Locating the wreck of HMD *Laurel Crown*, mined off the Orkney Mainland, 22nd June 1916.

Final Report

Submitted to: Historic Environment Scotland

- Philip Robertson

Contact: Kevin Heath
SULA Diving
Old Academy
Stromness
Orkney
KW16 3AW

Tel. 01856 850 285
E-mail. info@suladiving.com

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1. INTRODUCTION & AIMS

The drifter Laurel Crown was 81feet long and built of wood by Scott and Yule of Fraserburgh in 1912. Initially used as a fishing vessel (FR506) by the West family, she was later hired by the Royal Navy to carry out minesweeping duties during the First World War. Posted to Orkney, she was one of a number of drifters (known as Her Majesty's Drifters or "HMD") tasked with the protection of the naval base at Scapa Flow. On the 22nd June 1916 while on minesweeping duties to the west of the Orkney mainland, HMD Laurel Crown struck a mine and quickly sank with the loss of her entire crew of nine men. It is thought that the mine she struck was part of the same minefield which caused the sinking of HMS Hampshire 17 days previously on 5th June 1916.

The story of HMD Laurel Crown has been overshadowed by events surrounding the loss of HMS Hampshire and the Minister of War, Lord Kitchener, who was on a diplomatic and military mission to Russia. While a Court of Enquiry held shortly after the sinking of the Laurel Crown detailed its approximate position, its wreckage has never been located. Recently, its profile has been raised in a project which aims to carry out restorative work to Kitcheners Memorial - erected in 1926 by the Orkney community – ahead of the centenary of the sinkings in June 2016. That project also intends to construct a new wall at the site which will bear the names of not only all of the crew lost from HMS Hampshire, but also the crew members of HMD Laurel Crown.

Considering the imminent centenary, SULA Diving applied to Historic Environment Scotland (HES) for funds to carry out a contemporary investigation of the circumstances surrounding the loss of the Laurel Crown with the overall objective of locating her wreckage. This investigation comprised an examination of historical accounts of the incident, a review of recent hydrographic surveys and a new survey of the area where HMD Laurel Crown was lost using side scan sonar, in an effort to locate her wreckage on the seabed.

The following pages detail the findings made in each phase of the project.

2. METHODS

2.1 Background research

A number of historical documents were reviewed for information relating to the loss of the Laurel Crown, and in particular for her position when she was lost. These included:

- Excerpts from the logbook of the HM Yacht Evening Star, June 15th – July 18th 1916. ADM ref 53/41245.
- Court of Enquiry Report – Loss of HMD Laurel Crown. ADM reference 137/3138.
- Bi-monthly minesweeping statements, No. 97 (15th June – 30th June) and No. 98 (1st July – 16th July 1916).
- Naval Staff Monographs – Home Waters – Part VII. From June 1916 to November 1916. ADM 186/628.
- U75 KTB (Kevin Heath, personal archive).

These documents were obtained from the National Archive, Kew, following information requests made by Kevin Heath (SULA Diving).

United Kingdom Hydrographic Office (UKHO) records for the area were also reviewed.

2.2 Survey operations

Seabed surveys were carried out using CMax CM2 side scan sonar system, which included a digital towfish with depth sensor. Sonar data were collected using a medium frequency setting of 325 kHz and recorded using MaxView software. The towfish was deployed behind the survey and towed at a speed of approximately 4 knots. Sonar range was generally set to 75m (9.4 pings per second) which resulted in a swathe width of 150m during each sonar pass, with sufficiently high resolution to determine objects on the seabed. Towfish altitude was maintained at approximately 10m off the seabed through the survey. A sonar range of 150m was also used in some instances to cover a wider area (4.8 pings per second).

An Evermore SA380 Marine GPS (accuracy +/− 3m), attached to the winch was used to collect spatial data. The towing wire was routed through a counter pulley at the stern of the vessel, to record the layback (the distance of the towfish behind the vessel). The distance between the GPS and the counter pulley was then used during post processing to determine the location of the towfish (and thus any sonar contacts) relative to the boat.

2.2.1 Post processing

Post processing of sonar data was achieved using SonarWiz 5 following standard guidance[1]. Scans were completed to ensure the target was within either the port or the starboard channel, thus minimizing potential data loss during slant range collection. A

[1] Plets, R., Dix, J., & Bates, R., 2013. Marine Geophysics Data Acquisition, Processing and Interpretation: Guidance Notes. Published by English Heritage.

bronze colour palette was chosen to provide the best data clarity, accentuating anomalies and shadows making them easier to locate and characterise. Each data run was reviewed for contacts, which were given unique identification numbers and characterised using their reflective and shadow properties to determine shape and height off the seabed.

All locations were given in degrees and deci-minute format, (datum WGS84).

3. RESULTS

3.1 Background research

Records obtained from the National Archives provided a relatively detailed account of events leading up to the loss of HMD Laurel Crown. Following the loss of HMS Hampshire on 5th June 1916 and believing that a mine had been responsible, the Royal Navy dispatched a group of minesweepers from Scapa Flow to sweep the area for further mines. Between the period 8th and 15th June a total of 13 mines had been swept from the area where the Hampshire was lost, confirming in the Navy's mind at least the cause of the Hampshire's sinking. In fact it is now known that mines were indeed deployed in the area by the U-boat U75 on the 29th May 1916.

Later that month, following orders from Commander Bertram A. Nicolson, a group of HM drifters were dispatched to carry out further minesweeping duties to the west of Orkney. This appeared to be a more routine operation however as the vessels were tasked with sweeping "Area 2", one of a number of maritime areas around Orkney which were swept regularly to maintain secure channels for shipping (referred to as "swept channels"). Area 2 is shown in Figure 1 and included a significant part of the maritime area to the west of the Orkney mainland. The drifters, led by the HM Yacht Evening Star, departed Kirkwall at 0445hrs on the 22nd June and headed for Area 2, via Eynhallow Sound. At 0730hrs the flotilla passed the Brough of Birsay to the southeast, reportedly travelling at a speed of 8 knots. The group then headed in a west-southwest direction for the sweeping area. According to the log of HMY Evening Star, the Laurel Crown struck a mine at 0805hrs and sank with a few minutes. Boats were quickly lowered from some of the other vessels in the group to check for survivors. One body was found among the wreckage, which was recovered. At 0900hrs a mine was observed floating just under the surface. This mine was subsequently swept and dragged inshore where it was sunk by gunfire. Further sweeping work was carried out before the vessels departed for Stromness, where they anchored at 2015hrs. Further minesweeping efforts were made in Area 2 in the following days.

The CoE report suggests that it was Commander Nicolson's impression that all mines cleared previously from the area of the Hampshire's sinking had been found at a depth of 15 feet below the surface at low water. He was aware that the drifters dispatched from Kirkwall by him would have to travel through the area where the Hampshire was lost in order to get to the starting point for the Area 2 survey. However, as the maximum draft of all vessels in the group was approximately 10 feet, he judged it a safe route.

No schematics of HMD Laurel Crown were found during the background research. However, given the uniform design of the drifter, comparison can be made to other vessels of the era. The general arrangement of the single screw drifter "Ocean" shows the location of the main components of the vessel (Figure 2). Eye witness testimony from the Court of Enquiry suggested that the explosion occurred towards the stern of the vessel. The damage caused by the mine was clearly considerable given the speed with which she sank. It is also possible that damage was inflicted to features of the vessel such as the engine and boiler that are useful in terms of detection, particularly in the case of wooden vessels, when using contemporary search methods such as side scan sonar. A further point to consider is that that the wreckage may be widely dispersed on the seabed, given the type of vessel, the force of the explosion and the depth of water (approximately 80m), where the incident occurred.

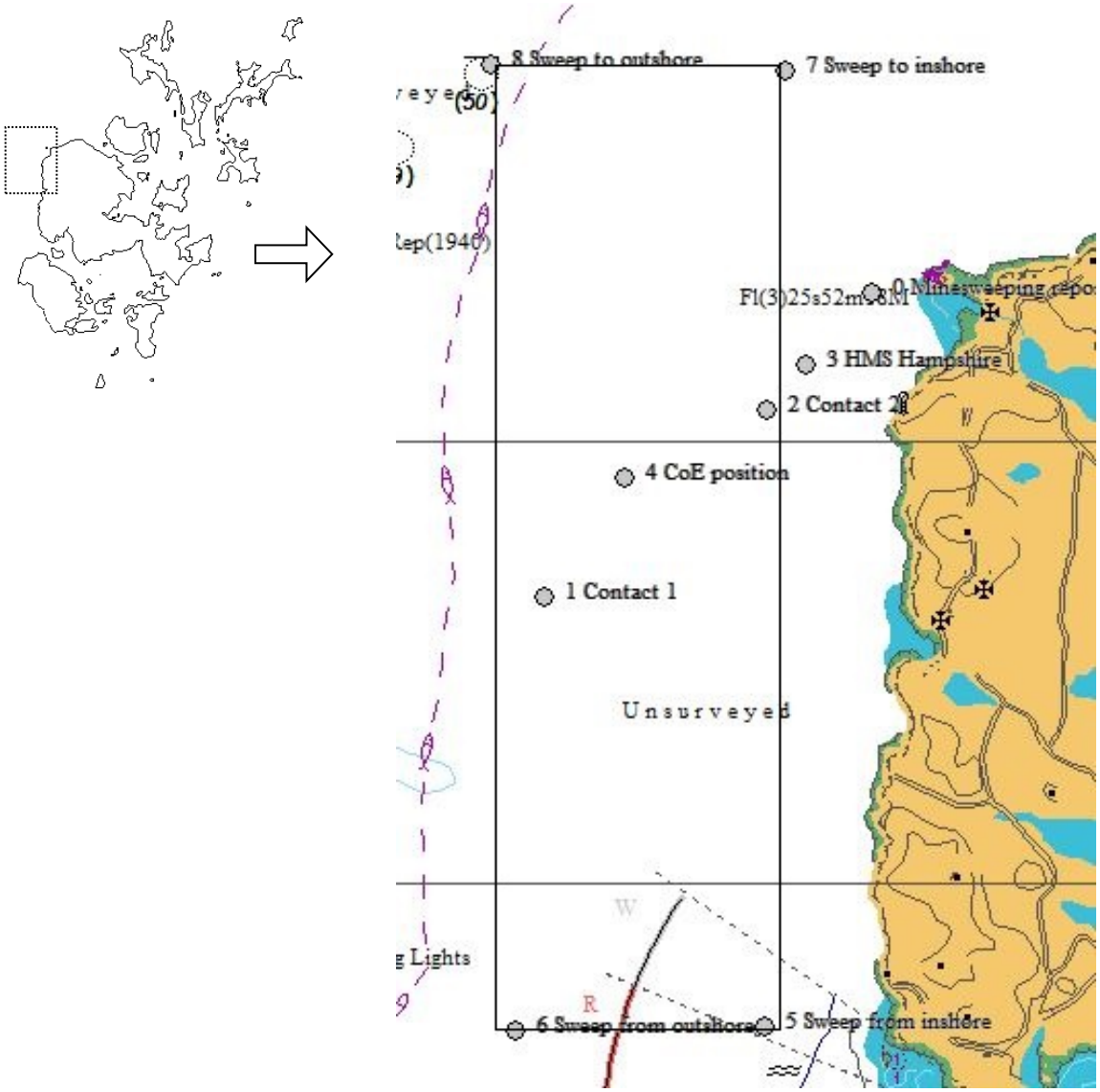


Figure 1: Location of Area 2 off the west coast of the Orkney mainland. The area, denoted by the black rectangular box, was defined by the following co-ordinates: Lat. 58° 46' N, Long. 3° 18' W; Lat. 59° 22' N, Long. 4° 11' W; Lat. 59° 11' N, Long. 4° 39' W; Lat. 58° 46' N, Long. 3° 37' W.

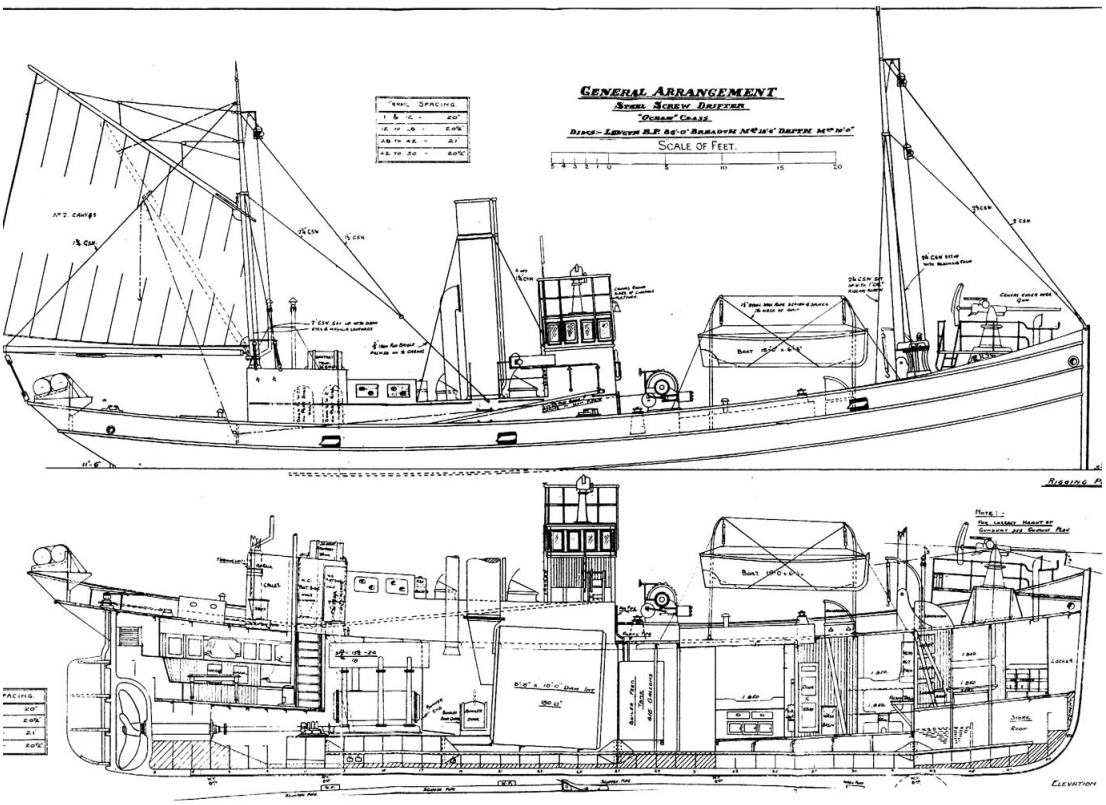


Figure 2: General layout of a steam drifter in service with the Royal Navy.

3.1.1 Estimated position of the HMD Laurel Crown

The location given for the Laurel Crown when she sunk varies between the different reports. The minesweeping statement for 1st to 15th June 1916 gives her position as 59° 08' N, 03° 22'W, approximately 0.5 nautical miles west of the Brough of Birsay. However, the Court of Enquiry (CoE) report gives her position as 59° 5.5' N, 3° 28.5'W, approximately 5 nautical miles to the southwest of the Brough of Birsay. Both positions are shown in Figure 1.

Also shown in Figure 1 are the positions of two unidentified obstructions (contacts 1 & 2) detected during a recent multibeam survey of the area carried out in 2009 (Netsurvey, HI 1218). These positions were:

Netsurvey (offshore): 59° 03.885' N, 003° 30.588' W
Netsurvey (inshore): 59° 06.397' N, 003° 24.756' W

Each position was considered in light of the evidence given in the Admiralty records. The position given in the minesweeping statement of 1st to 15th June 1916 was thought to be erroneous. Giving evidence at the CoE, Lieutenant Commander Sidney Reginald Lane, Commanding Officer of HMY Evening Star, stated that the vessels proceeded towards their target area at a speed of 8 knots. Indeed, an entry in the the logbook of the Evening Star states that a speed measurement was taken at 0750hrs ("streamed the log"). The vessels passed the Brough of Birsay at 0730hrs and continued for another 35 minutes before the

Laurel Crown struck a mine at 0805hrs. The approximate distance travelled in this period would therefore be 4 nautical miles, putting the position of the Laurel Crown 3.5miles further away than the position given in the minesweeping statement.

3.1.2 Definition of search area

In light of the evidence described above, the CoE position was selected as the starting point for the survey phase of this project. Additional survey work was carried out at the two Netsurvey sites, termed Netsurvey (inshore) and Netsurvey (offshore), both of which lie within 3 nautical miles of the CoE position.

3.2 Side scan survey

A side scan survey was conducted in the area on 20th January and 17th March 2016. A series of sonar images were captured at different sites in the area. The total area covered by the sonar survey is illustrated in Figure 3, which also shows the CoE and Netsurvey positions. A total of 19 individual sonar runs were acquired.

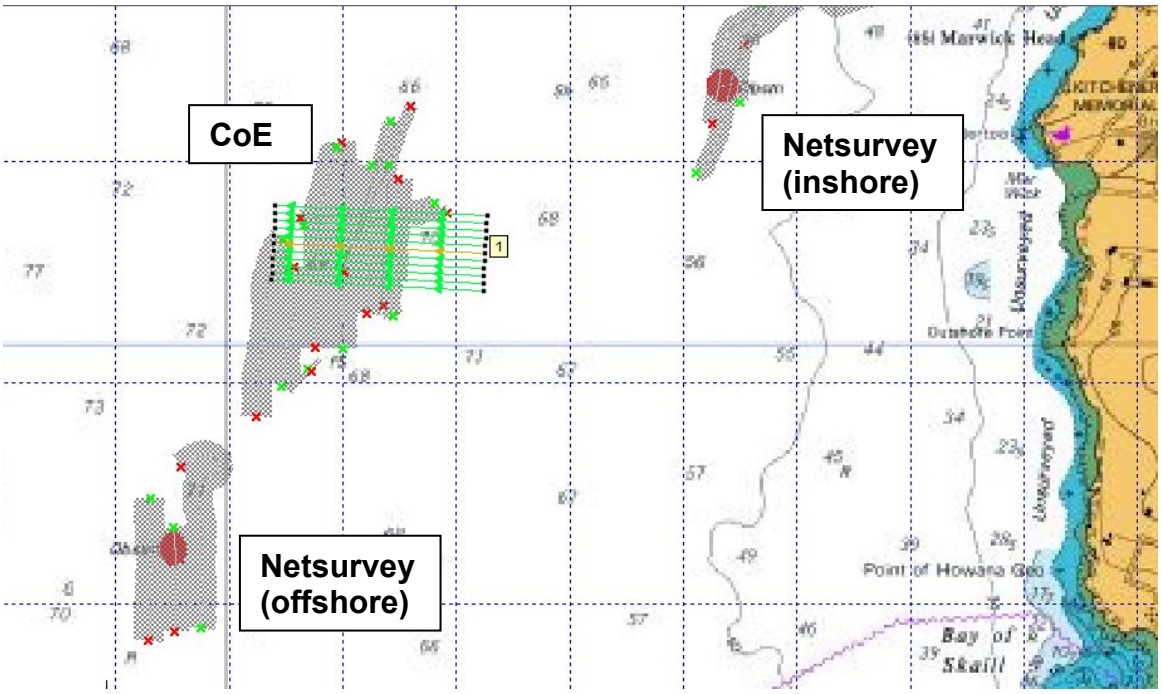


Figure 3: Overall sonar survey coverage achieved during the 20th January and 17th March 2016, showing the CoE, Netsurvey (inshore) and Netsurvey (offshore) search areas. The red dots indicate the charted positions of obstructions.

The seabed in each survey area was relatively flat and was primarily sedimentary in character with areas of dispersed rocks that were mostly small in size (<1m). Depth ranged between 60-70m at the CoE and Netsurvey (inshore) sites and was approximately 80m at the Netsurvey (offshore) site. Side scan data at each site is presented below.

3.2.1 CoE search area

The CoE search area was surveyed on both day 1 (20th January) and day 2 (17th March). A number of sonar contacts were recorded, many of which were most likely natural in origin, being typical of dispersed areas of rock/stones lying on the seabed. Two sonar contacts (01 & 03) were recorded on day 1 of survey work (20th January) that appeared to be relatively large in size and in an isolated position, which set them apart from the areas of stones which occurred elsewhere in the survey area (Figure 4).

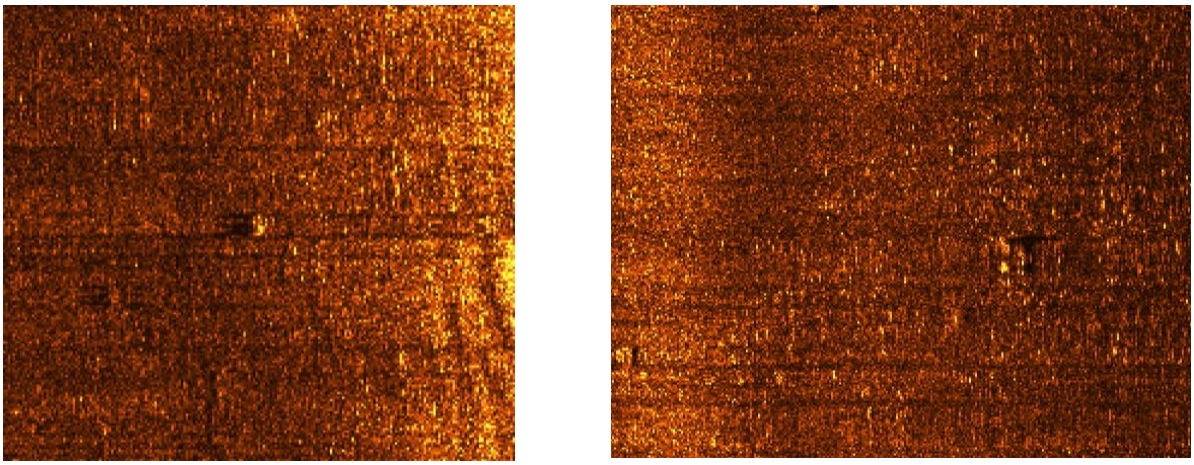


Figure 4: Sonar images of contacts 01 and 03, recorded with the CoE search area.

Contact 01 was located at 59° 06.008'N, 003° 28.352'W, approximately 1000m north of the reported CoE position. The contact was isolated and sonar data suggested its size was approximately 4m long by 1m high. The sonar shadow suggested a shape which was less natural in character, i.e. there appeared to be multiple upright features to the object, and may therefore be of human origin.

Contact 03 was located at 59° 05.702'N, 003° 28.619'W, approximately 400m north of the CoE position. It also occurred in an isolated position and at approximately 6m long by 1m high, was larger than other features in the region. The profile and height of its sonar shadow again suggested a feature that was possibly of human origin.

Both contacts 01 and 03 were re-surveyed on day 2 (17th March), when sea surface conditions were much more favourable compared to day 1. Despite this, the features which had yielded sonar contacts 01 and 03 on day 1 could not be re-located, despite multiple passes were made over the positions for each contact. The reason that they could not be re-located is unclear and the images obtained on day 1 remain the best images for these features. The failure to re-locate these contacts aside, excellent sonar data for the CoE area were acquired in day 2, which provided detailed seabed images, showing sand ripples, ridges and dispersed rocks through the region (Figure 5). A number of smaller contacts were found in the data that were smaller in size than contacts 01 and 03. These may be natural in origin but could also be worthy of investigation in future search operations for Laurel Crown wreckage.

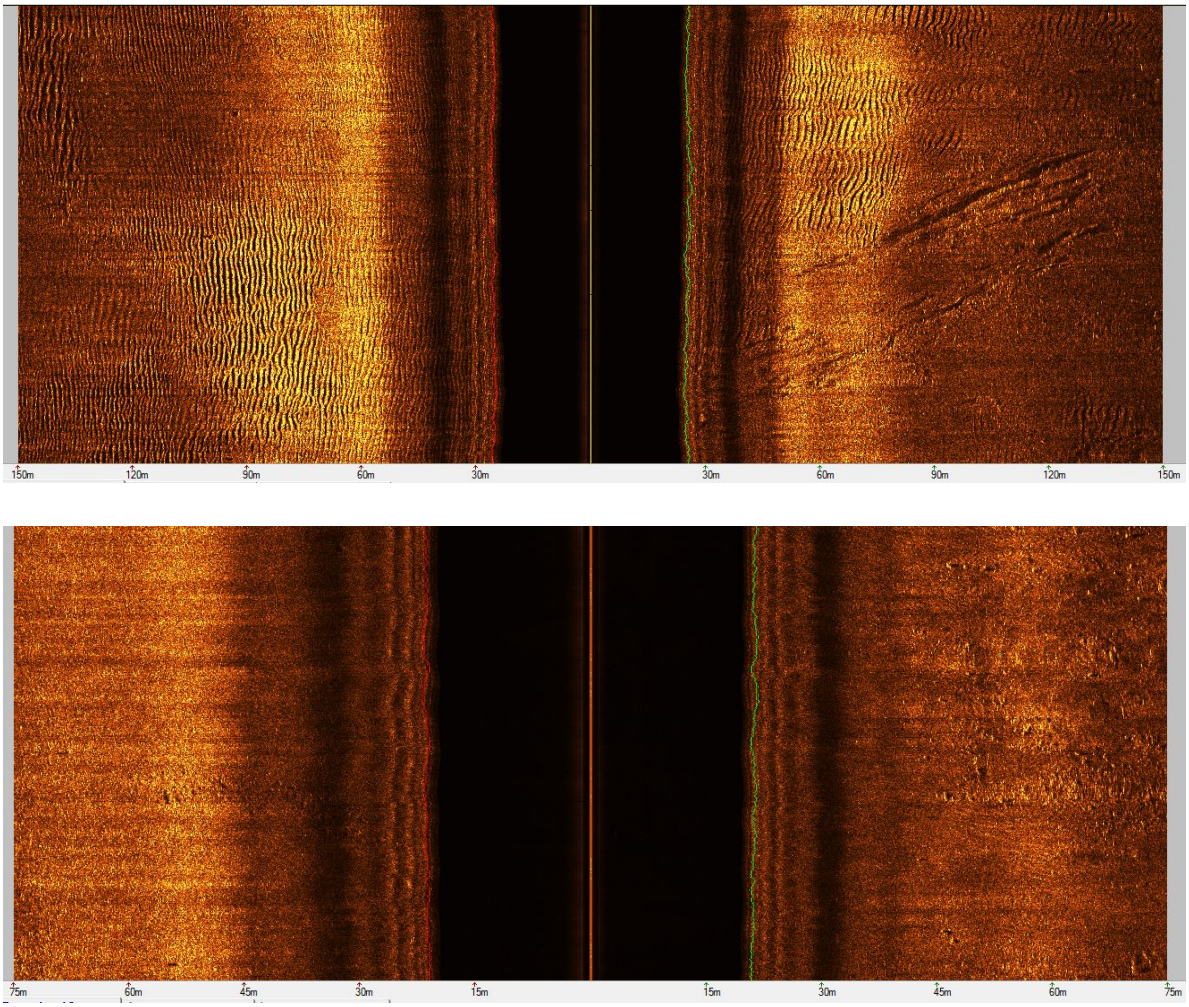


Figure 5: Representative images of sonar data in the CoE search area. Sand ripples and ridges are shown clearly (top, 150m range) as well as the occurrence of dispersed areas of rock/stone (bottom, 75m range).

3.2.2 Netsurvey (inshore) search area

The Netsurvey (inshore) site was surveyed on day 1. A strong sonar contact (contact 02) was located at 59° 06.411'N, 003° 24.789'W, approximately 50m from the obstruction recorded by Netsurvey (UKHO wreck no. 71442, Canmore ID 324364). The object was approximately 4m long by 3m wide and 1m in height. It was smooth sided and probably natural in origin, e.g. a large boulder.

3.2.3 Netsurvey (offshore) search area

The Netsurvey (offshore) site was surveyed on day 2. No significant sonar contacts occurred at this site. However, a large object was detected on the seabed by the survey vessel depth sounder and its location directly beneath the survey vessel would explain why it was not detected by the side scan sonar. The position of this object corresponded to the position of the Netsurvey obstruction (UKHO wreck no. 71442, Canmore ID 324363) noted for this site.

Given its size, which according to the depth sounder stood approximately 3m off the seabed, the drop video system was deployed in an attempt to identify the object. This succeeded in locating the object which proved to be a large boulder of natural origin (Figure 6).

Figure 6: Video still of large boulder located at the Netsurvey (offshore) site. Given shape and surface scarring the boulder was most probably an erratic (natural) feature.

4. DISCUSSION

The loss of HMD Laurel Crown on the 22nd June 1916 is closely tied to the sinking of HMS Hampshire two weeks earlier. Both vessels hit mines laid in the area off Marwick Head by U75, on or around the 29th May 1916. Although the survey work undertaken in this project failed to pinpoint the remains of HMD Laurel Crown, it has been possible to describe the circumstances around its loss and provide some general details on the role of such vessels in the First World War. The sonar survey did however succeed in characterising two obstructions charted in the area which were not wrecks but in fact features of natural origin (boulders).

The failure to find any obvious wreckage during the side scan sonar survey should be considered along with the circumstances surrounding the loss of HMD Laurel Crown. The speed with which HMD Laurel Crown sank indicates that severe damage was done to the hull by the explosion. Considering the severity of the damage, the hull material (wood) and the passage of time it is likely that the remains of HMD Laurel Crown have degraded and dispersed around the wreck site. The location of her remains with side scan sonar therefore represented a difficult task. However, it was hoped that the metal components of the vessel, such as the engine and boilers, may remain sufficiently intact to be detectable using sonar.

Apart from the probable boulder (contact 02) and the confirmed boulder (confirmed by drop video), only two other contacts were found which warrant further examination. Contacts 01 and 03 were located approximately 1000m and 400m north of the reported position of where the Laurel Crown sank, according to the CoE. Given potential error associated with recording latitude and longitude in that era, combined with apparent tendency to record latitude and longitude to the nearest 0.5 of a minute (or 0.9 nautical miles), then both contacts are within a realistic search area for the Laurel Crown remains. Sonar data suggested both contacts were irregular in nature and more likely to be of human than natural origin. Contacts 01 and 03 were estimated to be approximately 4m and 6m long respectively and therefore large enough to be the boiler, engine or associated metal debris from a vessel of the size and type of HMD Laurel Crown. Either contacts could be related to the events surrounding the loss of the Laurel Crown, being either the wreckage of the vessel or perhaps remnants of the mines and/or mine anchors which had been deployed in the area. Unfortunately, there were insufficient resources available within this project to directly inspect each target. However, using the data obtained in this project it is hoped that a future attempt can be made to determine the precise nature of each contact.

REFERENCES

1. Logbook of the HM Yacht Evening Star, June 15th – July 18th 1916. ADM ref 53/41245.

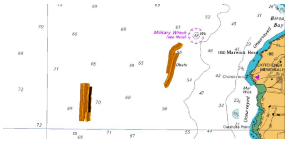
2. Court of Enquiry Report – Loss of HMD Laurel Crown. ADM reference 137/3138.

3. Bi-monthly minesweeping statements, No. 97 (15th June – 30th June) and No. 98 (1st July – 16th July 1916).

4. Naval Staff Monographs – Home Waters – Part VII. From June 1916 to November 1916. ADM 186/628.

APPENDIX 1: CONTACT REPORT.

Report HMD Laurel Crown



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Generated on: 03/14/2016 04:05:51 PM
By: targetReportGen2 V3.15.15

Projection: UTM84-30N

Contacts in this report:

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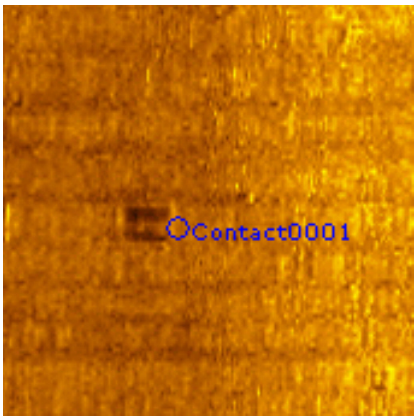
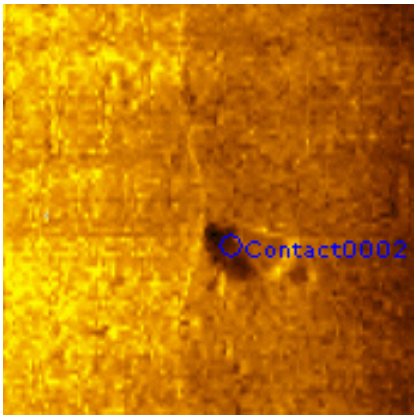
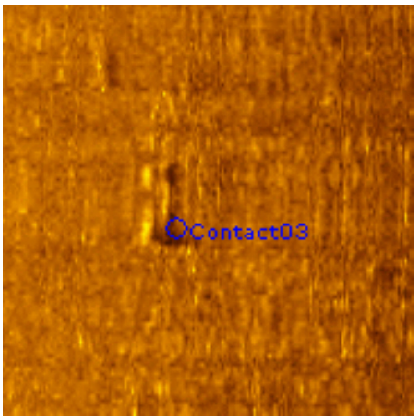
Contact0002	01/20/2016 12:42:30	59.1084219140 Lat	-3.4117274807 Lon
Contact03	01/20/2016 13:58:06	59.0931609193 Lat	-3.4763014014 Lon

Report HMD Laurel Crown

Generated on: 03/14/2016 04:05:51 PM by SonarWiz.MAP targetReportGen2 V3.15.15

Target Image	Target Info	User Entered Info
	**Contact0001** * Sonar Time at Target: 01/20/2016 14:04:29 * Click Position (Lat/Lon Coordinates) 59° 05.20643' N 003° 28.48679' W (WGS84) * Map Proj: UTM84-30N * Acoustic Source File: C:\Users\Laptop\Documents\MaxView Projects\Laurel Crown\LC CoE 3.cm2 * Ping Number: 3768 * Range to Target: 53.86 Meters * Fish Height: 11.52 Meters * Heading: 65535.000 degrees * Event Number: 0 * Line Name: LC CoE 3 * Water Depth: 0.00	**Dimensions and Attributes** * Target Height: = 1 Meters * Target Length: 4 Meters * Target Shadow: 4 Meters * Target Width: 1 Meters * Mag Anomaly: * Avoidance Area: * Classification 1: * Classification 2: * Area: * Block: * Description:
	**Contact0002** * Sonar Time at Target: 01/20/2016 12:42:30 * Click Position (Lat/Lon Coordinates) 59° 06.50531' N 003° 24.70364' W (WGS84) * Map Proj: UTM84-30N * Acoustic Source File: C:\Users\Laptop\Documents\MaxView Projects\Laurel Crown\LC contact 2.cm2 * Ping Number: 3888 * Range to Target: 38.57 Meters * Fish Height: 18.95 Meters * Heading: 0.000 degrees * Event Number: 0 * Line Name: LC contact 2 * Water Depth: 0.00	**Dimensions and Attributes** * Target Height: = 1 Meters * Target Length: 4 Meters * Target Shadow: 3 Meters * Target Width: 3 Meters * Mag Anomaly: * Avoidance Area: * Classification 1: large rock ? * Classification 2: * Area: * Block: * Description: Possible large boulder.
	**Contact03** * Sonar Time at Target: 01/20/2016 13:58:06 * Click Position (Lat/Lon Coordinates) 59° 05.58965' N 003° 28.57808' W (WGS84) * Map Proj: UTM84-30N * Acoustic Source File: C:\Users\Laptop\Documents\MaxView Projects\Laurel Crown\LC CoE 3.cm2 * Ping Number: 1911 * Range to Target: 64.34 Meters * Fish Height: 11.91 Meters * Heading: 65535.000 degrees * Event Number: 0 * Line Name: LC CoE 3 * Water Depth: 0.00	**Dimensions and Attributes** * Target Height: = 0 Meters * Target Length: 6 Meters * Target Shadow: 3 Meters * Target Width: 2 Meters * Mag Anomaly: * Avoidance Area: * Classification 1: Unknown * Classification 2: * Area: * Block: * Description: