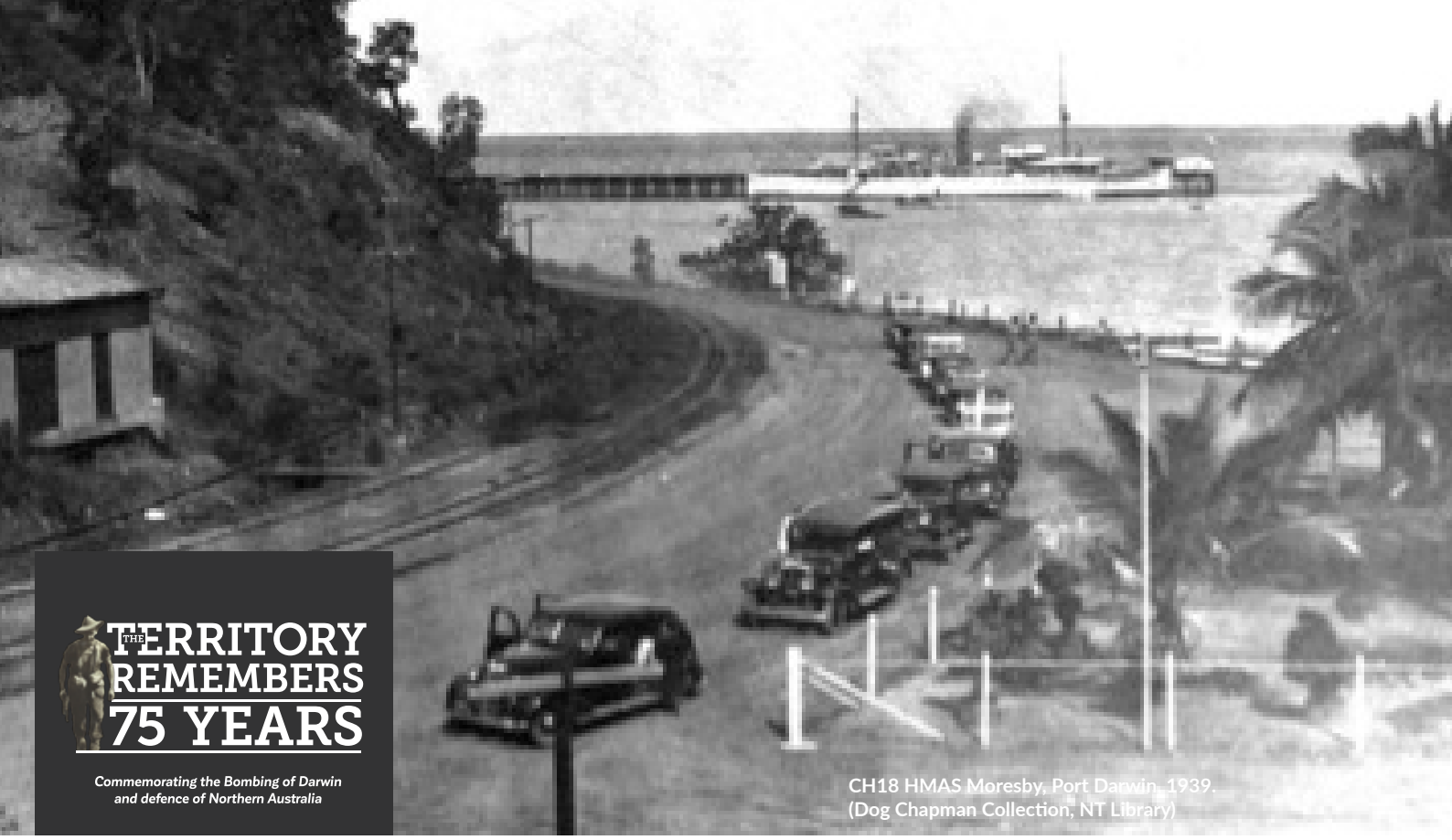


CH18 HMAS Moresby, Port Darwin, 1939.
(Dog Chapman Collection, NT Library)

The Territory Remembers

Mapping the Land and Charting the Sea for the War in the North

By Trevor Menzies

Defence forces need maps and charts for the effective waging of war on land, sea and in the air. The high command needs strategic maps to plan defences and campaign strategies. The combat troops in the field need detailed tactical maps over the battlefield to plan tactics to find and fight the enemy. The engineers need maps and plans to site and construct the infrastructure needed to support the war effort and the Navy and Air Force need charts for the safe navigation of ships and aircraft.

However, on the eve of World War II, there were no maps of northern Australia suitable for military purposes. The nautical charts then in use were those produced mostly from surveys carried out in the nineteenth century by the British Royal Navy.

Britain emerged from World War I as victor but with a badly battered economy that could no longer maintain regional forces to defend its far-flung Empire. Consequently the Singapore Strategy was adopted in 1923 to provide for the defence of the dominions and colonies in the Far East and the Pacific. Under this arrangement Australia would maintain forces for limited local defence but Britain would be called upon if a threat came from more powerful enemies. Singapore was to be fortified as the main naval fleet base from where operations could be launched into the region. The port of Darwin was included in the strategy as a refuelling station but not as a base for warships. Construction of the first fuel tank commenced in 1924 and four tanks were operational by 1928.[1]

The safe navigation of large warships into Darwin for refuelling called for accurate nautical charts showing water depths, tidal information, underwater hazards and navigation aids. The most recent chart of the harbour had been produced from surveys carried out by the Royal Navy's hydrographic survey ship *HMS Myrmidon* in 1885.[2] Most of the existing charts of the approaches to Port Darwin were based on surveys carried out by Royal Navy hydrographers PP King in *HMS Mermaid* (1818-19), JC Wickham and JL Stokes in *HMS Beagle* (1839-40) and J Hutchinson and J Howard in the *Beatrice* (1864-65). More detailed and accurate charts were now required for the safe passage of large warships.

The Royal Australian Navy had established a hydrographic survey service in 1921. The survey ship *HMAS Geranium* was sent north in 1925 to commence the huge task of upgrading and expanding the coverage of the nineteenth century charts.[3] The methods of hydrographic surveying then in use had hardly changed since the days of the nineteenth century hydrographers. Depth measurements were made with the lead and line – a device comprising a lead weight attached to a line graduated in fathoms (one fathom = 6 feet) that was lowered from the vessel until hitting the sea floor. For coastal work the position of the "sounding" on the chart was fixed from horizontal sextant angles observed to trig stations established on land.

In the early 1930s the global political climate was becoming unstable and hostile. The economic woes of

the Great Depression had enabled extremist governments to assume power in Germany and Japan. The military controlled Japanese government had ambitions to dominate the Asia Pacific region as the leader of a *Greater South-East Asian Co-Prosperity Sphere*. Japan's intentions soon became apparent when Manchuria was occupied in 1931. The Australian Government began to take notice and steps were taken to boost defences in the north. Additional oil tanks were constructed at Darwin Port and coastal and antiaircraft guns were installed on the peninsula. In 1933 the survey ship *HMAS Moresby*, which had replaced the paid-off *Geranium* in 1927, was sent north to continue the hydrographic surveying of the north coast. *Moresby* was to be deployed on surveys in northern waters for long periods before and during the war, and became a familiar sight in Darwin harbour until being paid off and sold for scrap in 1946.[4]

Extract from Darwin Harbour Chart surveyed by HMAS Moresby in 1937

Moresby was equipped with the recently invented echo-sounder for taking depth measurements by recording the time interval between transmitted sound waves and the return signal reflected off the sea floor. Knowing the velocity of sound waves in water the water depth could be determined. The replacement of the tedious lead and line method by the echo-sounder in the 1930s revolutionised hydrographic surveying. Another stimulus to productivity and chart quality was the availability of aerial photography to assist with the accurate delineation of the coastline and offshore features.[5]

One of the tasks allocated to *Moresby* in 1937 was the survey of the waters off Groote Eylandt for a flying boat base. Port Langdon was subsequently chosen and became a refuelling depot for QANTAS flying boats operating the nine day service from Sydney to Southampton in England. The *Moresby* crew obviously found the going tough as related in the poem *Farewell to the Gulf and Groote Eylandt* penned by an unidentified sailor. References are made in the poem to a volcanic eruption on Vulcan Island near Rabaul, New Guinea, in 1937 where *Moresby* was despatched to render assistance; and the death of Stoker Petty Officer James Lambert who was buried on Thursday Island in July of that year.[6]

The QANTAS flying boat service between Australia and England operated for only 13 months until the outbreak of war in September 1939. In 1943 the RAAF occupied the base at Port Langdon, then known as Little Lagoon, for use as a staging base for Catalina flying boats flying out of Cairns on missions to the Dutch, East Indies.[7]

In 1937 after Japan invaded China, the threat had become serious. Australia was then totally unprepared to defend its territory against an enemy that had devoted time and resources to building up a modern war machine. The vast north of Australia was sparsely inhabited and lacking the basic military infrastructure, including maps, needed to defend the country. The government took urgent action to boost northern defences by despatching two RAAF squadrons to Darwin and raising the Darwin Mobile Force to defend the area from ground attack.

The Darwin Mobile Force (DMF) with strength of about 250 troops was raised in Sydney in 1938 and arrived by sea in Darwin in 1939. The unit comprised a rifle company, machine gun and mortar sections and a troop of 18-pounder field guns.[8] However when the unit was raised in Sydney there were no existing maps of the Darwin area suitable for military purposes. Topographic maps showing the features and lay of the land were needed to support the DMF's infantry and artillery operations.

The Cartographic Section of the Army Survey Corps in Melbourne was tasked as a matter of urgency to produce a topographic map of the Darwin area. Topographic maps are compiled from controlled aerial photographs with additional detail filled in from ground surveys. Aerial photography over Darwin was available from the RAAF and some ground control had been established by the crew of *Moresby* when undertaking a triangulation survey of Darwin harbour for charting purposes in 1937. The resulting map titled *Sketch Map Darwin* was published in colour in 1938 at a map scale of one inch to one mile (1:63,360).[9] It was classified as a sketch map because the urgent time frame meant that accuracy standards had to be compromised for expediency. But at least when the DMF arrived in Darwin in 1939 they had a map covering their primary defence area.

Sketch Map Darwin was to have an interesting history. At the end of the war a printers proof copy was found among Japanese map stocks seized by US Forces in Tokyo.[10] It was a copy of the 1938 original but with the legend and marginal notes translated into Japanese. The question of how the map got to Tokyo is a matter of some conjecture but it seems probable that Japanese agents, covertly fishing

for pearl shell off the Territory coast before the war, somehow obtained a copy.

In February 1940 the military high command embarked on an emergency mapping scheme to provide strategic map cover over the country. Seventeen map sheets were hastily produced by the Survey Corps in Melbourne to cover the Northern Territory at a scale of eight miles to the inch (1:506,880).[11] These sheets were compiled from whatever material was available – cadastral plans, road maps and information supplied by pastoralists, mineral exploration companies and mission settlements. The urgent time frame meant that map accuracy standards had to be compromised, so the maps were regarded as approximate and only intended as interim coverage until better data became available.

Sapper Basil Stahl (age 19) (Stuart Highway), NT, 1942

While the 8-mile series provided broad coverage for strategic planning purposes, the troops in the field needed more detailed maps at a larger scale for tactical operations. In 1941 a survey section with an establishment of 45, comprising surveyors, draftsmen and support staff under the command of Lieutenant Lindsay Lockwood, was raised in Melbourne and sent to Darwin. The unit was attached to the 7th Military District which had overall responsibility for defence in the Northern Territory. From their base at Larrakeyah Barracks the initial task was to upgrade the *Sketch Map Darwin* and produce eight other map sheets at a scale of one inch to one mile of Darwin and environs.[12]

Although topographic mapping was the Survey Section's main priority, other units within the 7th Military District requested their services. The coastal and anti-aircraft artillery batteries sought assistance from the surveyors to calibrate their guns. This involved using two theodolites placed a known distance apart to simultaneously observe angles to an exploding test shell. The bearing, elevation and distance from gun to target could then be calculated and the gun sights adjusted accordingly. The Engineer units had a need for surveys to assist with construction of camps and infrastructure. The headquarters staff kept the draftsmen busy with requests for miscellaneous maps and plans.

Life in Darwin was soon to change after 7 December 1941 when the Japanese attacked the US naval base and airfield at Pearl Harbor in Hawaii. The US declared war on Japan and Australia followed soon afterwards. Non-essential civilians were evacuated from Darwin, the Northern Territory Administration relocated to Alice Springs and the northern part Territory placed under military control. The Survey Section was diverted from its mapping and surveying activities to construct air-raid shelters, dig trenches, prepare defences and practice their weapon handling skills.

On 19 February 1942 the Japanese bombed Darwin resulting in 242 deaths and inflicting considerable damage to ships in the harbour, the port, town and RAAF base. 7th Military District HQ evacuated Larrakeyah Barracks and moved to a bush camp at the 22-Mile. The Survey Section follow suit and was given the task of defending the HQ perimeter from enemy invasion, then thought to be imminent.[13]

Reinforcements were sent north to boost defences. About 6 weeks after the bombing, units from Australia's most experienced fighting force, the 6th Division AIF, recently returned from the Middle East, began to arrive in the Darwin area. The much larger army in the north was reorganised to become Northern Territory Force (Norforce).

The Survey Section could now be relieved of infantry duties and resume the mapping program. A base camp was established at Adelaide River from where field parties were despatched to obtain ground control for an expanded mapping program. The coastline from Cape Hotham (Adelaide River mouth) to Anson Bay (Daly River mouth) and the hinterland to the Adelaide River township was identified as a priority area as this section of coast has beaches suitable for enemy amphibious landings. Another priority was mapping the Line of Communication along the North-South Road (later named Stuart Highway) from the Adelaide River Township to the railway terminus at Birdum. Maps were required to plan for the construction of airfields, camps and depots needed by air force and army units being deployed along the corridor.[14]

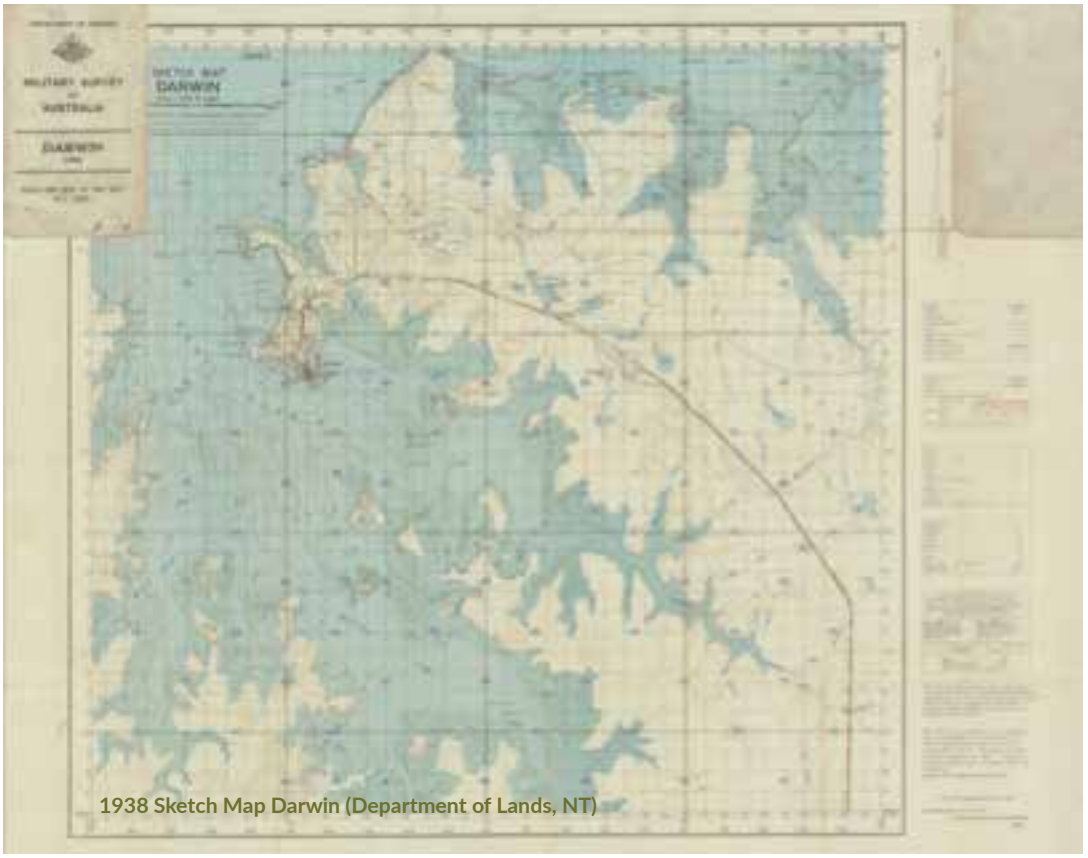
In April 1943, a detachment of the 6th Army Topographic Survey Company, with a strength of 46 personnel under Captain James Tait, arrived in Darwin to relieve the 7th Survey Section. After 21 months of service in the NT the 7th Section relocated to north Queensland and was absorbed into the 2/1 Army Topographic Survey Company. In late 1944 the Company moved to Hollandia in Dutch New Guinea and then to Morotai Island in the Netherlands East Indies to produce maps and terrain models for the final campaigns of the war in the Pacific.

General Headquarters, South West Pacific Area, gave 6 Topo the task of producing strategic map coverage at a scale of four miles to the inch over the vast area of the Top End from the east Kimberley to Arnhem Land.

The field parties were now faced with surveying ground control points over remote country that had barely been explored since European colonisation. The extent and nature of the terrain called for a modification of the surveying methods used for standard mapping. Traditional methods of triangulation and traversing were not feasible over the coastal mud flats, mangroves, river floodplains and rugged terrain that prevailed over the country. Instead the astro-fix method of position lines was adopted. Although not as accurate as triangulation or traversing the results were adequate for four inch to one mile scale mapping.

The field parties used various modes of transport to access the control point locations that were spaced at 30km to

50km around the coast and through the interior. The army ketch *AK121 Aroetta* and the motorised yacht *HMAS Southern Cross* were used to land field parties around the coast and on islands off the coast.[15] This was often a hazardous exercise when operating in uncharted waters subjected to huge tides. Ford Blitz trucks provided the main means for travelling over land where access was possible. In inaccessible areas the bush soldiers of the North Australia Observer Unit known as the *Nackeroos* assisted with packhorses.[16] The RAAF also flew parties to remote locations. Warrant Officer Bryan Meehan of 6 Topo made the following entry in his diary of a trip to Milingimbi:[17]



1938 Sketch Map Darwin (Department of Lands, NT)

"We were to leave by bomber....driven to Hughes Field just after lunch. Arrived at Milingimbi after an uneventful but interesting trip....a Japanese reccy plane came over at about 30 thousand and then bussed off again.

The two bombers that brought us over crashed five minutes after taking off this morning. It seems incredible that the men who brought us over yesterday are now all dead. Saw the missioner re the aerial photography from which we would make a map of the island. Did night work on position lines ... leaving straight away in a Hudson. Had a nice trip but frightened all the way."

The nature of the work and limiting conditions of the wet season required the field parties to spend long periods out bush. Periods of several months working in isolation and under difficult and unpleasant conditions were typical. Tinned food and 'dog' biscuits were the basic rations but the occasional barramundi, bush turkey or scrub cattle provided a welcome change of diet. On one long field trip through the Victoria River District Sergeant Jack Hunt recalled this incident:

"We set out and passed Bullita Station and reached the river but could go no further with the trucks. We made camp and opened a box of food which normally contained a weeks supply of tinned vegetables, meat & veg and spam. This box was full of baked beans and nothing else, so we ate 21 meals of baked beans. The drivers tried to shoot a bush turkey, kangaroo or even a steer but had to give up because the petrol supply was too short." [18]

Water could not be carried in sufficient quantity to meet all needs so supplies had to be replenished along the way. Waterholes were often befouled by dead animals which necessitated treatment with coagulating tablets to clear the sediment and chlorine tablets to purify the water. It was soon discovered that the resulting foul taste could be rendered bearable with the addition of a teaspoon of Sal-Vital.[19]

The arduous tropical conditions and nature of the work impacted on the health and fitness of the personnel. Almost everybody suffered from prickly heat and infected insect bites from time to time. Abrasions and cuts were common as a lot of axe work was required to clear vegetation along traverse lines for line of sight and chaining distances. Cuts readily developed into tropical ulcers if not quickly treated. Dengue fever became a major cause of casualties often requiring hospitalisation. The skin condition known as impetigo was a common problem. It produces yellow crusty sores on the skin that cause lot of discomfort when the pustules break and clothing sticks to the raw wounds. The unit was usually under strength due to personnel undergoing treatment in hospital or being declared medically unfit for the tropics and repatriated south.[20]

Apart from the four miles to one inch strategic mapping program, the survey unit had other demands for its expertise. The RAAF had a need for survey information on the network of airfields, landing grounds and radar station scattered across the Territory. The latitude and longitude coordinates of aerodrome reference points, early warning radar and Loran (long range navigation) stations had to be determined to facilitate accurate navigation and accurate position fixing. The height above sea level and magnetic variation at reference points were needed by aircrew to calibrate altimeters and adjust compass readings.

An air warning radar unit was first installed at Dripstone Caves near Darwin in February 1942 but was not operational at the time of the first bombing raid. However, soon after becoming operational the effectiveness of radar was demonstrated when enemy aircraft could be detected in time for warnings to be given. Over the ensuing months a network of stations was established around the north coast including remote islands off the Kimberley and Arnhem Land coasts.[21]

Survey parties were called upon to take astro-fixes to determine the coordinates of the radar antennae. Transport to the site was usually by RAAF aircraft to the closest landing ground and then by vehicles and boat to the station. On one job Sergeant Jack Lowe and a party of three flew to RAAF Base Truscott in the north Kimberley and then by boat to 344 Radar Station on West Montalivet Island.

On returning from the trip he commented:

> *"I have often thought of that unit stuck on that little island, nothing to do and nowhere to go. When you think of it we had it made, periodically going off in small parties on different jobs and as tiring and difficult as they may have been, they kept you from going round the bend from boredom*[22]*."*

A member of the station recalled his experience in a publication on the history of RAAF Radar Stations:

> *"My main recollection of this station was the loneliness – about 30 men, no changes of personnel for approximately seven months. The same faces, the same food, no fresh water, no 'flicks' and no mail for seven months initially. 344RS was a tough posting. Six months was almost more than any man could bear and the initial crew spent about nine months there*[23]*."*

By 1944 the tide of war was beginning to turn in the Allies favour. The last Japanese raid to affect the Top End occurred on 12 November 1943 when nine enemy bombers attacked targets in Parap, Adelaide River and Batchelor. Eleven RAAF Spitfires intercepted the raiders and two were destroyed. This was the final of 64 raids recorded in the Darwin area since the first and most destructive raid on 19 February 1942. RAAF and army units were now being moved north to bases in New Guinea and the Netherlands East Indies for the final campaigns of the war.

With the end of the war now only a matter of time the Commonwealth Government started looking at the future of Darwin. An Inter-Departmental Committee, comprising military and government personnel was set up to examine the post-war requirements and reconstruction of Darwin. The Survey Corps was called upon to produce detailed topographic maps of the greater Darwin to assist the Committee plan for the return of the civilian population and post war reconstruction. Seven map sheets covering the area from the town south to Manton Dam were produced in colour at a scale of 1:25,000.[24]

The detachment of the 6th Army Topographical Survey Company was withdrawn from the Northern Territory in March 1945 after 23 months of creditable service. They joined the rest of the Company in Queensland and moved to Lae in New Guinea to prepare maps and terrain models to support the final campaign against the Japanese in New Guinea.

The contribution of the NT based Survey Corps units to the war effort in the north is commemorated by a plaque on the Memorial Wall at the Darwin Cenotaph.

References

1. Powell, Alan, The Shadows Edge p.5, Melbourne University Press (1988)
2. Ingleton G.C.,Charting a Continent, p.131, Angus and Robertson, Sydney (1944)
3. Powell, Alan, op.cit., p.18
4. Ibid., p.19
5. Hardstaff R.J., Leadline to Laser: Hydrographic Service, Royal Australian Navy 1920-95, R.J. Hardstaff, Northwood, NSW., (1995)
6. Ibid., pp.15-16
7. McMillan, Andrew, Catalina Dreaming, p.49, Duffy & Snellgrove, Sydney (2002)
8. Dennis P. et al. The Oxford Companion to Australian Military History, p.201, Oxford University Press, Melbourne, (2000).
9. Hillier, John, Military Contributions towards the Northern Topographic Framework in Technical Papers of the 35th Australian Surveyors Conference, p.139, Institution of Surveyors Australia, Northern Territory Division, Darwin (1993)
10. Ibid., pp.153-155
11. Ibid., pp.157-158
12. Ibid. p.148
13. Personal notes of Corporal J.D. Aitken, 7MD Survey Section, held by the Author
14. Hillier, John, op.cit., pp.158-159
15. Hunt J.F., Military Mapmakers in Northern Australia 1943-45, pp.73-85, J.F. Hunt, Apollo Bay, Victoria, (1998)
16. Ibid., p.35
17. Hillier, John, op.cit., p.151
18. Hunt, J.F., op.cit., p.55
19. Ibid., p.36
20. Personal notes of Corporal J.D. Aitken, 7MD Survey Section, possessed by the Author
21. Units of the Royal Australian Airforce, A Concise History, Vol. 5, RAAF Historical Section, Canberra, (1995)
22. Hunt, J.F., op.cit., p.64
23. Units of the Royal Australian Airforce, op.cit., p.35
24. Hillier, John, op.cit., p.159

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His interest in WWII mapping and charting stems from the experiences of his late father-in-law, Jim Aitken, who served with the Australian Army Survey Corps in the Northern Territory, Queensland and the Netherlands East Indies from 1940 to 1946. In this story he describes how the Army's Survey Corps and the Navy's Hydrographic Service responded to the call for maps and charts needed to defend Australia's north in World War II.