Expedition: Battle of the Java Sea Revisited

Hr.Ms.DeRuyter, Gaspar Strait 15 Feb 1942, (Arnold de Lange 2015, oil on canvas)

Explorer’s Club Flag-192

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Historical Background:

By the middle of February 1942, the situation for the allied coalition forces in the South East Asian theatre was dire. On the 15th of February, Japanese forces landed at Pelembang in central Sumatra taking the oil refinery and airfield (albeit at considerable cost), effectively cutting off the line of retreat for British and Commonwealth forces fighting in Singapore. American land forces in the Philippines had withdrawn to Bataan and Allied coalition naval forces had been whittled down in a series of minor battles and escort duties. The fall of Singapore on February 15th, with the surrender of more than 100,000 British and Commonwealth troops left only the local Dutch colonial army supported by a relatively small number of British and Australian troops to oppose the coming invasion of Java. On February 19th, Japanese forces invaded the Island of Bali just to the east of Java. In contrast to Allied operations of this nature, the Japanese transports did not remain on site but deposited their troops and left. Unaware of this, RADM Doorman hastily assembled what forces were available and a poorly coordinated attack on the beachhead followed that night. The Battle of the Badung Strait resulted in no serious damage to the Japanese forces but lost the Allies the destroyer Hr.Ms. Piet Hein while the cruiser Hr.Ms. Tromp was hit by eleven 5 inch shells and had to subsequently retire to Australia for repairs. The Dutch destroyer Hr.Ms. Kortenaer was also damaged when she ran aground leaving the port of Tjilatjap and had to proceed the following morning to Soerabaja for repairs. She was subsequently only able to achieve 26 kts, a factor that was to have significant consequences in the actions that were to follow. On Bali, the Dutch colonial forces melted in the face of the highly trained Japanese forces and due to a communication mix-up, the engineers failed to demolish the airport at Den Pasar. This was captured intact, giving the Japanese air control over Eastern Java. It was aircraft from this base that subsequently sank the USS Langley on the 27th February, which was carrying crated P40 fighters and their crews, effectively preventing any chance of the Allies regaining even local air superiority over Eastern Java. The Japanese forces were now gathering to launch invasions in both the East and West of Java.

The Battle of the Java Sea.

On the afternoon of the 26th February, all allied ships that could be mustered, gathered in the harbour of Soerabaja. These included the heavy cruisers USS Houston and HMS Exeter, the light cruisers HMAS Perth, Hr.M. Ships De Ruyter and Java, the destroyers US Ships Alden, John D. Edwards, John D. Ford, Paul Jones, HM Ships Electra, Encounter and Jupiter and Hr.M. destroyers Kortenaer and Witte de With. RADM Karel Doorman, the Officer in Charge of the ABDA coalition fleet called a meeting in the private office of the ANIEM1 south of Soerabaja2. He announced that air reconnaissance had indicated that the Japanese eastern invasion fleet would be approaching Java that evening and he planned to intercept them and engage them in a night action. The Fleet, lacking a common doctrine, communication code or language, sailed forth that afternoon but failed to make contact with the enemy. By the middle

1 Netherlands East Indies Electricity Company.
2 Due to the loss of the airfield at Den Pasar Bali to the Japanese on the 19 FEB 42, Surabaya was under regular air attack and it was felt that holding the meeting at the Naval Base too risky.
of the 27th February, the fleet was just entering Soerabaja Roads when news arrived that the invasion fleet had been spotted 90 mile to the north. Doorman hastily turned the fleet around and headed off to engage the enemy.

In a rare lapse, the Japanese has left the invasion convoy only lightly protected by a light cruiser and some destroyers while the main support fleet of two heavy cruisers and their attendant destroyers remained at a distance. However, Japanese reconnaissance aircraft had spotted the ABDA fleet when it first departed and the transports were hastily turned around. The distant-covering forces accelerated to close the distance. When the allied fleet had been seen to be returning to Soerabaja, the 41 transports had once again been turned South and headed back towards Java.

At approximately 1600 the Japanese convoy escorts were spotted by the leading British destroyers. In what could have been a disaster for the Japanese, the transports were ordered to again reverse direction and the escorts charged forward to engage the enemy, but fortunately for them just at that moment, the heavy cruisers, HIJM Ships Haguro and Nachi, appeared over the horizon. The Japanese now had 2 heavy cruisers (36 knots) with twenty 8 inch guns between them, 2 light cruisers and 14 destroyers, against the ABDA fleet of two heavy cruisers (limited to 26 kts due to issues with Kortenaer) with only twelve functioning 8 inch guns, three light cruisers with 6 inch guns and 9 destroyers.

Classically trained, RDAM Doorman, confronted with his “T” being crossed by the Japanese forces, turned to port and the ABDA fleet formed a battle line with the destroyers on the disengaged side. With the Japanese holding both the gun and speed advantage, they elected to sit outside of the range of the ABDA light cruisers’ guns and lob 8-inch shells at the allied fleet. This had been part of their pre-war battle plan where they would entice the opposing fleet into a classical battle line and while they occupied it in a gunnery duel, would launch their secret weapon, the type 93 (Long Lance) torpedo at the unsuspecting enemy who would assume themselves well out of torpedo range.

Gunnery on both sides was poor, especially so on the allied side given that HMS Exeter had a ‘state of the art’ type 284 gunnery control RADAR set and had considerable previous battle experience. The Japanese launched a large salvo of torpedoes but before these could arrive, Exeter was hit in her boiler room by an 8 inch shell taking out 6 of her 8 boilers. Despite the shell not exploding, it severed the steam-main and she lost power, turning away to port. Perth, Houston and Java following in line, followed suit and in doing so inadvertently avoided the arriving

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3 The USS Houston had had her aft 8 inch gun turret destroyed by a bomb hit several days earlier.
4 Java was of a WW1 design and had guns in single open shield mounts so could not bring the guns on the disengaged side to bear during battle. The Japanese used their light cruisers as Destroyer leaders at this time in the war.
5 The four American destroyers were of WW1 design, limiter to 28 kts. and of dubious value against the Japanese destroyers that mounted six 5 inch guns in power operated turrets and were capable of 38 kts.
6 These oxygen powered torpedoes had been developed in secret, carried a 490kg warhead and were capable of 50 kts for 21,0000 yds, ranges and speeds that were considered impossible by Western experts at that time.
torpedoes. Kortenaer was not so lucky and was struck near the bridge, breaking in two with the stern rapidly sinking as surviving crew climbed onto the bow, which floated for a few minutes longer. Perth, seeing Exeter’s strife circled around and laid a smoke screen between her and the Japanese fleet. With the ABDA fleet in confusion, the Japanese destroyers closed in to attack the crippled Exeter. Doorman ordered the British destroyers through the smoke screen to fend off this attack. Unable to coordinate their attack in such a short time, the British destroyers attacked piecemeal. As Electra exited the smoke, she was confronted by the Japanese destroyer Asagumo and the light cruiser Jintsu. In the subsequent uneven engagement at point blank range, the Electra damaged the Asagumo such that she had to retire but was herself mortally wounded and began to sink. Exeter managed to regain some power and was ordered back to Soerabaja escorted by the Witte de With\(^7\). With the Allied fleet in chaos, the US destroyers conducted a torpedo attack and laid smoke. While no hits were achieved this allowed the fleets to disengage and the ABDA fleet to get itself in order. The time was approximately 1800 and the sun was setting.\(^8\)

**Night Phase**

Doorman gathered up his remaining ships and headed south in an attempt to get around the covering Japanese forces and to get at the invasion convoy. The American destroyers, low on fuel, detached and returned to Soerabaja. As the remaining fleet approached the Java coast they headed west. Unfortunately, while the fleet had been at sea other elements of the Dutch navy had been tasked with laying mines in this area to prevent the Japanese landings. Unfortunately the ship involved had dumped the mines when threatened by a Japanese aircraft and thus HMS Jupiter, the most modern destroyer in the Allied fleet struck one of these mines sank. The allied Fleet sailed on, all the while shadowed by the spotting aircraft from the Japanese cruisers, which continually dropped flares to mark the course of allied fleet. Doorman turned the fleet north once again, passing though the spot where Kortenaer had sunk several hours earlier. HMS Encounter, which had been trailing behind since the day phase, was tasked to pick up the survivors, rescuing some 113 men (including her Captain, LCDR A. Kroese\(^9\)) and returned them to Soerabaja. Thus the ABDA fleet was reduced to just the four cruisers. Shortly before 23:00, the Japanese cruisers spotted the ABDA fleet on a reciprocal course. They rapidly reversed course and caught up, engaging the ABDA cruisers in another gunnery duel at long range. Once again, they launched a salvo of type 93 torpedoes. Just as Doorman ordered the ABDA fleet to turn away Java was struck by a torpedo from Nachi blowing off her stern. The rapid flooding of the engine room that followed caused a loss of power and the ship sank in 15 minutes with the loss of 512 of her crew\(^10\). Only a minute or two later another torpedo, this time from Haguro, struck De Ruyter in the engine room with a similar

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\(^7\) Also damaged after a depth charge inadvertently exploded under her stern.

\(^8\) Throughout much of this phase of the battles the Japanese transports were just over the horizon, their masts visible to the Japanese escorts and were attacked by Allied aircraft at 1657. Here, once again, the lack of air to ship communication and coordination on the allied side robbed Doorman of the vital intelligence that could have turned the battle.

\(^9\) LCDR Kroese gave his officer’s whistle that was used to attract his crew in the water after the sinking to Theo Doorman in 1943 as a memento of the action.

\(^10\) There were only 19 survivors from Java.
loss of power. Huge fires immediately broke out in the 40mm antiaircraft gun suite. *Perth* and *Houston*, following close behind were forced to take evasive action but were unable to render assistance. As per their orders, the pair broke off the action and returned to Tanjong Priok. *De Ruyter* remained afloat till about 0230 burning fiercely. 345 of her crew, including RADM Doorman and CAPT Lacomblé went down with her.

*Perth* and *Houston* arrived at Tanjong Priok the following afternoon. They sailed at 1900 on the 28th February for Tjilatjap via the Sunda Strait. Unfortunately, due to a communication breakdown, the Naval Command were not informed that Japanese forces were approaching Bantam Bay even though allied aircraft had already commenced attacking the invasion convoy. At 2300 the two cruisers, already low on fuel and ammunition, stumbled onto the Japanese Western invasion fleet in the middle of conducting the landings. In the confused melee that followed, both ships were handled skillfully by their captains, but confronted by 5 enemy cruisers and 12 destroyers the outcome was never in doubt. 4 transports (including a seaplane carrier) were sunk, but having expended all their remaining ammunition, both allied ships were sunk with the loss of more than 1000 US and Australian sailors.

Meanwhile, *Exeter* had been burying her dead and undergoing makeshift repairs. She sailed from Soerabaja on the evening of the 28th of February with HMS *Encounter* and the USS *Pope* with orders to make for the Sunda Straits. This plan, made by ADML Palliser seemed to fly against common sense given the Japanese air dominance in the Java Sea and the presence of the undiminished covering force for the Eastern Invasion fleet. At 0400 the small allied fleet was North-west of Bawean Island when ships were spotted to the west. The *Exeter*, making 23 knots, turned to the NW with her consorts to avoid contact. More ships were spotted at 0750 to the southwest and a Japanese spotting aircraft shadowed the allied ships. At 0930 *Haguro* and *Nachi* were spotted to the south. *Exeter* managed to increase speed to 26 knots but this was not going to matter against the 36 knots of the Japanese ships. Shortly before 10:00, *Ashigira* and *Myoko* (having so far not been engaged) were spotted to the North, the trap was sprung. At 10:30 the Japanese opened fire. Despite her gunnery RADAR, *Exeter*’s gunnery plotting computer developed a fault and her shooting was poor. *Encounter* and *Pope* vainly laid smoke to hide *Exeter* but with the Japanese cruiser’s spotting planes aloft it was to no avail. At approximately 11:30, *Exeter* was hit in her only remaining boiler room. With all power lost and raked by 8 inch gun fire, CAPT Gordon ordered her to be abandoned and scuttling charges set. The latter proved unnecessary as the Japanese destroyer *Inazuma* closed in and dispatched her with torpedoes. *Encounter* and *Pope* were ordered to escape, but *Encounter* was rapidly disabled by gunfire and sunk. *Pope* made it to a rainsquall and avoided detection but was eventually found by aircraft from the carrier HIJMS *Ryujo* and sunk as well.

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11 Including the two 8-inch gunned heavy cruisers HIJM Ships *Mikuma* and *Mogami*

12 The American Destroyers acting independently, exited Soerabaja via the Madura and then Bali Straits. After a brief engagement with Japanese destroyers they successful arrived in Australia on 2nd March.
With this action over, the Battle of the Java Sea ended and so with it all Allied Naval forces had been defeated in the South East Asian theatre. The Invasion of Java proceeded and despite a vigorous defense by the Dutch, Australian and British forces remaining, Java was surrendered on the 8th of March. The main aim of the Japanese war plan achieved, they now turned to expanding their buffer into the Pacific where they planned to meet the American fleet in a decisive victory from which the Americans would be compelled to seek peace. What happened was not quite in their carefully scripted plan.

Finding the ships

The positions of HMAS Perth and USS Houston were discovered in the late 1960s and their Ship’s Bells were recovered and repatriated by the early 1970’s. That both ships were found relatively soon after the war was not surprising as they were located close to shore and in relatively shallow water (<40 msw). It is not known when HMS Jupiter was discovered but she probably underwent salvage either during or soon after WW2. The remains of the other warships from the battle remained lost until the early part of the 21st century due to their depth and the difficulty of accessing records from the war. The development of the Internet allowed for collaboration between Naval Historians to access many of the rarer records, particularly those of the Imperial Japanese Navy and developments in mixed gas diving enabled deeper underwater exploration by recreational divers. Understandably, as the logs of many of the Allied ships were lost with them and their final Post Action Reports were often submitted many years later after the senior surviving officer had undergone years of privation in Japanese POW camps, the official Allied positions of the ships were often wrong by a considerable margin. Japanese records usually offered a much more accurate assessment of the battles and the final locations of the ships.

In the late 1990’s and early 2000’s, the MV Empress, skippered by Vidar Skoglie hunted for many of the warships lost during these actions. Assisted by Kevin Denlay (FN ’09), Mr Skoglie located Hr.M. Ships De Ruyter and Java in 2002. The Ship’s Bells of both ships were located in the initial dives and were eventually repatriated, with the bell of De Ruyter displayed in the Naval Church (Kloosterklerk) in The Hague and the bell of Java held at the Dutch war cemetery in Surabaya (Kembang Kuning).

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13 The difficulty of locating these ships should not be underestimated, especially given the technology of the time. The searches involved many weeks of fruitless side scan sonar recording of the sea floor as well as months of historical research.
HMS *Electra* and Hr.Ms. *Kortenaer* were discovered in 2004 and HMS *Exeter* and *Encounter* in 2007. The heavily salvaged remains of the USS *Pope* were discovered in 2010 and nearby, the intact USS *Perch* (a US Submarine scuttled after being damaged by Japanese forces in early March 1942) in 2009. Over that decade, the positions of the ships were not released to the general diving community (although they were to the Flag nations) and thus the only diving that was known to be done on the sites was the few times that MV *Empress* visited. The sites were however regular fishing locations for Indonesian fishermen.

The Author conducted video surveys of several of the wrecks in 2008. Narratives of these videos are found in ANNEX A.

**Salvage fears**

In late 2012 and early 2013 reports appeared from divers of salvage activity on HMS *Repulse* and HMS *Prince of Wales*, the British Battlecruiser and Battleship sunk off the coast of Malaysia in December of 1941. Initial salvage consisted of the taking of the large bronze propellers but this was soon followed by reports of damage to the hull structure. Mr. Skoglie then noted that some of the merchant ships he would occasionally dive in the South China Sea were seemingly missing. Diving the sites revealed only scattered remains where once intact ships had been. Given that warships remain the property of the flagged nation and hence should not be subject to salvage, the disappearance of merchant ships and the ‘minor’ salvage of the well known large ships for high value items, while distressing was not seen as entirely surprising. However, in mid 2013 a report was received from local Australian ex-patriot divers that HMAS *Perth* had been heavily damaged by salvage. This was initially met with a certain degree of skepticism as it was not viewed in the western world as ‘economic’ to salvage a ship at depth for purely the scrap steel value. However, video footage supplied to the Sea Power Centre RAN (SPC-A) confirmed that HMAS *Perth* had undergone significant salvage of her superstructure and forward turrets. Unfortunately, international relations between Australia and Indonesia suffered a downturn shortly after this, before a dive team could comprehensively survey the wreck to confirm the full nature of the damage.
In October of 2013, while transiting the South China Sea, Mr. Skoglie noticed a large “Crane barge” located over the site of the Dutch submarine Hr.Ms. O-16. On the deck of the barge was a large amount of scrap steel plate and pipework. The Royal Netherlands Navy was informed and MV Empress was chartered by the ‘Relations Submarines R.N.I.N.1940-1945’ to photograph the underwater site to confirm any damage. This was performed in June 2014 by the Author and Mr. Simon McNally and confirmed that the submarine, which had previously been intact, had been completely destroyed. The nearby site of another Dutch Submarine, Hr.Ms. K-XVII was also photographed which showed that it had been significantly damaged but that the wreck was still grossly intact. Reports were subsequently received that the Japanese cruisers HIJMS Kuma and HIJMS Haguro located off the west coast of Malaysia (subject of Explorer’s Club flag-52 expedition 2010) had been destroyed by one of these barges, although as no diving operations have been undertaken to these sites this has not been confirmed.

Figure 2: Crane barge located over the site of Hr.Ms. O-16 in October 2013 with the remains of the submarine on the deck (Vidar Skoglie collection)

As a result of these events, it was realized that the wrecks of the remaining warships in the eastern Java Sea were at risk. However, the lack of a suitable diving platform\(^{14}\) precluded inspection. During 2015, Mr. Skoglie decided to sell MV Empress to an Indonesian diving company\(^{15}\) who reflagged her as an Indonesian vessel. Discussions with the new operator confirmed that appropriate permits to dive the cruiser sites

\(^{14}\) Due to tightening Indonesian laws, MV Empress had not operated in the Java Sea since 2012.

\(^{15}\) Scuba Froggy Indonesia. (Lombok)
could be obtained. This then opened up the possibility of inspecting the Dutch war wrecks to confirm their state. Discussions were held with the ‘Karel Doorman Foundation’\(^{16}\) (KDF) who rapidly agreed to fund the enterprise in the lead up to the 75\(^{th}\) anniversary of the battle in 2017.

**2016 Expedition:**

**Aims:**

The aims of the expedition were;

(a) To positively locate and identify the wrecks of the Dutch warships lost during the Battle of the Java Sea prior to the 75\(^{th}\) commemoration ceremony planned for February 2017
(b) To Sonar scan each site to provide details of the orientation of each wreck and associated debris fields.
(c) To provide a video and still photographic record (including 3D photogrammetry if possible) of the sites for the Den Helder Naval Museum.
(d) To identify artifacts that should be considered for repatriation to the Netherlands.
(e) To place a plaque on each site to commemorate the sacrifice of the sailors of the KM.(RNLN)

The expedition team was assembled (ANNEX B) comprising of a multinational group of divers chosen for their known photographic skills and their ship wreck diving experience. All appropriate permits were arranged by the boat’s new owners and letters were sent by the KDF to the Indonesian Ministry of Culture informing them of the plans.

Mr. Skoglie agreed to participate as technical advisor for the expedition as this was the first time that the new owners had conducted a diving expedition of this nature. Mr. Scott Willan provided a Multi-beam SONAR scanner for the expedition’s use.\(^{17}\) This allowed for 3D images of the sea floor and the wreck to be rapidly obtained and would become both the expedition’s most important and controversial tool (ANNEX C).

In addition to the divers and the KDF representative, Mr. Theo Doorman, son of RADM Doorman was in attendance as was a Dutch film crew who were making a documentary\(^{18}\) about Mr. Doorman’s journey back to the Java Sea and the expedition.

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16 The ‘Karel Doorman Fonds’ is a NGO set up for the benefit of families and survivors of the Java Sea campaign. It has strong ties with the Royal Netherland Navy. http://www.militairefondsen.nl/karel_doorman_fonds/index.html
17 Scott was originally recruited for his extensive experience in creating 3D photographic models of the shipwrecks around Sydney. Most fortunately he had recently purchased a portable, high resolution multi-beam sonar units to aid in this work.
18 Dutch not for profit broadcasting association Oproep Max.
Whilst we hoped that the salvager had not yet reached the Eastern Java Sea, we realized that there was a possibility that the ships may have undergone salvage. However, experience from the HMAS Perth site led us to believe that at worst the ships might have been significantly damaged but that there would still be much worth exploring and filming………

**Expedition:**

The expedition team assembled over the weekend of the 29th October 2016 at the Puri Santian resort in Sanur, Bali. This allowed for some acclimatization, particularly for those members coming from Europe. A meeting was held with Mr. Robert Van De Rijdt from the Netherlands War Graves Commission where team T shirts and polo shirts were handed out and the Plaque to be laid on the site of Hr.Ms. De Ruyter was presented by Simon McNally. Simon had plaques for each of the Dutch warships manufactured in bronze in Australia.

![Figure 3. Mr. Robert Van de Rijdt holds one of the bronze plaques.](image)

The film crew arrived in the evening of the 30th October 2016 along with Mr. Theo Doorman, son of RADM Doorman who had commanded the ABDA fleet.
The team travelled to the port of Bali and embarked MV *Empress* on 01NOV16. After a safety brief the boat left harbour and commenced the long transit along the west and northern coasts of Bali towards the site of the first phase of the Battle of the Java Sea, a journey of some 36 hours. On 02NOV16 MV *Empress* stopped over the site of a WW2 landing barge so that the diving team could conduct a ‘shake down dive’ to test all the equipment. This proceeded without incident with the exception of one of the team’s GoPro cameras being lost due to flooding.

The stop at this site meant that *Empress* would arrive at the site of *De Ruyter* at dawn rather than in the middle of the night. During the rest of the transit, the team were regaled by Theo Doorman who told his story of the last days of Java and his flight to Australia in a Catalina Flying-boat, where having just landed he, his mother and other surviving Dutch refugees were strafed by Japanese Zeros from *Kito Butai*, the Japanese Carrier task force.

*Figure 4. Mr. Theo Doorman with the plans and 1:350 scale model of *Hr.Ms. De Ruyter* during the transit to the wreck sites.*
MV *Empress* arrived on the datum for Hr.Ms. *De Ruyter* at 03NOV16 at approximately 0700. A local fishing boat was on site conducting fishing operations. Initial passes were conducted using *Empress’s* bottom sounder but failed to located the wreck so the Multibeam Sonar was mounted and scanning conducted. However, rather than showing the outline of the cruiser it revealed a 170m trench at: 6° 05.4617’ S112° 2.4986’ E laying SE to NW in approximately 70 msw. The topography on the bottom of the trench indicated that the wreck had been completely removed! The team, who had gathered on the bridge of *Empress* was stunned.

![Figure 5. Mr Scott Willan sets up the Multibeam Sonar system prior to scanning the site of Hr.Ms. De Ruyter](image)

As it was clear that the ship was gone, a decision was made that while the Sonar was deployed, to fully scan the sites of both Cruisers before conducting diving operations. Before transiting to the site of *Java*, the crew of the fishing boat was asked about the wrecks. They stated that a large crane barge had been on the site pulling up both wrecks about a month previously and that they had been threatened with guns when they had approached. They believed that the barge had been based at the port of Lambongan Java.

While the Multibeam Sonar images were conclusive, it was felt necessary to visually inspect each site and search for iconic artifacts so as to avoid any accusations that we were on the wrong sites. Divers would usually have used the shipwreck to navigate the site and get back to the shot line at the end of the dive for ascent and decompression. With this gone, and the area renown for strong currents, the divers were restricted to searching a radius of approximately 100m.

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19 With a two knot + current and 90 minutes of decompression, a diver off the ‘shot line’ would surface several miles away from *Empress* and risk getting lost. This risk was mitigated by carrying surface marker buoys that could be deployed to the surface from depth during decompression and personal EPIRBs in depth-proof housings.
(the length of their reel lines) from the shot line. This was placed in the area deemed most likely to contain debris based on the appearance of the Multibeam sonar. Divers were instructed to photograph the bottom topography and search for items that would identify the wrecks. If a suitable item worth retrieval was found it was to be retrieved or tagged for later recovery. Human remains were not to be disturbed.

**HrMs De Ruyter site:**

![Figure 6. Multibeam sonar search area De Ruyter. The trench that the ship previously occupied is clearly visible. The bow had previously been to the SW.](image)

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\(^{20}\) One of the divers using a Underwater Diver Propulsion Vehicle (“Scooter”) conducted a more distant search using the “chase” boat for retrieval.
Diving operations were commence on the De Ruyter site 04 NOV 16 at approximately 0900. Depth was 70 msw and current was minimal. Divers reported a large trench lined with subsurface mud/clay. This had large gouges through it consistent with the use of a claw. Visibility was poor (approximately 1m) due to suspended mud particles. Some small debris was located including a section of torn hull plating containing a scuttle. The deadlight on this was of the pattern seen on De Ruyter (Figures 8;9).
Figure 8. Torn hull plating and Scuttle with deadlight, De Ruyter site. The bronze deadlight with the cross on it is typical of those seen Dutch Cruisers and quite unlike the Admiralty pattern ones on HM and HMA ships. Note the fresh (orange) rust on the hull plating and the twisted and torn nature.

Figure 9. Pre war photograph, crew quarters De Ruyter. Note pattern on deadlights compared to figure 8.
The diver using the DSV with a GoPro camera reported that the topography and debris away from the shot line was similar and that no large wreckage was visible.

As the wreck had clearly been removed as seen on the MBS scan and visual confirmation by the divers, and given the poor conditions and the risks of diving at 70msw in poor visibility, the Diving leader in conjunction with the KDF expedition leader decided that further diving on the site was not justified. An ROV would be required to survey the whole of the site to ascertain what debris remains, however from that which was observed by the divers, what debris that does remain is buried in the thick subsurface clay.

Given that, apart from scattered debris, the wreck was no longer on site, the KDF representative decided to not place the plaque on the seabed where it would disappear into the mud. Instead it was hung beneath Empress and the Dutch ensign ‘flown’ above it during diving operations and filmed for commemorative purposes.

![Image](image_url)

*Figure 10. KDF Plaque and RNLN Ensign ‘flown’ under MV Empress over the site of the De Ruyter.*
Hr. Ms. *Java* site:

MBS scanning of the site of Hr. Ms. *Java* was conducted on the afternoon of 03 NOV 16. This revealed a ship shaped trench 130m$^{21}$ long at 6° 01.8298’ S 112° 2.1317’ E Laying approximately N to S in approximately 70m of water. A second smaller trench was located some 200m away to the SE consistent with the previously known position of the stern.

![Figure 11. Java Multibeam sonar search area. Note position of the second trench to the SE of the main site. Bow had been to the North.](image)

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$^{21}$ The Stern of Java had been blown off when she was hit by the type 93 torpedo.
Diving operations were conducted on 04 NOV 16 in the afternoon. As on the De Ruyter site, divers were restricted to a radius around the shot line with the exception of the diver using the DPV. This revealed similar bottom topography to the De Ruyter site with subsurface mud / clay exposed in the trench and poor visibility. Scattered torn hull plates were seen as were minor fittings. A battered 15cm copper-alloy cartridge case was recovered for positive identification of the site. Base makings showed it to be of Dutch manufacture and of the type used by Hr.M. Cruisers.
Figure 14. Shoe sole located in debris field Java.

Figure 15. 15cm copper alloy cartridge case recovered Java site.
Figure 16. Base markings 15 cm cartridge case recovered Java Site. Note Dutch crown and manufacture date 1922.

As on the *De Ruyter* site, The KDF Plaque and RNLN ensign were flown under MV *Empress* during diving operations.

Figure 17. KDF Java plaque and RNLN ensign under MV Empress over the Java site.
Given the topography seen on the MBS scan, the visual inspection by the divers and the fact that the site had been identified as that of a Dutch cruiser by the retrieval of the artifact at the expected datum, further diver exploration of the site was again not considered to be worth the risks.

In light of the findings at the sites of De Ruyter and Java, a discussion was held with the KDF expedition leader with regards to exploring the nearby British war wrecks from the Battle of the Java Sea. This was readily agreed to and the MV Empress transited to the sites of HM Ships Encounter and Exeter during the night of 04 NOV 16.

**HMS Encounter site:**

MV Empress arrived at the datum for HMS Encounter on 05 NOV 16 at approximately 0500hrs. MBS scanning was commenced at approximately 0700. Scanning revealed a large trench at: 4° 53.52554’S  111° 36.59607’E on a heading of 326°T consistent with the previously known location. There was some variation in the bottom topography suggestive that some wreckage remained.\(^{22}\)

![Figure 18. Search area at HMS Encounter site. The trench that the wreck previously occupied is clearly visible. Bow had been to the NNW.](image)

\(^{22}\) This is in contrast to the sites of De Ruyter and Java, which were very uniform.
Diving operations commenced at approximately 0900. Bottom conditions were difficult with poor visibility (although better than that experienced on the Dutch Cruiser sites). Divers located several small sections of the wreck scattered over the bottom. The largest of these was approximately 17 metres long as measured using the Multibeam sonar. Still lying on its starboard side. A single 4.7-inch Mk IX gun in a CPXVII mount was located in this structure with the barrel imbedded in the sea floor. The rotating structure was still attached to the remaining deck. 4.7-inch cartridge casings were scattered around nearby on top of the structure (i.e. the port hull) indicating that the magazine had been breached. Old netting was still attached to this part of the structure. It is probable that this section was the bow back to approximately the wheelhouse area. However, the section a few meters forward of the gun had been destroyed by salvage so this cannot be positively confirmed. Its position within the debris trench would also support this theory. Grossly distorted hull plates were scattered widely away from this structure.

Figure. 19. Multibeam sonar scan of HMS Encounter Site. Note debris remaining in the centre of the trench.

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23 As measured using the Multibeam sonar.
24 The Mk IX 4.7-inch gun used separate projectiles and cartridge cases.
Figure 20. 4.7-inch Mk IX gun and CP XVII mount with characteristic gun shield, HMS Encounter site. Shell loading tray can be seen in the centre-right upper. The gun barrel is buried into the sea floor with the face of the shield just above the seabed.

Figure 21. 4.7 inch Mk IX gun in a CP XVIII mount. Note shape of gun shield. The counter-weight was placed above the breech in this mount compared to the XVII mount to allow greater elevation. (Reference I)
HMS Exeter Site:

MV Empress transited to the datum for HMS Exeter at 1600 05 NOV 16.

MBS scanning revealed a trench at 4° 54.12016’S 111° 34.63553’E on a heading of 264° T (i.e. bow to the E) consistent with the previous known position of the wreck. MBS scanning implied some variation of bottom topography consistent with some debris remaining. Empress anchored near the largest of these variations.

Figure 22. Presumed port hull side HMS Encounter. A damaged 4.7-inch cartridge case is evident in the foreground and the torn apart nature of this part of the ship is clearly seen. Note; orange (recent) rust on metal in the foreground.

Figure 23. HMS Exeter search area. Bow had been to the East.
Diving operations were commenced at approximately 0900 06 NOV 16 over the site. Diving revealed widely scattered small debris including a significant number of human remains. These were not disturbed or photographed. No large structures were in evidence. A single cartridge case was raised to confirm the identity of the ship. This was cleaned and base markings identified it as a 4-inch copper-alloy cartridge case for Mk XVI&XVI* guns as used on the Mk XIX mounts on HM and HMA cruisers during WW2. Exeter carried four of these mounts. Strong currents in the afternoon prevented further diving on the site and re-location of the human remains for photographing. However, the diver who observed the remains is extremely experienced and has often seen human remains on Japanese war wrecks.
Figure 25. Debris at site of HMS Exeter. Note shoe sole in the foreground.

Figure 26. Debris at site of HMS Exeter.
Figure 27. Typical debris seen on HMS Exeter site. No identifiable large parts of the ship remain.

Figure 28. 4-inch MkXVI&XVI* cartridge case recovered from HMS Exeter site.
USS *Perch* site:

1700 MV *Empress* transited to the datum for the USS *Perch*, an American Submarine scuttled after being damaged to prevent her capture by Japanese forces. She was located at: 4° 47.4424’ S 111° 33.6512’ E Laying approximately WSW to ENE in approximately 60m of water.

![Figure 29. Search area, USS Perch. The bow had been to the West.](image)

MBS scanning revealed a small indentation where the wreck had been located with no obvious debris.

Diving operations were commenced at 0830. Minor debris only was found with the largest item a large gas cylinder.

![Figure 30. Multibeam sonar scan of USS Perch wreck site (2 times vertical exaggeration).](image)
**Hr.Ms. Kortenaer site:**

08 NOV 16 MV *Empress* transited to the datum for Hr.Ms. *Kortenaer*, the Admiralen class destroyer lost during the first phase of the Battle of the Java Sea. Several Known Merchant shipwreck sites were passed on the way to this site and all were missing.

MBS scanning of the *Kortenaer* site revealed some remaining wreckage at: 6°28.6124’ S 112° 03.3130’ E Laying approximately N to S. In approximately 50m of water

![Image of multibeam sonar scan](image)

*Figure 31. Multibeam sonar scan Kortenaer search area. Bow had been to the South.*

MBS Scanning revealed that she too had been largely removed although some debris and a 20m section of wreck was identified.

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25 These were not formally multibeam scanned as the scanner sensor had to be stowed during large transits to allow an economical cruising speed, however, the wrecks all failed to show on the bottom sounder at their known locations. These included the SS *Camphuijs* and SS *Benkoelen* (See ANNEX D).
Diving operations were conducted to confirm the site. Divers reported that the upturned aft section of the wreck remained embedded in the mud but that machinery spaces had been opened and the turbines and condensers etc. had been removed. As with *Encounter*, the thin corroded nature of the remaining hull was may have made extracting the wreck more difficult for the salvagers. Multiple tears were seen on the hull side with fresh corrosion indicating that attempts had been made to take this section. Identity was confirmed by the retrieval of a 12 cm cartridge case. Base markings showed it to be of Dutch origin, manufactured at the Hembrug Armoury north of Amsterdam in 1929.
Figure 34. Torn hull plating Kortenaer. Note the thin nature of the plate and recent corrosion. Piled up subsurface mud can be seen in the bottom right.

Figure 35. Exposed engine room grate, Kortenaer site.
As with the other Dutch sites, the KDF plaque for Kortenaer and the RNLN Ensign were flown off the back of MV Empress during diving operations over the site.

Figure 37. RNLN ensign and KDF Kortenaer plaque over Kortenaer site. (Diver, Tino De Rijk).
Once again, a local fishing boat was onsite. The crew of this vessel stated that the wreck was removed about a month previously. This was consistent with the fresh appearance of the subsurface mud which had been dumped on top of the remaining hull, the fresh rust on the torn metal and in the topography trench where the wreck had been removed.

As the sun set over the site of Hr.Ms. Kortenaer, a ceremony was held to honour the sacrifice of the men who had fought and given their lives during actions in February 1942. The Naval Ode was recited and then Mr. Theo Doorman blew the Officer’s whistle from the commanding officer of the Kortenaer over the site where 74 years previously it had been used to gather together the survivors in the gathering gloom.

![Image](image.png)

Figure 38. Subsurface mud exposure during salvage operation. Note linear gouges thought to be due to the passage of the claw and lack of marine plants / corals. Similar gouges were seen on all the sites that had been subject to recent salvage.

**HMS Electra Site:**

09 NOV 16 MV Empress transited the datum for HMS Electra at 6° 35.8689’ S 112° 09.1174’ E. The wreck was laying approximately SW to NE (with the bow to the north), in approximately 50msw.

MBS scanning was commenced at 0800 and showed a large structure consistent with the presence of the wreck.
Figure 39. Search area HMS Electra. Bow is to the NE.

Figure 40. Multibeam sonar scan of HMS Electra wreck site.

Diving was commenced at 1000. The wreck lies on her port side. The propellers have been removed and the aft deckhouses and guns are completely encased in multiple layers of netting. Forward of amidships the netting has been largely removed and the weather deck has separated from the main hull. Considerable damage to the forward structures was seen and the bow was
separated from the main structure by a short distance. This does not appear in a side scan Sonar image taken in 2004.

Figure 41. Sidescan sonar image HMS Electra taken 2004 (Vidar Skogli collection)

Hull plating was noted to be very thin and numerous holes have appeared in the starboard hull side. These do not have the appearance of being salvage related and were consistent with corrosion. Turbine gearing (large herringbone gears) and other large machinery items were observed to still be in situ.

The forward damage observed may be as a result of entanglement in trawl nets and natural collapse rather than deliberate salvage although this cannot be excluded. All damaged appeared to be old as no fresh rust was visible.
As previously mentioned, while not the subject of the expedition, the sites of several merchant ships sunk during WW2 were also transited while steaming between the warship sites. This was also done on the way to Surabaya where the team was due to disembark. While formal multibeam scanning was not performed on these sites, the
ships bottom sounder showed that 4 out of the 5 wrecks passed over had also been removed.

Having completed the survey of the sites, MV Empress sailed to Surabaya for the team to disembark in the morning of the 10 NOV16. Rather fittingly, Empress was docked near the old Dutch naval base. The team were met by Mr. Robert Van De Rijdt and Mr. Ferdinand Lahnstien the latter the Dutch Deputy Head of Mission to Indonesia. The British Military Attaché and an adviser were also in attendance. Understandably the British representatives were initially somewhat skeptical of the expedition’s findings however once they were shown the evidence including the recovered items they agreed that there was no doubt. A request had been made for an Indonesian Naval Officer to be in attendance as well but after waiting into the early afternoon there was no sign of one appearing. The team therefore retired to the overnight accommodation in the old Colonial Hotel Majapahit (prev. Hotel Orange) Surabaya.

Most appropriately, the following morning, Remembrance Day 11NOV 16, the team travelled to the Dutch War cemetery, Kembang Kuning in Surabaya to honour those who had fought and died at the places we had recently visited.

In a very moving ceremony, wreaths were laid and the bell of Hr.Ms. Java tolled in the still Indonesian morning air.
Figure 45. Mr. Robert Van de Rijdt of the Dutch War Grave Commission with Vidar Skogli and Mr. Theo Doorman and the bell of Hr.Ms. Java which Mr Skogli recovered in 2002.
Discussion:

They have no grave but the cruel Sea
No flowers lay at their head
A rusting hulk is their tombstone
A'fast the oceanbed
They do not grow old
as we that are left grow old
Age does not weary them,
nor the years condemn
At the going down of the sun,
and in the morning
We will remember them

Lest we forget.

It is quite clear that salvagers have systematically removed the shipwrecks of the Java Sea, including almost all the warships over the last few months. This is a tragedy at many levels.

In 1917 the Imperial (now Commonwealth) War Graves Commission was established to protect and maintain the graves of British and Commonwealth combatants who had died in active service during the war. Similar institutions were also formed by other nations. At that time, those who died when their ship were sunk had no formal grave, their ships being their tombs. As these ships were underwater, could not be accessed by the public, and required no maintenance or memorial erected over them, there was thought to be no need to designate them for protection in legislation. Furthermore, as under International Law, Warships remain the property of the flagged State, they cannot be legally salvaged without the expressed permission of the flagged State and so the sites were theoretically already protected. Thus in many cases these sites were never formally recognized as “war graves” although in the perception of the public they most certainly were.

In the late 1990’s as diving technology improved, it became apparent that recreational diving was being conducted on the wrecks of various warships around the world. While certain nations legislated to attempt to limit or prevent the looting or entry into their warship wrecks, this was generally non-enforceable as the wrecks lay mostly in international waters and the flag government had no jurisdiction over foreign nationals. In some respects this legislating actually had negative effects. When the Ship’s bell of HMS Repulse was located by British divers they were forced to leave it in situ due to fears of prosecution. The bell was subsequently recovered by a Singaporean national and reputedly now sits in a Japanese company’s board room. Similarly, when the Ship’s bell of HMS Prince of Wales was located by a British National, the bell was successfully recovered and repatriated but required an “official” expedition to do so at a cost to the UK taxpayers of several hundreds of thousands of UK Pounds for what could have been done at the initial finding for free. Furthermore, while divers may have

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26 recreational diving did not become practical until the 1960’s and to the depth that most of these ships lie, until the 1990’s.
removed some minor items, they had a vested interest in protecting and monitoring the wrecks. In the case of the last two named vessels and HMAS *Perth*, it has been divers who have alerted officials to the illegal salvage activities. Interestingly however, many governments still do not officially recognize the wrecks as war-graves sighting that they are not so covered under legislation. Even the issue of ‘ownership’ has come into question, with some government lawyers worried that if ownerships were asserted, they would become liable for any environmental clean up should oil be spilled or be sued if ammunition blew up and killed someone. While such issues have been discussed at length in meetings, the matter has now conveniently been solved for them in many cases.

From the perspective of the family and relatives of the sailors who died on these vessels (and the few remaining survivors), what has occurred is equivalent to one of the major terrestrial war cemeteries being ripped up and its contents sold for landfill. One can but imagine what would have happened if one of the major cemeteries at The Somme were so desecrated. While there is often a perception that there would not be human remains in the wrecks after 75 years, this is not the case. Divers exploring these wrecks commonly come across human remains and personal items in the deeper parts of the wreck where the relatively anoxic environment preserves organic material. While remains were only spotted on the site of HMS *Exeter*, it is assumed that they will also be present on the sites of the other ships, most likely having been washed off the deck of the carmine barge or spilled out during the salvage process. The relative lack of interest in the mainline press outside of the Netherlands in regards to these events is disturbing.

This is also surprising given that the interest in Battlefield tours etc. in recent times have indicated that the younger generations are if anything becoming more interested in the events of the war and the parts their relatives played. For these warships wrecks, technology was just arriving that would have allowed tourism on these sites similar to that which is done on land based battlefield sites. With recent 3D-photogrammetry and mapping developments and new submersible technologies the potential was emerging to allow both visits to the actual wrecks and the development 3D virtual wrecks for shore based museums.\(^\text{27}\) Unfortunately the wrecks have now been taken and along with them a whole potential industry for Indonesia.

The salvage of these ships has been an incredibly thorough job and has ignored such factors as the fuel oil remaining on the vessels and the live ammunition. If normal Western Workplace and Environmental Safety rules were applied the salvage of these vessels would not only be uneconomical it just could not have happened. From an environmental issue alone, the release of fuel is a significant issue. When HMAS *Perth* was partially salvaged, an assessment was done on the likelihood and quantity of oil remaining on the wreck. While contemporary reports indicate that a considerable amount was spilled from the wreck during her sinking, assessment of the battle damage and estimation of remaining stores at the time of her sinking indicated that up to 900,000 liters may have remained onboard. Similarly, HM Ships *Repulse* and *Prince of Wales* were fully bunkered

\(^{27}\) Recently demonstrated by Rod McDonald on HMS *Hampshire* (Flag-192 expedition prior to this expedition) and planned for this expedition.
at the time of their sailing and would therefore very likely still contain considerable quantities of oil. Small amounts of oil were always seen rising to the surface during diving operation over these ships, but in recent times after salvage has occurred, an oil slick several miles long has been observed down current from the wrecks. While a detailed estimate of the oil remaining on the wrecks of the British and Dutch warships in the Java Sea has not been done, given the known amount that HMAS Perth arrived with at Tanjong Priok the next afternoon, we can probably assume that Hr.M. Ships De Ruyter and Java would have been approximately half full at the time of their sinking. HMS Exeter and Encounter would have been almost fully bunkered at the time of their sinking given their recent departure from Surabaya. It is therefore fairly safe to assume that the crude salvage methods involved on theses wrecks (and the merchant ships in the area as well) has released several millions of liters of light fuel oil in to the waters of the Java Sea. An assessment of the effects of this on the local marine life is beyond the scope of this report but cannot have been inconsequential.

A further major environmental issue is the destruction of the fish rookeries that these wrecks represented. Annex D contains a list of the merchant ships sunk in the Java Sea area just in the first months of the war. This lists some 58 ships accounting for more than 250,000 tons lost during this short period alone. For 74 years each of these ships have acted as an artificial reef in the Java Sea, providing a home to countless fish, a place where they could breed and grow in relative safety. The effectiveness of this was clearly shown by the fishing that was done by the local Indonesians over the sites. The complexities of the wrecks meant that only the larger fish that ventured away from the wrecks got caught as fishing too close to the wrecks would result in the loss of nets and lines. The wreck itself therefore acted as a rookery where the fish could grow. On previous diving expeditions we would commonly see large schools of Trevally and Mackerel over theses sites while Moray eels and large Gropers inhabited the various nooks and crannies deeper inside the wrecks. The wrecks themselves were covered in a myriad of soft and hard corals and had all the appearance of a garden, something that the survivors always commented on when they were shown the underwater video of their ships. This is now all gone with only subsurface mud remaining.

What the impact to the local fishing industry will be cannot be gauged but should they turn to the local reefs now that there are no fish at their traditional sites, these, which are already stressed, will be further damaged, perhaps irreparably. Needless to say, for the onetime monetary gain for one salvage company, the livelihood of many others will now suffer.

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28 The appearance of the subsurface mud visualized on the sea floor is consistent with the use of a crane-barge with a large claw as has been observed taking wrecks in the South China Sea (Hr.Ms. O-16) and on HMAS Perth (I) during 20013-15.
Figure 46. ‘Screen shot’ HMS Exeter hull survey video 2008. The wreck was home to not only a myriad of hard and soft corals as well as the usual reef fish and also large schools of pelagic species.

For the Marine Archeologists, the removal of these ships is also an unparalleled disaster. Each of these ships represented a time capsule of the events and formal assessments of the battle damage against contemporary reports has never been done.

That new information can be gained from the study of these wrecks was amply demonstrated by the Author’s expedition to HMS Prince of Wales in 2007. This expedition found significant new information about the loss of this ship that was subsequently presented at a meeting of RINA (Royal Institution of Naval Architects) and IMarEST (Institute of Marine Engineering, Science & Technology) members in London by Mr. William Garzke.

The analysis of the damage to both HMS Prince of Wales and HMS Repulse showed considerable variation from that claimed by the Japanese and that described by the British. Similarly, a hull survey of HMAS Perth conducted by the Author in 2009 showed considerable variation from official reports of the damage to that ship.

It might therefore be assumed that had proper surveys of the warships that were the subject of this expedition been done, new insights into their losses might also have been gleaned. Indeed, the fact that the forward turrets of Hr.Ms. De Ruyter were trained to Green 90 (while the stern turrets are in cruising configuration) and that they had used cartridge cases nearby may suggest that they continued to engage the enemy after the fatal torpedo hit even while the ship was sinking.

29 EC Flag 118 Expedition ‘Job 74’,
While there has been a long debate over the removal of artifacts from such sites by dives, it is only those items that have been illegally removed by divers that now remain. Should there be a desire to create a museum memorial to these ships and the men who died on them, the time may have come to encourage divers who have items in their possession to donate them rather than continue to threaten them with prosecution.

Summary:

1. Hr.M. Cruisers DeRuyter and Java have been completely removed, probably recently.

2. H.M.S. Exeter has been completely remove. Some human remains were observed exposed on the seabed.

3. H.M.S. Encounter has undergone near complete salvage with a 17 metre section remaining.

4. Hr.Ms. Kortenaer appears to have undergone partial recent salvage. Approximately 20 percent of the aft hull remaining inverted embedded in the mud. All the machinery appears to have been removed.

5. H.M.S. Electra has undergone light salvage a substantial time previously and is showing signs of advanced corrosion.

6. U.S.S. Perch has been completely removed.

7. A significant but unknown number of WW2 merchant ship wrecks have also be removed.
ANNEX A

Condition of the Wrecks, 2008

Figure 47: Possibly the last photograph taken of Hr.Ms. DeRuyter in Soerabaya February 1942 from HMAS Ballarat. (CPO Pete Cannon, RAN Collection)\(^{30}\)

1. The Author conducted a limited video survey of the wrecks of Hr.M Ships De Ruyter and Java in 2008

2. Hr.Ms. De Ruyter was located by Mr. Vidar Skogli in 2002 and 2 of her 3 bells were recovered at that time. She was located at: 06.05.47S 112.02.44E in 68 msw and was last dived in 2008.

3. Hr.Ms. Java was also located by Mr. Vidar Skogli in 2002 and her bell was also recovered. She was located at: 06.01.81S 112.02.13E in 68 msw and was last dived in 2008.

\(^{30}\) The presence of what appears to be gun shields on the 40mm AA guns would indicate that this photo may have been taken hours before the departure of the ABDA fleet.
At the time of the video survey, Hr.Ms. De Ruyter was laying intact and upright with a list to starboard of approximately 30 degrees. The starboard guardrail was nearly at the level of the seabed. The Forward rangefinder atop the bridge tower had lost its port arm. The forward gun turrets were trained to approximately Green 90\textsuperscript{31}. Expended 15cm cartridge casings were scattered around the seabed on the starboard side (0 minutes 49 seconds). The Helm and the Telegraphs were in situ (5 minutes 34 seconds). The five 40mm Bofor guns on the aft deckhouse (above the Captain’s cabin) were in situ and demonstrated the protective shield fitted just prior to her sailing (6 minutes 55 seconds). The Aft turrets were still in cruising position pointing towards the Stern (9 minutes 56 seconds). The letters of ship’s name were seen on the port side of the stern jumbled together (11 minutes 25 seconds). The Site of the fatal torpedo hit was not observed. The Dutch ensign was flown from the wreck during diving operations.

\textsuperscript{31} \textit{De Ruyter} video at 03 minutes18 seconds shows a small hatch along the side of the No.1 turret. If the Turret was in the fore-aft position this would be under the rear of the turret (Reference F).
5. **Hr.Ms. Java** was laying on her starboard side. The No.1 gun mount was trained to Red 60 and the No.2 mount to Red 100 with its barrel muzzle near the port bridge wing. The remaining aft and portside 15cm Gun mounts were trained to approximately Red 100 (0 minutes 43 seconds). The bridge structure was intact with the frame for the canvas roof still present. Both the Helm and the triple Telegraph were still present on the bridge (7 minutes 11 seconds). Targeting equipment and Searchlight supports were all still in situ. The 40mm Bofor antiaircraft guns were in situ on the aft deckhouse as was the forward of the two 15 cm gun mounts aft of them, however, shortly aft of this gun mount the stern was missing, located some 200m away. The ship was considerably torn up in this area. The Dutch ensign was flown over the site from the wreck during diving operations.
6. The Author conducted a limited video survey of the wreck of HM Ships *Exeter* and *Encounter* during 2008.

7. HMS *Exeter* was located by Mr. Vidar Skogli in 2007 at: 04.53.128S 111.34.650E. The site was last dived in 2012 and was intact at that time.

8. HMS *Encounter* was located by Mr. Vidar Skogli also in 2007 at: 04.53.513S 111.36.578E. This site was last dived in 2008 and was intact at that time.
9. **HMS Exeter** was complete and lying on her starboard side in 61 msw with all her guns trained to approximately Green 100. The port torpedo tubes were empty and stowed. The hull was generally intact but showed significant battle damage from torpedo hits aft of Y turret and forward of A turret. The bow in particular was separating from the after part of the wreck and the lower hull had been blown in over an extensive area. Large caliber shell damage was visible on the port upper hull aft of the torpedo tubes and around the bridge. The lower bridge area was in the process of collapse and had significant battle damage. All other upper-works were present. Her propellers were present and the bridge rangefinders and other equipment was still in situ. The white ensign was flown over the site during diving operations.

10. **HMS Encounter** was also lying on her starboard site. Her No.1 four 4.7-inch main armament gun mounting trained to approximately Green 90, the No.2 mount to Green 110 and the No.3 mounting to Red 90.\textsuperscript{32,33} The No. 4 mounting was not located. Her torpedo tubes were trained to Red 90 and were empty. She was in a much poorer condition than **Exeter**, with the after port side hull split open between the line of the scuttles and the waterline back to

\textsuperscript{32} The gun barrels of both No.1 and No.2 gun mountings were embedded in the seabed.
\textsuperscript{33} The main guns being on different bearings gives a vivid picture of how this ship was surrounded and overwhelmed.
the stern. However the propellers and all machinery and equipment were present. A 4.7-inch cartridge case was still sitting in the loading tray of No.1 Gun. She also showed considerable shell damage, especially around the bridge area.

Figure 52. Props and rudder HMS Encounter 2008 (Andrew Fock Collection)

11. HMS *Electra* was located by Mr. Skogli in 2004 at: 06.35.85S 112.09.12E 2004. The wreck was almost cocooned in netting but appeared intact. The propellers were present at that time. The wreck was last visited in 2006 and was rarely visited prior to that due to the poor visibility and netting on the site. No known video survey or previous photos of the site was available.
ANNEX B:

Expedition leader Karel Doorman Fonds: Sip Wiebenga, KM (ret.)
Expedition leader Diving: Andrew Fock, CMDR, RANR

Divers:
Andrew Fock (AUS)
Simon McNally (AUS)
Peter Mesley (NZ)
Andrew Simpson (NZ/UK)
Tino De Rijk. (NL)
Scott Willan (Multibeam sonar) (AUS)

Java Sea 2016 Expedition team members: Front row left to right: Pete Mesley, Stephan Schmidt, Theo Doorman, Scott Willan, Andrew Fock. Second Row; Simon McNally, Tino de Rijk, Vidar Skogli, Andrew Simpson, Kick Stokvis, Sip Wiebenga

Film Crew:
Director : Kick Stokvis (NL)
Camera: Stephan Schmidt (NL)

Theo Doorman (son of RADM Karel Doorman, Commander ADBA Fleet at the Battle of the Java Sea)

Vidar Skogli (Technical advisor to Scuba Froggy Dive charters Indonesia)
Diving operations:

4 divers utilized Closed Circuit Rebreathers UBAs with trimix diluent; 9% Oxygen, 61% Helium residual Nitrogen. Gas mixture was planned on gas density at maximum depth to minimise the risks associated with increased work of breathing at depth. This mixture gave an ‘equivalent air density depth’ of 33 msw. Open circuit bailout was carried as a team. Deep bailout, Trimix 20% Oxygen, 35% Helium, shallow bailout EAN50. Emergency EAN50 and 100% O₂ were also carried in a chase boat in case of a diver decompressing off the shot line and requiring extra gas. 100% O₂ was available via SSBA on the decompression station.

2 Divers utilized open circuit UBAs with Trimix 17% Oxygen, 45% Helium, residual Nitrogen back gas and EAN50 and 100% Oxygen for decompression.

1 Diver utilized a DPV\(^{34}\), however, extremely poor visibility limited the usefulness of the DPV.

Divers carried EPIRBs and Nautilus lifeline DSC VHF radios.

Environmental protection was provided by 3mm wetsuits.

*Andrew Simpson stands just off the diver lift at the stern of MV Empress: Typical CCR Diving configuration with open circuit emergency bailout cylinders.*

\(^{34}\) Diver Propulsion Vehicle also know as a “Scooter”.
Diving in the Java Sea can result in some unexpected encounters. Here, Pete Mesley gets up close to a Whale Shark that stayed with the divers for 90 minutes while they decompressed under MV Empress.

Diving team assemble around the plaque for Hr.Ms. Java prior to the descent to the site.
ANNEX C:

SURVEY PROCEDURES AND OPERATIONS

SURVEY VESSEL
The multibeam was mounted on a vessel of opportunity the MV Empress, a 22.4 meter 100 Tonne steel vessel.

![Figure 1 MV Empress](Image)

Centre of Roll
The centre of roll was determined to be just below the water line on the centre line of the vessel approximately 55% down the length of the vessel
All offsets are measured from this point.

SURVEY EQUIPMENT

MULTIBEAM
The Unit used was a WASSP S3 multibeam [http://wassp.com/s3-for-survey-and-mapping/](http://wassp.com/s3-for-survey-and-mapping/)

![Figure 2 WASSP S3 Multibeam](Image)
<table>
<thead>
<tr>
<th>Frequency</th>
<th>Wideband 136-184 kHz</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beams</td>
<td>224 Equiangle</td>
</tr>
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<td>Maximum Depth (Metres)</td>
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<tr>
<td>Swath Width</td>
<td>120°</td>
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<tr>
<td>Max Vertical Resolution, CM</td>
<td>3.9</td>
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<tr>
<td>Beam Width (Port/Starboard)</td>
<td>4.4°</td>
</tr>
<tr>
<td>Beam Width (Fore/Aft)</td>
<td>3.2°</td>
</tr>
</tbody>
</table>

GPS

The unit used was a Hemisphere V113
https://hemispheregnss.com/Products/Products/Position-Heading/vector-v103e284a2-and-v113e284a2-gps-compasses-96

![Figure 3 Hemisphere V113 Vector GNSS L1 GPS Compass](image)

<table>
<thead>
<tr>
<th>Receiver Type</th>
<th>Vector GNSS L1 Compass</th>
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<tbody>
<tr>
<td>Signals Received</td>
<td>GPS and GLONASS</td>
</tr>
<tr>
<td>Channels</td>
<td>540</td>
</tr>
<tr>
<td>GPS Sensitivity</td>
<td>-142 dBm</td>
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</tbody>
</table>

| SBAS Tracking          | 2-channel, parallel tracking |
| Update Rate            | 20 Hz standard            |
| Beacon Channels        | 2-channel, parallel tracking |
| Frequency Range        | 283.5 to 325 kHz         |
| Operating Modes        | Manual, Automatic, and Database |
| Compliance             | IEC 61108-4 beacon standard |

<table>
<thead>
<tr>
<th>Positioning Accuracy RMS</th>
<th></th>
</tr>
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<tbody>
<tr>
<td>Horizontal Vertical Single Point</td>
<td>(H) 1.2 m (V) 2.5 m</td>
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<tr>
<td>SBAS (WAAS)</td>
<td>(H) 0.3 m (V) 0.6 m</td>
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<tr>
<td>Code Differential GPS (Beacon)</td>
<td>(H) 0.3 m (V) 0.6 m</td>
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<tr>
<td>Heading Accuracy</td>
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<tr>
<td>Timing (1PPS) Accuracy</td>
<td>20 ns</td>
</tr>
<tr>
<td>Rate of Turn</td>
<td>90°/s maximum</td>
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</tbody>
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IMU

The unit used was an Advanced Navigation Spatial
Spatial is a miniature GNSS/INS & AHRS system that provides accurate position, velocity, acceleration and orientation under almost the most demanding conditions. It combines temperature calibrated accelerometers, gyroscopes, magnetometers and a pressure sensor with an advanced GNSS receiver. These are coupled in a sophisticated fusion algorithm to deliver accurate and reliable navigation and orientation information.

Figure 4 Advanced Navigation Spatial IMU

<table>
<thead>
<tr>
<th>Roll &amp; Pitch Accuracy (Static)</th>
<th>0.1 °</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heading Accuracy (Static)</td>
<td>0.5 °</td>
</tr>
<tr>
<td>Roll &amp; Pitch Accuracy (Dynamic)</td>
<td>0.2 °</td>
</tr>
<tr>
<td>Heading Accuracy (Dynamic with GNSS)</td>
<td>0.2 °</td>
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<tr>
<td>Heave Accuracy</td>
<td>5 % or 0.05 m</td>
</tr>
<tr>
<td>Output Data Rate</td>
<td>Up to 1000 Hz</td>
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</tbody>
</table>

MOUNTING, SETUP AND OFFSETS

Transducer mounting
The transducer was mounted to a 5m pole which was attached to the boats handrail (approximately 3m above waterline) as well as to the vessels rubbing strake (approximately 1m above water line) with fore and aft back stays mounted from the transducer. A lateral line was also attached to the keel to limit port / starboard wobble.

Figure 5 Multibeam Transducer mounting
The transducer was mounted on the roof of the bridge of the VOO

| 3.0m | Starboard from the Centre of Roll |
| 2.25m | Below from the Centre of Roll |
| 0.0 m | Fore from the Centre of Roll |

**GPS mounting**
The GPS was mounted to roof of the vessel.

![Figure 6 GPS Mounting](image)

The GPS was mounted

| 1.7m | Starboard from the Centre of Roll |
| 4.0m | Above from the Centre of Roll |
| 2.0m | Fore from the Centre of Roll |

**IMU mounting**
The IMU was mounted adjacent to the multibeam control unit in the main bridge of the vessel.

![Figure 7 IMU Mounting](image)

The IMU was mounted

| 1.7m | Starboard from the Centre of Roll |
| 3.0m | Above from the Centre of Roll |
| 2.0m | Fore from the Centre of Roll |
MULTIBEAM SET UP COMMENTARY

Although not ideal, the setup of the system was able to provide adequate reliable results. Known deficiencies included that no patch test was undertaken as the transducer was being regularly removed from the water but all results for an individual wreck are internally consistent. As such it is known that there were some misalignment in the default pitch and roll of the unit. This can particularly be seen in the results of the USS Perch where an up to 4m difference can be seen on the sea bed over the 200m swath (i.e. approximately a 1.2° misalignment (port side low) with the transducer.)

![Figure 8 Example of uncorrected roll in a data sample](image)

The multibeam mounting pole was seen to wobble at speeds greater than 4 knots thus all scanning was conducted below this threshold although from the record and visual vibrations seen on the pole at time of data capture it can be seen that there is some residual wobble. Although there was virtually zero offsets between the GPS and the IMU in the Port/Starboard and Fore/Aft planes there was an offset in the height planes of approximately 1m which was not applied to the IMU (although it was applied to the multibeam) for its internal corrections to the Roll / Pitch and Heave values provided to the multibeam. This is not considered significant as the flex of the overall 5m pole mounting the multibeam was significantly greater than this. No Speed of sound corrections were applied a default value of the speed of sound in water of xxxx m/second was used throughout all data recording.

Data Collection and Post processing

Data was collected via the WASSP CDX software which is a control, visualisation, data management and data processing application for use with the WASSP DRX ‘Black Box’ multibeam transceiver. Associated with this is the Data Manager application bundled with the WASSP CDX for use with recording the DRX data and capable of exporting to various supported data formats.
Generally all of the data was collected as it was captured so as to allow later post processing of the data set. The Data Manager application, then exported the bathymetric data as an ASCII XYZ (latitude longitude depth) point cloud file for further processing. Global Mapper was used as a geographic information system (GIS) package to provide viewing, conversion, and other general post processing GIS features of the raw data. Hydrographic / Bathymetric style data used within this report was gridded as a triangulated elevation grid using a 5 point binning average to reduce the effects of minor observation errors. As such the original data values was thinned within the 5 data point bin and replaced by a statistical mean value representative of that central value bin to produce a somewhat smoothed result more statistical representative value. Where more detail of the seabed topography was sort a Triangulated irregular network (TIN) was used displaying all of the collected data, at time a combination of both were used where the smoothed 5 point binning average was displayed below the individual point cloud data. This depth style information is represented within this report by colour scale terrain with cooler colours (blues and greens) representing deeper depths whist shallower items are represented by hotter colours (reds and yellows).
## ANNEX D: Allied Merchant losses Java Sea area DEC 41 to the fall of Java:

### Allied ship losses

<table>
<thead>
<tr>
<th>British / Australian</th>
<th>Name</th>
<th>Date of loss</th>
<th>Reason of loss</th>
<th>cargo</th>
<th>Tons</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Derrymore</td>
<td>13-Feb-42</td>
<td>I-55</td>
<td>Aumunition / aircraft and AA guns</td>
<td>4799</td>
<td>Carried crated Hurricanes and injured future Prime minister of Australia</td>
<td></td>
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<tr>
<td>Silksworth</td>
<td>06-Mar-42</td>
<td>Gunfire Suzuya &amp; Kumano</td>
<td>4921</td>
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<td></td>
<td></td>
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<tr>
<td>Autolycus</td>
<td>06-Mar-42</td>
<td>Gunfire Suzuya &amp; Kumano</td>
<td>7621</td>
<td>Carried Perth’s crew to UK prewar</td>
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<td>Gunfire Suzuya &amp; Kumano</td>
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<td>Gunfire Suzuya &amp; Kumano</td>
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<td>Sloet Van Beele</td>
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<td>aircraft (Ryujo)</td>
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<td>Van Landsberge</td>
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<td>gunfire</td>
<td>Tanker</td>
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</tr>
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</table>

**Total:** 225852 tons
ANNEX E: Ship Data:

Hr.Ms. De Ruyter:

De Ruyter class Light cruiser:
Commissioned: 1936

Length: 170.92m
Beam: 15.70m
Displacement: 6962 tons (7548 FL)
Compliment: 435

Armament: 7 x 15cm 50 caliber guns, 6 Mk 9 guns in 3 twin turrets (two aft super-firing and one forward) and one super-firing single Mk 10 forward mount. 5 x twin 40mm gyroscopically stabilised anti-aircraft guns mounted over the commanding office’s quarters aft. 8 x 12.7mm machine guns.

Machinery: 6 Yarrow water tube boilers in three boiler rooms. Two Parson’s geared steam turbines in two engine rooms developing 66,000 SHP.+ 15% overload capability. 33knts.

Armour: Belt 30-50mm, turrets 30mm, deck 30mm
Hr. Ms. Java

Java Class Light cruiser
Commissioned: 1925

Length: 155.3m
Beam: 16m
Displacement: 6670 tons (8208 FL)
Compliment: 525

Armament: 10 x 15cm single mounts. 4 x twin 40mm antiaircraft guns mounted on the aft deck house. 4 x 12.7mm machine guns.

Machinery: 8 Schulz-Thornycroft boilers, Germainia turbines. 3 shafts @ 72,000 SHP = 31 knts.

Armour: 75mm belt, 25-50mm deck. 125mm conning town, 100mm gun shields.
HMS Exeter:

York Class Heavy Cruiser
Commissioned: 1931

Length: 175.3m
Beam: 17.7m
Displacement: 8520 tons (10660 FL)
Compliment: 628

Armament: 6 x 8-inch (20cm) Mk VIII guns in 3 MkII turrets. 8 x 4 inch Mk XVI guns in 4 twin mounts. 16 x 2pdr ‘Pompoms’ in two octuple gun mounts. 2 x 20mm Oerlikon guns. 6 x 21 inch torpedo tubes in 2 triple mounts amidships.

Machinery: 8 Admiralty drum boilers with 4 Parsons geared turbines. 80,000 SHP. 32 knts.

Armour: Belt 75mm, magazines 140mm, deck 38mm. Turrets 25mm
Hr.Ms. Kortenaer

Admiralen class destroyer.
Commissioned: 1927

Length: 98.1m
Beam: 9.5m
Displacement: 1310 tons (1640 FL)
Compliment: 143

Armament: 4 x 12cm single mount guns. 2 x 7.6 cm HA gun, 4 x 12.7mm machine guns, 6 x 21 inch torpedo tubes in two triple mounts.

Machinery: 3 Yarrow boilers with 2 Yarrow geared turbines. 31,000 SHP 34 knts.

Armour: nil
HMS Encounter / Electra

HMS Encounter 1938 (IWM Collection)

E-Class Destroyer
Commissioned: 1933

Length: 100.3m
Beam: 10.13m
Displacement: 1405 tons (1970 FL)
Compliment: 145

Armament: 4 x 4.7 inch Mk IX single mount guns. 8 x 0.5 inch machine guns in quadruple mounts, 8 x 21 inch torpedo tubes in two quadruple mounts.

Machinery: 3 Admiralty pattern drum boilers with 2 Parsons geared turbines. 36,000 SHP 36 knts.

Armour: nil
Approximate locations of the wrecks.

HMAS Perth Engaging enemy forces, night action February 28th 1942. (Bruce Constable 2014).
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The Author would like to thank the Karel Doorman Foundation for trusting a group of mostly Aussie and New Zealand technical divers with such an important expedition. To Mr. Vidar Skoglie for finding the wrecks and taking us out to explore and photograph them over the last decade. To the dive team who delivered the goods every time they were asked despite most difficult conditions. And finally, to the Explorer’s Club of New York for honouring us with Flag-192.