British Geological Survey

OFFICIAL

Report of Survey: Ascension Island Mulitbeam & Video Transects

OR/24/014

Overseas Seabed Mapping Programme

HI Number	N/A – Darwin Plus Grant – Ascension Island
HI Name	N/A – Darwin Plus Grant – Ascension Island
Company	British Geological Survey
UKHO Reference	N/A

Contents

Part A - Introduction

A1. a	Background	This report forms part of a commissioned study of the seafloor surrounding Ascension Island undertaken by the British Geological Survey in partnership with the Ascension Island Government. This work has been funded by the Darwin Plus overseas conservation/biodiversity challenge funds programme. **Project reference: DPR9S2\1018** **BGS Report reference: OR/24/014** **Project title: Bathymetry, and seafloor habitats within Ascension Island's nearshore waters** The United Kingdom Hydrographic Office (UKHO) have provided invaluable advice and data (HMS Protector – HI1571) and will be custodians of the multibeam collected for this project, ensuring the data is used beyond the timescales of this project. This report uses a template designed to cover the technical survey details requested by the UKHO for commissioned multibeam bathymetric surveys (Hydrographic Instructions - HI). The primary objective of this project was seabed geological and habitat mapping, so not all the elements required for a hydrographic instruction are covered or even appropriate due to the budget and time available. Some sections have been removed and we have also added more details when appropriate, particularly on the seabed sampling equipment and methodology (Part I – Seabed).
A2.	Project Introduction	The nearshore habitats of the Ascension Island Marine Protected Area (AI-MPA) comprise high biodiversity and are most at risk from anthropogenic development and climate change. This project will determine the character, distribution, and extent of these key habitats through an integrated programme of hydrographic and ground-truthing surveys. Resulting seafloor habitat maps will provide urgently needed tools to better monitor and protect marine ecosystems and underpin the evidence-based management of the AI-MPA.

A3.	British Geological Survey	The British Geological Survey (BGS) is Britain's national geological survey and has been in existence since 1835. The BGS is a component body of the Natural Environment Research Council (NERC) and is the nation's principal supplier of objective, impartial and up-to-date geological expertise and information for decision making for governmental, commercial, and individual users. The BGS maintains and develops the UK's understanding of its geology to improve policy making, enhance national wealth and reduce risk. BGS works for both the public and private sectors and employs around 670 staff, 450 of which are scientists. BGS applies its research and commissioned work to key sectors in the UK: mineral, energy, and groundwater resources; land use; geological hazards; and environmental protection. The British Geological Survey (BGS) is well qualified and experienced to do this work with a long history of undertaking a wide variety of marine surveys, geoscientific investigations, and applied earth science research studies, much of which is interdisciplinary.
A4.	Objectives	The primary objectives of this survey are as follows: • Collect the ground truth samples required for the BGS to create substrate, geomorphology and habitat maps. Drop camera transects were identified as the most appropriate solution. From preliminary substrate mapping, using multibeam and backscatter data, around 60 drop locations were identified. • Mobilise the Kongsberg EM2040P Portable Hydrographic System (PHS) and USM RIB mounting kit on an 8m RIB. Trial the suitability of the system for use on similar projects requiring low cost, rapid mobilisation in areas with a limited supply of local charter vessels available and water access issues. • Initial requirement/estimate was to collect around 5-10 days of multibeam data. • Fill gaps in the data collected by HMS Protector (Fig 5), especially shallow areas of interest (<5-10m) and attempt to collect data from the totally uncharted south coast. • Improve data quality and data density of HMS Protector data in priority areas around George Town. These areas were identified by UKHO prior to departure (Fig 6) • Acquire higher quality backscatter data in areas of interest for marine geoscience studies and allow backscatter signature comparison with HMS Protector data.

		• Collect water column data at areas of potential fresh water/gas seeps.
A5.	Project timeline/progress/issues	This project was subject to numerous delays, primarily due to the COVID-19 pandemic, and underwent significant change and budget reduction when the HMS Protector fortuitously collected most of the required bathymetric data in 2020 (Fig 5). BGS received this data in November 2022. The original plan was to ship a BGS owned survey boat called the White Ribbon, an 8m Cheetah Marine catamaran. However, since project inception BGS closed its Marine Operations facility and combined with the reduced requirement for large areas of multibeam collection due to HMS Protector data, a decision was made to sell the White Ribbon and use the only boat available on island, the Ascension Island Government owned and operated 8m RIB called '*Moray*' (Fig.1). The size of this boat would intrinsically limit the area of operation and available weather windows. It also required a novel approach to mobilising the multibeam equipment and a solution was found using a brand-new RIB mounting kit, designed and supplied by Universal Sonar Mounts (USM) (Fig.1). The proposed multibeam survey solution was tested, prior to travel in Port Edgar, Edinburgh to confirm that it would work and was safe to operate in the challenging conditions of Ascension (*https://www.youtube.com/watch?v=eOBy9bqnJ-w&t=3s*). Assessment of HMS Protector data (both bathymetry and backscatter) then enabled a targeted approach to multibeam survey operations and ground truth sample transects (Fig 7). There was still significant uncertainty over certain factors that could affect survey operations, that included launch and recovery, frequency of suitable weather, effectiveness of equipment (the RIB has no cabin/shelter) and the performance of boat and crew etc. These risks were mitigated by undertaking two distinct periods of fieldwork: 31 Oct – 15 Nov 2023 and 17 Jan – 31 Jan 2024. Therefore allowing sufficient time between each period to resolve any major issues, mobilise new equipment and conduct operations on Ascension during two separate weather windows.

		No reconnaissance trips were undertaken to reduce the total number of flights and availability of staff. Ascension is an incredibly remote location. Shipping and air freight are not always reliable and/or takes a long time and is expensive. The recommencement of the RAF operated AirTanker, South Atlantic Air Bridge in May 2023 has made personal travel significantly easier.
A6.	Results	• BGS successfully deployed two different drop camera systems to collect video transects – Drifto2000/GoPro11 and STR SeaSpyder Nano. We collected 50 samples around the island of Ascension using both systems -15 GoPro, 35 STR (Fig 7). The size of vessel, manual handling the camera systems, sea state and wind conditions meant these were primarily all on the more sheltered west coast. These samples allow us to validate and make assumptions over backscatter signatures for substrate and habitat mapping (Fig 7). Both drop camera systems performed well and their use proved complimentary (Part 1 - Seabed). • The chosen multibeam survey solution proved extremely effective as it enabled rapid mobilisation aboard a vessel of opportunity such as the *Moray*. However, an 8m RIB with no cabin/shelter from the elements for personal or equipment presented practical limitations. Survey operations should be limited to short duration surveys in enclosed water body/sheltered nearshore water without the big swells, wind, and heat typical of Ascension. Six (6) 6 days of multibeam were collected during the first fieldwork period (Fig1-4). • The data density collected is lower than required by higher IHO hydrographic standards due to the challenging environmental conditions and survey vessel. It was not feasible in the time available to wait for suitable weather windows required for the higher standards of data collection. The survey is not focused on object detection and this author suspects object detection requirements will be far from uniform across all survey areas, even those of similar depth. • We collected multibeam data over all the pre-planned features of interest, infilled data in extremely shallow water (<2m), collected water column data over areas of

		potential gas/freshwater seeps and added extra data density to all the areas requested by UKHO (Fig 7). • We used real tide gauge data so this will be a significant improvement to HMS Protectors data (predicted tides) for charts and will allow data validation. We were also able to collect data in the uncharted south coast, although weather conditions were far from ideal. • BGS news articles covering the two trips are available here: https://www.bgs.ac.uk/news/bgs-completes-first-mapping-expedition-to-ascension-island/ https://www.bgs.ac.uk/news/in-photos-marine-surveying-a-remote-volcanic-island/ • Ascension Island Government twitter feeds here: First trip. https://x.com/AscensionMPA/status/1725102115360522557?s=20 Second trip. https://x.com/AscensionMPA/status/1750460817047204098?s=20 Various outreach https://x.com/AscensionMPA/status/1750818467383546270?s=20 https://x.com/AscensionMPA/status/1750816535621390808?s=20
A7.	Acknowledgements	It should be noted that none of this data collection would have been possible without the willing and ingenuity of the crew and staff of the AIG Department of Conservation. Every element of performing a successful survey in Ascension requires some adjustment, acclimatisation, pragmatism, and common sense. We had big weather, sun exposure and

		boat malfunctions that were fixed, incredibly, with minimal downtime. In a tiny 'wee boat' we still managed to collect valuable data and BGS hopes the resulting maps are useful. Credit to all involved (see staff listing below).
A8.	Data of Historical or General Interest for Future Surveys	There is a tide gauge installed at English Bay. The installation was undertaken by NOC in 2021 - see website http://www.ioc-sealevelmonitoring.org/station.php?code=ascen for more details and data downloads. This service was used by BGS for tidal reduction. It was not available for the surveys undertaken by HMS Protector in 2020. Local survey charter boat options are extremely limited and/or expensive. Ascension Island Government (AIG) Department of Conservation own and operate an 8m RIB called Moray. It is black and has no cabin or cover. Launch and recovery of survey vessels in Ascension is via a pier, tenders and/or crane. There is no slipway or pontoons/jetty to tie-up alongside. Ascension is a very exposed island in the South Atlantic and the weather is not favourable for small boat surveys. The swell, wind and sun exposure/heat can severely limit operations. The pier is used by many different stake holders on the island for MOD operations, shipping and fuel etc. Access is restricted during higher priority functions and crane operations.
A9.	Weather	The island is prone to extended periods of high winds and swell, predominantly from the south/southwest. A large swell prevents launch and recovery from the pier. This project was lucky in only experiencing two periods of weather downtime 8th-10th November 2023 and 25th-28th January 2024. The first period coincided with the decision to switch to drop camera operation and the time was used to process data and demobilise kit to make the space required for additional equipment. Note: the primary objective of this project was seabed geological and habitat mapping so survey operations were often undertaken in marginal conditions. This was especially true on the south coast that was uncharted prior to our visit due to its exposed location.

Figure 1. From left - Catriona MacDonald, Rhys Cooper (BGS), Simon Watkins, Marcus, Pascale, Cerys, Dan Simpson & Cuen Miller (AIG) stand alongside the survey vessel '*Moray*' with EM2040P Portable Hydrographic Solution (PHS) mobilised,

Figure 2. Launch and recovery of '*Moray*' via the pier at George Town.

Figure 3. Exposed working conditions on the 'Moray'

Figure 4. Little boat, big sea

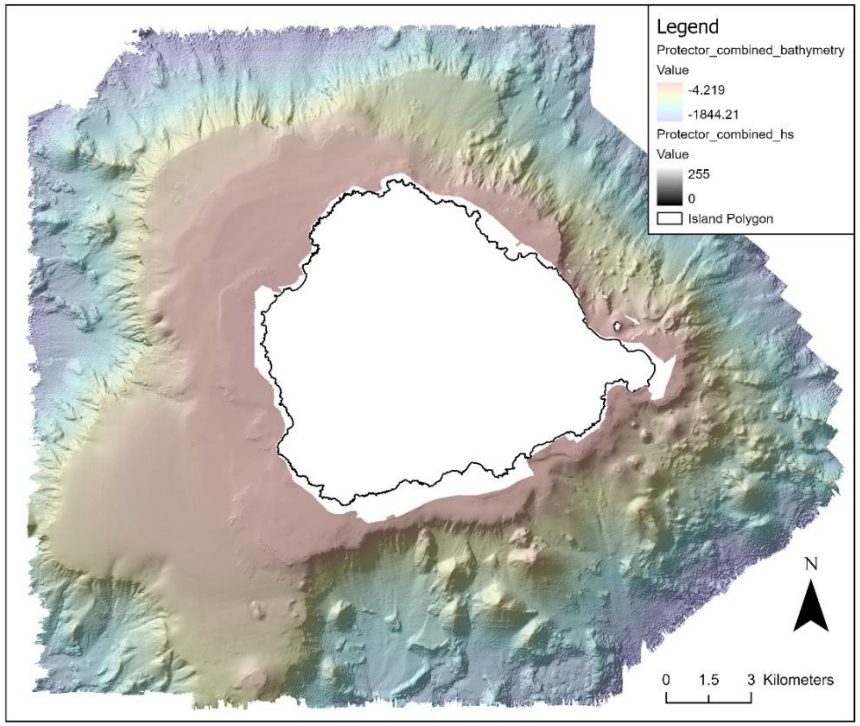


Figure 5. HMS Protector data - these data were collected using 2 boats and includes some extremely deep water which enables rapid data collection.

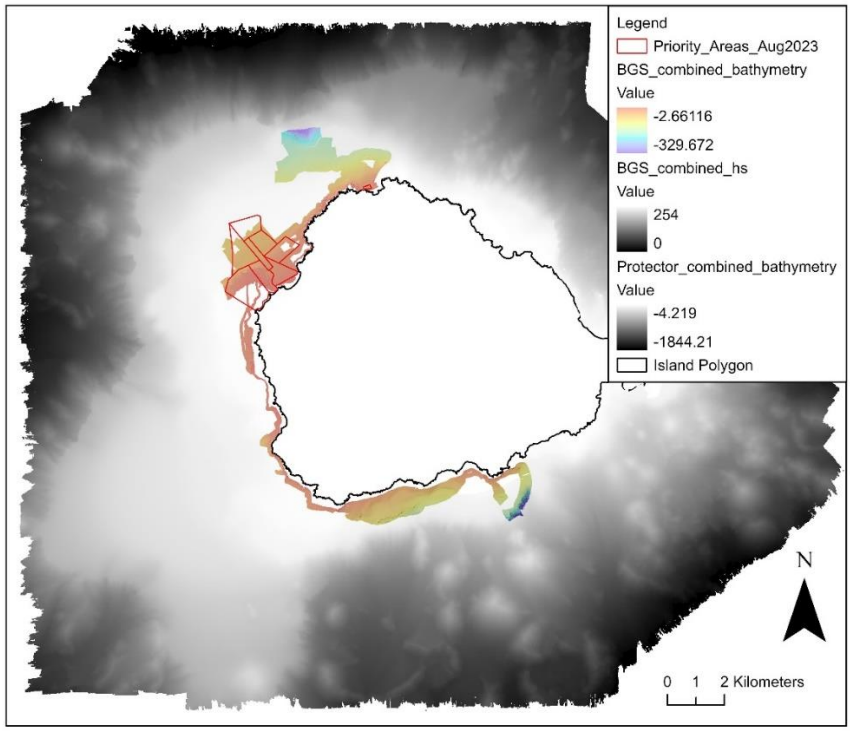


Figure 6. BGS data, Priority Areas and HMS Protector data

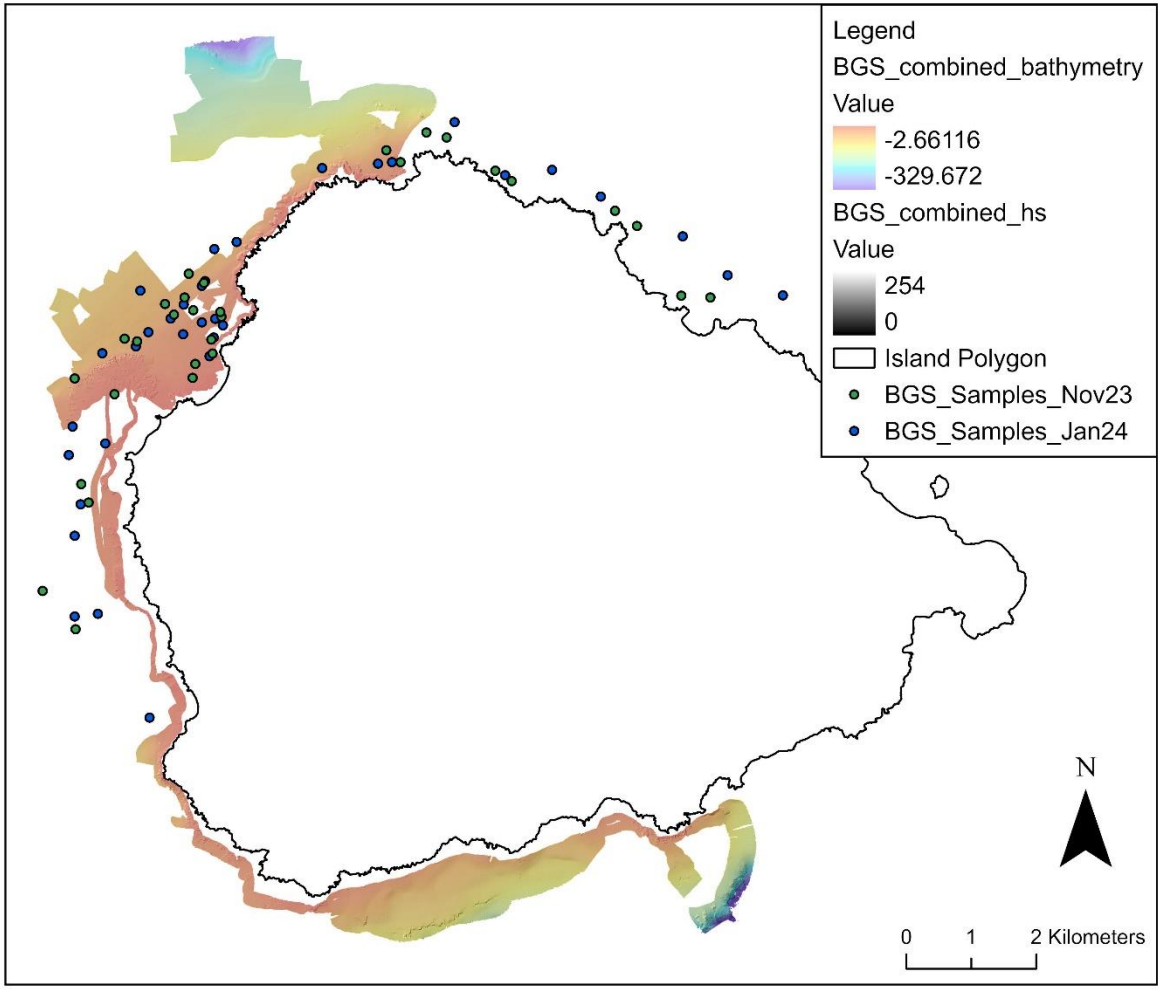


Figure 7. BGS Multibeam data extent and sample locations

Part B - Personnel

B1. List of Key Personnel

Position/Job	Name	Dates To	Dates From
Project Manager	Rhys Cooper	2021	2024
Charge Surveyor	Rhys Cooper	2023	2024
Data Processor	Rhys Cooper	2023	2024
Report Writer	Rhys Cooper, Catriona Macdonald	2023	2024
Boat Driver	Dan Simpson, Simon Watkins, Cuen Millar	2023	2024
Marine Crew	Pascale Walters, Big Sheldon, Cerys, Marcus	2023	2024
Marine Geoscientist	Catriona Macdonald	2022	2024
Project Manager AIG	Tiffany Simpson	2023	2024
Design Engineer & 'Upcycler'	Dan Simpson	2023	2024
AIG Comms	Lorna West	2023	2024

Part C – Quality Health, Safety and Environment

C1.	Project Execution (C17)	Key Date	From	To
		Contract Date:	2021-2024	
		Kick off Meeting:	01/10/2021	
		Recce:	N/A	N/A
		Customs Clearance:	28/10/2023	05/01/2024
		Mobilisation:	31/10/2023	01/11/2023
		Mobilisation and Calibration Report:	07/11/2023	
		Multibeam Survey:	02/11/2023	07/11/2023
		Multibeam Demobilisation:	09/11/2023	09/11/2023
		Weather Downtime[1]:	08/11/2023	10/11/2023
		Weather Downtime[2]:	25/01/2023	28/01/2023
		Sampling Survey 1:	11/11/2023	14/11/2023
		Sampling Survey 2:	20/01/2023	29/01/2023
		Platform Downtime:	21/01/2023	21/01/2023
		Equipment Downtime:	N/A	
		Survey Vessel Name(s):	Moray	
		Total Days:	20	
		Date Rendered to UKHO:	Click here to enter a date.	

1 Include Weather, Platform and Equipment Downtime in days

2

<table>
<tr><td>C2.</td><td>Equipment Defects</td><td>
<table>
<tr><td></td><td colspan="3">Period Unavailable or Defective</td></tr>
<tr><td>Valeport Swift SVP</td><td>02/11/23</td><td>05/11/23</td><td>Unable to record full sound velocity profile – downloading of data erratic. Firmware update required – issues with local internet caused delay in sourcing new firmware/technical help etc.</td></tr>
<tr><td>EM2040P</td><td>02/11/2023</td><td>06/11/2023</td><td>System drop-out in unpredictable swell patterns caused delays and start-up & during some operational days/patch test</td></tr>
<tr><td>SIS 5</td><td>02/11/2023</td><td>07/11/2023</td><td>SIS 5 not accepting usual format of Geotif for background priority areas</td></tr>
</table>
</td></tr>
<tr><td>C3.</td><td>Health, Safety and Environmental Management Plan (C25)</td><td>Please contact BGS for full risk assessments, permission to travel and environmental plans</td></tr>
<tr><td>C4.</td><td>Incident Reporting (C99)</td><td>No incidents to report</td></tr>
</table>

Part D – General

<table>
<tr><td>D1.</td><td>Customs, Licenses, Consents and Permissions (D1)</td><td>Provide dates and details of all license's, consents, customs clearances and permits gained for the conduct of this survey.

<table>
<tr><th>Item</th><th>Date</th><th>Authority</th></tr>
<tr><td>Ascension Island Visa</td><td>31/10/2023</td><td>Ascension Island Government</td></tr>
<tr><td>Ascension Island Research Permit</td><td>31/10/2023</td><td>Ascension Island Government</td></tr>
</table></td></tr>
<tr><td>D2.</td><td>Fishing Industry (D3)</td><td>Provide details of and liaison or interaction (positive or negative) with local fisherman during the survey, specifically if it affected the conduct of the survey.

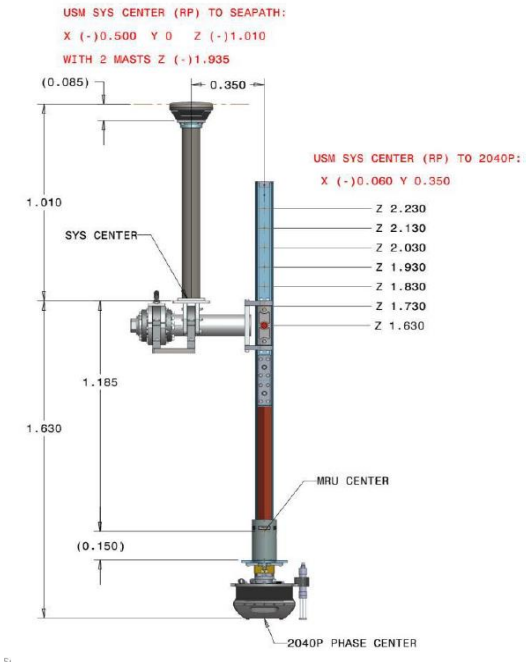
Positive feedback and interaction with all local fishermen during survey, even supplying us with freshly caught tuna to eat.</td></tr>
<tr><td>D3.</td><td>Progress Reports (D6)</td><td>Where daily reports have been rendered these should be included as part of the final deliverable and the number of reports inserted here. If these are not available, the daily narrative at Annex A to this report should be completed.

Daily Reports – Annex A – Daily Narrative</td></tr>
</table>

Part E – Positioning

<table>
<tr><td>E1.</td><td>Survey Geodesy (E1)</td><td>
<table>
<tr><td></td><td>Reference Frame (Navigation)</td><td>Reference Frame (Geodetics)</td></tr>
<tr><td>Datum:</td><td>WGS84</td><td>WGS84</td></tr>
<tr><td>Spheroid:</td><td>GRS 80</td><td>GRS80</td></tr>
<tr><td>Semi-major axis:</td><td>6378137.000m</td><td>6378137.000m</td></tr>
<tr><td>Semi-minor axis:</td><td>6356752.31424518m</td><td>6356752.31424518m</td></tr>
<tr><td>Inverse Flattening:</td><td>298.257223563</td><td>298.257223563</td></tr>
<tr><td>Projection:</td><td>UTM 28S</td><td>UTM 28S</td></tr>
<tr><td>Geoid Model:</td><td>EGM 08</td><td>EGM 08</td></tr>
<tr><td></td><td>Projection and Grid System</td><td></td></tr>
<tr><td>Grid</td><td>◉ UTM</td><td>○ TM</td></tr>
<tr><td>Grid & Grid Zone:</td><td></td><td>28S</td></tr>
<tr><td>Central Meridian:</td><td></td><td>015W</td></tr>
<tr><td>Latitude of Origin:</td><td></td><td>0</td></tr>
<tr><td>False Easting:</td><td></td><td>5000000</td></tr>
<tr><td>False Northing:</td><td></td><td>10000000</td></tr>
<tr><td>Scale Factor on CM:</td><td></td><td>0.996</td></tr>
</table>
</td></tr>
<tr><td>E2.</td><td>Submitted Data</td><td>No geodetic control was required or set-up. NOC installed a tide gauge at English Bay (contact NOC for more details)

RTK correction service license provided via Atlas Link – (https://www.oceaneering.com/positioning-solutions/).</td></tr>
<tr><td>E3.</td><td>Other Data</td><td>NA</td></tr>
</table>

E4.	Processing Software	NA
E5.	Calibrations and Validations (E9-21)	Valeport Swift Calibration Report 04/12/2020 0652817C Serial No.56961 Vessel Dimensional Control (E9) – We were operating on a RIB and used the Kongsberg Portable Hydrographic Solution (PHS) – this has fixed offsets and dimensions irrespective of vessel. A Portable Hydrographic System is a completely self-contained system. All the system offsets are known regardless of the placement on the boat. See attached documentation relating to Kongsberg PHS.  Figure 8 – Universal Sonat Mount – Fixed offsets EM2040 PHS

Date of last dimensional survey:	NA
Company conducting survey:	NA
Changes since survey:	NA
Comments:	NA
Reference Point Position:	NA

Swath Bathymetry Vertical Offset Check (E11)

Methodology: Comparison with HMS Protector data & existing charts

Results:

Random points	Dataset	Depth
1	BGS_1m	-13.150901
	Protector_100m_1m	-13.146000
2	BGS_1m	- 43.892170
	Protector_100m_1m	- 43.758999
3	BGS_1m	-16.803907
	Protector_100m_1m	-16.938000
4	BGS_1m	-88.200478
	Protector_100m_1m	-88.402000
5	BGS_1m	-27.556736
	Protector_100m_1m	-27.614000
6	BGS_1m	- 48.686970
	Protector_100m_1m	- 48.960099

Table 1: Random point selection, range of depth comparison between BGS AIG Moray v HMS Protector/SMB James Cairn bathymetry data

Comments: BGS used real tides, HMS Protector used predicted tides.
Previous charts very old and some based on lead line.

VORF uncertainty high and unvalidated for use on Ascension

Swathe Bathymetry Calibration (Patch Test) (E12)

Methodology:

Standard Operating Procedure for Kongsberg EM2040P single head – roll, pitch, heading & latency.

Limited time, lack of ideal seafloor area and continuously questionable sea state made performing a perfect patch test almost impossible.

A patch test was performed at start of survey, but we had issues with a malfunctioning Valeport Swift SVP, weather & seafloor locations. A minor correction was added for roll, but pitch was 'spot-on' and no suitable object for heading found. Skipper ability challenged with high wind and chop. No Latency on system has ever been identified.

An area of flat seabed of approximately 50m depth was used offshore of Clarence Bay. For Pitch, a suitable slope was found heading back into the pier at George Town.

On the last day of multibeam survey a final patch test was performed and data analysed back in office using Qimera – another minor adjustment for Roll applied to all data.

NOTE: A robust mounting system - fixed offsets and dimensions – all previous patch tests have required limited adjustments – especially latency (none ever identified).

A deteriorating weather forecast and a requirement to collect samples forced decision making and progress.The boat is so small it is impossible to collect samples with the EM2040 multibeam system set-up.

Results:

Online Patch Test 2/11/24 – Lines 001-005 – Images 1-5

An area of flat seabed of approximately 50m depth was used offshore of Clarence Bay. For Pitch, a suitable slope was also found heading back into the pier at George Town (not shown below).

Image 1: Pitch and Roll Location

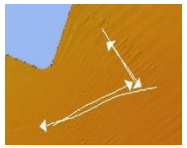


Image 2: Roll – pre-correction

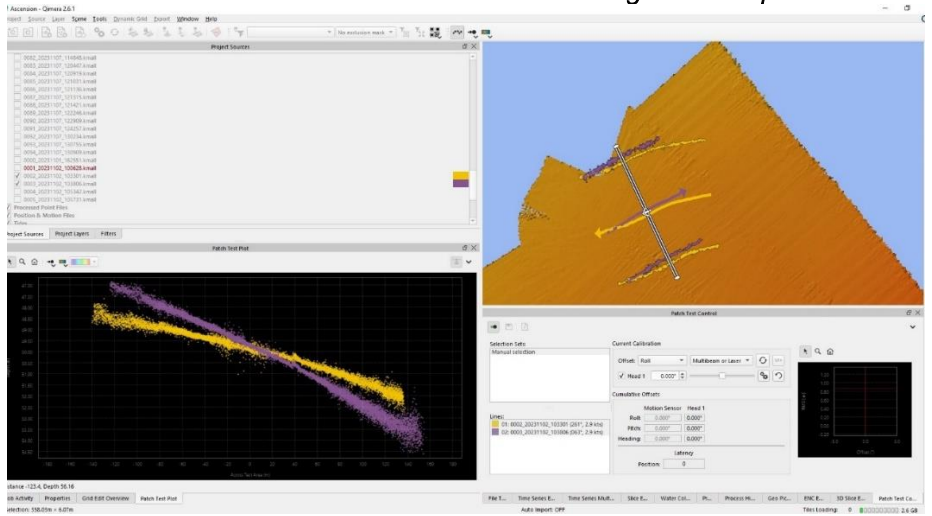


Image 3: Pre correction roll - zoomed in.

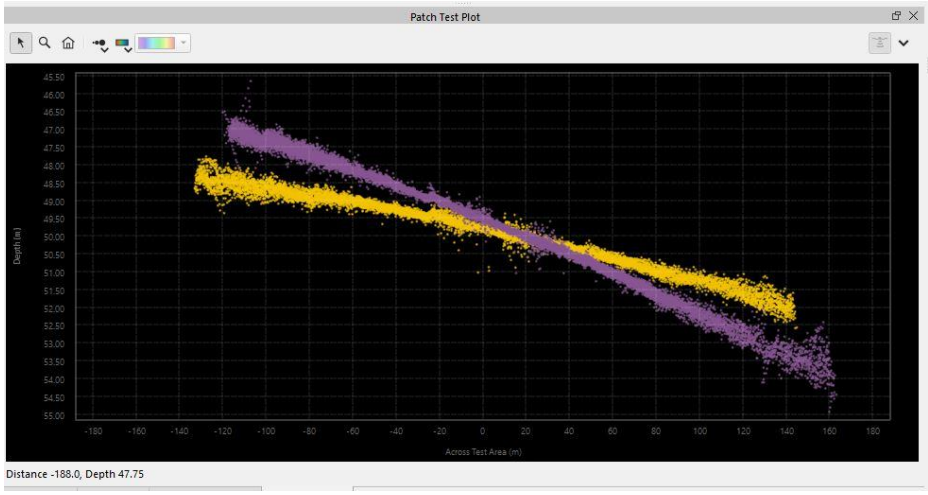


Image 4: Roll – post-correction – +0.254

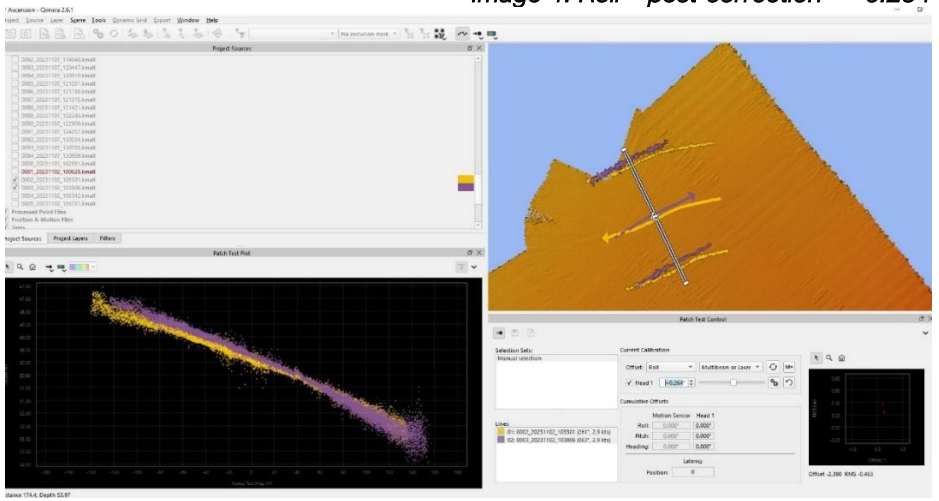


Image 5: Roll correction applied (zoomed in).

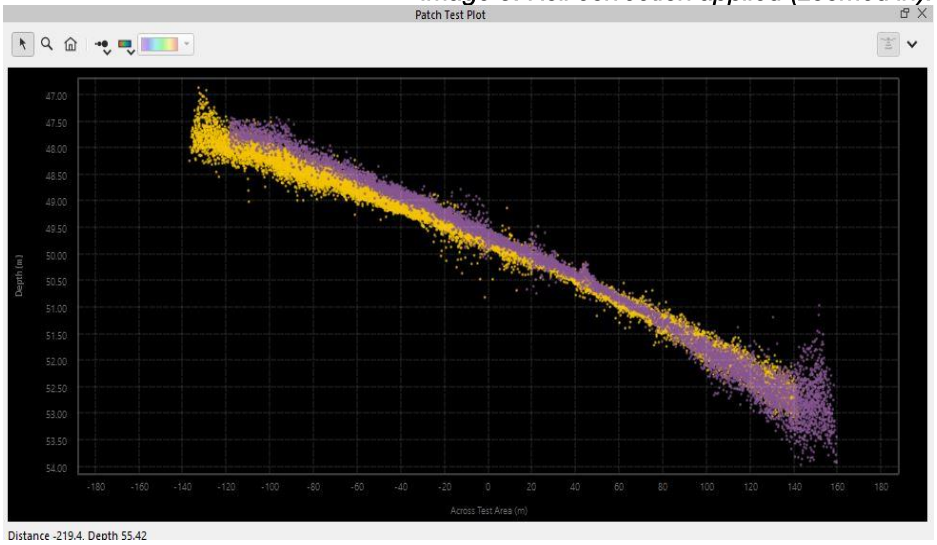
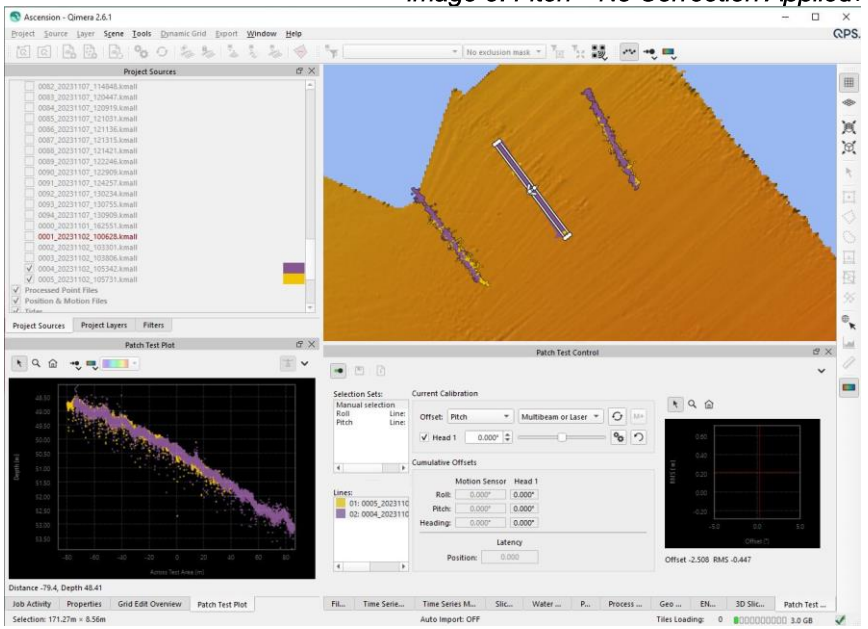
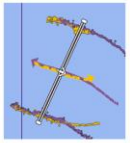


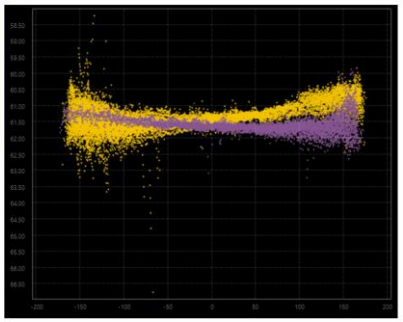
Image 6: Pitch – No Correction Applied.



Qimera – Processing patch test.

Image 7) Roll – Pre & post correction applied – +0.07. Nov 7th 2023 – Lines 067 – 068





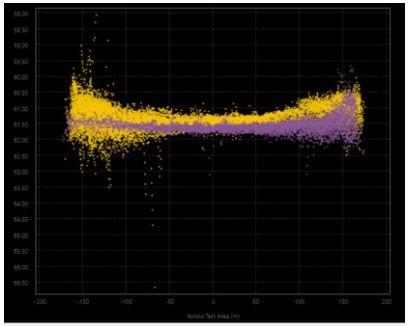
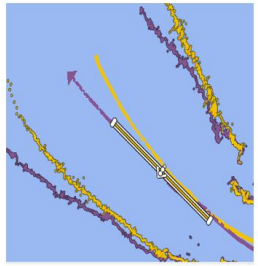
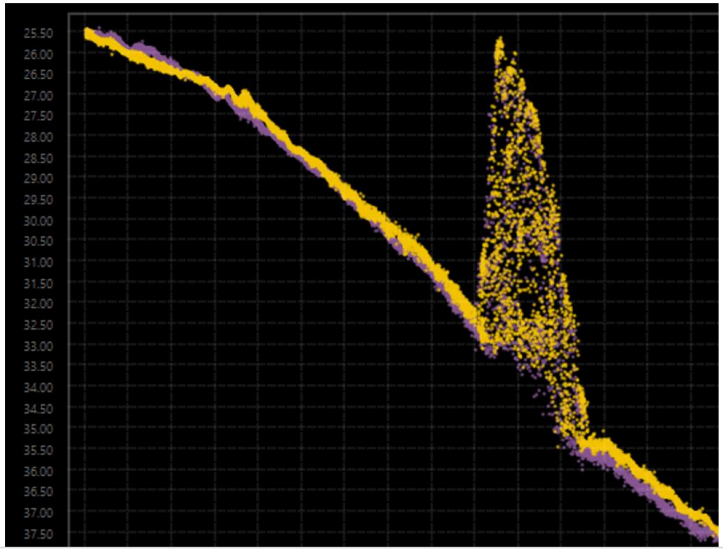


Image 8) Pitch – No correction applied – Nov 7th 2023 – Lines 070 – 071





Bathymetric Repeatability Test (E13)

Methodology:	Time constraints meant the full test not possible or appropriate (this is not a HI), but numerous areas of overlap (different lines & survey day) plus comparison with Protector data and existing charts achieved.
Results:	As expected, within accuracy of system.
Comments:	The HMS Protector data used predicted tide making direct comparison difficult.

Annex A to Part E – Geodetic Observations

Section removed – no new geodetic stations established or required.

Part F – Tides

F1.	Reduction of Soundings (F1)	Method:	Direct Observation (single tide-gauge)
		Brief Description:	Tide gauge installed at English Bay by NOC http://www.ioc-sealevelmonitoring.org/station.php?code=ascen
		Vertical Datum:	CD – See Annex A – Tide Gauge – English Bay
F2.	Establishment of Sounding Datum (F2)	Establishment of Sounding Datum:	Yes – tides referenced to CD
		Was a transfer of datum carried out?	Yes
		Transfer details:	Contact NOC tide team for more details – Angela Hibbert has been invaluable in advice and details provided (anhi@noc.ac.uk) See Annex A – Tide gauge for more details
		25 Hour pole/gauge comparison:	Yes
		Weather and Sea Conditions:	NOC installation
		Adjustments to SD during survey:	NOC installation

F3.	Tide-gauges/GNSS Buoys (F3-6)		Position			
		Gauge	Lat	Long	Location	Remarks[3]
		English Bay	DD 7.8933119 S	DD 14.387226 W	English Bay ASI	Tide gauge installed at English Bay by NOC http://www.ioc-sealevelmonitoring.org/station.php?code=ascen

[3] To include operating/owning authority if local gauge used.

Part G – Bathymetry

G1.	Recommendations: (G6-G8)	UKHO Level Met	Level 1
		IHO S44 Standard Achieved	IHO Order 1b
		Comments	The data density collected is lower than required by higher IHO hydrographic standards due to the challenging environmental conditions and challenging survey vessel. It was not feasible in the time available to wait for more suitable weather windows and data density requirements for this project are lower. The survey is not focused on object detection and this author suspects object detection requirements will be far from uniform across all survey areas, even those of similar depth. All data is to be submitted to UKHO for full validation.
G2.	Equipment Details (G2 - G3)	Vessel Name:	Moray
			Primary Echosounder
		Make:	Kongsberg
		Model:	EM2040P
		Operating Frequency:	300khz (200-400khz)
		Beam Pattern:	Hybrid beam spacing
		Pulse Length and Type:	CW 38, 108 & 328 us FM 2 & 6ms
		Typical Speed of Advance (knots):	3-5knts
		Swath Width	Up to 140 degrees, 5 X water depth
		Additional Specifications:	Dual swath, extra detections
		Heave Applied SBES only	NA
		Settlement Applied SBES only	NA
			Primary Navigation/Motion Reference System
		Make:	Kongsberg Seatex

		Model:	Seapath 130
		Software Version:	
		Mode:	RTK SmartLink
		Correction Source:	ATLAS LINK
		Reference Stations Used:	Global Ref Network
		Post Processed Positions:	NO
		Dynamic Accuracy at Antenna (95% Confidence Level)	8cm 95% (4cm RMS)
		Validation Method:	Manufacturers Quoted
		MRU Type:	Seatex MRU 5
		Post Processed Motion:	NO
		Other Comments:	We were operating on a RIB and used the Kongsberg Portable Hydrographic Solution (PHS). It consists of an EM2040p, Valeport SV at the head, Seapath 130 positioning system and an MRU 5. An independent ATLAS LINK GNSS antenna for RTK corrections – decimetric accuracy (license provided by Oceaneering – Atlas H10 Land and Nearshore). The entire system is powered through a single 110/230VDC power cable, the rest is already wired by Kongsberg. The PHS PU rack transport case consists of a PPU and a DGNSS receiver mounted in a rack mount pelicase with a top lid specially designed to hold a laptop. All internal cabling is already connected and ready to go when delivered. Simply connecting a single cable to 110/230VDC will power the entire unit with outlets to spare on the back for other equipment. The unit also has an 24VDC output in front for powering external SV probes.

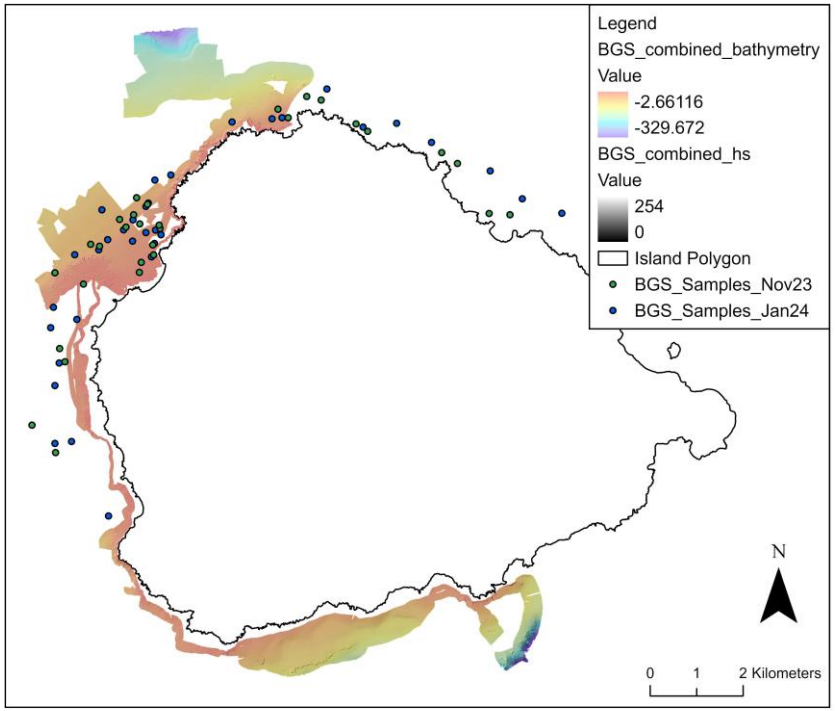
		The EM 2040P a Valeport SV probe, and the Seapath 130 system is powered from the PPU, and the rugged laptop can talk to the Seapath and the EM 2040 system through the same ethernet connection to the PPU. See attached documentation relating to Kongsberg PHS. Survey Acquisition Software Make: Kongsberg SIS Version Number: 5.1.134 Comments: A few of the usual SIS bugs – frequent dropouts, no Geotiff import.
G3.	Deliverables: (G31)	The following list should provide a checklist of required bathymetry deliverables as well allowing the Authority to check that all deliverables have been received correctly. <u>Bathymetric data:</u> The following grids (suitability determined by depth range and location) were created for the project. (ESRI Grids, XYZ, BAGS and Geotiffs) a. All data collected - 3m resolution. b. All data <30m 1m c. All data >30m 3m d. Coastal strip <15m – 50cm resolution e. Long beach <15m – 50cm resolution f. Uncharted South Coast – 3m <u>Backscatter data:</u> A single backscatter file was made to allow comparison of backscatter signatures across the full area of interest and with HMS Protector/SMB James Cairn data. Backscatter files were also made after each day of survey. g. All Backscatter – 1m Geotiff.

Milestone	Deliverable	Type/Date	Number rendered
1,2 & 3	Coverage Geotiff	01/04/2024	1
	Raw Bathymetry	Kongsberg .KMALLs	1
4	Qimera Project(s)	Ascension Qimera v 2.6.1	1
	Processed Bathymetry	1.4	1
	Additional Files	BAG, ESRI ASC, XYZ	Select below or type

G4.	Uncertainty (G5 – G6)	If a Sounding error Budget has been used copies of the budget at representative depths across the survey area is to be rendered. If TPU values have been used to assess the uncertainty of soundings insert the following factors as inputted into the real time / Processing Systems. Alternatively, screen shots of the relevant screens can be inserted: The list below is an indication of the areas that should be covered and is not exhaustive. As well as figures, comments should be given as to why those figures have been chosen and proof given, or relevant sections referenced.

'Tide' Measurement Errors Applied:	0.02m
Sound Speed Measurement Errors:	+/- 0.02m/s
Surface Sound Speed Error:	+/- 0.019 m/s
Water propagation errors:	0.01 m/s
Uncertainty Sources used for TPU calculations:	QPS Qimera used for TPU/CUBE processing
Position:	Realtime
Sonar:	Realtime
Heading:	Realtime
Pitch:	Realtime
Roll:	Realtime
Vertical:	Realtime
Tide:	Realtime

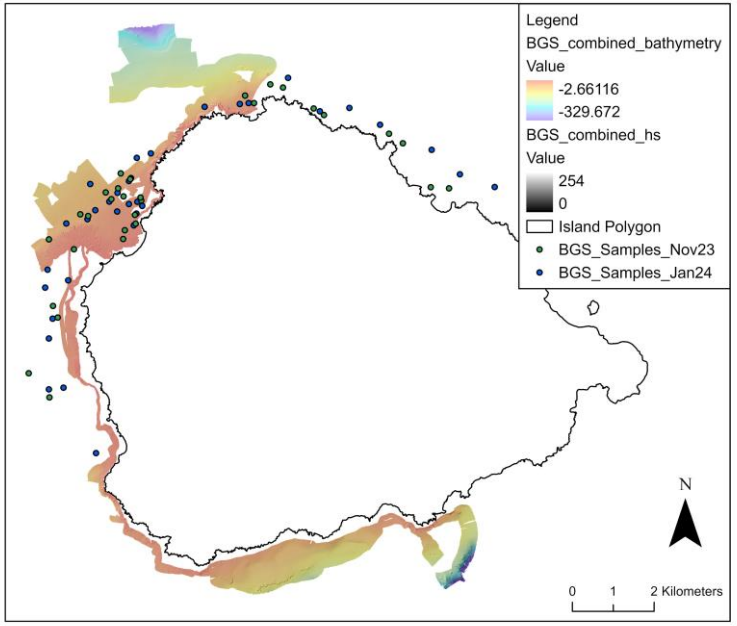
G5.	Draught Measurements (G11)	Draught remained unchanged during survey – daily measurement of waterline from reference point on USM mount.	
G6.	Sounding Density (F7)	HI Specified Data Density Achieved:	N/A
		Comments:	Not a Hydrographic Instruction. Object detection not a priority for this survey.
G7.	Coverage (G8)	Coverage:	'Dynamic driving' – paint the seafloor/infill of areas of interest/we followed the edge of existing Protector data and worked in. Target features/areas of interest delineated with survey extent boxes in SIS. Skipper discretion – predetermined lines were not created, and we didn't have a set requirement for % of overlap.
		Extinction Depth:	300m or less when weather terrible/swell extreme
		Data Gaps:	Gaps occurred to allow for avoidance of existing moorings, high degree of danger/grounding and/or skipper training junior crew etc.
		Comments:	The requirements lower than a HI and time available and extreme conditions led to a rapid data collection methodology.

		Area Surveyed  Figure 9. BGS Multibeam data extent and sample locations
G8.	Crosslines (G10)	No requirement for this level of analysis, but all data to be provided to UK for full validation.
G9.	Wreck/Obstruction Investigations (G14, G15)	See priority areas identified UKHO in front of George Town pier and moorings.
G10.	Leading Lines, Tracks, Dredged Channels, and anchorages (G21)	See priority areas identified UKHO in front of George Town pier and moorings.
G11.	Data Processing (G24)	Processing system(s): QPS Qimera 2.6.1, CARIS HIPS & SIPS 11.2

		Software Version(s):	2.6.1
		Data Cleaning Method:	CUBE
		Brief Description of Bathymetry Processing Procedure:	Initial CUBE dynamic surfaces created – resolution determined by depth, visual inspection, outliers removed manually.
		Blocks:	N/A
		Comments:	'CUBED' all areas

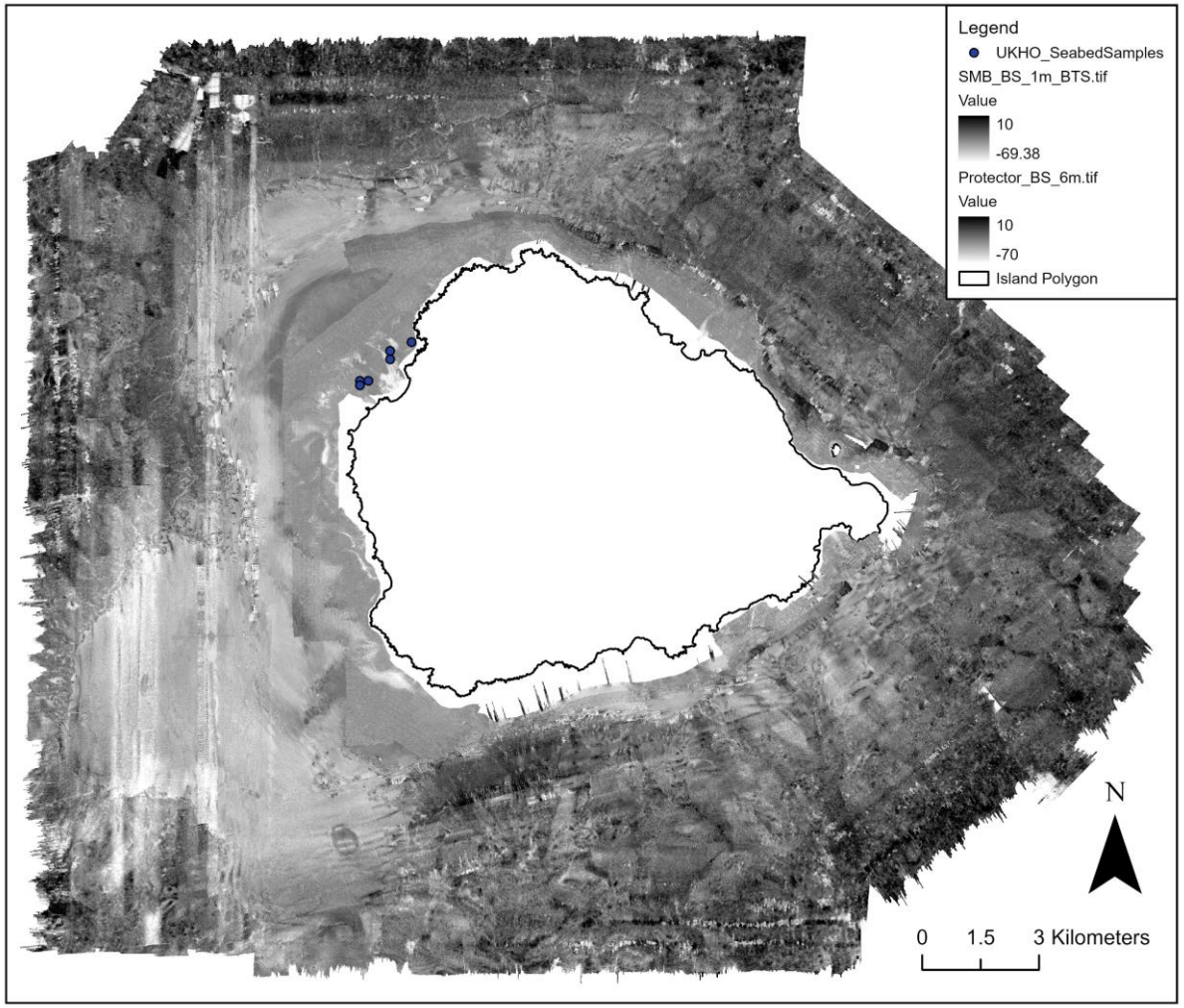
Part I – Seabed

I1.	Backscatter (I2)	Processing system(s):	QPS - FMGT
		Software Version(s):	7.10.3
		Achieved resolution:	1-3m
		Description of field measures taken to ensure homogeneity:	None
		Description of Backscatter Processing Procedure:	Standard FMGT workflow
		Comments or Issues Arising:	The modern EM2040P provided excellent backscatter quality compared to HMS Protector EM3002D.
I2.	Seabed Sampling (I4 & I5)	Required:	Yes
		Sampling Strategy:	Drop camera/video transects
		Equipment Used:	'Drifto2000' with a GoPro11 mounted, STR SeaSpyder Nano
		Total Number of Samples:	1st fieldwork season - 15 successful 2nd season - 45 attempted – 25 successful
		H575	N/A

I3.	Seabed Sampling Locations:	 Figure 10. BGS Multibeam data extent and sample locations
I4.	Drop camera system 1. November 2023	Pre-survey meetings with Tiff and Dan Simpson at AIG led to a decision to use their own in-house drop camera system for the first field season in November. There was also discussion using a more advanced system designed and supplied by Plymouth University. Unfortunately, the team and equipment from Plymouth did not arrive in time for our first fieldwork season. The Department of Conservation at AIG have built their own drop camera system. 'Drifto2000' – This is a plastic sledge system designed by Dan 'upcycle' Simpson. Its use was supplemented with a GoPro 11, supplied by BGS, in a 50m waterproof diver housing. There is a live video feed to surface via digital camera and umbilical. Video transect samples were recorded on the GoPro. 'Drifto2000' functioned very well as a drift camera. The GoPro produced fantastic images (field of view, exposure, and image stabilisation) and the live digital camera feed to surface allowed operators to position near the seafloor and avoid obstacles.

		Line numbers recorded using piece of paper and the start and end position of drift (first seabed contact and start of recovery) were recorded by hand/iphone picture from Raymarine Nav to excel file for import into GIS. Weakness – no lasers for scaling, limited depth range and no live position. Both systems suffered from issues of glare on screen due to lack of cover from sun light (various solutions used).  Figure 11. AIG Drifto 2000 with BGS GoPro 11 attached.
I5.	Drop camera system 2. January 2024	The second field work season required a change in camera system to address four main issues: 1) Improve sample positioning to allow more robust sediment/substrate delineation. 2) Increase the depth range possible – 'Drifto2000' could only be deployed to 50m due to camera housing limitations. 3) Allow scaling – lasers at a fixed distance are industry standard on most drop camera systems to allow inferences on object/seafloor feature size to be made. 4) As depth range increases some form of illumination will be required. The survey platform, an 8m RIB, limited the available possibilities but after much research a commercially available solution was found. This was the STR Spyder Nano, a very compact system that could be deployed by hand from the small boat available.

<table>
<tr><td></td><td></td><td>This offers high resolution digital imaging, illumination, and laser scaling from a highly compact, lightweight frame. A dedicated Kevlar re-enforced umbilical allowed deployment down to 100m, but current and wind direction prevented the full depth being achieved due to inherent layback. Real time HD video was captured using the supplied software and a live position graphic overlay via a live feed from the ATLAS Link.
The whole solution allowed for a far more considered and professional solution to collecting video transects. Data storage, file labelling and accurate position data led to step change from Drifto2000 – no more handwritten notes etc.. However, this was a more much expensive solution at a cost of around £300 a day, plus the excess baggage costs.
We achieved greater depths than the Drifo2000, but found that the video quality, exposure, and stabilization was better via the GoPro. The laser scaling and LED lights were not as valuable as envisaged primarily due to the excellent water quality and levels of light experienced in Ascension. We also had a very cautious approach to ‘flying height’ above the sea floor which rendered lasers difficult to spot (Note: the nano costs ~£20k representing an unaffordable project expense if damaged, therefore prohibiting a high-risk-high reward-approach to its deployment. UKRI/NERC policy prevents separate insurance policies).
We successfully collected 25 video samples and approximately 10aborted attempts primarily due to weather conditions and/or proximately to rock outcrops.
 
Figure 12: STR SeaSpyder Nano</td></tr>
<tr><td>I6.</td><td>Seabed Classification (I16)</td><td><table>
<tr><td>Processing system(s):</td><td>QPS FMGT & ESRI ArcPro</td></tr>
<tr><td>Software Version(s):</td><td>3.1.0 & 11.1.2</td></tr>
<tr><td>Seabed Texture Procedure:</td><td>BGS developed auto classification script & manual interpretation</td></tr>
<tr><td>Comments or Issues Arising:</td><td>BGS are creating substrate, geomorphology and habitat maps</td></tr>
</table></td></tr>
</table>

I7.	Seabed Classification (i16)	 *Figure 13: HMS Protector & SMB James Caird IV* – Backscatter © Crown Copyright and/or database rights. Reproduced by permission of The Keeper of Public Records and the UK

Hydrographic Office (www.GOV.uk/UKHO

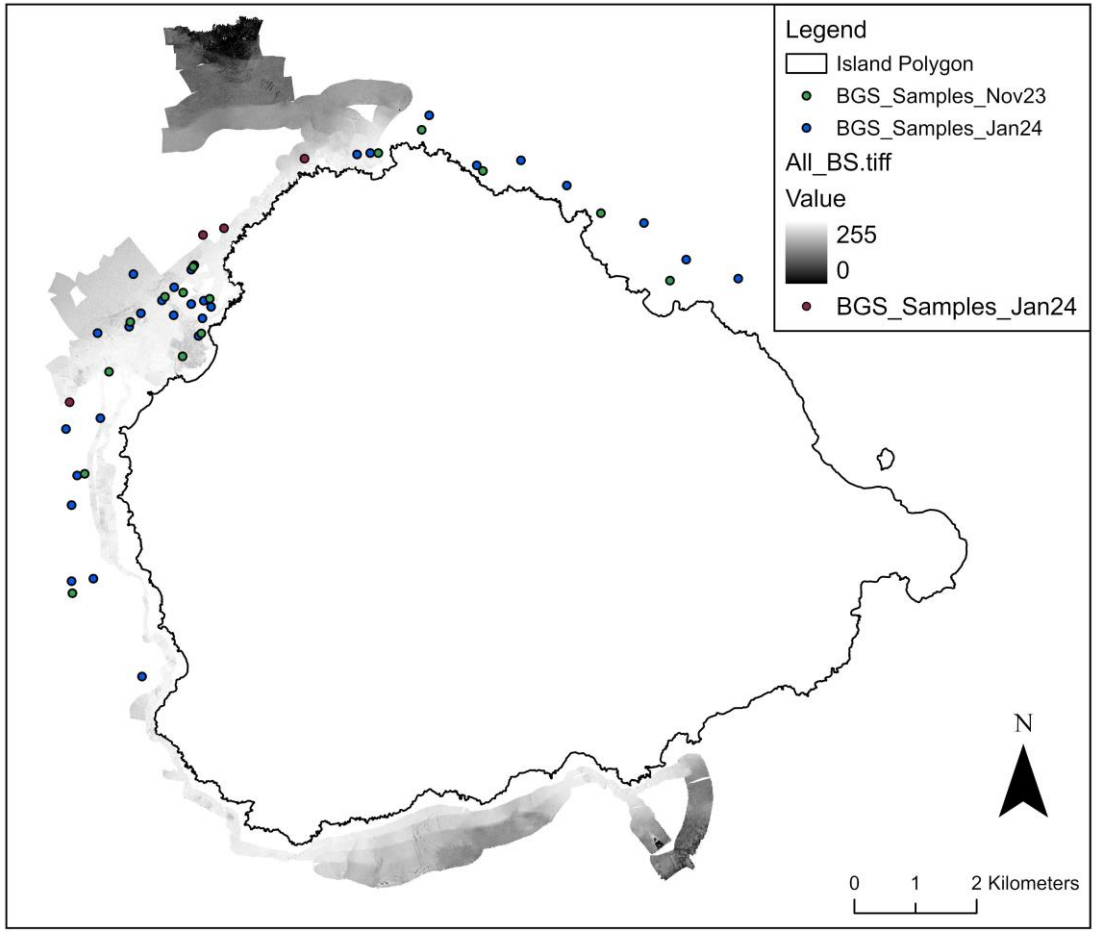


Figure 14: BGS AIG *Moray* - Backscatter

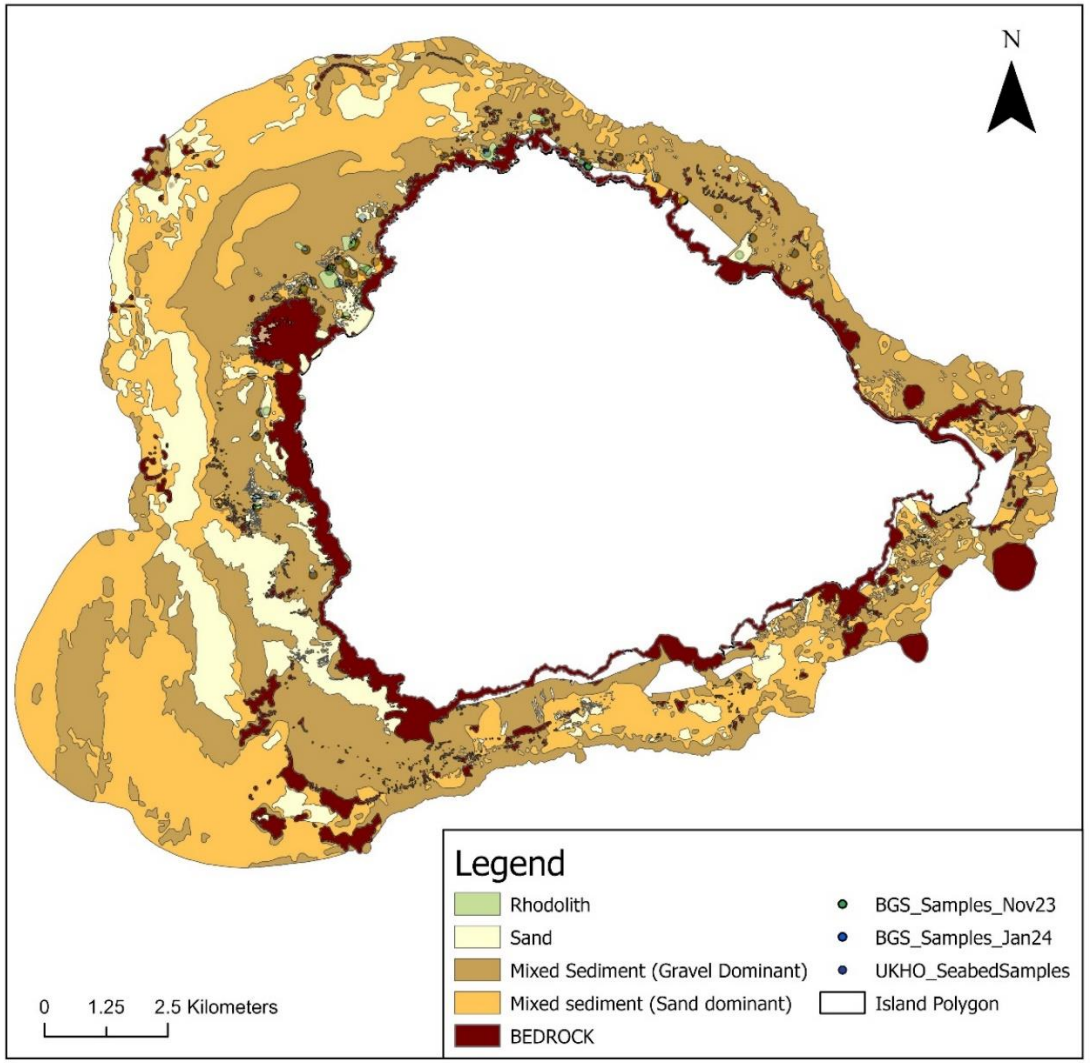


Figure 15: Ascension Island Substrates

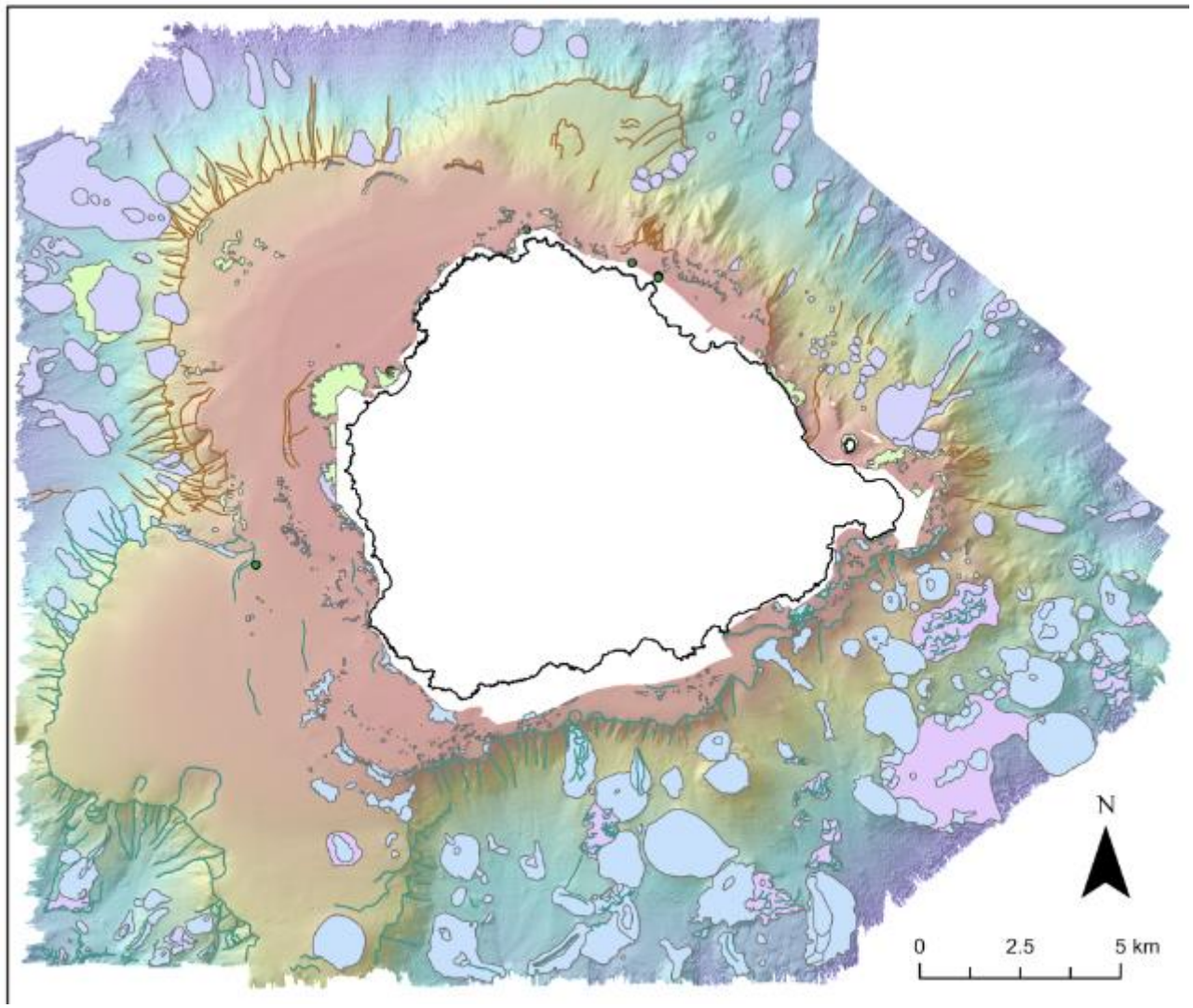
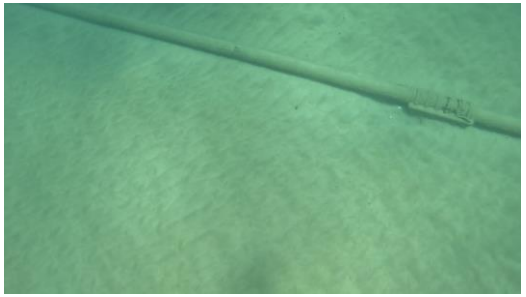
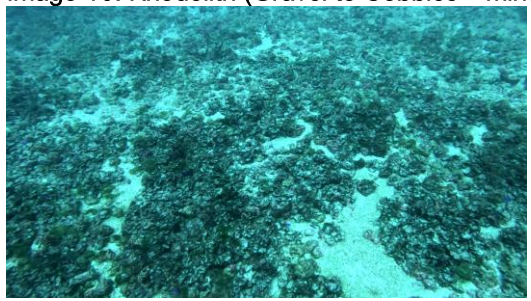
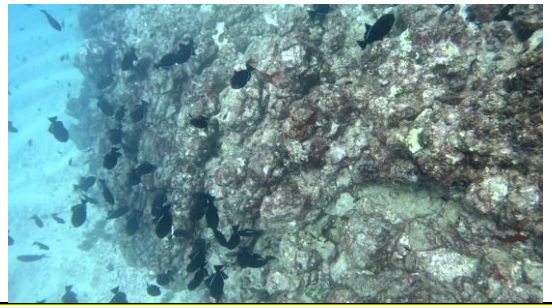


Figure 16: Ascension Island Geomorphology

I8.	Seabed Description (I16)	The BGS ground truthing sample data were acquired using two different drop camera systems to collect video transects – Drifto 2000/GoPro11, and STR SeaSpyder Nano. A total of 50 samples around the island of Ascension were collected over the two campaigns using both systems. The size of the vessel, manual handling of the camera systems, sea state and wind conditions meant there were primarily collected to the west and north-west of the island which was more sheltered. The samples were visually inspected to determine substrate type allowing general, qualitative observations on the composition of the seabed sediments. For the purposes of this project have also been converted into EUNIS sediment classes depending on the water depth at that location. The following sediment classes were identified: Sand (Fig , Mixed Sediment (Sand and Gravel – Sand dominant), Mixed Sediment (Sand and Gravel – Gravel dominant), Rhodolith (Gravel to Cobbles – minor sand), and Rock. The dominant sediment class across the entire area is 'Mixed sediment', found with varying proportions of sand and gravel. This was split into two classes based on a visual inspection of grain size: 'Mixed sediment – Sand dominant with minor gravel', and 'Mixed sediment – Gravel dominant with minor sand'. Sand only areas were mapped primarily in the nearshore beach areas and was characterised by occurrence mobile bedforms and visible mobility of the sediments on the videos. Visual ground-truthing of the sand on the beach areas around the island showed the sand to be coarse-grained with shell fragments. Rhodolith is defined as "colourful unattached calcareous nodules composed of marine red algae" and was mapped only in areas where it was easily identifiable on the video transects. Rock (assumed to be mainly volcanic in origin) has dominantly mapped along the coastline, and where rock was mapped on the bathymetry data. See separate report – "Mapping of geomorphology, seabed substrate and nearshore habitats within Ascension Island's Marine Protected Area"

		Image 7: SAND  Image 8: Mixed sediment (Sand and Gravel – Gravel dominant)  Image 9: Mixed sediment (Sand and Gravel – Sand dominant)  Image 10: Rhodolith (Gravel to Cobbles – minor sand)  Image 11: ROCK 		
I9.	Deliverables (I11 – I16)	Backscatter Mosaics	LWZ GeoTIFF	2

		Index Files	n/a	n/a
		Texture Shapefiles	Geodatabase	Substrate, Geomorphology and Habitat maps created
		Comments	None	

Part M – Ancillary Observations

None

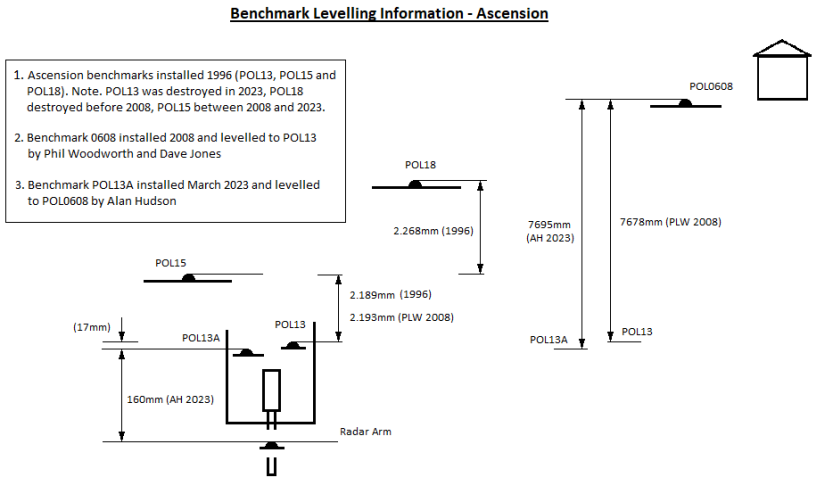
M1.	Cetaceans and Marine Mammals (M2 & M10)	Form/Data: Number rendered H634 – Marine Life and Seabirds: 0 H637 – Marine Mammal Observations: 0
M2.	Eddies and Overfalls: (M3)	NONE
M3.	Sound Speed: (M4)	H635: No Comments: Click here to enter text. Any difficulties experienced with the operation of probes or gathering of data. Problems: We had continual issues with ValePort Swift SVP – download and uploading files was a constant issue. Firmware update and full hard reset corrected issue. Delay due to poor internet access. Comment on the results obtained including any variations (ie temporal), anomalies, steps taken to verify these results and the impact on the survey particularly on the overall accuracy of the bathymetry. The Charge Surveyor should state whether the data met the H I requirements and comment on the quality, reliability and completeness of the results obtained. Results: Sound velocity profiles were very constant during field time. Perhaps due to the presence of extremely deep water and little if any surface water run-off
M4.	Water Clarity: (M5)	Provide details of equipment used, results and any issues encountered. Include a Geotiff showing positions of measurements. Equipment: N/A Results: Extremely clear water – seabed visible to naked eye >30m depth Issues: N/A H631 – Secci Disc: N/A

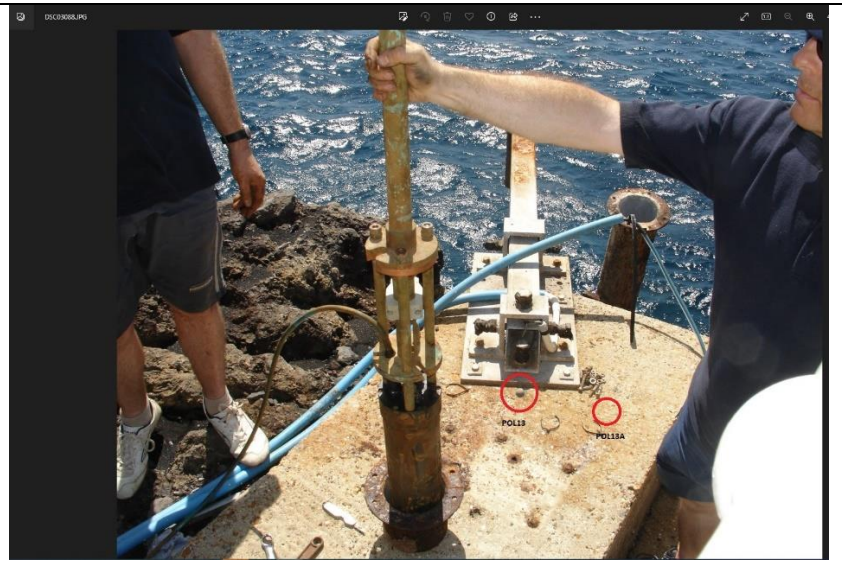
		Measurements: N/A

Annex A to Report of Survey – Tide Gauge – English Bay

All information provided by Angela Hibbert at NOC.

The current tide gauge was set-up by NOC in 2021.





NOC (previously known as POL) installed 3 BM at English Bay in 1996:

POL BM 13 about 60cm from the tide gauge (shown in the attached photo), POL BM 15 near the steps on the 'first floor' of the pier structure, POL BM 18 near the winches on the top floor of the pier structure.

At that time:

POL15 was 2.189 above POL13, POL18 was 2.268 above POL15 and 4.457 above POL13.

POL18 was obliterated at some point, but POL15 still exists and POL13 was replaced by POL13a (photo attached) during 2023. Another BM was installed in 2008 (POL0608) outside the old tide gauge hut (see attached photo) on a concrete block and is still in place. NOC also installed a BM on the new radar arm in 2023 and the attached radar instrument level PDF shows the heights of that BM relative to the measuring point of each radar sensor. The latest (2023) heights for all of these BM are in the attached diagram. The data shown on the IOC website are relative to a datum that is 10m below the measuring point for each radar sensor.

During the 2008 visit NOC tried to find the old 1955 BM as part of a sea level reconstruction (Sea level changes at Ascension Island in the last half century: African Journal of Marine Science: Vol 34, No 3 (tandfonline.com)).

I found some levelling notes from this visit, which give heights of POL0608 and POL13 relative to the HMS Herald BM2 1984, so this should help you to connect other BM to our own BM. The notes read:

"The USNHO and CGS measurements at Georgetown and English Bay in the 1950s were hourly measurements with a tide staff for one month spanning 23 Feb - 23Mar 1955. The MSL for the period was 4.27 feet above the tide staff zero which was 10.85 feet below the "Tidal 1955" BM

The USNHO notes said that the BM was flush with the surface of the concrete pier, but the mark itself had vanished, so we levelled to the top surface of the present broken up layers of concrete (top of what looks like 'icing' layer). However, this layer of concrete was about 3 inches thick and under that was another surface (or maybe two). It is possible that the top layer of concrete was a post-1955 addition and the one referred to by the USNHO was under that. So assuming the Tidal 1955 BM was indeed flush with the concrete surface we have zero of staff = 10.85 below Tidal BM

so USNHO MSL = 10.85 - 4.27 = 6.58 ft below Tidal BM = 2.006 m

= 2.006 + 1.340 below Herald BM2 1984 from our levelling (assuming the concrete surface the same as the Tidal BM level)

= above + 7.481 below POL0608 from our levelling (see above)

= above - 7.678 below POL13 from our levelling"

How to correct/reference tide gauge downloaded files (radar data) to chart datum.

- If you are using radar sensor 1, you need to subtract 6.1155m from the measurements (absolute rather than relative levels) on the IOC website to get to ACD and for radar sensor 2, you need to subtract 6.1145m. If you prefer to use MSL, subtract another 0.7m in each case.
- Explanation - I used the BM on the radar arm as the starting point. It is 0.2125m above the radar 1 measuring point and 0.2115m above the radar 2 measuring point. Each radar is set to measure to a zero datum, which is 10 m below each measuring point, so the total height from the zero datum to the radar arm BM is 10.2125m (radar1) and 10.2115m (radar 2).

The height from the radar BM to the POL13a BM is 0.16m and from POL13a to MSL is 3.237 (or to ACD it is another 0.7), so we get a total height from the radar arm BM to MSL of 3.397m or from the radar arm BM to ACD of 4.097m. You can then subtract the 4.097m from 10.2125m (or 10.2115m) to get the height of the zero datum to ACD (6.1155m or 6.1145m depending on the sensor).

Annex B to Report of Survey – Daily Narrative

Provide a new table for each day of operations. The event drop down provides guidance as to the sort of event to be noted but is exhaustive.

Day 1 – Sunday - 29th October.

Depart Edinburgh Waverley station 10:51 – Birmingham New Street.

Missed connection to Oxford @ 15:30. Caught next train @ 16:10.

Depart for Brize Norton 18:30. Uber Arr Brize 19:00

Dep Brize for Ascension 00:30

Day 2 – Monday - 30/10/23

Arr 9:30ish AM.

Tour of island with Tiff & Dan, Dropped at AIG GuestHouse. Settle in.

Housekeeping, sorting internet, hire car, checking equipment arrival & unload.

Check shops, eating places etc. Quick recce of island.

Meeting with Tiff (AIG Conservation)

Day 3 – Tuesday - 31/10/23

Equipment set-up – mobilising AIG Moray Rib.

All equipment arrived and appeared in good order.

Lots of minor set-up issues. Underside of pontoon grab requires foam insert to provide a packing against the side of boat, wood planking is sourced for underside feet to extend to rib floor. The position of processing unit is undecided due to splash and limited options. HDMI cables too short.

Various attempts made at creating suitable cover for boat – BGS purchased a Bimini, small pop-up tent and tarpaulin to hopefully solve this issue. Not suitable due to position & size of Rib and requirements for launch and recovery.

Day 4 – Wednesday - 01/11/23 – Line - 0000

Finish mobilising boat, Book crane 1ish pm

Boat sea trial launch at 2pm. Crane booked for recovery at 4pm

Note - Launch and recovery limited to times set by MOD/Mighty Operations who are currently repairing a floating pipeline. We are limited to crane launches which is not ideal and very marginal in swell. AIG Conservations RIB blew away in a storm last month and they are yet to receive a replacement.

Surveyor – Rhys

Crew - Dan Skipper, Simon

SIS 5 not accepting any format of GeoTiff from ArcMap or ArcPro – message sent to Kongsberg Support.

SVP not working. All green lights and communicating over blue tooth, but no files created on dips. Try numerous modes etc. and email sent to ValePort support.

Error in communications with Seapath controller software – resolves on reboot.

Seastate not great, 20-25mph Easterly, choppy swell. Attempt patch test in 40m water but too rough.

SIS drops out continually and HMDI cable to helmsmen display not working.

Move to calmer water and collect a few lines. SIS continual drops out – unknown issue but probably due to vertical drop of small boat in big swell.

Line numbers 0000 – not relevant to survey.

Position of equipment unsuitable due to splashing over and sea state, position of USM mount arms. Decision made to move processing unit to front of boat. Bimini umbrella can be used as shelter from sun and swell/splashes.

Image – Day 1 – line 0000 – not used in survey outputs. (background tiff of full final survey)

Day 5 – Thursday - 02/11/23 – Lines 0001-0024

First full day of survey. 07:30 Launch – 3pm recovery

Surveyor – Rhys

Crew - Dan Skipper, Cuen, Pascale.

0001-0024 – lines.

Area – Clarence Bay.

First proper day – continue trials and capabilities of boat. Area good to check Bathy and BS quality compared to Protector data and this is a sheltered area close to Georgetown and recovery. Wind & swell clearly an issue here on Ascension and the boat isn't covered.

Continual issues with SVP – fix applied – minimal variation in SV at head – decision made to continue and post process based on same state of tide SVPs. Time is of the essence. Deteriorating weather predicted for later in week.

Patch test completed English Bay – 30-40 m of water due to seastate. Too bouncy deeper.

Due to sea state lines run perpendicular to shore which worked well due to changing topography – also easier for new skippers to maintain bearing etc.

Download new firmware and software for Valeport SVP using Marcus' Starlink. Install on SVP

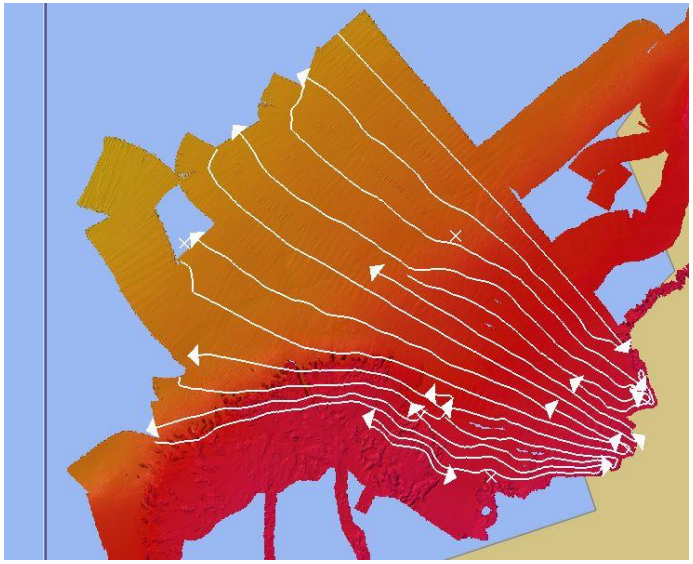


Image – Data collection achieved day5 (patch test lines not included, tiff image of full final survey)

Day 6 –Fri - 03/11/23 – Lines 0025-0035

07:30 Launch – 3pm recovery – boat on mooring

Surveyor – Rhys

Crew – Simon Skipper, Cerys, Marcus (rotation of skipper causes some issues in erratic turning – better guidance required from me/surveyor)

Lines 0025-0032 - Offshore English Bay.

Followed 100m-300m to check resolution possible with system and get better backscatter/bathy on break of slope. Sediment movement/break of slope/slips etc.

Seastate deteriorates and lines shortened to accommodate/try and catch slope break, System starting to struggle/drop out – reboot required.

Very deep mode set, but bathy/bottom lost ~300m – abort area and slow steam into shelter of English Bay due to sea state.

Lines 0032-0035 (2 32s.) English Bay & coast back towards George Town.

Complete survey in English Bay as close to headlands as possible. Lines to south of English Bay hugging coast to hopefully infill area left by Protector.

Helmsman monitor still not working – HDMI cable causing system meltdown. Purchase new cable and extender at SURE.

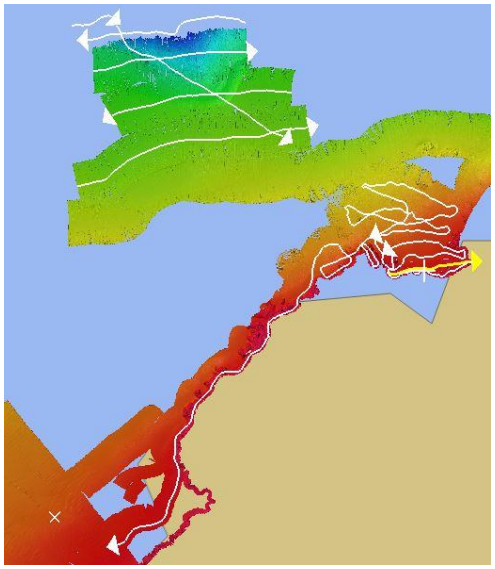


Image – Data collection achieved day6 (lines from deep removed due to poor quality, tiff image of full final survey)

Day 7 – Sat - 04/11/23 – Lines 0036-0050

0730 launch – 3pm recovery

Launch with the sea and rescue guys – take us to boat on mooring using wee jetboat. Recovered via crane/MOD.

Surveyor – Rhys, Junior Surveyor / BGS Geoscientist Catriona

Crew – Skipper Dan, Cerys.

SVP finally working – dips taken at Clarence Bay and 30m offshore.

Area – Clarence Bay. Continue Day 5 area until weather turns and forces change of tact.

Lines 36-48. Collect data inshore around George Town jetty for UKHO and Kitty (Harbour Master)

Area – Coast hugging back up towards Radon Mast and English Bay.

Line 48-50. Infill of areas not covered by Protector. Habitats for AIG.

Smooth day!

Helmsman monitor working.

Image – Data collection achieved day7 (patch test lines not included, tiff image of full final survey)

Day 8 – Sun – 05/11/23

No access to boat. Data day + recce of Southern Area & Northern shores.

Processing data, reporting, meeting with Tiff (AIG Conservation).

Day 9 – Monday 6/11/23 - Lines 0051-0066

07:30-8 crane in, lift out only possible at 2 due to MOD operations (mooring but boat to pier)

Dan, Cuen, Catriona and Rhys

Weather window to attempt southern uncharted section.

SVP and set-up just to the north of target area (pan am bay)

Swell and wind not ideal but complete 60% of area.

Catriona extremely seasick.

Return to George Town infilling coastal area.

Boat left on mooring overnight.

Image – Data collection achieved day9 (tiff image of full final survey)

Day 10 – Tuesday 7/11/23 – Lines 0067-0094

Simon, Marcus & Rhys

SVP & full path test in 50m waters and slope heading into George Town pier.

67,68 roll (cal also be used for pitch)

69 transit line

70,71 pitch

72, 73 yaw (check direction of lines)

74 transit line to infill box.

74 – 83 infill box

84 onwards – Water column and seeps

89 – onwards box infill and coastal around to comfortless cove.

Boat craned out due to bad weather.

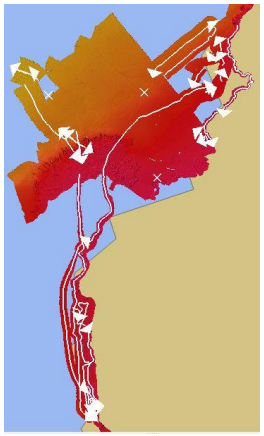


Image – Data collection achieved day10 (tiff image of full final survey)

Day 11 – Wednesday 8/11/23

Weathered off due to swell – no survey day.

Processing, reporting and beach sight recce etc.

Day 12 – Thursday 9/11/23

Poor weather for next 2-3 days.

Decision made to demobilise kit to enable more effective sampling for last available weather window.

Demob multibeam kit – take all day – kit cleaned, and lube applied. Contact Kitty for shipping back.

Next boat 24th Nov – going for it.

Day 13 Friday 10/11/23

Weathered off – swell sw hitting pierhead etc.

Sampling plan and processing/reporting.

Prep benthic sampler.

Discuss shipping kit – check pallet availability etc.

Contact NOC / Angela Hibbert regarding English Bay tide gauge. Reference to Chart Datum unclear from previous noted and data download is not clear in terms of correct column and offset to use.

Data shared with AIG Conservation – SDB (need to chase from UKHO for release statement) and Bathy (have release statement).

Day 14 Saturday 11/11/23

Drop camera – with the team (Dan, Catriona, Tiff, Sheldon, Rhys).

6,5,1,39 drop cam locations.

Day 15 Sunday 12/11/23

Drop camera - with the team (Dan, Cuen, Ceri, Big Sheldon, Catriona, Rhys).

32,33,35,45,13

Day 16 Monday 13/11/23

Drop camera - with the team (Simon, Cerys, Cuen, Catriona, Rhys).

8,4,3,47,0,1

Presentation to all – Marine Conservation Dept, Marine Ops, Sea Rescue

Day 17 – Travel Day home - Flight to Brize ~10-11pm

Day 18 – Arr Brize 08:00am – Taxi to Oxford, Train to Birmingham change to Edinburgh

January 24

Day 1 - 17/01/24

(STR video system arrived Lyell Centre 15/01/24)

Depart Edinburgh – Brize Norton 10:00 (M6, M5)

Dinner at pub, before dropping car at Charlies Taxi 19:00

Flight 23:30 ish, departed 01:00

Day 2 - 18/01/24

Arrived Ascension 10:00.

Picked up by Pascale, dropped at house (two boats)

Sort car hire, stock house with supplies, internet deal at Sure, go to AIG office, makes plans etc.

Pier out of action due to fuel being loaded from tanker.

Day 3 - 19/01/24

Set-up system and test with Atlas Link GPS. All working.

Pier shut until 2pm due to fuelling.

Organise equipment for boat. Boat launched at 2 ish. Weather windy and swell not ideal.

Sampling plan finalised. Reporting

Day 4 - 20/01/24

Survey trial run. First day of Seabed Sampling. Depart at 8:00.

Windy and slight swell. Sea state – slightly choppy and wind picks up during survey. Not ideal.

Issue with boat steering identified by skipper Dan. Decision made to stay close to George Town.

First test – shallow water sample goes well – system works well, but issue logging (cut out halfway) – unsure if due to software (heat/splash on mouse pad) or user error due to bounce. Launch and recovery good. Thicker umbilical makes recovery easier, but lack of spool creates desk space limited and cable organisation essential.

Sample 2 – deep water. Wind has increased and conditions marginal. Continue. Launch and recovery ok, but same issue with logging – cuts out. Decision made to move system to front of boat for next survey due to splash issues. No data logged. Deep samples to be reserved until calmer conditions.

Sample 3 & 4 – good. Full recovery & log.

Sample 5 - position cuts out due to boat slam and cable becoming detached. Bright conditions make it hard to notice feed/overlay not working.

Sample 6 – ok but no positioning.

Lots of lesson learned in terms of optimum system set-up on boat.

On return to George Town steering breaks.

Day 5 - 21/01/24

Boat broken steering mechanism. Dan and team to source replacement part.

Catriona & Rhys work on data, reporting and map outputs.

Day 6 - 22/01/24

Boat fixed. A steering mechanism has been found on another boat. Testing from 1pm allowing ample time for swell to reduce. Windy.

S7-S15 completed – nice conditions (relatively)

Day 7 - 23/01/24

08:00 Headed to NE Bay.

Conditions not ideal – windy.

S16-S19 completed.

S20 aborted due to speed of boat drift- camera not making bottom. 1knt SOG

S21 had to pull up to reposition camera.

S22 – short line due to approaching rock outcrop.

S23 – aborted – high drift speed.

S25-s27 skipped due to rocks or depth too much for drift andchop.

S28-29 completed in English Bay

S30 too deep

Day 8 - 24/01/24

Another day of sampling – windy and choppy again, but this is the norm.

31-45 – drop cameras.

Day 9 - 25/01/24

No access to boat as in use for other things.

Ran a MPA workshop for the kids at local school.

Presentation to island community at Naffi cinema.

Days 10 – 12, 26-28/01/24

Weathered off – high winds unsuitable for boat in areas we need samples from.

Decision made to extract boat. We have enough samples in sheltered areas – some areas of island extremely inaccessible by boat during this period.

Remove equipment from boat and wash down and clean.

Report writing and map compilation.

Day 13 - 29/01/24 – Meetings with Tiff & Cuen Miller on habitats classification to use.

Training in data formats and GISoutputs.

Day 14 - 30/01/24

Continuation of office work

Depart Ascension for Brize Norton

Day 15 - 31/01

Drive Brize Norton - Edinburgh