

Unravelling a 100-year-old Submarine Mystery

20 November 2015

The search for our missing sailors continues.

The ongoing mystery surrounding the loss of Australian submarine *AE1* in the early stages of World War One is being carefully, **scientifically**, stripped bare. A successful search along the coastal fringe where *AE1* was last seen is giving relatives and historians more clues about her fate. A search team of marine survey experts from IXSurvey Australia, led by one of our former submariners, Rear Admiral Peter Briggs Ret'd has returned to Australia after searching coastal waters near Rabaul, Papua New Guinea.

In the opening days of the First World War, Australia sent a combined military and naval force to capture a German naval radio station and seize the German colony centred on the island of New Britain. The Royal Australian Navy's operation included two submarines to escort the fleet in case it encountered the German Pacific Squadron. On 14 September 1914, Australia's first submarine HMAS *AE1*, vanished without trace. The fate of her 35-man British, Australian and sole New Zealander crew remains the single largest outstanding mystery from this war.

And now we are closer to solving it.

Submarine *AE1* and the destroyer *Parramatta* were ordered to patrol the approaches to the harbour where the Australian fleet was anchored. The German Pacific Squadron, if present, would have been a threat to the battlecruiser HMAS *Australia*, and it was thought that the patrolling submarine and destroyer would be able to give warning by radio. *AE1* would then submerge to attack the enemy.

In fact, the German ships were cruising elsewhere in the Pacific. HMAS *AE1* went on patrol to safeguard the fleet and was never seen again.

Volunteer historians, submariners and search experts of the Find AE1 Ltd team considered a range of possibilities for the loss of *AE1* and concluded that she was lost with all hands after damaging her pressure hull by striking one of the many reefs in the area. *AE1* was probably en route from its last known position SE of the Duke of York Islands, back to her sister submarine in Rabaul. Historians are reliant on the report of her consort, *Parramatta* that made the last sighting of *AE1* at 2.30pm on 14 September 1914, for this position.

The Find AE1 Ltd team have just completed a search of the waters off Duke of York Islands up to a depth of 300-400 metres. It was previously thought *AE1* quickly filled with seawater and sank with all hands on board. After searching the coastal fringes and her likely return route to Rabaul, we now can conclude with confidence that *AE1* did not sink in the immediate coastal area.

We can now begin to piece together what happened.

The crew of *AE1* may have struggled some time for survival. The latest search points to the probability that the submarine did not immediately sink after striking the reef. The negative result allows us to rule out a third of the primary search area, lying inside the 200 m depth contour. From this we can deduce that: *AE1* did not immediately sink inside the 200 m deep contour line, close to the grounding, but may have endeavoured to return to Rabaul or Kokopo, the nearest friendly anchorage before fate overtook her.

In the struggle to save her, the crew may have moved into deeper water on either of these routes to safety.

A search team of both volunteers and professionals has brought the latest technology to help solve the puzzle. A multibeam echo sounder and high-precision survey system was towed across the search area. On board the search vessel, two maritime survey experts from IXSurvey Australia collected and analysed

data streaming directly in from the sonar. This technology is similar to that used to undertake a marine survey, with positional accuracy of 10 cm on the surface, the sonar transmits 512 beams, typically every half second, using software to process this into a 3D map, able to detect a bump of 12 cm on the bottom at 200 m depth. And given *AE1* was 54 m in length, 7 m beam and had a 5 m fin height, she would have been seen. We now know where she does not lie!

The primary search area was off the southern shores of the Duke of York Islands. This is the where we would expect to find *AE1* if she sank soon after striking a coral reef. Strong currents sweep here during the annual SE monsoon, making it a hazardous place for the crew of *AE1*.

The sonar has provided accurate bottom topography down to 400 m and a high probability of detection (95%) of *AE1* if she indeed sank quickly in November 1914. This search was confined to the shallower coastal areas – recognising that the deeper waters would require different technology and were best left to a second search.

Peter Briggs, chair of Find *AE1* Ltd, gives a colourful account of the search.

The search began on Thursday afternoon – half a day early as we swept around the reef-fringed, picturesque islands, with sandy beaches and swaying coconut palms, and made our way – in marginal weather conditions – into the security of a remote anchorage in Mioko Harbour before last light.

The next day – Friday 13 November – established the routine for the remainder of the search, up at 4.30am for an early breakfast, before weighing anchor and exiting the anchorage at first light, 5.30am, ready to start the first search line by 6.00am. Up and back we went, with a line spacing of 150m providing a comprehensive overlap, and building up a highly refined 3D picture of the bottom beneath us. By the time we completed the survey, we were to cover over 480km at the sedate pace of 5 knots, collecting precise details of the sea floor beneath us. Picturesque sandy beaches and villages fringe the shores of the islands. The offshore reef provides a bountiful sea garden for the locals before dropping precipitously to 100m.

To cover the possibility that the damaged submarine had been able to make ground towards Rabaul before being overtaken by her fate, we extended our search along the route back, again confining our efforts to water depth of less than 400m. The nearest suitable anchorage was at Kokopo lying on the Peninsula to the south – making our way there on Sunday evening also enabled us to search this route. Perhaps the damaged submarine headed towards the nearest friendly anchorage? In worst case, it was also the nearest suitable, reef-free beach to save the damaged submarine by deliberately running it ashore?

*On Sunday, at first light, we made our way north away from the shore, searching as we went. The excited cry went up – ‘what’s that?’ and pulses rose on the bridge! A wreck, identified as DS 03 in our database – could it be that *AE1* reached within half a mile of safety at Kokopo? The dimensions were right. Reluctantly we headed off to complete the search of the route back to Rabaul, resolving to examine the contact further on our return to the anchorage that evening. Checks with the RAN Hydrographer drew a blank; there was no known wreck in that area.*

*So after 5 days hard work we have a handful of contacts for further examination and no confirmed sightings of *AE1*. Was it worth it? Whilst it is disappointing not to have found our 35 missing submariners we are able to conclude that their submarine does not lie intact within the 200m contour in the area we searched. Finding the smaller dive wreck in deeper water gives us confidence that our technology and skills were up to this task.*

*The 126 km² or 482 km of linear soundings area searched will update the hydrographic charts and provide an excellent starting point; the scene is now set for the more expensive and better resourced deep-water search that will follow. We will return to locate and solve the mystery of *AE1*.*

So now we can cast some light on this maritime mystery.

The crew of *AE1* probably fought against a string of events. First came the grounding, late in the afternoon. The Captain and officer of the watch on the bridge had unwittingly navigated into perilous conditions. The tropical sun was setting, light glancing off the waves and covering the presence of shoals

and rocks. A strong current swept onto the coast, pushing them onto the hazards. At this point, *AE1* was being propelled by twin diesel engines. Then disaster struck. A call down to reverse engines was always going to be a problem this day. The engine clutch on the starboard drive train was known to have seized – the sub could only reverse on her port electric motor. The evolution of stopping the diesels, declutching to allow one of the electric motors to be engaged propelling astern, was a task of some minutes duration. Meanwhile *AE1* was being pushed onto the reef by the current, wind and her own diesel engines – resulting in sprung plates, letting seawater into her hull.

We now know that *AE1* did not sink immediately; her crew would have fought bravely to save their boat, manoeuvring away from the coastline hazards and into deep water. Again, Peter Briggs gives us a likely course of events.

Following a grounding and losing ballast tanks on the side of the impact, it is likely that the submarine was not in condition to attempt a return to harbour on the surface due to the heavy list. But this could have been overcome by diving, bring the boat back to an even keel with all ballast tanks full of water, at the risk of increasing the stress on any pressure hull damage – a risk that had to be accepted in the circumstances. In this scenario we can imagine AE1 making her way at slow speed on one shaft (one of her two electric motors was defective and unusable) as the crew fought a number of cascading issues – calamities – which overwhelmed them. Eventually, enroute to safety in Rabaul or Kokopo, she sank in deep water.

Finding *AE1* is the only way we can hope to understand what befell *AE1* and her crew. This will require different search technology; a towed side-scan sonar and magnetometer. We are planning to mobilise an Australian ship and fit her with leased equipment – the companies involved in the first phase are offering further sponsorship and support, however the equipments are more expensive and we are seeking \$1.5M to cover the costs of a 10-day search.

Special thanks must be given to the Submarine Institute of Australia, Australian National Maritime Museum, ASC, Secora, MacTaggart Scott, TKMS Australia, DCNS Australia, Serco Defence, SAAB Australia, IXSurvey Australia, the parent company IXBLUE in France and the equipment suppliers who provided discounted rates. Without your support this search would not have been possible.

Finally, my thanks to the hardworking team on *Deepstar* who patiently scanned the depths and provided the 3D analysis to reach the conclusion on the shallow-water areas.

We now need to search the deep water to find the crew of *AE1*:

*They have no grave but the cruel sea,
No flower lay at their heads,
A rusting hulk is their tombstone,
Afast on the ocean bed.
We will remember them.*

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