



Maritime &
Coastguard
Agency

**PROTECTION OF WRECKS ACT 1973 SECTION 2
SS RICHARD MONTGOMERY SURVEYS**

STATEMENT OF SERVICE REQUIREMENT

**BASED ON IHO STANDARDS FOR HYDROGRAPHIC SURVEYS (S-44)
5TH EDITION, FEBRUARY 2008**



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RECORD OF CHANGES

The table below documents the version history of the Protection of Wrecks Act 1973 Section 2 (PoWA) – SS Richard Montgomery surveys Statement of Service Requirement (SSR). The MCA Receiver of Wreck has final sign off on all changes made to the SSR as a whole or the modules contained herein.

Version	Date	Status	Approved	Signature
2018.01	13/03/2018	Final Document	AJK	

ABBREVIATED TERMS

ETRS89	European Terrestrial Reference System 1989
GNSS	Global Navigation Satellite System
GPS	Global Positioning System
GRS80	Geodetic Reference System 1980
IHO	International Hydrographic Organization
MAIB	Marine Accident Investigation Branch
MBES	Multibeam Echosounder System
MCA	Maritime & Coastguard Agency
PoWA	Protection of Wrecks Act 1973
QC	Quality Control
RoS	Report of Survey
SV	Sound Velocity
SSR	Statement of Service Requirement
SSRM	SS Richard Montgomery
THU	Total Horizontal Uncertainty
TPU	Total Propagated Uncertainty
TVU	Total Vertical Uncertainty

UKHO	United Kingdom Hydrographic Office
UTM	Universal Transverse Mercator
VORF	Vertical Offshore Reference Frame
WGS-84	World Geodetic System 1984

CROWN COPYRIGHT STATEMENT

The Protection of Wrecks Act 1973 Section 2 – SS Richard Montgomery surveys Statement of Service Requirement is an MCA controlled document and should not be reproduced in part or in full without permission from the MCA. All copyright will remain vested in the Crown.

Unless otherwise stated, the re-use of this document shall include the following statement:

“Maritime & Coastguard Agency© Crown copyright 2018”.

All of the data collected during SS Richard Montgomery surveys is the property of the MCA and the Contractor is not permitted to use (other than for the purposes of this contract) or share any data or information on the surveys or the results obtained from the surveys without the express permission of the MCA.

INTRODUCTION

The Protection of Wrecks Act 1973 (PoWA) is a piece of UK primary legislation which provides a statutory process for the designation of wrecks in certain circumstances. Section 2 of the Act provides for the designation of wrecks which are considered to be dangerous by virtue of their contents. This section of the Act is administered by the Department for Transport (DfT) for the whole of the UK. However, aspects of the management of the wrecks designated under section 2 of the PoWA are delegated to the Maritime and Coastguard Agency (MCA). This includes wreck monitoring surveys.

As part of the administration of section 2 of the PoWA, the MCA has a requirement for the provision of wreck surveys, in particular, surveys of the wreck of the SS Richard Montgomery (SSRM), a US Liberty ship which sank in the Thames Estuary in August 1944 whilst carrying a cargo of munitions. The wreck still contains approximately half of this cargo of munitions, which totals c.1400 tons NEQ¹. When the SSRM sank, it broke into two sections. These two sections lie approximately 10 metres apart on Sheerness Middle Sand, to the north of the Medway Approach Channel. The wreck was designated as a protected wreck under section 2 of the PoWA in October 1973. There is a prohibited area around the wreck (see Annex B) and it is under 24-hour surveillance by Peel Ports, Port of Sheerness Ltd, on contract to the MCA. The MCA has commissioned regular surveys of the wreck and its environment since taking responsibility for this requirement in 1993. Although diving surveys have been used in the past, these monitoring surveys now utilise remote sensing technologies and, since 2002, the preferred method has been multibeam sonar and laser scanning.

The main objectives of the SSRM surveys are to monitor the condition of the wreck, to identify any changes and deterioration and to inform future management strategies. Surveys must provide a clear understanding of the current condition of the wreck, its cargo (as far as is possible) and the seabed topography in the surrounding area in order to identify, visualise and quantify any changes to these. The data collected during the surveys must be compared to previous survey results in order to better understand the levels of change and rate of deterioration over time.

To ensure that data is gathered to the highest possible quality for the purposes outlined above, personnel from (and on behalf of) the MCA routinely visit survey vessels during scheduled operations to verify data integrity and compliance with survey requirements. Prior to final survey data being accepted from the Contractor, it passes through a quality assurance appraisal process.

¹ Net Explosive Quantity

SCOPE

The Protection of Wrecks Act 1973, Section 2 SS Richard Montgomery surveys Statement of Service Requirement (SSR) has been prepared in accordance with the 5th edition of the IHO Special Publication S-44 Standards for Hydrographic Surveys (2008).

The SSR details the specific requirements for conducting surveys of the SSRM on behalf of the MCA, in particular, this document covers the requirements of Lot 4 (Protection of Wrecks Act 1973, sec. 2 surveys - SS Richard Montgomery).

Two types of survey are specified under Lot 4, they are Full Surveys and Snapshot Surveys. Both survey types require the full and detailed coverage of the bow and stern sections of the SSRM. A Snapshot Survey is a small survey area encompassing the wreck and the seabed immediately adjacent to the wreck. The Full Survey is a larger survey area encompassing the wreck and wider seabed around it, including a section of the dredged channel to the South of the wreck (see Annex A). The Full Survey requires a full and detailed report including data comparisons with a minimum of two previous years' survey data across the wreck and the seabed, while the Snapshot Survey requires equal focus on the wreck but with fewer data comparisons (only the most recent previous survey data) and a focus on areas of change. The requirements listed below are divided into four sections. Section 1, Technical Requirements, applies to both the Full Survey and Snapshot Survey. Section 2 is specific to the Full Survey and Section 3 is specific to the Snapshot Survey. Section 4, Deliverables, applies to both Full and Snapshot surveys.

SECTION 1: TECHNICAL REQUIREMENT

PERSONNEL		
1.1	Charge Surveyor	<p>A Charge Surveyor (also termed as Party Chief or Surveyor in Charge) shall be on site at all times during survey operations. The Charge Surveyor shall have completed an IHO/FIG Category A accredited hydrographic survey course (or equivalent) and have a minimum of 5 years offshore surveying experience, ideally to have included wreck surveys.</p> <p>The Charge Surveyor shall have the authority and experience to make and implement operational decisions and will be available for the MCA to contact regularly to assess progress and modify the survey plan if necessary.</p> <p>The Contractor will provide MCA with the CV for each proposed Charge Surveyor and seek approval from the MCA prior to their deployment on survey operations.</p>
1.2	Survey Team	Survey teams shall include personnel with adequate experience both in charge of and in assisting with all aspects of surveys of complex offshore areas, including office-based data compilation as well as fieldwork. Preferably to have included wreck surveys.
SAFETY		
1.3	Responsibility	Equipment and survey personnel provided by the Contractor for work in connection with the contract shall be the Contractor's responsibility at all times. Any loss, injury or damage suffered or caused by them shall be at the Contractor's risk throughout but must be reported to MCA immediately and any other relevant authority, including MAIB.
1.4	Safety Management Plan	Details of the Contractor's safety policy shall be supplied to the MCA prior to survey operations being undertaken. A Safety Management Plan specific to the SSRM survey shall be supplied to the MCA a minimum of 72hrs prior to survey operations being undertaken within the prohibited area.
1.5	Drugs and Alcohol Policy	The Contractor shall have a drugs and alcohol policy, which forbids the presence of drugs or alcohol in vessels or offices used under this contract. The policy must include random drug and alcohol testing. MCA reserve the right to request evidence of the regime in place at any time throughout the life of the contract.

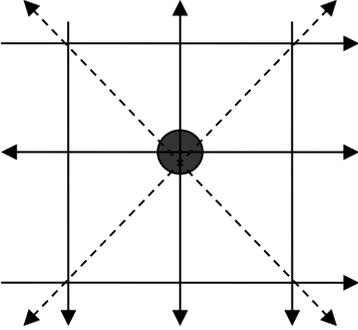
1.6	Communications	The Contractor and MCA SSRM contract manager shall hold a 'kick-off' meeting at the beginning of each year of the contract, at which the SSRM survey programme will be agreed. The Contractor will keep the MCA SSRM contract manager updated on the progress of surveys, data processing and the drafting of reports. For each survey, the Charge Surveyor will hold a briefing with the navigational watch, which will include the planned survey activities, safety and hazards.
1.7	Safe survey operations	The Vessel Master is responsible for the overall navigational safety of the vessel and crew. If the Master considers that there is a conflict of interest in terms of the safety of the vessel and crew with regard to the conditions for the proposed survey (for example marginal weather conditions or tidal state), the Master has the overriding authority to refuse to survey those areas. Similarly, an MoD technical advisor must be on board the survey vessel for any work over or immediately adjacent to the SSRM and they shall have the authority to terminate survey operations.
1.8	Medical Certification	All offshore survey personnel must have a valid UK ENG1 medical fitness certificate or an MCA accepted equivalent. Evidence of certification may be requested by the MCA at any time.
1.9	Safety Training Certification	<p>All offshore survey personnel must have in-date certification to demonstrate completion of the STCW 78 as amended Basic Safety Training package including:</p> <ul style="list-style-type: none"> • Personal Survival Techniques (STCW A-VI/1-1) • Fire Fighting and Fire Prevention (STCW A-VI/1-2) • Elementary First Aid (STCW A-VI/1-3) • Personal Safety & Social Responsibility (SCTW A-VI/1-4) <p>(Note that survey personnel and supernumeraries may alternatively have in-date certification to demonstrate completion of an Offshore Petroleum Industry Training Organisation approved course adhering to the "Minimum Industry Safety Training Standards"). Evidence of certification may be requested by the MCA or its representatives at any time.</p>

<p>1.10</p>	<p>Familiarisation Training</p>	<p>All offshore survey personnel must undertake familiarisation training prior to sailing, which must ensure attendees are able to:</p> <ul style="list-style-type: none"> • Communicate with other persons on board on elementary safety matters and understand safety information symbols, signs and alarms; • Know what to do if: a person falls overboard; fire or smoke is detected; the fire or abandon ship alarm is sounded; • Identify assembly and embarkation stations and emergency escape routes; • Locate and don lifejackets and immersion suits if carried; • In the event of a fire know how to raise the alarm and have a basic knowledge of the use and types of portable fire extinguishers; • Utilise smoke hoods or emergency escape breathing device if carried; • Be familiar with the location of first aid kits and AED devices; • Take immediate action upon encountering an accident or other medical emergency, before seeking further medical assistance on board; and close or open the fire, weathertight and watertight doors fitted in the particular ship, other than those for hull openings. <p>Evidence of training may be requested by the MCA or its representatives at any time.</p>
<p>VESSEL</p>		
<p>1.11</p>	<p>Vessel Coding and Approval</p>	<p>Each vessel tasked with surveying under the PoWA surveys shall be subject to approval by the MCA prior to survey work commencing under the contract.</p> <p>All vessels (and crew) must comply with the relevant MCA codes of practice or relevant Merchant Shipping Legislation as applicable.</p> <p>The Contractor must provide proof that the required codes and inspections for all vessels used for the purposes of this contract are in place.</p>
<p>1.12</p>	<p>Vessel Flag</p>	<p>UK Flag or EU registered vessels are preferred. The term “UK Flag” includes not only those vessels flagged in the UK but also flagged within the Red Ensign Category 1 and 2 Registers operated by the UK Overseas Territories and Crown Dependencies. Vessels registered with a Flag State on either the Black or Grey List will not be accepted for the purposes of this contract.</p>

1.13	Vessel suitability	All vessels used for SSRM surveys must be of appropriate size and draught for surveying around obstructions (the wreck and navigational aids) and surveys must include the use of a survey vessel of appropriate size and draught to allow for survey lines to be run directly over the wreck. For safety purposes, twin-engine vessels are preferred.
1.14	Vessel Commitment	Once a vessel has been approved for a PoWA survey of the SSRM, the Contractor should seek the MCA's prior agreement to remove or replace the vessel with another. The MCA will only approve a vessel replacement if the oncoming vessel is an appropriate like-for-like exchange and continues to abide by the requirements of the SSR and tender bid.
1.15	Vessel and Technical Office Visits	All vessels and offices utilised for this contract may receive visits by MCA and/or MoD technical advisors. Vessel and technical office visits are primarily intended to focus on the quality of hydrographic processes and deliverables but may also include an informal assessment of safety aspects onboard. If significant safety concerns are raised, then the contract overseer shall ensure that the local MCA marine office is made aware.
MULTIBEAM BATHYMETRY		
1.16	Primary Depth Sensor	Depth will be measured throughout the survey area using a multibeam bathymetry system capable of meeting all requirements stated below.
1.17	Uncertainty	<p>Sounding uncertainty (in three dimensions) shall be in accordance with IHO Order Special Order as defined in IHO S44 Edition 5.</p> <p>Total Horizontal Uncertainty (THU) and Total Vertical Uncertainty (TVU) values must be calculated at/for each valid sounding, and be representative of the spread of data. These values must be inclusive of but not limited to the following components: temporal and spatial effects, equipment, systematic and random errors in survey system and platform configurations.</p> <p>The Contractor shall provide a fully developed uncertainty model to the MCA prior to survey operations commencing. The model shall state all component uncertainties, as well as the combined Total Propagated Uncertainty (TPU).</p>
1.18	Object Detection	For all parts of the survey area, the minimum size of object or feature detected shall be consistent with, or better than, the previous year's survey output.
1.19	Sounding Density	See Sections 2.2 and 3.2 for details.

1.20	Acoustic Coverage	See sections 2 and 3 below for details.
1.21	Depth Data Precision	Soundings shall be logged to at least two decimal places of a metre and presented as depths below Chart Datum.
1.22	Data Cleaning	All accepted soundings within the final bathymetric dataset shall fall within the IHO Special Order uncertainty allowance or better. All systematic errors and obvious outliers shall be rejected from the bathymetric data. Data points falling within the Special Order depth requirements but still numerically distant from the main dataset will still be regarded as outliers and should be rejected, but not deleted, from the dataset.
1.23	Water Column	Log water column data over the wreck (log data and deliver raw data, no requirement to process or report on water column data).
GEODESY AND POSITIONING		
1.24	Survey Geodesy	Unless otherwise stated, every survey shall be rendered using the following geodetic parameters: Datum: ETRS89 Spheroid: GRS '80 Projection: UTM Grid Zone 31North All rendered positions shall be quoted as geographical co-ordinates (i.e. in terms of Lat / Long) as degrees and decimal minutes.
1.25	Horizontal Accuracy	The Horizontal Accuracy of all depths and positions shall be in accordance with IHO S44 Special Order (5 th Edition) or better.
1.26	Positioning	Soundings are to be positioned by using dual frequency carrier phase GNSS combined with the Ordnance Survey Active Networks (i.e. Post Processed Kinematic GNSS). Post processed positions should ideally be integrated with the vessel attitude data to avoid bias associated with vessel motion. The Contractor shall demonstrate that the method chosen for sounding positioning results in the overall horizontal uncertainty requirements being met.

1.27	Vessel Dimensional Control	<p>An appropriate dimensional control survey of each vessel to be utilised shall be conducted prior to commencement. Permanent and recoverable control points are to be established on each vessel utilised, coordinated to the vessel reference frame to within a tolerance $\pm 0.01\text{m}$ relative (at the 95% confidence level) in X, Y and Z.</p> <p>All sensors shall be established within the vessel reference frame within a tolerance of $\pm 0.02\text{m}$ relative (at the 95% confidence level) in X, Y and Z.</p> <p>Where appropriate, the rotations of each sensor around the X, Y and Z axis shall be initially determined by the dimensional control survey to within ± 0.2 degrees (at the 95% confidence level). These values may be later adjusted during the sonar patch test, if required.</p> <p>The centre of gravity (rotation) should also be estimated and its location within the vessel reference frame and method of establishment clearly stated in the RoS.</p> <p>A copy of the dimensional control report for each vessel shall be supplied with the RoS.</p>
SURVEY CONTROL AND CALIBRATION		
1.28	Multibeam Bathymetry Calibration	<p>A calibration of the multibeam bathymetry system and associated sensors (i.e. "patch test") shall be performed at the start of each survey or after changing out or significantly reconfiguring any survey sensor (methodology shall be detailed in tender). Final post calibration repeatability shall be proven by means of the repeatability test detailed below.</p>
1.29	Static Positioning Check	<p>A static positioning check shall be performed at the start of each survey season or after changing out or significantly reconfiguring any survey sensor. The check shall monitor the three-dimensional position of either the primary GNSS antenna or another appropriate point within the vessel reference frame, for a period of no less than 30 minutes at a 1 minute resolution.</p> <p>The RoS should separately state the computed statistical reliability of both the horizontal position and the height measured. The positioning data to be compared will have been derived using the same procedures used to obtain all positions associated with the bathymetric data (i.e. post processed kinematic).</p>

<p>1.30</p>	<p>Multibeam Bathymetry Repeatability Test</p>	<p>A multibeam bathymetry repeatability test shall be performed following calibration at the start of each survey or after changing out or significantly reconfiguring any survey sensor (methodology shall be detailed in tender). This test should be conducted after the static position check as per section 1.29.</p> <p>The test shall monitor the three-dimensional position of a clearly defined small but easily detectable feature on the seabed. The feature should be first surveyed near nadir from multiple directions – as a minimum from north, south, east and west. Secondly the feature should be boxed in, so that it appears in the outer beams on port for 2 lines, and the outer beams on starboard for 2 lines.</p>  <p>The subsequent report should separately state the computed statistical reliability of both the horizontal position and the depth measured for the feature.</p>
<p>1.31</p>	<p>Vertical Offset Check</p>	<p>A vertical offset gross error check shall be performed at the start of each survey season or after changing out or significantly reconfiguring any survey sensor (methodology shall be detailed in tender). The check shall compare the physical measurements of the distance from the primary and secondary GNSS antennas on the vessel to the seabed. This shall be performed in one location using a method entirely independent of the vessel's survey systems (e.g. level staff or leadline in a berth). These measurements shall be compared to data logged simultaneously in the same location using the vessel's survey system and software. The results should be compared and detailed in the RoS.</p>
<p>1.32</p>	<p>Quality</p>	<p>The Contractor shall provide a real-time indication of the quality of the 3D position and received augmentation data.</p>

TIDES AND REDUCTION OF SOUNDINGS		
1.33	Reduction of Soundings to Chart Datum	<p>Soundings are to be reduced to Chart Datum by using dual frequency carrier phase GNSS height observations combined with the VORF model and the Ordnance Survey Active Networks. Soundings are to be presented as depths below / heights above Chart Datum, as supplied by the UKHO and defined in VORF.</p> <p>The Contractor shall demonstrate that the method chosen for sounding reduction results in the overall depth uncertainty requirements being met.</p>
GENERAL REQUIREMENTS		
1.34	Surveying within Prohibited area	<p>The Contractor can only enter within the prohibited area with the written consent of the Secretary of State and if accompanied by a representative from the Ministry of Defence, Salvage and Marine Operations (unless otherwise stated), both of which will be arranged via the MCA.</p> <p>Equipment cannot be placed on the seabed within the prohibited area or on the wreck and towed equipment cannot be used over or adjacent to the wreck structure in order to avoid entanglement or impact with the wreck.</p>
1.35	Survey line plan	<p>Survey line planning must be determined in advance of the survey and must ensure thorough coverage and adequate safety margins between the survey vessel (including sensors) and all points on the wreck. Tidal height must also be taken into account. A survey plan should be discussed with the MCA contract manager at the 'kick-off' meeting at the beginning of each year of this contract and submitted to the MCA for agreement a minimum of 72hrs in advance of a survey taking place.</p>
1.36	Survey speed	<p>Vessel speed must be kept slower than 3 knots during the survey over the wreck and adjacent to the wreck.</p>
1.37	Survey operations	<p>Survey operations for all SSRM surveys should take place in daylight hours only.</p>
1.38	MoD technical advisor	<p>An MoD technical advisor must be on board the survey vessel for any work over or immediately adjacent to the SSRM and they shall have the authority to terminate survey operations.</p>
1.39	Sound Speed	<p>The Contractor shall observe sound speed profiles at an interval consistent with the proposed error budget.</p>

1.40	Licences, Consents & Permissions	The Contractor shall be responsible for arranging all licences, consents and permissions for access and frequency clearance that may be required for all survey operations aside from the written consent of the Secretary of State and the attendance of the MoD S&MO technical advisor, which will be arranged through the MCA contract manager.
1.41	Progress Reports	<p>Daily Progress Reports (DPRs) detailing progress, planned activities and any problems encountered shall be completed and e-mailed to the MCA only during survey operations. Outside of survey operation, the Contractor will not provide DPRs.</p> <p>A brief Weekly Progress Report (WPR) summarising progress and any issues encountered shall be completed and e-mailed to the MCA during the data processing and report writing phase of a survey.</p>
1.42	Quality Control	Quality control procedures shall be provided and adhered to during processing of all data. Prior to survey operations commencing, and whenever updated, these procedures shall be provided to the MCA.
1.43	Sharing & Use of Data	All of the data collected during SSRM surveys is the property of the MCA and the Contractor is not permitted to use (other than for the purposes of this contract) or share any data or information on the surveys or the results obtained from the surveys without the express permission of the MCA.

SECTION 2: SURVEY & REPORTING REQUIREMENTS FOR A FULL SURVEY OF THE SSRM

SURVEY REQUIREMENTS FOR A FULL SURVEY OF THE SSRM		
2.1	Survey Area	<p>The Contractor will be required to undertake a comprehensive multibeam sonar survey of the entire wreck and the seabed within the survey area. The survey area is defined as a polygon bounded by the following coordinates:</p> <p>Latitude (N) Longitude (E)</p> <p>51 27.75604 0 46.71516</p> <p>51 28.25409 0 46.75512</p> <p>51 28.23601 0 47.47680</p> <p>51 27.73201 0 47.43138</p> <p>This encompasses the wreck, the prohibited area around the wreck, the surrounding seabed area and a section of the dredged shipping channel to the south of the wreck. See Annex A for a chart showing the survey area.</p>
2.2	Survey Data Coverage	<p>The survey should utilise multibeam sonar equipment to provide detailed data on the entire wreck structure and surrounding seabed within the survey area.</p>
		<p>The Contractor should maximise data density in order to ensure full and complete ensonification of the wreck to allow assessment to take place. Sufficient data density should be achieved to allow for the production of close, detailed images of the wreck structure which will allow for the location, identification, visualisation and quantification of any anomalies including cracks, apertures and collapse – ones which have been noted by previous surveys and any that may have appeared since the last survey (see 2.11 – 2.22 for reporting requirements).</p>
2.3	Geo-Referencing	<p>The wreck and seabed survey must be fully and accurately geo-referenced in a format that will enable detailed analysis and comparisons with previous and future surveys.</p>
		<p>The survey data coverage and geo-referencing must be sufficiently detailed to accurately identify the list and orientation of the bow and stern sections of the wreck and the masts on both the bow and stern sections of the wreck.</p>
2.4	Surveying over the Wreck	<p>Full wreck coverage must be achieved, including survey lines run directly over both the bow and stern sections of the wreck.</p>

<p>2.5</p>	<p>Key Areas</p>	<p>Although the Contractor is required to fully ensonify the entire wreck, previous surveys have identified six Key Areas where changes and deterioration are most likely to be noted and where data density is of particular importance. These are:</p> <ul style="list-style-type: none"> • The hole and crack in the hull at Hold 2, port side • The collapsed deck plating at Hold 2, port side • Aperture in the bulkhead at the aft end of the forward section • Split in the hull on the starboard side, aft section (near aft mast house) • Split in the deck and the hull plating, aft section, port side. • Collapsing superstructure at the forward end of the aft section including bridge deck and boat deck. <p>It should also be noted that surveys carried out under this contract might identify further areas of the wreck where deterioration is greater or more rapid than is noted elsewhere on the wreck and, therefore, the number of Key Areas may grow during the life of this contract.</p>
<p>2.6</p>	<p>Seabed Debris Between Bow and Stern Sections</p>	<p>The survey must pay particular attention to the break between the two sections of the hull, ensuring full ensonification of the debris between the two sections (including any overhanging rigging and other structures, as well as the debris mound on the seabed) and fully assess the area for any munitions or changes in shape/size since previous surveys.</p>
<p>2.7</p>	<p>Contents of Holds</p>	<p>The Contractor should ensure sufficient data coverage to enable the visualisation of the contents of the holds through the hatches and also through the apertures in the hull, particularly those apertures in the bulkhead at the aft end of the bow section of the wreck and the main crack and collapsed deck area at Hold 2.</p>
<p>2.8</p>	<p>Seabed Data</p>	<p>The Contractor should maximise data density in order to ensure full and complete ensonification of the seabed within the survey area to allow assessment and accurate comparisons to take place. This includes the ensonification of loose and isolated wreckage, munitions or other debris within the survey area (previous surveys have located a number of objects within the area, which must be relocated within the survey data along with any new objects). See Annex A for details of the survey area.</p> <hr/> <p>The seabed data coverage must fully ensonify the level of sediment around the wreck and the level of seabed support of both the bow and stern sections of the wreck in sufficient detail to enable assessment and accurate comparisons with previous data to take place.</p>

<p>2.9</p>	<p>Laser Scanning & Photography</p>	<p>Laser scanning equipment should be used to collect data on the masts and other structures which are visible above the waterline on a low spring tide.</p>
		<p>The Contractor should maximise data density in order to ensure full and complete laser data coverage of all of the wreck features that are visible above the waterline on a low spring tide. Sufficient data density should be achieved to allow for the production of detailed images and for accurate comparisons with previous and future data to identify changes or deterioration.</p>
		<p>The laser survey must be fully and accurately geo-referenced in a format that will enable detailed analysis and comparisons with previous and future surveys and can be integration with MBES data.</p>
		<p>Laser data should be complemented by digital photographs of all parts of the wreck which are visible above the waterline on a low spring tide.</p>
<p>2.10</p>	<p>Repeatability & Data Comparisons</p>	<p>The SSRM surveys are repeat surveys and form part of a body of survey data collected over more than 15 years. The Contractor must ensure that all survey data collected can be directly compared to previous surveys of the SSRM, is fully repeatable and will enable comparisons with future surveys (for data comparisons the Contractor can obtain previous survey reports, raw and processed data from the MCA).</p>
		<p>Once the survey data has been collected and processed, the Contractor will compare that data to a minimum of two previous SSRM surveys in order to identify any changes and deterioration as well as areas of no change both on the wreck and the surrounding seabed.</p>
		<p>The Contractor will compare the survey data with the most recent previous survey data (MBES and laser data) and at least one other previous survey (to be agreed with the Contractor at the beginning of each year of the contract when the survey type and number for that year are also agreed).</p>

REPORTING REQUIREMENTS FOR A FULL SURVEY OF THE SSRM		
2.11	Reporting	If, during any survey work being conducted on the SSRM under this contract, the Contractor notes any significant change in the wreck, the Contractor will immediately report this to the MCA contract manager by telephone and follow up with an email. At the contract start-up meeting the MCA contract manager will identify what constitutes 'significant change'.
		The Contractor will produce an initial report and a final report for each Full Survey conducted under this contract.
2.12	Initial Report	<p>The Contractor will submit the initial report, all raw data and geo-TIFFs evidencing the data coverage of the survey area within ten working days of the completion of the survey operations.</p> <p>The initial report will be no more than ten pages long, will provide a brief summary of survey operations, along with images of the survey area, images of the seabed area and the Key Areas on the wreck, highlighting any areas of the wreck that initially appear to demonstrate change or deterioration since the most recent previous survey (if any).</p> <p>The raw data should be provided on a USB 3.0 hard drive (or equivalent) and the initial report should be submitted by email to the MCA contract manager or on the hard drive with the raw data.</p>
2.13	Final Report	The Contractor will submit the final report within ten weeks of the completion of the survey operations.
		The final report will provide a detailed survey report which will include a comprehensive account of the survey, its methodology, the equipment and software packages used, the results of the data collection and comparisons with results from previous surveys. The report will detail the results across the entire wreck and seabed within the survey area and will focus in particular on the Key Areas and any changes or deterioration identifiable in the survey data and will also report on areas of no change.
2.14	Final Report – ID Numbers	The Contractor will use the same ID number referencing system for the features on the wreck that has been used in previous survey reports in order to ensure ease of comparisons and consistency (this will be provided by the MCA contract manager).
2.15	Final Report – Data Comparisons	The survey report will include comparisons with survey results from at least two previous surveys one of which must be the most recent previous survey (see 2.10 above).

<p>2.16</p>	<p>Final Report – Areas of Focus</p>	<p>The final report should provide a full report of the survey and the results of data comparisons but, in particular, survey report must include images of the wreck and seabed and images of each area of the wreck displaying any change (including any cracks, bulging, apertures, collapse etc.) from the previous survey, alongside comparative images of these same areas from the previous survey to highlight the change.</p> <p>The survey report must clearly identify and quantify any changes, providing measurements and specifying where the scale of change is within or outside of the error margins of the equipment used.</p> <p>The report must include a clear graphic or narrative description of where each of the areas of change are located on the wreck (or within the seabed area).</p> <p>The final report should include full coverage of each of the Key Areas (see 2.5 above and Annex C Fig. 5 for details of Key Areas), including comparisons with previous survey data, visualising and quantifying any changes and presenting these alongside images from previous survey data to demonstrate that change. Key Areas should still be reported on even where no change has been noted. The Contractor may add to the Key Areas if particular areas of deterioration are noted in individual or successive surveys carried out under this contract.</p> <p>The final report will provide an image of the survey area in its entirety showing gradient, as well as images of all Seabed Contacts identified on the seabed within the survey area (these seabed contacts should be provided as a separate Annex, see 2.21 below).</p> <p>The final report should include an image of the edge of the dredged channel adjacent to the prohibited area, along with a comparison of the shape and location of the edge of the dredged channel from the most recent previous survey.</p>
<p>2.17</p>	<p>Final Report – Gazetteer of Observations</p>	<p>An updated version of the Gazetteer of Observations (GoO) with references for all of the previously recorded features on the wreck remaining consistent with the alpha numeric referencing used in previous reports (GoO is a quick-reference spreadsheet of features on the wreck, their location and brief comments from each survey). Copy of the GoO to be provided by the MCA.</p>

2.18	Final Report – Integration of Laser, MBES Data & Photographs	The final report should present the laser scanning data, assessing the condition of the masts and other structures which are visible above the waterline on a low spring tide by comparing the data with the results of previous surveys (as detailed above).
		The final report should present all of the data, including MBES, laser data and photographs, together to provide full measurable data above and below the waterline. Laser data should be incorporated with the multibeam data and presented together to provide an integrated view of the wreck above and below the waterline.
2.19	Final Report – Debris Between Bow and Stern Sections	The survey report must detail the break between the two sections of the wreck, including any overhanging rigging and other structures and the debris mound on the seabed adjacent to Hold 3, fully assessing the area for any munitions which may have escaped from the wreck since the last survey or any changes in shape/size of the debris mound since the previous surveys (previous survey comparisons as detailed above).
2.20	Final Report – Hold Contents	The final report must visualise the contents of all five holds as far as is possible, providing comparisons with previous surveys (as detailed above).
2.21	Final Report – Seabed Data	The final report must present the seabed including the level of sediment build-up and scour around the wreck, providing a colour gradient representing changes in depth throughout the wreck site and comparing this to the results of previous surveys to identify any changes.
		The final report must identify the level of sediment build-up and seabed support of both the bow and stern sections, with a particular focus on the foot of the bow, providing comparisons to previous survey results and depth measurements.
		The final report will include (as an annex) an updated list of Seabed Contacts which will confirm the location of previously identified contacts and add any new ones found in the survey data. Details and images of any new Contacts are to be included in the main body of the Final Report. The Seabed Contacts list is a spreadsheet detailing location and brief description of each contact and confirmation of whether it was located in the survey data. A copy of the Seabed Contacts spreadsheet can be obtained from the MCA contract manager.
2.22	Final Report – Areas of No Change	The survey report will also detail areas on the wreck where there has been no change since the most recent previous survey.

SECTION 3: SURVEY & REPORTING REQUIREMENTS FOR A SNAPSHOT SURVEY OF THE SSRM

SURVEY REQUIREMENTS FOR A SNAPSHOT SURVEY OF THE SSRM		
3.1	Survey Area	<p>The contractor will be required to undertake a comprehensive multibeam sonar survey of the entire wreck and the seabed within the survey area. The survey area is defined as a polygon bounded by the following coordinates:</p> <p>Latitude (N) Longitude (E)</p> <p>51 27.93595 0 47.04126</p> <p>51 28.04993 0 47.05080</p> <p>51 28.04993 0 47.14794</p> <p>51 27.93595 0 47.13882</p> <p>This encompasses the wreck and the seabed area immediately adjacent to the wreck. The survey area is wholly within the prohibited area around the wreck. See Annex A for a chart showing the survey area and Annex B for details of the prohibited area.</p>
3.2	Survey Data Coverage	<p>The survey should utilise multibeam sonar equipment to provide detailed data on the entire wreck structure and adjacent seabed within the survey area.</p> <p>The Contractor should maximise data density in order to ensure full and complete ensonification of the wreck to allow assessment to take place. Sufficient data density should be achieved to allow for the production of close, detailed images of the wreck structure which will allow for the location, identification, visualisation and quantification of any anomalies including cracks, apertures and collapse – ones which have been noted by previous surveys and any that may have appeared since the last survey (see 3.11 – 3.22 for reporting requirements).</p>
3.3	Geo-Referencing	<p>The wreck and seabed survey must be fully and accurately geo-referenced in a format that will enable detailed analysis and comparisons with previous and future surveys.</p> <p>The survey data coverage and geo-referencing must be sufficiently detailed to accurately identify the list and orientation of the bow and stern sections of the wreck and the masts on both the bow and stern sections of the wreck.</p>

3.4	Surveying Over the Wreck	Full wreck coverage must be achieved, including survey lines run directly over both the bow and stern sections of the wreck.
3.5	Key Areas	<p>Although the Contractor is required to fully ensonify the entire wreck, previous surveys have identified six Key Areas where changes and deterioration are most likely to be noted and where data density is of particular importance. These are:</p> <ul style="list-style-type: none"> • The hole and crack in the hull at Hold 2, port side • The collapsed deck plating at Hold 2, port side • Aperture in the bulkhead at the aft end of the forward section • Split in the hull on the starboard side, aft section (near aft mast house) • Split in the deck and the hull plating, aft section, port side. • Collapsing superstructure at the forward end of the aft section including bridge deck and boat deck. <p>It should also be noted that surveys carried out under this contract might identify further areas of the wreck where deterioration is greater or more rapid than is noted elsewhere on the wreck and, therefore, the number of Key Areas may grow during the life of this contract.</p>
3.6	Seabed Debris Between Bow and Stern Sections	The survey must pay particular attention to the break between the two sections of the hull, ensuring full ensonification of the debris between the two sections (including any overhanging rigging and other structures, as well as the debris mound on the seabed) and fully assess the area for any munitions or changes in shape/size since previous surveys.
3.7	Contents of Holds	The Contractor should ensure sufficient data coverage to enable the visualisation of the contents of the holds through the hatches and also through the apertures in the hull, particularly those apertures in the bulkhead at the aft end of the bow section of the wreck and the main crack and collapsed deck area at Hold 2.
3.8	Seabed Data	The Contractor should maximise data density in order to ensure full and complete ensonification of the seabed within the survey area to allow assessment and accurate comparisons to take place. This includes the ensonification of any munitions or other debris within the survey area. See Annex A for details of the survey area.

3.9	Laser Scanning & Photography	Laser scanning equipment should be used to collect data on the masts and other structures which are visible above the waterline on a low spring tide.
		The Contractor should maximise data density in order to ensure full and complete laser data coverage of all of the wreck features that are visible above the waterline on a low spring tide. Sufficient data density should be achieved to allow for the production of detailed images and for accurate comparisons with previous and future data to identify changes or deterioration.
		The laser survey must be fully and accurately geo-referenced in a format that will enable detailed analysis and comparisons with previous and future surveys and be integrated with MBES data.
		Laser data should be complemented by digital photographs of all parts of the wreck which are visible above the waterline on a low spring tide.
3.10	Repeatability & Data Comparisons	The SSRM surveys (Full Surveys and Snapshot Surveys) are repeat surveys and form part of a body of survey data collected over more than 15 years. The Contractor must ensure that all survey data collected under Lot 4 can be directly compared to previous surveys of the SSRM, is fully repeatable and will enable comparisons with future surveys (for data comparisons the Contractor can obtain previous survey reports, raw and processed data from the MCA).
		Once the survey data has been collected and processed, the Contractor will compare that data (MBES and laser data) to the data from the most recent previous survey in order to identify any changes and deterioration on the wreck and in the small seabed area encompassed with the Snapshot Survey area.
REPORTING REQUIREMENTS FOR A SNAPSHOT SURVEY OF THE SSRM		
3.11	Reporting	If, during any survey work being conducted on the SSRM under this contract, the Contractor notes any significant change in the wreck, the Contractor will immediately report this to the MCA contract manager by telephone and followed up with an email. At the contract start-up meeting the MCA contract manager will identify what constitutes 'significant change'.
		The Contractor will produce an initial report and a final report for each Snapshot Survey conducted under this contract.

3.12	Initial Report	<p>The Contractor will submit the initial report, all raw data and geo-TIFFs evidencing the data coverage of the survey area within five working days of the completion of the survey operations.</p> <p>The purpose of the initial report is to provide a brief summary of survey operations, evidence of data coverage and initial information on any areas of the wreck that appear to demonstrate change or deterioration since the most recent previous survey (if any).</p> <p>The initial report should be in the format of an email to the MCA contract manager with attached images and geo-TIFFs, and raw data provided on a USB 3.0 hard drive (or equivalent). The images and geo-TIFFs can also be submitted on the hard drive if too big for an email.</p>
3.13	Final Report	<p>The Contractor will submit the final report within six weeks of the completion of the survey operations.</p> <p>The final report will provide a detailed survey report which will include a comprehensive account of the survey, its methodology, the equipment and software packages used, the results of the data collection and comparisons with results from the most recent previous survey. The report will detail the results across the entire wreck and seabed immediately adjacent to the wreck within the survey area. The report will focus on the Key Areas and any changes or deterioration identifiable in the survey data. Apart from the Key Areas, there is no requirement to report on areas of no change (beyond specifying the ID number and stating no change).</p>
3.14	Final Report - ID Numbers	<p>The Contractor will use the same ID number referencing system for the features on the wreck that has been used in previous survey reports in order to ensure ease of comparisons and consistency (this will be provided by the MCA contract manager).</p>
3.15	Final Report – Data Comparisons	<p>The survey report will include comparisons with survey results from the most recent previous survey only (see 3.10 above).</p>
3.16	Final Report – Areas of Focus	<p>The final report should provide a full report of the survey and the results of data comparisons but, in particular, the survey report must include images of the wreck and the small area of seabed within the survey area (see Annex A). Images of each area of the wreck displaying any change (including any cracks, bulging, apertures, collapse etc.) from the previous survey should be presented alongside comparative images of these same areas from the previous survey to highlight the change.</p>

		<p>The survey report must clearly identify and quantify any changes, providing measurements and specifying where the scale of change is within or outside of the error margins of the equipment used.</p>
		<p>The report must include a clear graphic or narrative description of where each of the areas of change are located on the wreck (or within the seabed area).</p>
		<p>The final report will include full coverage of each of the Key Areas (see 3.5 above and Annex C Fig. 5 for details of Key Areas), including comparisons with the most recent previous survey data, visualising and quantifying any changes and presenting these alongside images from the previous survey data to demonstrate that change. Key Areas should still be reported on even where no change has been noted. The Contractor may add to the Key Areas if particular areas of deterioration are noted in individual or successive surveys carried out under this contract.</p>
		<p>The final report will provide an image of the survey area in its entirety showing gradient.</p>
3.17	Final Report – Gazetteer of Observations	<p>The final report will include (as an annex) an updated version of the Gazetteer of Observations (GoO) with references for all of the previously recorded features on the wreck remaining consistent with the alpha numeric referencing used in previous reports (GoO is a quick-reference spreadsheet of features on the wreck, their location and brief comments from each survey). Copy of the GoO to be provided by the MCA.</p>
3.18	Final Report – Integration of Laser, MBES Data & Photographs	<p>The final report should present the laser scanning data, assessing the condition of the masts and other structures which are visible above the waterline on a low spring tide by comparing the data with the results of the most recent previous survey.</p>
		<p>The final report should present all of the data, including MBES, laser data and photographs, together to provide full measurable data above and below the waterline. Laser data should be incorporated with the multibeam data and presented together to provide an integrated view of the wreck above and below the waterline.</p>
3.19	Final Report – Debris Between Bow and Stern Sections	<p>The survey report must detail the break between the two sections of the wreck, including any overhanging rigging and other structures and the debris mound on the seabed adjacent to Hold 3, fully assessing the area for any munitions which may have escaped from the wreck since the last survey or any changes in shape/size of the debris mound since the previous survey (previous survey comparisons as detailed above).</p>

3.20	Final Report - Hold Contents	The final report must visualise the contents of all five holds as far as is possible, providing comparisons with the most recent previous survey.
3.21	Final Report – Seabed Data	<p>The final report must present the seabed including the level of sediment build-up and scour around the wreck (as far as is encompassed within the survey area), providing a colour gradient representing changes in depth throughout the wreck site and comparing this to the results of the most recent previous survey to identify any changes.</p> <p>The final report must identify the level of seabed support of both the bow and stern sections, with a particular focus on the foot of the bow, providing comparisons to the previous survey results and depth measurements.</p> <p>The final report will include (as an annex) an updated list of Seabed Contacts which will confirm the location of previously identified contacts and add any new ones found in the survey data. Details and images of any new Contacts are to be included in the main body of the Final Report. The Seabed Contacts list is a spreadsheet detailing location and brief description of each contact and confirmation of whether it was located in the survey data. A copy of the Seabed Contacts spreadsheet can be obtained from the MCA contract manager.</p>
3.22	Final Report – Areas of No Change	There is no requirement for a Snapshot Survey report to report on areas of no change, except to confirm that unless stated, there has been no change since the most recent previous survey.

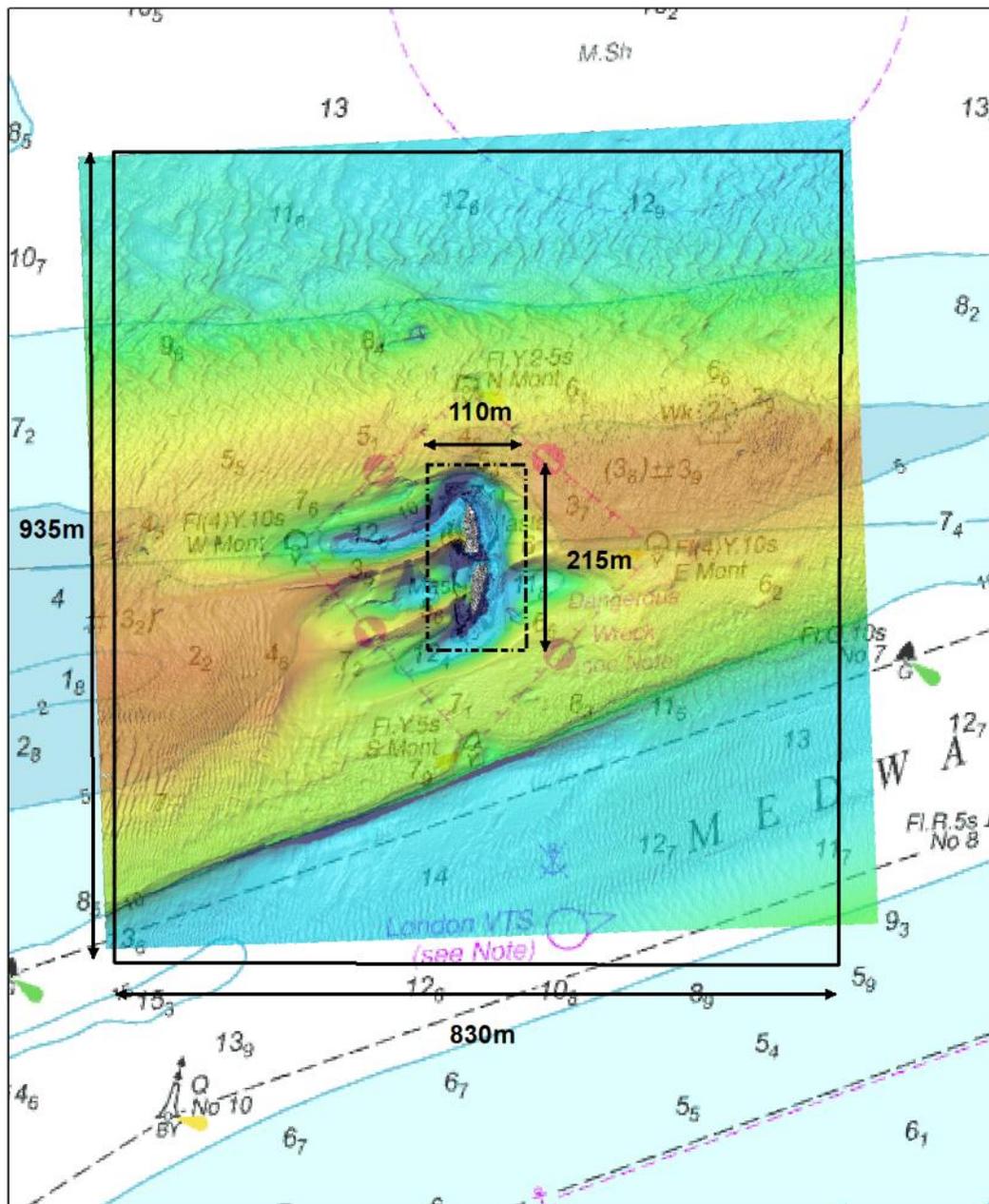
SECTION 4: DELIVERABLES

DELIVERABLES		
4.1	Data Delivery Deadline – Initial Reports	<p>For a Full Survey of the SSRM, the Contractor will deliver the initial report, all raw data and geo-TIFFs evidencing data coverage within ten working days of the completion of survey operations</p> <p>For a Snapshot Survey of the SSRM, the Contractor will deliver the initial report, all raw data and geo-TIFFs evidencing data coverage within five working days of the completion of survey operations.</p>
4.2	Data Delivery Deadline – Final Reports	<p>For a Full Survey of the SSRM, the Contractor will deliver the final report and all processed data within ten weeks of the completion survey operations.</p> <p>For a Snapshot Survey of the SSRM, the Contractor will deliver the final report and all processed data within six weeks of the completion of survey operations.</p>
4.3	Appraisal Schedule	<p>When survey reports and data are delivered the MCA will endeavor to fully validate initial deliverables for both Full Surveys and Snapshot Surveys (for first payment milestone) within 7 working days and final deliverables (for second payment milestone) within 20 working days. If the deliverables are not fully compliant with the contract requirements or are outside of the stated timescales for delivery, this validation period may take longer. See Statement of Requirement 17.3 for payment milestones.</p>
4.4	Labelling of Records & Deliverables	<p>Project Name: Protection of Wrecks Act 1973 Section 2 SS Richard Montgomery Full Survey/Snapshot Survey (deleted as appropriate) 2018*</p> <p>All data and accompanying documents and records originating from the survey become the property of HM Government and must be handed over on demand. Where appropriate, they are to carry the following official markings:</p> <p>Maritime & Coastguard Agency © CROWN COPYRIGHT 2018* (*year as appropriate).</p>
4.5	Other Data Deliverables	<p>All data collected during the survey, including:</p> <ul style="list-style-type: none"> • Raw MBES • Raw water column data • Raw Laser • Raw Positioning • Sound speed

4.6	MBES Wreck Processed Deliverables	<p>Processed (cleaned) MBES data as:</p> <ul style="list-style-type: none"> • Caris HIPS project (with deleted soundings included but flagged as rejected) of the survey results. The data must be converted to full HDCS format. • xyz file format • Fledermaus .SD file (10cm resolution)
4.7	MBES Seabed Processed Deliverables	<p>Processed (cleaned) MBES data as:</p> <ul style="list-style-type: none"> • Caris HIPS project (with deleted soundings included but flagged as rejected) of the survey results. The data must be converted to full HDCS format. • Fledermaus .SD file (1m resolution)
4.8	Difference Deliverables	<p>Survey data comparisons (most recent previous survey and at least one other previous survey for a Full Survey and the most recent previous survey for a Snapshot Survey) for seabed and wreck surveys as:</p> <ul style="list-style-type: none"> • Fledermaus .sd file (1m resolution) • ArcGIS compatible files (1m resolution)
4.9	Laser Processed Deliverables	<p>Processed (cleaned) laser data as:</p> <ul style="list-style-type: none"> • Proprietary format • xyz file format
4.10	Positioning Processed Deliverables	Data files used in the post-processing of GNSS position and motion.
4.11	Project Deliverables	Present the results in Fledermaus .scene file format containing all .sd and .xyz files.
4.12	Report Deliverables – Initial Report	<p>Initial Report deliverables:</p> <p>– Snapshot Survey initial report as an email with attached images and geo-TIFFs, see section 3.12 above.</p> <p>Full Survey initial report as a Word and PDF document with images and geo-TIFFs, see section 2.12 above.</p>

4.13	Report Deliverables – Final Report	<p>Final Report deliverables for both Full Surveys and Snapshot Surveys:</p> <ul style="list-style-type: none"> • Each Report (content as detailed above) as Word and PDF documents • Mobilisation Report • Gazetteer of Observations • Seabed Contacts • Photographs <p>All of the above to be delivered on USB 3.0 hard drive (or equivalent) with the survey data.</p>
4.14	Digital Data Media	<p>All data and reports shall be delivered on USB 3.0 hard drives (or equivalent). No rendered data file shall be larger than 2 Gigabytes in size.</p>
4.15	Final Report on Disks	<p>2 disks each containing a Word and a PDF copy of the final report (to enable the MCA contract manager to immediately and easily share the final report with MoD technical advisors and DfT).</p>
4.16	Retention of Data	<p>All raw and processed digital records shall be retained and maintained by the Contractor for a period of 3 years from the date of the final contract payment. On completion of this 3-year period, the Contractor may seek permission from MCA to dispose of the data.</p>

Annex A - Survey Areas



TITLE SS RICHARD MONTGOMERY: SURVEY LOCATION & EXTENT		
OVERVIEW 	LEGEND 	 Maritime & Coastguard Agency
	NOT TO BE USED FOR NAVIGATION © Crown Copyright, 2018. All rights reserved. Graphic may only be reproduced in full.	
		DRAWING Projection: ETRS89 UTM Zone 31N Originator: RK Date: 4th January 2018 Document Reference: SSRM 18

Fig. 1 – Full Survey area shown in hard black line, Snapshot Survey area shown in broken black line. Prohibited area shown in red on the chart.

SS Richard Montgomery Survey Area Coordinates:

Snapshot Survey Extent		
Point	Latitude (N)	Longitude (E)
1	51 27.93595	0 47.04126
2	51 28.04993	0 47.05080
3	51 28.04993	0 47.14794
4	51 27.93595	0 47.13882

Table 1. Coordinates of four points marking the extent of the polygon survey area for a Snapshot Survey.

Full Survey Extent		
Point	Latitude (N)	Longitude (E)
1	51 27.75604	0 46.71516
2	51 28.25409	0 46.75512
3	51 28.23601	0 47.47680
4	51 27.73201	0 47.43138

Table 2. Coordinates of four points marking the extent of the polygon survey area for a Full Survey.

Annex B – The Prohibited Area Around the SSRM

The co-ordinates of the prohibited area around the wreck (as they appear on Statutory Instrument 1973 No. 1690) are:

51° 28' 04" N	00° 47' 12" E
51° 27' 57" N	00° 47' 22" E
51° 27' 50" N	00° 47' 11" E
51° 27' 58" N	00° 47' 01" E

Entry within the prohibited area requires the written permission of the Secretary of State, which will be provided for the successful Contractor by the MCA and this permission may be removed by the MCA if the Contractor does not comply with all aspects of the contract requirements.

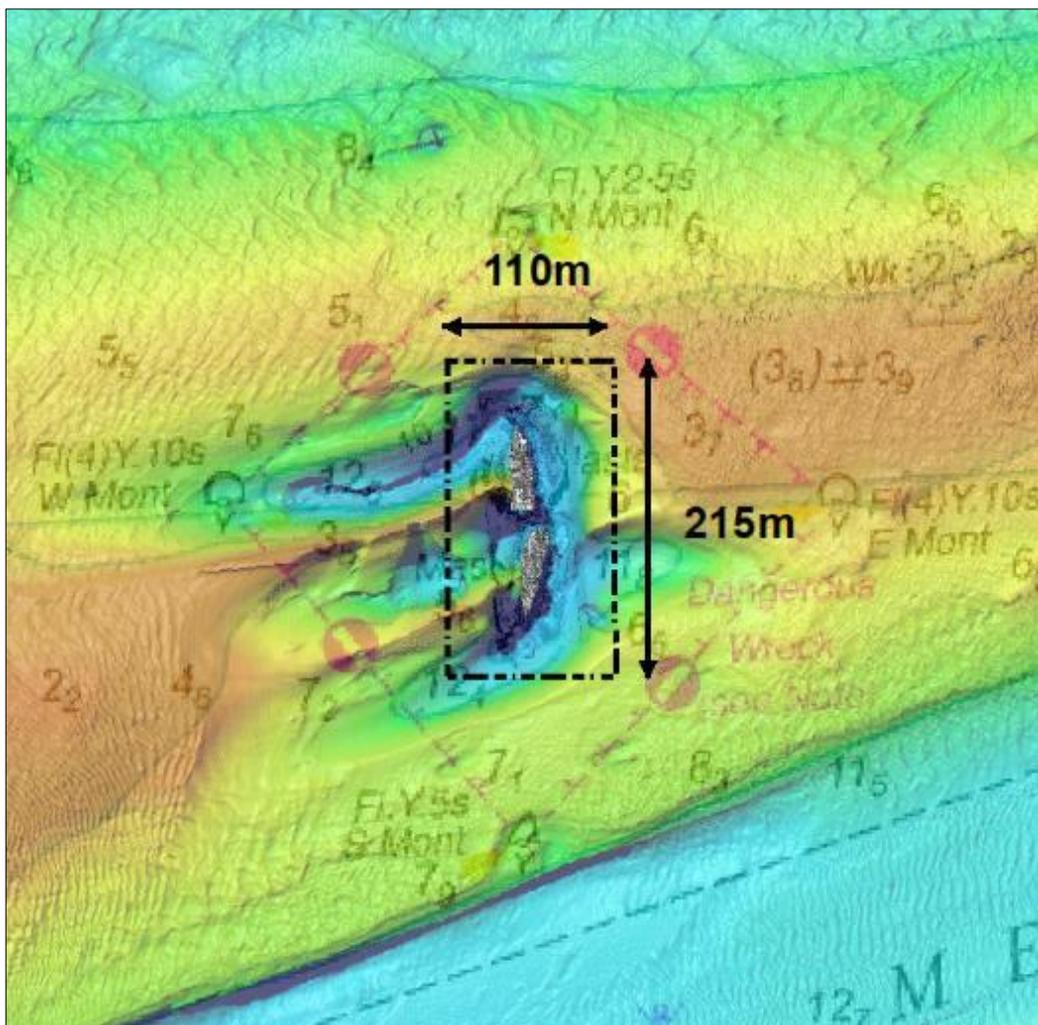


Fig. 2 The prohibited area around the SSRM shown by the dashed red line (with survey area for a Snapshot Survey shown as a dashed black line).

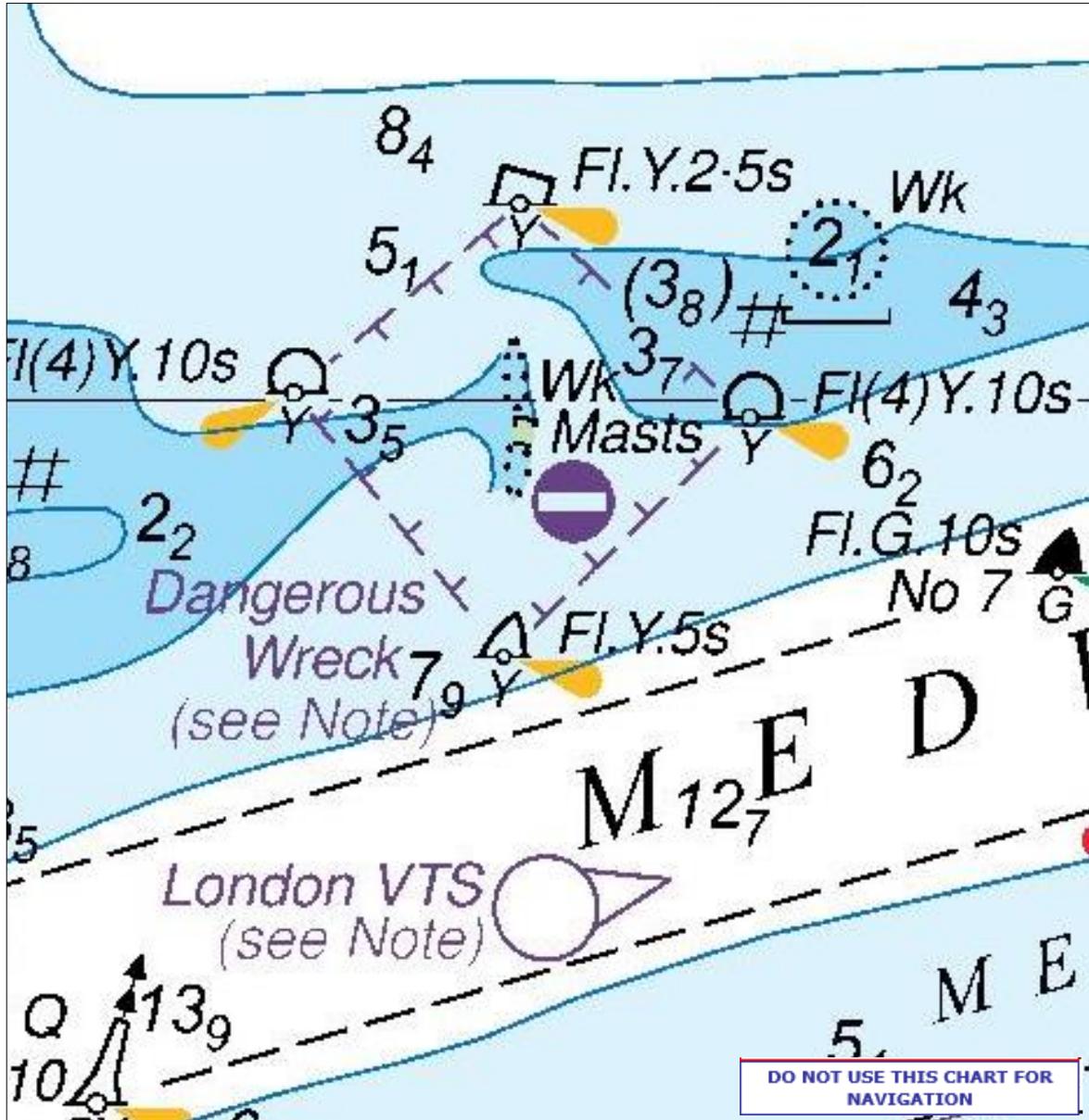


Fig. 3 Chartlet showing the prohibited area (dashed purple lines with no-entry sign).

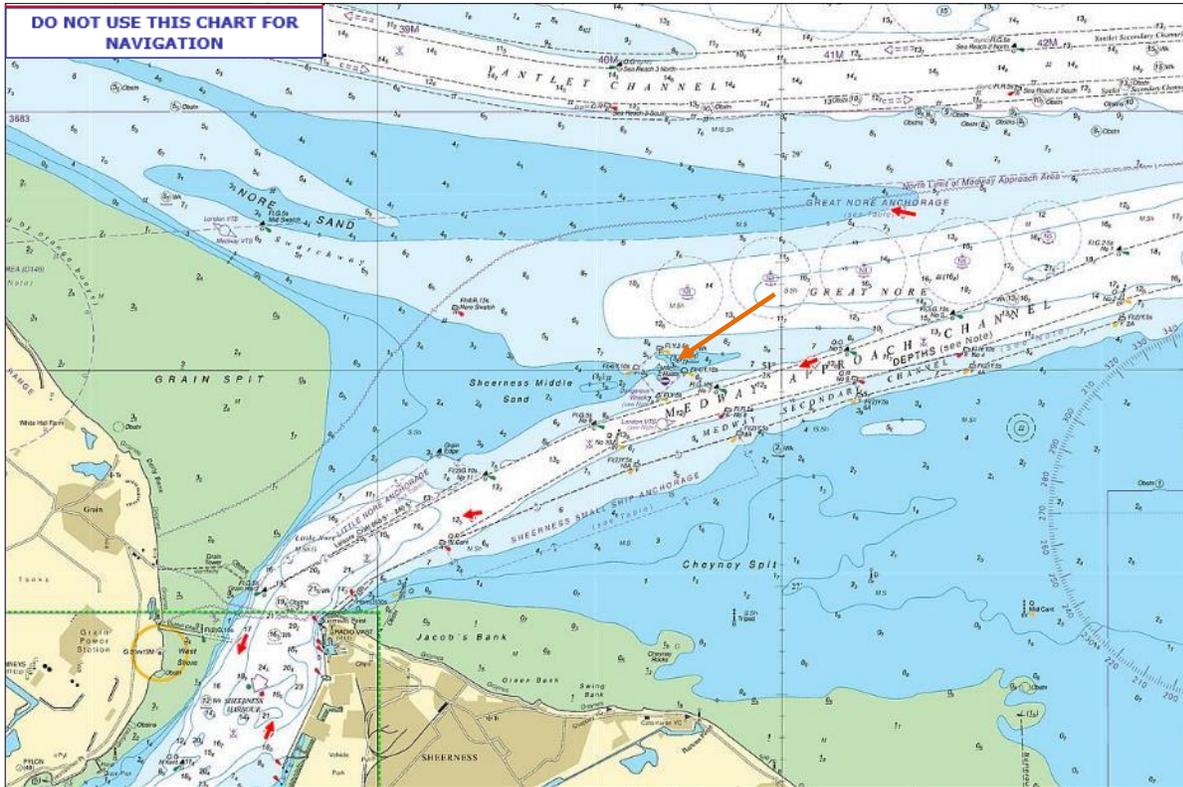


Fig 4 Medway Approach & Sheerness Middle Sand, showing prohibited area (orange arrow).

Annex C – Data From Previous SSRM Monitoring Survey (2016) Including Key Areas

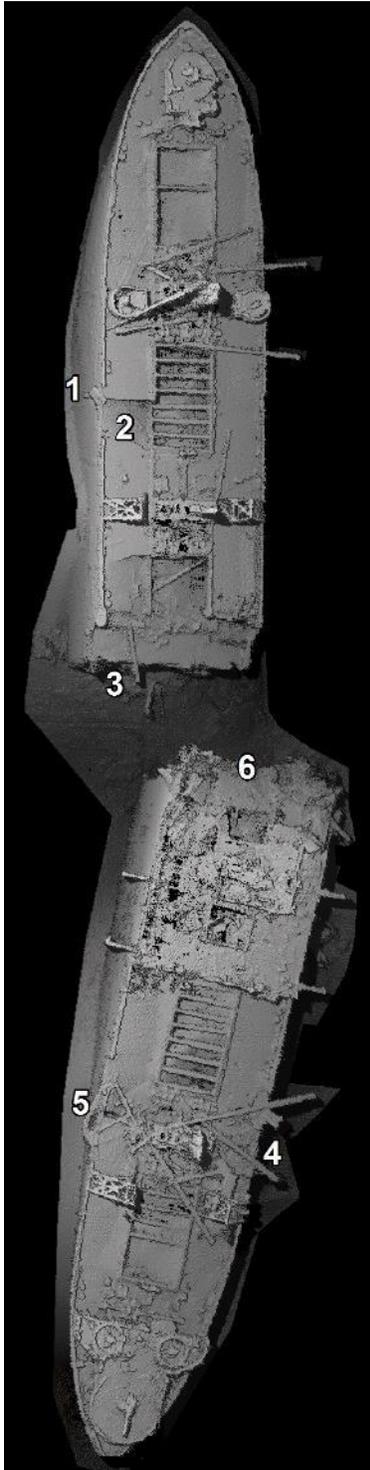


Fig. 5 Location of the six Key Areas of change.



Fig. 6 Key Areas 1 & 2 – Hold 2 collapsed deck plating and crack in hull.

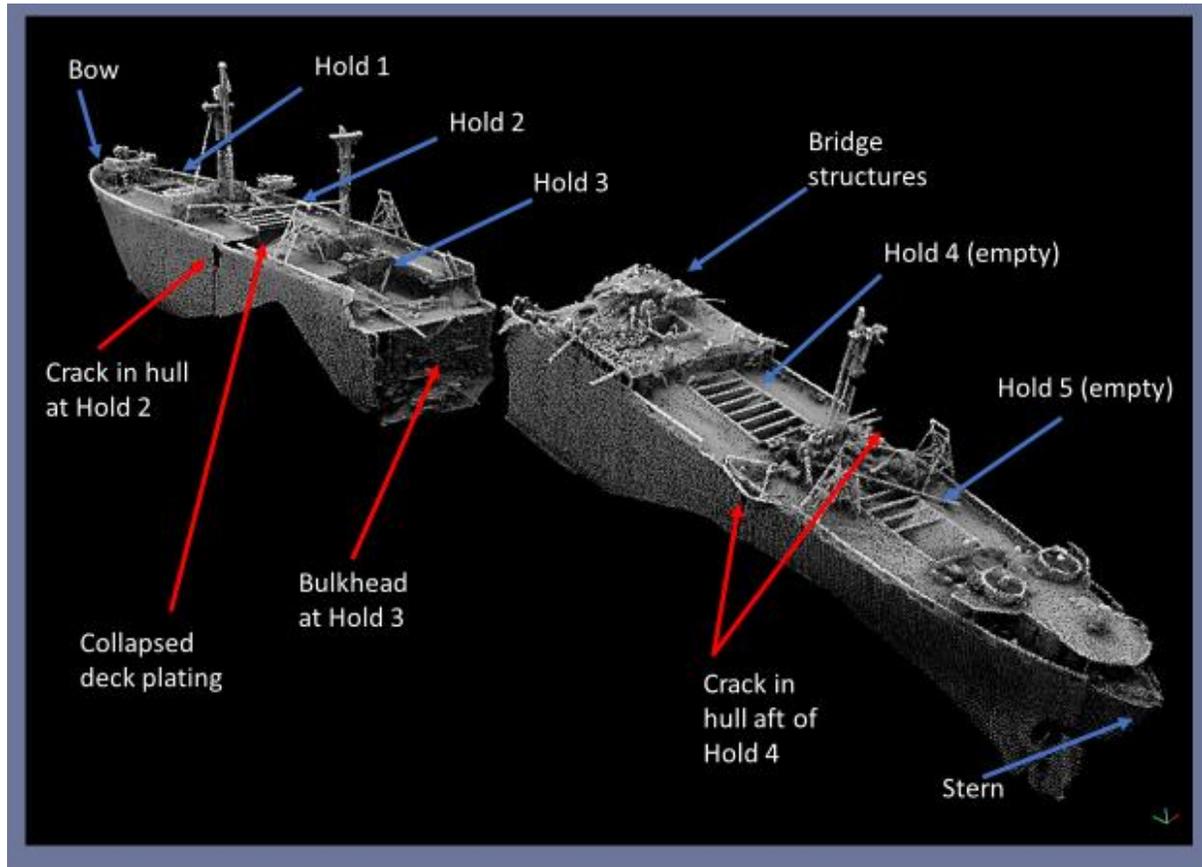


Fig. 7 General orientation around the wreck of the SSRM

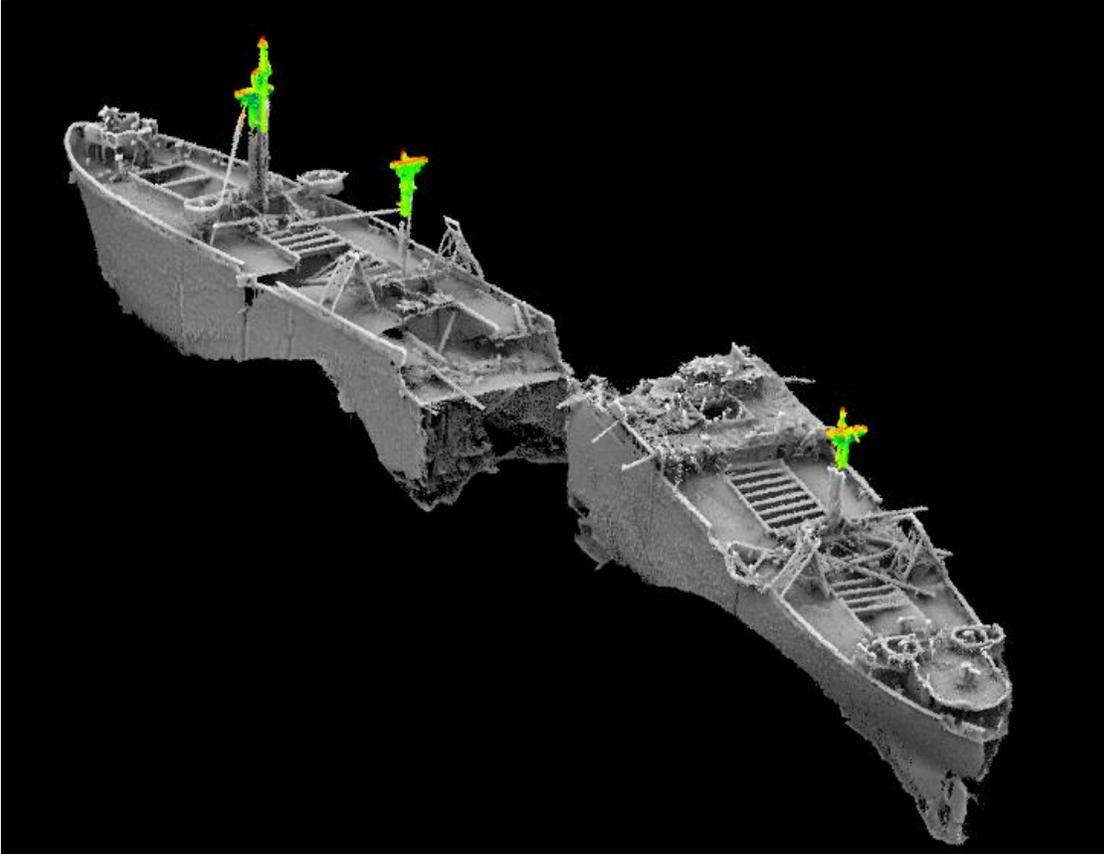


Fig 8. Multibeam data from 2016 (in grey), laser scanning data (2016) in green.

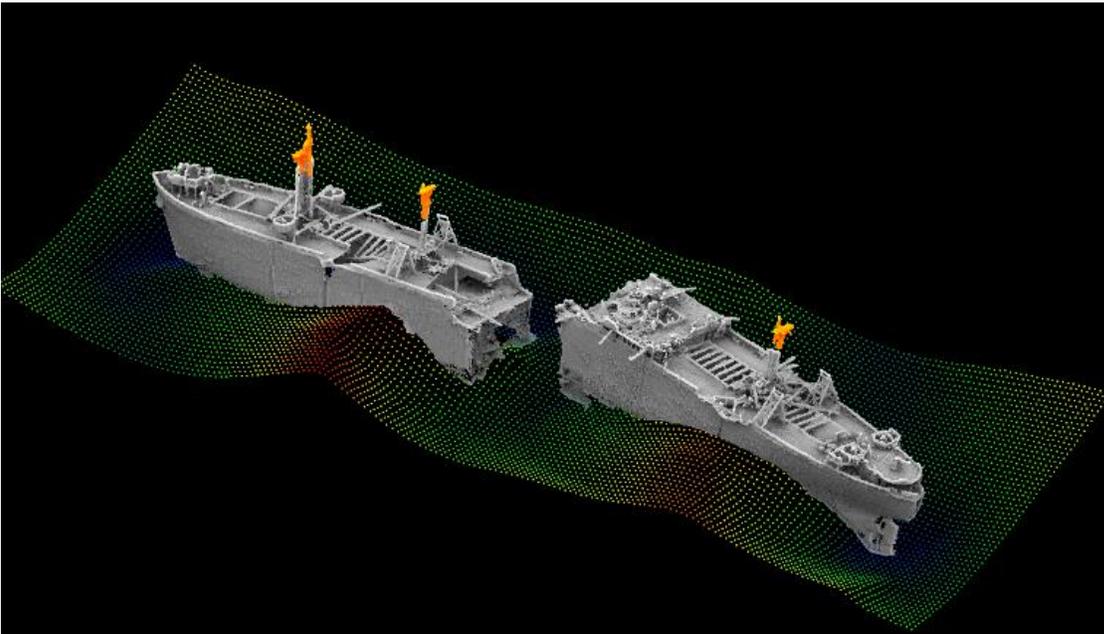


Fig 9. 2016 multibeam & laser data.