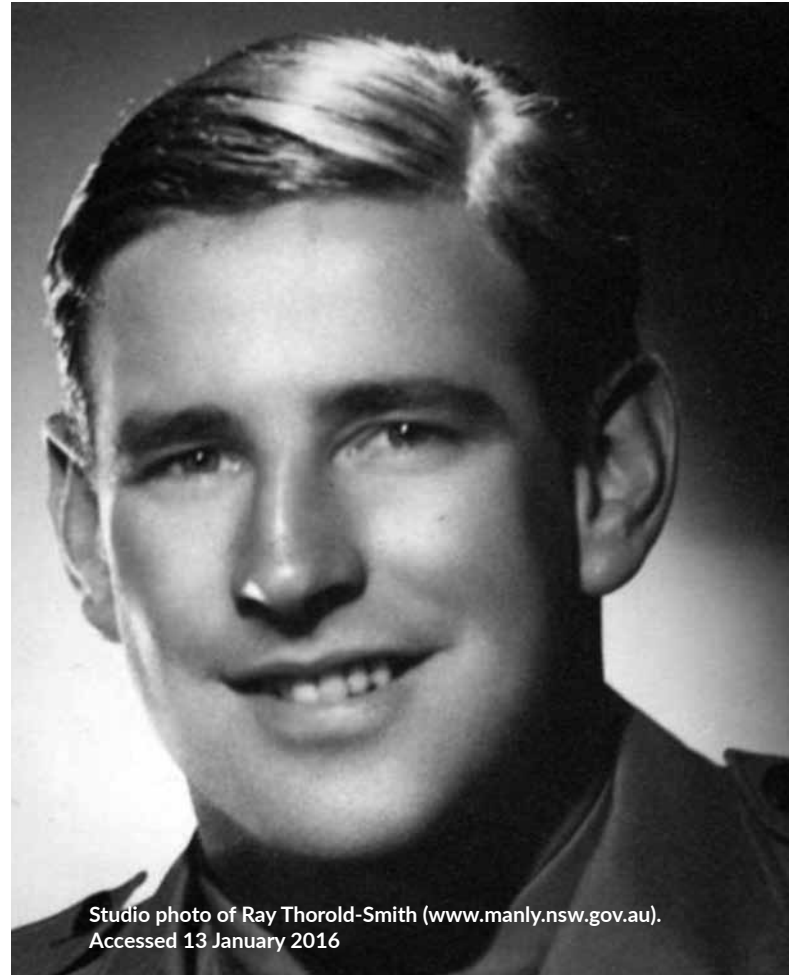
"... an inspiring Commanding Officer who endeared himself to every member. He was a man of enthusiasm and burst of great energy. He had an acute intellect, which enabled

him not only to grasp the essentials of fighter aviation, but also subjects as remote as swing music or modern poetry." (Thomas, 2009:13).

### Aircraft history and description

The Spitfire is one of the best-known aircraft ever produced, made famous by its role in the Battle of Britain. It was an outstanding single-seat fighter of its time, a masterpiece of aerodynamic engineering. The Spitfire was the British Air Ministry's response to Germany's Messerschmitt 109 fighter dominance of the sky. Produced by Supermarine Aviation Works, there were 20,334 Spitfires of all variants built, of which there were 2,447 Mk. Vc, the marque that mainly constituted those which served in Northern Australia. The main differences between the earlier Mk. IV and the Mk. Vc were that the latter had a strengthened fuselage, revised canopy, a more powerful Rolls-Royce Merlin 45 (XLV1) engine, a drop tank and provisions for carrying bombs. The 'C' variant saw the first use of the universal wing that could be configured for different weapon arrangements, either four 20-mm Hispano cannons or two cannons and two 12.7-mm (0.5-in) machine guns. Most 'C' variants only had the two cannon configuration as the four cannons provided too heavy a loading for the wing. The 'C' variant also had more armour for the pilot seat and ammunition boxes.

The RAF and RAAF sent its Vc Spitfires to North Africa and Malta and these were fitted with a distinct Vokes tropical air intake. Three Spitfire squadrons were sent to bolster the defence of Darwin – No. 54, No. 452 and No. 457. The latter two were RAAF flown by Australian pilots who were sent to North Australia as part of a contingent of aircraft known



Studio photo of Ray Thorold-Smith ([www.manly.nsw.gov.au](http://www.manly.nsw.gov.au)). Accessed 13 January 2016

as the 'Churchill Wing', or No. 1 Fighter Wing. The wing was formed at Richmond in NSW on 7 October 1942 to coordinate the three squadrons. 'Capstan' BS231 arrived in Australia on board SS Teak (or Timoclea) on 29 October 1942. 'Capstan' was a code name for Spitfires, as the RAAF did not want the Japanese to know that they had them in Australia. It was recorded as serviceable after assembly shortly after. The aircraft was coded 'QY-D' and was stationed at Strauss Airfield with 452 Sqn. An engine number for BS231 is recorded to have been 91465, which is significant in helping to identify its wreck. Apparently BS231 was never painted with its RAAF designation, A58-92, which was retroactively recorded on paper in November 1943.

### Account of loss

*"The combat raged so close over Darwin that the A-A [anti-aircraft] unit summary for the raid recorded 'NOT allowed to engage'. Cliff Taylor; a gunner with the 19th HAA Bty [Heavy Anti-Aircraft Battery] at Fannie Bay wrote that '...They clashed right overhead. Dogfights ranged from about 25,000 ft down to almost ground level with some of the Spits going straight at the bombers. Planes wheeling, milling, machine guns, cannon fire (the haze remained for nearly an hour), planes on fire, pilots bailing out, men dying - it's hard to image that this happened in Australia. I shall never forget the air battles.'" 20*

Japanese air raid Number 53 began on the morning of 15 March 1943 with Nos. 109 and 132 Radar Stations at RAAF Darwin picking up a contact at 10.39am. The contact was initially believed to be a reconnaissance flight, but was soon confirmed by coast watchers on Bathurst Island that it was an air raid. At 10.30am Thorold-Smith was airborne with four other Spitfires heading back to Strauss from Darwin after night-flying practice and was ordered to intercept the raiders after rendezvousing with other aircraft from 54 Sqn., which had just been scrambled from Strauss. Prior to the rendezvous, however, two of his Spitfires dropped out of formation due to lack of oxygen, leaving only F/Lt Hall and F/O Goldsmith DFC, Distinguished Flying Medal (DFM) in the section. 21

Thorold-Smith did not wait for the rendezvous. Other Spitfires from 452 and 457 Sqns were scrambled and on their way for the planned attack en-mass (or RAAF's 'big wing' doctrine), 22 but out-numbered and out-gunned he attacked the bomber formation anyway. He led his section and elements of 54 Sqn., 19 Spitfires, in a badly staggered formation towards the bombers, which were encountered at 21,000 feet when at about:

*"500 feet above the bombers S/LDR. THOROLD-SMITH gave the order to attack the bombers, the section made for the bombers, but were intercepted by the enemy fighters.*

*Neither F/LT. HALL nor F/O. GOLDSMITH actually saw what happened to S/LDR. THOROLD-SMITH in the attack, as they themselves were jumped by the enemy fighters and had to take evasive action. About 30 seconds after the initial attack F/LT. HALL saw a Capstan, smoking, in a vertical dive: this is presumed to have been S/LR. THOROLD-SMITH's aircraft. The action took place approximately over POINT CHARLES." 23*

Three other Spitfires were shot down that day and these are recorded in Table 1, together with all other Spitfires recorded to have been lost. There were many more accidents at

airfields, but Table 1 only records the Spitfires that may still be in the archaeological record. Of the 24 Spitfires lost in the Northern Territory, 19 resulted in pilot death and of those pilots, 12 are still missing. Focusing on the casualties for 15 March 1943, Spitfire A58-9 flown by F/Sgt Cooper, 54 Sqn. crashed near Shell Island in East Arm. The wreck and Cooper's body was recovered. The third was Spitfire A58-8 (ex-AR619) flown by F/Sgt Varney, also of 54 Sqn. He crashed near Kahlin Hospital, between two houses at Myilly Point. Varney died of his injuries the next day. Both pilots were buried at the Adelaide River War Cemetery on 16 March 1943. A photograph of a crashed Spitfire appears to be of that Varney's aircraft, crashed between two houses at Myilly Point, though it is captioned as that of Spitfire A58-101, flown by F/O Lloyd at Picnic Point, crashed at Cox Peninsula. 24 Lloyd managed to bail out and parachute to safety.

The action that day continued after the bombers successfully delivered their bombs. Once the other Spitfire squadrons came over Darwin, the Japanese were by this time heading back to Timor and were intercepted at sea off Charles Point and Port Patterson. The Japanese lost one Zero in the ensuing contact: Japanese records detail two Zekes lost with one, PO2c Seiji Tajiri, listed as missing; the pilot of A6M2 Zeke No. 6540, Tajiri was downed by 54 Sqn. pilot, FlgOff A. Mawer. 25 Only one Japanese pilot was actually lost. Mawer gives an account of the Zero's loss over Darwin Harbour, but greatly exaggerates the losses:

*"One got on my tail and sent tracer past my left wing but followed it past in an overshoot. I kicked the rudder to follow and when I had closed to 50 yards opened fire, allowing one ring's worth of deflection on the sight. He began to roll and I continued firing until the range had opened out to 200 yards. Intense flames then flickered from his underside. It was his belly tank, which he must have forgotten to jettison when the action began. He rolled onto his back and went straight down. I followed, giving him squirt after squirt. I was also keen to get away from the assorted jobs still on my own tail. He burnt like fury and was doing about 450 mph when the wings tore away. As he went into Darwin Harbour, near the boom, three other Zeros were going in too. It was a great sight. I pulled out at 1000 feet, going like the clappers, and headed back for the 'drome.'" 26*

Tajiri and his Zero have never been found, but the three other Spitfires lost that day were recovered on land. Observers from 65 Anti-Aircraft Searchlight Battery site on Flagstaff Hill at the end of Myilly Point recorded seeing an aircraft go down. The following day 5 Fighter Sector reported to 452 Sqn. the observation of the crash. This, in hindsight, was a crucial clue in later identification of the wreck:

*"... a Capstan aircraft had been seen to crash on a bearing of 230 degrees from FLAGSTAFF HILL at approximately 8 miles from it. Four aircraft were immediately sent out to search this area, but no crash was found.*

*A map giving the exact position of the crash seen from FLAGSTAFF HILL was sent up to No. 452 Squadron from Fighter Sector. An aircraft was sent up to this point, but nothing was seen." 27*

Wing Commander Clive Caldwell had lost a comrade and a friend. He searched the area with other pilots, but no trace of wreckage, oil slick, debris, rubber boat or parachute could be found. 28 Thorold-Smith and his Spitfire had simply



disappeared without trace for 23 years, until one day someone spotted an unknown aircraft wreck in West Arm, exposed at a king low tide. It took another 21 years before it was identified as that of Spitfire A58-92.

### Previous site visitors

Lugger skipper Cedric Hawkes, who ran a coastal shipping business, found the wreck of an aircraft in the early 1960s. He was returning from the West Arm landing when his boat became trapped by the ebbing tide. He saw wreckage on the opposite bank to where his boat was and notified police upon his return to Darwin. It was not until 1966 that a Shark Cat was sent out to investigate. Police found the wreck and recovered a Perspex cockpit canopy, but found no human remains.<sup>29</sup> They

recovered other artefacts too that included the aircraft's weapons, but lost a cannon on the return trip to Darwin, in a manner reminiscent of the 'Keystone Cops'. As reported in *The Northern Territory News* at the time:

*"RAAF security police and CIB detectives yesterday recovered two machine guns and a cannon off a wrecked warplane in West Arm.*

*But choppy seas forced police to abandon the heavy cannon in mid-harbor as they feared its movement would plunge it through the bottom of the boat.*

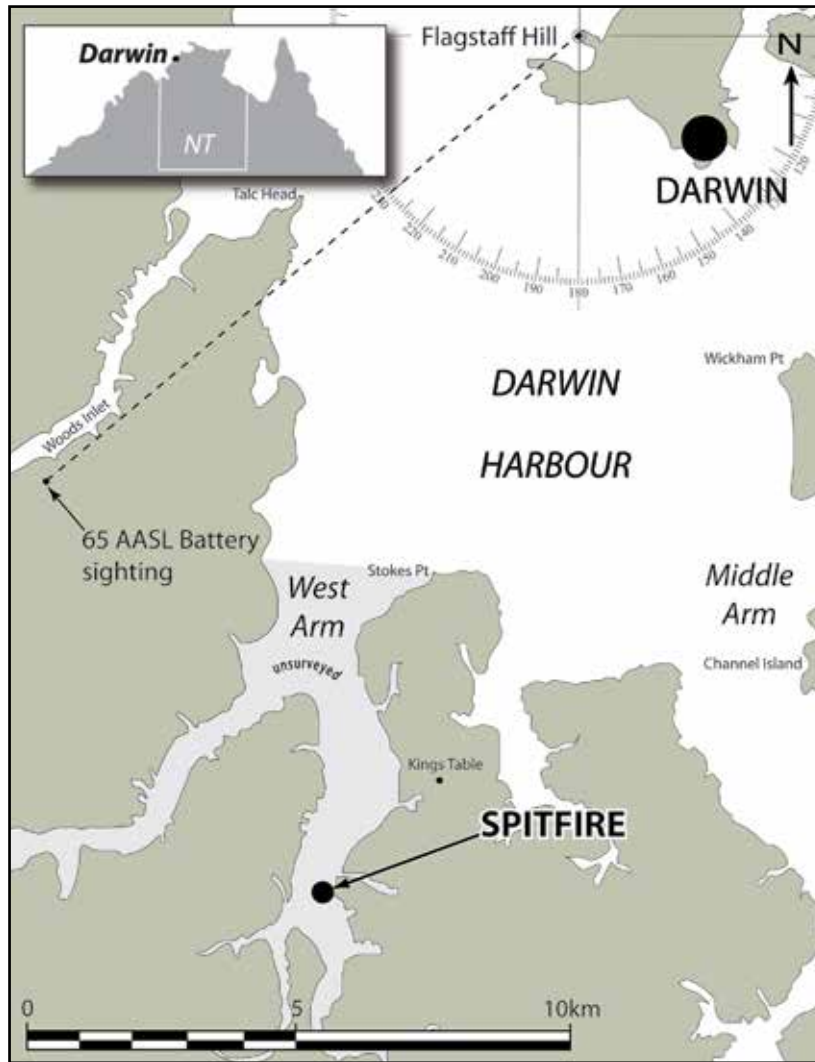
*The single engine, four gunned aircraft, riddled with cannon and machine gun fire, is deeply embedded in mangrove mud up West Arm and is only visible at very low tide.*

*Although the wreck has not yet been positively identified, RAAF authorities believe it was a Spitfire fighter, piloted by an Australian airman.*

*Darwin CIB chief, Detective Sergeant Len Cousins and Mr Vern Jenkins, of the RAAF security, found the plane's magazines loaded with ammunition, and live rounds in the breaches of the guns. Indicating the plane was shot down during a dog fight with Japanese Zeroes.*

*Squadron Leader Fosdike of the Darwin RAAF said today he had known of the wreck for some time.*

*The position of most planes shot down during battles over Darwin are known to the RAAF although these wrecks are*



now just coming to public attention through publicity given to other wrecks found earlier in the year' he said. He said he had no details on the plane as yet but if given its registration number could probably ascertain during which engagement it was lost."<sup>30</sup>

The next recorded visit was on 6 November 1983 when Glenn R Smith produced a report titled *West Arm Spitfire*, but this report has not been cited in this research. Photographs, however, were taken during the expedition and one of these shows clearly the scour zone the wreck lies in. Of note are the bent propeller blades. Only two of the three remain on site, but they clearly show damage consistent with a power-on impact.

Darwin aviation historian Bob Alford was on another trip out to the site on 4 December that same year with Peter Dermoudy,

who was undertaking a survey of World War II sites for the Museum and Art Galleries Board of the NT. The tide state was recorded as 0.6 metres at 12.04pm.

Alford states that his role in the expedition was to "safely remove any remaining armament including weapons and report derelict ammunition, and to recover the aircraft identification plate, which hopefully would remain in the cockpit area."<sup>31</sup> Some mention is made of Smith's report in Alford's work, which provides a glimpse of what the wreck would have looked like in December 1983. The wreck was found at approximately Latitude 12° 36' 15"S and Longitude 130° 47'E in the upper reaches of West Arm on the eastern bank with the wreck's orientation as almost north-south. The propeller was attached to the gearbox, which had broken off from the engine. The propeller, as discovered later, was stood up and wired back up to the engine by previous unofficial site visitors.<sup>32</sup> The propeller, therefore, was not found in situ by the December 1983 expedition team. The engine was described as relatively intact, but that the rocker cover and exhaust assembly had fallen off the port cylinder bank. The firewall was relatively complete and most of the airframe was there, but heavily corroded and collapsed, albeit in articulated positions. The site was strewn with ammunition in very good condition.

Alford elaborates on the site description and records an inventory of artefacts recovered by the December 1983 expedition. The wreck lies on a bearing of 350° with its

undercarriage in the retracted position. The starboard wing was covered in mud and the whole site lies in a scour depression. Currents had dug out the mud around the wreck, leaving it exposed at low tide in a pool of murky water. The propeller was recorded to have been in coarse pitch, not the configuration it should have been if a pilot was about to ditch. The aircraft was found to be in a straight and level attitude.<sup>33</sup> The wreck's condition gave rise to a theory that Thorold-Smith had ditched his aircraft, but this would seem to have been quite an achievement:

*"The Spitfire was a very dangerous aircraft to ditch, as it did not so much land on the water as dive into it upon first impact. This is reflected in the advice given to 'Bluey' Truscott by his flight commander, 'Paddy' Finucane, upon his joining 452 early in 1941: 'Don't ditch her, Truscott. If you are over water and in trouble, bail out ... get out of her fast. She doesn't take to water like a duck; she takes to it like a fish and goes straight down.'"*<sup>34</sup>

A wreck site plan was also produced during the December 1983 expedition, but this has not been cited. Whether the wreck site's morphology can give archaeologists an indication as to how the aircraft crashed is yet to be determined, given that previous site visits had no regard for archaeological considerations and were, if unknowingly, contributors to the site's contamination. Aviation archaeology was characterised in the 1980s as an antiquarian pursuit and the study had yet to formulate its own theoretical framework to answer research questions, as in historical archaeology. Previous site visitors, despite their best intentions, have often been described colloquially as an old fashioned 'Boys' Own Adventure' and have done more damage to the site than 72 years of immersion in salt water. Alford's work in particular, however, was a beginning to not just recovering objects from aircraft wrecks, but also recording the context of their finds, which archaeologist can study.

A list of the artefacts recovered in a subsequent visit on 14 February 1987 was made and all finds were left with the Aviation Historical Society of the Northern Territory's museum, some 12 objects including rounds of ammunition. These are listed below:

1. Engine Identification Plate [Merlin 46 No. 91405/A339973
2. Hispano 20mm Cannon, serial No C6117
3. Browning .303" machine gun, serial No BS190577
4. 20mm ammunition, including HE and SAPI
5. .303" ammunition including tracer rounds
6. Gunsight
7. Compass
8. Undercarriage control quadrant
9. Armour plate
10. Glycol [Oil] header tank [Serial No. WB / 1293 28]
11. Medicine bottle
12. Smaller items including instruments, fuse assemblies, priming pump, trim tab wheel, and rudder pedal.<sup>35</sup>

A search of the museum was made in 2015, but only two objects could be found – an exhaust said to be from the wreck, probably recovered in the November 1983 expedition but not confirmed, and the aircraft's undercarriage control quadrant, which Alford, with the assistance from the RAAF, had restored. Of particular interest is an engine identification plate. One such plate was recovered in the November 1983

expedition, but no data was recorded. It is important to note the discrepancy with the engine number recorded by the Pacific Wrecks website and that of the plate discovered in the December 1983 expedition. That plate's number was Merlin 46 No. 91405/A339973.<sup>36</sup> Going by the first number's prefix only, it is clear that the two do not correlate. How then was the wreck identified?

### Identification of the wreck site

*"When the investigation to identify the wreckage commenced in 1986, we are told only the details taken from the engine nameplate and the location of the wreckage. From the engine nameplate, it was established that the aircraft had been one of the Mk VC tropicalised Spitfires, the type flown in the area all through 1943 and well into 1944. In a letter, Ted Hall – the commander of 'A' Flight in No. 452 Squadron at the time of Darwin Raid No. 53 – focused attention on about one hour out of the thousands we spent in the North-western Area. What was more important, Ted gave some very sound reason for his belief – he told us 'I'm 97% certain' – the aircraft was that of his Commanding Officer, Sqn Ldr Ray Thorold-Smith."*<sup>37</sup>

It would be better of course to be 100 per cent certain that Spitfire A58-92 had been found. The positive identification of a wreck site is one of the fundamental aims of aviation archaeology. In the absence of serial markings on an aircraft's flight surfaces or fuselage, wreck identification would usually involve locating contractor's plates or any other serial numbers that may be found on the engine and other components.

Another method is to study wreck site morphology, which can be unique to particular aircraft types lost in the harbour. This is how six Catalina wrecks were identified in Darwin Harbour's East Arm as a result of archaeological research in the late 1990s.<sup>38</sup> A PBV-5A Catalina had a rounded bug-eye gun turret on its bow and there was only one aircraft of this type lost in Darwin Harbour. Another example is the use of propeller spinner and engine diagnostics that were unique to particular aircraft. This led to the positive identification of four of the six flying boats. Two others could only be identified as United States Navy.<sup>39</sup> Their specific aircraft identity will only be determined after one of them has been excavated to find diagnostic artefacts. The process of elimination is a valid tool in identifying wrecks and this is how the West Arm Spitfire was ultimately identified as that of A58-92.

Engine identification numbers can be a problem in identification of an individual aircraft because engines were changed on a regular basis. Similarly, machine gun serial numbers recorded by the December 1983 expedition were not recorded in the historical record by the RAAF. Only the US military recorded gun serial numbers as those belonging to particular aircraft.<sup>40</sup> Alford's correspondence with Ray S Sturtivant, an RAF historian in England, in 1987 concluded that the historical record itself was incomplete and was of little use in identifying archaeological material: "RAAF Spitfire records were returned to the U.K. postwar, but this too is no help, as they are only retained for ten years, due to shortage of space".<sup>41</sup> In the end it was 65 AASL Battery's observations that proved to be mostly correct. The other Spitfire losses that day were accounted for and there was only ever one Spitfire reported to have been lost near West Arm.

## Aerial survey results

A Robinson R44 (VH-MGQ) helicopter was chartered for survey work on 10 October 2014. The tide state on that day was 0.37 metres at 1.22pm. The wreck was found at 1.28pm and was awash with the flood tide. The tide needed to be lower still to reveal more of the wreck but, from previous accounts of visitors, it lies in a scour zone of murky water, which would make it impossible to see certain elements of its structure. Alford describes the dilemma: "Visibility in the water was nil during the November and December 1983 visits, however the possibility exists that such damage was visible to the police in their initial investigation. In physically assessing the wreck internally by feel I felt no part that would indicate such damage. In other words my fingers and hands remained intact!"<sup>42</sup>

Outside of the scour zone, debris must surely exist. The wings, for instance, were said to have sheared off outboard of the main wing root and that these were lying in close proximity to the fuselage.<sup>43</sup>

The wreck was found at Latitude 12° 36.182'S, Longitude 130° 47.049'E, on the eastern bank of West Arm, which was only about 135m from where its location was reported in 1983.

Both banks of West Arm are lined with low-lying mangroves, which slope gently to the water's edge. A wide mudbank lines the mangroves and this is the zone the wreck lies in, approximately 200m from the edge of the mangroves. Salt-water crocodiles (*Crocodylus porosus*) inhabit Darwin Harbour, but none were seen.

The site is nearly 17.7km on a bearing of 197° from Flagstaff Hill. The aerial survey verified its location, but what could be seen? Apart from the obvious features of the engine and propeller are the oleo legs for the landing gear in a stowed position. The protruding stubs out of the water are where the wheel hubs and tyres would have been. The entire top skin of the wing roots have corroded away, but the underside of the fuselage may still be perfectly preserved under the mud in an aerobic condition, perhaps with RAAF roundels. No trace of the outer wings or the tail could be seen, but they may have been underwater at the time of the survey.

## Discussion

From an archaeological perspective, the wreck is a contaminated site as almost every site visit in the past has resulted in the removal of artefacts. It is still possible that the body of Thorold-Smith lies in or near the wreck, albeit in a disarticulated state, buried in mud. It is highly likely that he put the aircraft down in an amazing feat of flying, but did not survive the crash. The propeller pitch mechanism may have been damaged in combat. He came down fast, but made a semi-controlled ditching in the sea close to land. The wreck is a testament to the pilot's skill in ditching such a dangerous aircraft. Another scenario could be that he bailed out, as he was trained to do, but that his parachute did not open. The wreck, therefore, would have evidence of an uncontrolled landing. The archaeological evidence, however, suggests the contrary that it did not simply plunge into the sea.

An archaeological excavation may reveal disarticulated skeletal material or dental tissue, small fragments missed by visitors who only searched for machine guns and other objects, almost all of which were lost or kept in private collections. For instance, what did the police and the AHSNT do with the weapons and other artefacts they brought ashore? In what state did the police find the aircraft's canopy? Was it in the open position, suggesting Thorold-Smith might have bailed out, or closed indicating that he drowned. The tide state at the time of the crash was 4.9m at 11.30am.<sup>44</sup> The water was deep enough for the aircraft to disappear beneath the waves.

A plot of the 65 AASL Battery's sighting puts the crash in Woods Inlet, approximately 10km away, well away from where it was actually found. Maybe Caldwell and other pilots searching that day were just simply looking in the wrong area? The sighting at least put the wreck to the southwest of Darwin, roughly where the crash occurred.

An archaeological survey by boat is planned for the next tide window. There is still much to do; West Arm is uncharted waters and archaeologists have very little understanding of the site's environment. A search around the wreck site may find a debris field. The tide will reveal the site on 16 November 2016. The tide state will be 0.12m, much lower than the time of the aerial survey in 2014. The aim for this forthcoming survey will be to map the site and study how site formation processes have affected the wreck's fabric to help explain what we see today and to understand better the circumstances of the site's deposition. It probably will not be easy, as the scour zone around the wreck will conceal structure and artefacts. Probing may be the only method to find the extent of the airframe. It should not have any armaments as Alford indicated that a machine gun and a cannon were removed in 1987. The police are said to have removed two machine guns and a cannon. The cannon, as mentioned before, was jettisoned on the return trip to Darwin, but they must have only raised one, not two machine guns. This Spitfire probably only had the two cannon, two machine gun configuration in its universal wing. They Mk. Vc never had five guns.

## Conclusions

The disappearance of Spitfire A58-92 after being shot down during aerial combat with Japanese Zero fighters on the morning of 15 March 1943 was a complete mystery, despite searches by other aircraft on the day and the next day. The war moved on and the Spitfire was forgotten. The wreck was found by accident in the 1960s, which has only added to its mystique. The pilot, S/Ldr Raymond Thorold-Smith, is still missing without trace. The aerial survey conducted in 2014 to find the wreck has now firmly established the wreck's location, enabling it to be brought into mainstream archaeological research. No longer is it the mysterious missing Spitfire somewhere in West Arm. The next stage in managing the wreck would be to nominate it for Northern Territory Heritage Register. The wreck site's significance not only lies in the fact that it is the only Spitfire wreck found in the Northern Territory in situ, but that it is highly likely a war grave.

**Table 1. Chronological list of Spitfire losses at sea – Northern Territory (italics = land sites) (National Archives of Australia. Series: A9845. Control Symbol: 120 and National Archives of Australia. Series: A9845. Control Symbol: 272)**

No	Aircraft Serial Number	Date Lost	Location lost	Rank	Pilot's Name	K	S	N R
	Spitfire A58-69 (ex-BS175)	27/02/43	Tabletop Range, near boundary of Litchfield National Park	FgOff	William Hendrie Ford	1	0	0
1	Spitfire A58-92 (ex-BS231)	15/03/43	West Arm	S/Ldr	Ray Thorold-Smith	1	0	1
2	Spitfire A58-9 (ex-AR620)	15/03/43	In sea near Darwin	F/Sgt	Albert Edward Cooper	1	0	0
	Spitfire A58-101 (ex-BS293)	15/03/43	Picnic Point (Cove/Grove), Charles Point	F/O	C P Lloyd	0	1	0
	Spitfire A58-8 (ex-AR619)	15/03/43	Kahlin Hospital	F/Sgt	Francis Leslie Varney	1	0	0
3	Spitfire A58-17 (ex-BR239)	02/05/43	In sea 32km southwest of Peron Island	P/O	G P Farries	0	1	0
4	Spitfire A58-66 (ex-BS171)	02/05/43	In sea 60 ml. west of Darwin	Sgt	S Hardwick	0	1	0
5	Spitfire A58-26 (ex-BR480)	02/05/43	Submerged at high tide on beach, Charles Point	Sgt	J F H Cavanagh	0	1	0
6	Spitfire A58-86 (ex-BS221)	02/05/43	Darwin Harbour	Sgt	P Fox	0	1	0
7	Spitfire A58-34 (ex-BR525)	02/05/43	48km northwest of Darwin	F/O	Anthony "Tim" P Goldsmith	0	1	0
8	Spitfire A58-58 (ex-BR572)	02/05/43	In sea 6km from Charles Point	P/O	G Wall	0	1	0
9	Spitfire A58-12 (ex-BS162)	02/05/43	20 ml. west of Peron Island	F/O	Alexander "Sandy" Charles McNab	1	0	1

10	Spitfire A58-67 (ex-BS173)	02/05/43	96km west of Darwin	F/O	Gordon Lindsay Charles Gifford	1	0	1
11	Spitfire A58-89 (ex-BS225)	02/05/43	96km west northwest of Darwin	Sgt	Kenneth James Fox	0	1	0
12	Spitfire A58-3 (ex-AR526)	28/05/43	In sea near Milingimbi Is.	F/O	Alfred "Harry" Henry Blake	1	0	1
13	Spitfire A58-30 (ex-BR493)	29/05/43	In sea near Milingimbi Is.	F/O	Francis Bruce Beale	1	0	1
	Spitfire A58-117 (ex-EE673)	12/06/44	5 ml. south of Port Blaze	F/O	C H O'Loughlin	0	1	0
14	Spitfire A58-107 (ex-EE607)	20/06/43	In sea off Adam Bay	FltSgt	W E Nichterlein	1	0	1
	Spitfire A58-68 (ex-BS174)	20/06/43	60 ml. west of Darwin. Hope Inlet	F/Sgt	A T R Rowe	1	0	1
	Spitfire A58-2 (ex-AR523)	30/06/43	East of South Perron Island (found in Litchfield National Park 2016)	P/O	Colin R Duncan	0	1	1
15	Spitfire A58-2 (ex-AR523)	30/06/43	East of South Perron Island	P/O	Colin R Duncan	0	1	0
16	Spitfire A58-32 (ex-BR497)	06/07/43	South of Perron Is.	F/O	C P Lloyd	0	1	0
17	Spitfire A58-33 (ex-BR499)	06/07/43	35 ml. east of Anson Bay (on land?)	P/O	F R J McDowell	1	0	0
18	Spitfire A58-61 (ex-BR589)	06/07/43	35 ml. East of Anson Bay	F/O	F D Hamilton	1	0	1
19	Spitfire A58-80 (ex-BS197)	06/07/43	35 ml. east of Anson Bay	P/O	N F Robinson	1	0	1



	Spitfire A58-121 (ex-EE677)	26/09/43	Collision with a/c below - 3 miles S E of Manton Dam	F/O	Granville Allen Mawer	1	0	0
	Spitfire A58-201 (ex-JL314)	26/09/43	Collision with a/c above - 3 miles S E of Manton Dam	F/O	John Philip Adam	1	0	0
	Spitfire A58-232 (ex- MA685)	24/04/44	On land near Port Patterson	Sgt	Colin William Dunning	1	0	0
20	Spitfire A58-302 (ex-JF820)	07/05/44	200 yards from main jetty, Darwin	W/O	Sidney Charles John Laundy	0	1	0
21	Spitfire A58-435 (ex-JG622)	18/09/44	1 ml. east of Cape Van Dieman	F/O	A K Kelly	1	0	1
22	Spitfire A58-310 (ex-JF847)	05/10/44	Darwin Harbour	W/O	Peter Cox [Fox?]	1	0	1
23	Spitfire A58-377 (ex-JG267)	02/11/44	Off Blaze Point	F/Sgt	B O'Connor	0	1	0
24	Spitfire A58-372 (ex-JG106)	31/07/45	16 ml. north of Cape Hotham	W/O	B Clinton	1	0	1
<b>Totals</b>						<b>19</b>	<b>13</b>	<b>13</b>

K = Killed, S = Survived, NR = Not recovered



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