Order Form / Work Package Order

Aerial Survey of Areas in the Southwest Celtic Sea for Seabird and Marine Mammal Species for the POSEIDON Project.

FROM

Authority	Natural England
Address	Foss House, Kings Pool, 1-2 Peasholme Green, York, YO1 7PX
Contact Ref:	[redacted] Mobile: [redacted] 249 Email: [redacted]@naturalengland.org.uk [redacted] Mobile: [redacted] 132 Email: [redacted]@naturalengland.org.uk
Order Number	TBC
Order Date	13 December 2022

TO

Contractor	APEM Limited
For attention of:	Name: [redacted] Phone: [redacted] Email: [redacted]@apemltd.co.uk
Address	Riverview A17 Embankment Business Park Heaton Mersey Stockport SK4 3GN

1. SERVICES REQUIREMENTS

(1.1) Services [and deliverables] required:

The service required is provision of all aspects of digital aerial survey (including suitably qualified surveyors, appropriate digital camera equipment, and survey aircraft designed for offshore work over long durations), digital data processing, Quality Assurance and reporting to meet the requirements and objectives of the survey work, as detailed in this specification.

There are four core objectives for this contract. These are to:

a) Conduct four, seasonal, high precision digital aerial surveys of the red outlined study area in the southwest Celtic Sea. Survey data are to be collected using digital video or still

imagery at a minimum of 1.5 cm Ground Surface Distance (GSD) to confidently capture and identify to the lowest taxonomic level possible all birds (in flight and on the water) and marine mammals within the surveyed area. Seasons are defined as:

1) December 2022

2) January – March 2023

3) April – June 2023, and

4) July – September 2023.

Whilst we recognise the challenges of surveying large areas to prescriptive timetables, we would suggest contractors aim for the middle month of survey seasons where practical, and limit as far as possible the total time required to survey the study area within a season. Where surveys have to take place at the beginning or end of seasons, Natural England would appreciate discussions to ensure seasons are separated to an acceptable degree.

b) process imagery to identify all birds, marine mammals, and other objects of interest captured to the lowest taxonomic level possible;

c) Quality Assure results so that pre-agreed data standards are met (e.g. to meet MEDIN standards, JCDP data standards for archival in marine data repositories such as the Marine Data Exchange);

d) produce ArcGIS layers, associated metadata, accompanying .csv files, etc. and four brief reports (one for each of the survey seasons) detailing survey effort and observations for each individual survey within pre-agreed timeframes, likely to be within 6 – 8 weeks of data collection. Files provided should quantify locations, dates and times of surveys in a clearly communicated coordinate system and/or projection, regardless of whether animals were sighted or not.

Methods

The successful Contractor will need to develop an appropriate survey design to meet the project aims and objectives outlined above.

Requirements

To enable successful delivery, the successful Contractor is expected to:

- Plan the survey design and submit these plans at tendering stage.
- Conduct the survey(s), including organisation and positioning of aircraft, crew and equipment and ensuring that all health and safety requirements, including Covid-19 requirements, are met.
- Process the acquired imagery.

- Quality Assure results so that pre-agreed data standards are met (e.g. to meet MEDIN standards and JCDP Data Standard for marine mammals or equivalent for archival in marine data repositories such as the Marine Data Exchange).

- Submit ESRI ArcGIS 10.2 compatible shapefiles (clean of any topology errors) and .csv files showing survey effort (e.g. aircraft tracks and altitude) and observations of birds, marine mammals and other objects of interest (one per survey), including data fields and metadata to pre-agreed standard (see above). These to be submitted to pre-agreed public repository with accompanying metadata, within pre-agreed period following each survey. Point and polygon data should be supplied. Column headers and terminology must be consistent amongst files with identical words, spacing and case.

- Submit four brief technical reports in Microsoft Word format following each set of seasonal surveys (i.e. four reports covering surveys in each season), detailing pertinent survey information including: detailed description of, and rationale for, survey methods and design, maps of survey routes and coverage; details of surveys as actually flown (dates, time, weather conditions, sea state, crew, camera set up, etc.); details of data extraction and processing and associated challenges or limitations (e.g. around species identification). Beaufort Scale should be used to report sea states in addition to a (subjective) underwater visibility estimated at 15min periods and added directly to the survey route data as additional fields. The final report structure and content will be agreed with the nominated officer.

- Submit copies of all survey imagery and above files to Natural England

2. Contract Extension Option – Transit Route Imagery

APEM Clarification response 14 Nov 2022 Ref: 10669 & 10708 contained several queries regarding collating imagery along transit routes, those along with Natural England response are listed below. Given those responses APEM will provide costings to providing this additional imagery for Natural England's consideration.

In order to comply with Public Contract Regulations 2015 Natural England may issue a Contract Change Note to extend the scope of this contract for additional collating imagery if those costings are no more than 10% of this contract cost. If costings exceed 10% of contract cost Natural England may only vary the scope of the contract if internal governance approval is granted.

i. Does the client have a preferred corridor between the coast and the survey sites that they would like the survey transit routes to capture? With this specified, APEM can provide accurate costings based on transit times and the appropriate departure point for those corridors.

A. We are looking at possible features of particular interest along likely transit routes (Newcastle to central North Sea and Newquay / Ireland to south-west Celtic Sea) and will inform APEM of any preferences. In the meantime, we would be keen to understand costs for imagery along APEMs standard / preferred transit routes.

ii. Does the client wish to capture the entirety of each route from coast to the survey sites, or just a section of these routes to the sites?

A. Please provide costings for the entirety of each route, and see response to question v. regarding % coverage / methodology.

iii. Does the client want images captured on both the out and return transits?

A. Ideally both the out and return transits. However, please provide costings for the out / return transit only, and for both the out and return.

iv. If two aircraft are used, is the capture and analysis of images on transit required from both aircraft or would the data from one aircraft suffice?

A. We imagine the two planes would overlap in both time and space, meaning the imagery collected by both planes would be broadly the same. If this is the case, we would require capture and analysis of imagery from one plane only. Please break down the cost for capture of imagery along transit routes, and for capture plus analysis.

v. Does the client require costings for different GSD and percentage coverage options for these transit flights?

A. GSD at 1.5cm. For percentage coverage, this is not a typical study area with a transect as imagery would be captured on route. Would APEM propose to capture imagery continuously in transit, or at specific time intervals covering a % of total transit time for example?

(1.2) Commencement Date: 12th December 2022

(1.3) Completion Date: 31st December 2023, with data collection completed by 30th September 2023.

There is the option to extend for up to a further six weeks, subject to availability of funds. To be confirmed by issue of a Contract Change Note (CCN). Any work undertaken after 30 12 2023 will be at Supplier's risk until a CCN is offered and accepted.

2. PERFORMANCE OF THE SERVICES [AND DELIVERABLES]

(2.1) Key Personnel of the Contractor to be involved in the Supply of the Services

(2.2) Performance Standards
Project deliverables

- Digital copies of a sample of the georectified original survey photographs or video stills – please indicate available formats.
- A copy of the camera calibration report for each survey.
- Quality assured datasets of validated and geo-referenced observations (for all

species/species groups/other objects of interest recorded) – so that pre-agreed data standards are met (e.g. to meet MEDIN standards or equivalent for archival in marine data repositories such as the Marine Data Exchange) (see guidance at https://medin.org.uk/), JCDP data standards and/or compliance with Marine Scotland's *Digital Aerial Survey Data Standard Guidance Document* (once finalised);

- ESRI ArcGIS 10.2 compatible shapefiles with attached metadata and clean of any typology errors and .csv files showing survey effort (e.g. aircraft tracks and altitude) together with log of conditions (sea state, visibility, cloud cover, glare, precipitation etc) during each survey. As above, sea state should be recorded using the Beaufort Scale and a (subjective) underwater visibility estimated at 15min periods and added directly to the survey route data as additional fields.
- ESRI ArcGIS 10.2 compatible shapefiles with attached metadata and clean of any typology errors and .csv files showing observations of birds, marine mammals and other objects of interest (one set per seasonal survey), including data fields and metadata to pre-agreed standard. Point and polygon data should be supplied. All datafiles to be submitted to pre-agreed public repository within pre-agreed period following each survey.
- Raw data files providing details of all the objects observed within each sample frame and subsequent identification. For each object detected, data fields to include, as a minimum, georeferenced position, date, time, number of individuals, assignment to identity (bird or mammal species and age/sex or broader category), confidence level in that categorisation, whether in flight or on the water surface and direction of travel. The locations of any objects such as vessels that might influence observed bird distributions should also be recorded within these data files. Positional and conditional information is required for photographs or video where animals were not seen.
- Four brief reports in Microsoft Word format; one following each survey season, each detailing pertinent survey information (dates, time, weather, sea state, crew, camera set up, incidents, etc.). (Reports do not need to contain any descriptive or analytical statistics or modelling).

All data provided must comply with Natural England metadata standards and GIS formats as outlined at Annex 1 and should additionally be in European Seabirds at Sea (ESAS) compatible format.

APEM Response

Understanding the Requirements

The Department for Environment and Rural Affairs (DEFRA), working with Natural England, requires a service provider to conduct four, seasonal digital aerial surveys across the South West Celtic Sea at a minimum Ground Surface Distance (GSD) of 2cm to capture and identify all birds (in flight and on the water) and marine megafauna within the survey area. The chosen service provider will process the imagery, provide quality assurance to MEDIN and JCDP data standards or equivalent, and provide evidence with 6-8 weeks in the form of four brief reports (one per season) alongside ArcGIS layers, associated metadata and other supporting data.

APEM are perfectly positioned to deliver this service. We have more than 20 years' experience in delivering digital aerial surveys in a similar environment and have worked with Natural England and DEFRA throughout this period. Our team of skilled Ornithologists, Marine Mammal Consultants and Technical Engineers have the experience to confidently and

accurately identify and quality check captured imagery and provide detailed and knowledgeable reports and advice on the survey area.

Survey Methodology

Natural England require a robust survey design which will seamlessly and accurately collect imagery across the survey area and provide precise data on the quantity of birds and marine megafauna in the area.

APEM's survey method collects multiple still images along the flight line corridors planned for each survey, providing an accurate footprint that allows very accurate abundance and density estimates to be modelled.

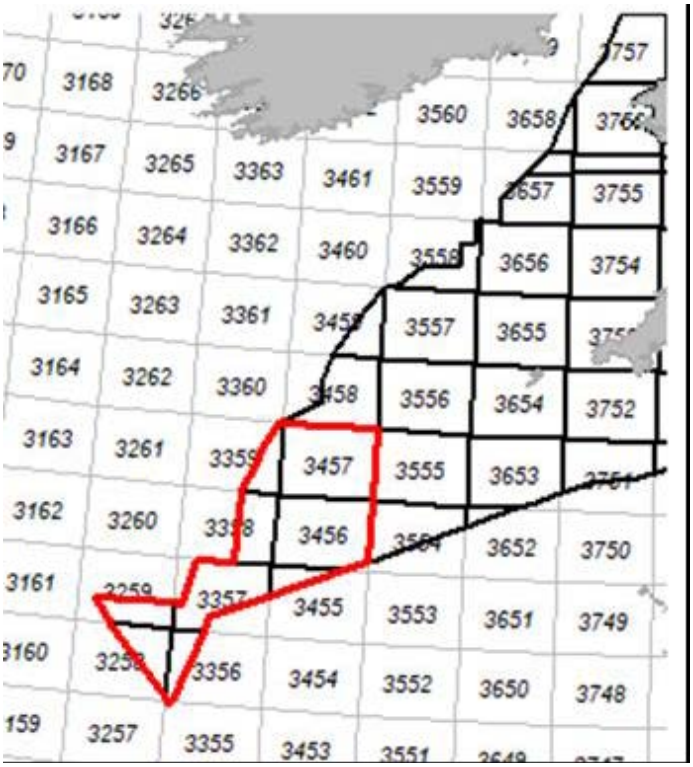

Figure 1: The survey area is shown in the red outlined area.

As provided within the RFQ, the survey area is shown in Figure 1, APEM have designed a survey methodology which will meet Natural England's requirements, and provided additional options which will exceed requirements and provide a more robust dataset.

In accordance with the specification, APEM provide the following survey design options:

1. 2cm GSD, 1.5% coverage, 4 transect survey lines at 62km spacing. On task approximately 9 hours, two aircraft over one day.
2. 2cm GSD, 2% coverage, 6 transect survey lines at 38km spacing. On task approximately 14 hours, two aircraft over one day (where weather allows).
3. 2cm GSD, 5% coverage, 14 transect survey lines at 17km spacing. On task approximately 21 hours, two aircraft over two days.

Additionally, APEM provide additional survey design options:

4. 1.5cm GSD, 1.5% coverage, 6 transect survey lines at 42km spacing. On task approximately 11 hours, two aircraft over one day (where weather allows).
5. 1.5cm GSD, 2% coverage, 7 transect survey lines at 35km spacing. On task approximately 14 hours, two aircraft over once day (where weather allows).

6. 1.5cm GSD, 5% coverage, 17 transect survey lines at 13.5km spacing. On task approximately 26 hours, two aircraft over two days.

Due to the size of the survey area, and for safety reasons, transects will be orientated in an E-W direction.

APEM recommend a GSD of 1.5cm, due to the level of detail captured in images of this resolution it is possible to identify the majority of seabirds and marine megafauna to species level which is not possible at 2cm GSD.

Figure 2: Example snags for identified red-throated diver, common scoter and little gull from surveys in European and America waters. A, and B: show red-throated divers at 1.5cm GSD. D and E: show common scoter at 1.5cm GSD.

Additionally, APEM's natural flightpath will capture imagery within other ICES zones around the allocated survey area. We would be happy to discuss options of analysing, storing and reporting on the additional data, if required.

APEM recommends that survey flights take place at a height of at least *c*.1,300 ft, which will avoid disturbance to birds and marine megafauna and optimises ground resolution and footprint. At 1.5cm GSD resolution, the footprint of the Shearwater IV camera system consists of an image node 135 m in length and 656 m in width, which is a footprint of 88,560 m sq. APEM's method collects multiple images of this sized footprint along the lines planned for each survey.

Image acquisition would be with a bespoke camera and sensor system, the Shearwater IV, set up to acquire and save a series of digital still images based on the latest technology introduced in 2020. This state-of-the-art system was created by APEM to deliver world-leading, ultra-high resolution digital still imagery for easier analysis compared to other systems. At the same time, it also saves on costs by having an extremely large image footprint at all resolutions.

APEM plan to conduct the surveys for the project in the middle of each season period. If we deviate from this schedule due to weather conditions, we will alert Natural England of this and discuss your preferences of when to reschedule the survey.

We confirm our ability to conduct both surveys for the Central North Sea and South West Celtic Sea.

Data Collection

Our state-of-the-art digital camera systems are integrated with custom flight planning software that allows each survey flight path to be accurately mapped out before the aircraft leaves the ground. Each image capture node is precisely defined, allowing the system to fire the camera exposures at exactly the right location. This ensures that each survey is flown with the same survey flight path orientation and the camera is triggered at the same position along each line within set tolerances. APEM's planning systems enable tolerances on flight path along survey lines to be set automatically aborting survey lines that drift away from the aircraft's planned flight line.

APEM collects and records additional data relating to each survey flight as standard, which is collated and provided as follows:

- Time – time of image capture, start / end time of whole survey and individual survey lines;
- Location of image – latitude / longitude or easting / northing in respect to UTM zone;
- Environmental conditions – including visibility, cloud cover, sun angle, wind speed, wind direction, air temperature, air pressure, precipitation, sea state and turbidity; and
- Anecdotal observations – for example, shipping observations made by the camera technician that may not be captured in the imagery.

All images collected would be securely saved and backed-up on mirrored disks during flight and then multiple servers at APEM to ensure data security. These data are then stored for five years as standard.

Data will be collated and provided in the form of ArcGIS Shapefiles and corresponding metadata and Microsoft Excel (.csv) spreadsheets, where applicable. Raw imagery will be in the form of Tiff files and will be transferred to Natural England via an external drive that would be billed at additional cost or can be transferred via a link.

Image Analysis Approach

The digital still imagery acquired by the aerial surveys will be analysed by APEM staff using bespoke image analysis software to determine species identification, raw counts, estimates of flight heights, flight direction, and other information relevant to seabirds and marine megafauna present within the Survey Area, including static fishing equipment (such as lobster pots) and fishing vessels. All possible information from the imagery is 'extracted' (including anthropogenic artefacts) and typically georeferenced to the WGS84 UTM projection unless otherwise requested.

Data collected and recorded as standard are as follows:

- Species-level identification of each animal observation, or, where not possible, the lowest taxon;
- Age, sex, length and wingspan of each animal observation where possible/applicable;
- Behaviour of each animal observation, e.g. sitting/flying/perching/diving for birds or submerged/surfacing for mammals;
- Flight height of flying birds where appropriate (see **Error! Reference source not found.** for more detail);
- Flight direction of flying birds;
- Date and time of each observation (e.g. animal/vessel/structure) recorded in the survey;

- Corresponding coordinates for each observation (with an accuracy of ±3 to 5 m); and
- Unique identifying numbers for each observation with reference to the corresponding image.

Image Analysis Quality Assurance

APEM's team of 50 image analysts are hand-picked for their existing skills and experience and then receive further ongoing training internally from our experienced Team Leads and QA Team providing excellent quality, making our data the best in the business. Our analysts receive on-going training in identification from APEM's [redacted], who is almost certainly the world's most experienced analyst of digital aerial images of seabirds. Our analysts also have access to the in-house Image Archive Library, which is regularly updated. This comprehensive guide is compiled from previously identified individuals in aerial images. Analysts also measure the body length and wingspan (for birds) as input parameters for species identification. On-going advances in digital imagery have removed many of the uncertainties in species identification that have existed in the past (e.g., failure to differentiate species of auk) through poor resolution and image smear. Every survey goes through a quality assurance process, where a percentage of images are sampled by at least two members of staff to quality check the identification. Avian and marine mammal identifications are reviewed by in-house specialists with extensive experience in identifying birds from digital aerial still images. After the images have been analysed, 10% of the birds and marine megafauna recorded by each survey can be subject to external QA upon request by the client at an additional cost (not included in the costs provided in this tender). This is carried out by our QA partners, the British Trust for Ornithology (BTO) and the Sea Mammal Research Unit Marine (SMRU Marine). APEM have recently included its Senior Marine Mammal and Ornithology Consultants in the Quality Assurance process of all marine mammal images.

Where identification to species is not possible individuals will be assigned to taxonomic groups such as 'black-backed gull sp.' (lesser black-backed or great black-backed gull) or 'gull sp.'

It is APEM's experience that for equal resolution, still images give a superior quality image for bird and marine megafauna identification than to those acquired using video (See example of images in Figure 1). Due to the limitations associated with High Definition (HD), vertical digital stills cameras are adept at detecting marine species submerged in the surface of the water column that may not be seen by oblique video cameras, and multiple frames from video surveys does not improve identification of marine mammals. APEM's bespoke camera systems also have a short focal length and are less zoomed at any given resolution in comparison to video cameras, providing better image quality and less motion blur for a better chance of species identification. Furthermore, the benefit of vertically mounted cameras is that they have an improved viewing angle over oblique video systems. This is because poorer sea states would have a negative impact on the detectability for objects of interest which may be obscured by waves and breaking surf. In addition, APEM can estimate its coverage captured more accurately whereas with angled video systems this is not the case. Using the methods described here, APEM can achieve identification accuracy of greater than 90% for a vast majority of avian species and 90% for harbour porpoise, common dolphins and bottlenose dolphins and over 85% accuracy for white-beaked dolphins.

Glare, Weather Risk, and Challenges

To provide Natural England with certainty on costs, various risks that may constrain the ability to complete the survey and data extraction within the required timescales, considering factors such as weather, tides, airspace restrictions and COVID-19. APEM cover all risks (provided

that the decision about when a survey goes ahead or not is also held by APEM). We are highly experienced in optimising surveys to make use of small weather windows and we fully expect to mitigate against weather risks. Should a survey attempt fail, we will try again at the next available opportunity at no cost to the client.

Weather windows are reviewed daily, and we have sufficient capacity of both aircraft and crew to be on task when the conditions are favourable. We have continual access to aircraft to be able to mobilise even at short notice. APEM has previously owned and operated three aircraft, meaning we are able to troubleshoot possible challenges with our aviation provider knowledgably. The surveys would be undertaken in weather conditions that have been acceptable to the UK statutory nature conservation advisers, namely: visibility greater than 5 km, wind speed of less than 30 knots, sea state of four or less (Beaufort 5 or 6), and no icing conditions. While it is possible to survey in less favourable conditions, our aim is to balance the number of possible survey windows, the safety of our aircrew and the quality of the data collected. On bright days, there is a risk of glare in the images that can make finding and identifying birds and marine megafauna more difficult. We mitigate for this by avoiding surveying for some two hours around midday and tasking our on-board technician with continuously monitoring the image quality and, if necessary, ceasing acquisition until suitable conditions return.

APEM has a forward planning process to ensure staff and resource availability for the duration of the project. Prior to each survey a ground check is undertaken of the camera systems as well as the aircraft to ensure they are in working order. We own multiple camera systems to enable us to survey if there are competing weather windows with other contracts we currently have. We have an arrangement with our aviation provider to have a number of aircraft available for use at our discretion.

APEM has a highly experienced Flight Operations team who coordinate APEM's operational logistics to ensure crew and systems are mobilised in multiple aircraft to survey seven days a week as suitable
weather and sea conditions allow. As part of its operations, APEM have a global Duty Operations roster; a fleet of survey sensors mounted in manned survey aircraft; multiple aviation providers providing a large pool of aircraft, as mentioned above; survey pilots; and aviation engineering support. The systems are operated and maintained by APEM's own pool of Aerial Survey Task Specialists. With this configuration, APEM currently maintains five crews ready and available for Marine Wildlife Offshore surveys every day of the year except for Christmas Day and Boxing Day.

Size-Based Flight Height Provision

In addition, using a set of rules developed in-house, based upon trigonometry and more complex mathematics, we can estimate the flight height of birds with a range of error and confidence intervals, dependent upon image quality, size of the bird species and the size of the bird relative to the image. Size-based flight heights can be provided as an additional part of the data. It must be noted that we are unable to accurately estimate flight heights for birds that are diving or turning sharply, as these individuals are not fully stretched out and therefore their measured lengths are not comparable to the reference length of the relevant species. Typically, the proportion of flying birds that APEM provide flight height estimates for is between 15% and 25% of the total in each survey.

Reporting
Four brief technical reports will be provided to Natural England in Microsoft Word format. These will include the following information:

- Description of the survey methodology.
- Maps showing GPS tracks and survey coverage.
- Survey information including survey date, times, weather conditions, sea state, aircraft and crew information, camera.
- Image analysis and QA methodology.
- Raw count tables of all birds and marine megafauna.
- Distribution map of bird and marine megafauna observations.
- Commentary on any other anthropogenic objects observed in the survey.

(2.3) Location(s) at which Services are to be provided: Southwest Celtic Sea study area (Figure 1)

(2.4) Standards: Reporting to pre-agreed standards, see below Annex 1

(2.5) Contract Monitoring Arrangements
Catch up call approximately every 8 weeks between NE Project Officer and Successful Contractor's Project Manager. Some of these are additional to the meeting dates set out under project milestones. Namely:

w/k beginning 12th December 2022 – Project Initiation Meeting

w/k beginning 2nd January 2023

Mid-Jan 2022 – MS Teams meeting to discuss conduct of first seasonal survey

w/k beginning 6th March 2023

Mid-April 2023 – MS Teams meeting to discuss conduct of second seasonal survey

w/k beginning 5th June 2023

Mid-July 2023 – MS Teams meeting to discuss conduct of third seasonal survey

w/k beginning 4th September 2023

Mid-October – MS Teams meeting to discuss conduct of fourth seasonal survey

3. PRICE AND PAYMENTS

(3.1) Contract Price payable by the Authority excluding VAT, payment profile and method of payment (e.g. BACS))

£335,093.82 as per the below correspondence and commercial submission:

Date: 09/11/2022 14:19

Sent from User: [redacted]

Subject: Re: Re: Re-tender of Submission for Central North Sea Requirement

My Message

Dear Supplier

With regard to your Re-tender submission 2nd November 2022 for both Central North Sea and Southwest Celtic Sea requirements we have several queries, see below:

1. Per the clarification letter shared on 2nd November, APEM provided costings for surveying the entirety of each ICES square in the Celtic Sea (itt 01708), as opposed to only the red outlined survey area indicated in the RfQ. Please confirm that the costings provided are inclusive of image processing/analysis for the entirety of each cell in addition to image collection.

2. Please provide costings for collection of imagery across the entire 9 cells, and only processing / analysing imagery from the red outlined survey area indicated in the RfQ.

3. Please provide costings for surveying the Celtic Sea red outlined survey area only (including collecting and processing imagery). Please provide costings for 1) 2% coverage at 1.5cm GSD and 2cm GSD, 2) for 2.5% coverage at 1.5cm GSD and 2cm GSD 3) for 3% coverage at 1.5cm GSD and 2cm GSD, and for 4) 5% coverage at 1.5cm GSD and 2cm GSD.

4. Please provide costings for 2.5% and 3% coverage at both 1.5cm and 2cm GSD for the Celtic Sea (01708) - 1) entire 9 cells and 2) red outlined survey area only, (see point 3) and for the North Sea (01707).

5. Please provide costings for collecting imagery along Celtic Sea and North Sea flight transit routes so this can be considered as an optional service.

6. Your proposal to survey the full 9 cells in the Celtic Sea will require flying over French and Irish territorial waters. Can you confirm this has been factored in on your bid and that you are confident that you will obtain all necessary airspace approvals?

Can you please answer the above questions no later than close of business, Monday 14th November.

Also please confirm you have capacity to start surveys in November and provide required lead time for mobilisation once contracts are awarded.

[redacted]
Defra Group Commercial

Broadcast Message: No

As provided by Clarification Response 14 November 2022 APEM Ref: 10669 & 10708.

Note Bene: This covers the red outlined study area of the Celtic Sea Only.

Southwest Celtic Sea – 1.5 cm GSD; 3% Coverage	£
Provide total cost (exc VAT) with the following breakdown:	[redacted]
Survey planning	[redacted]
Fuel cost	[redacted]
Flying hours required	[redacted]

Litres of fuel per flying hour	[redacted]
Fuel cost per litre, on date tender submitted	[redacted]
Image Analysis (Core study area. Framework Agreement suppliers are asked to quote separately for analysis of images collected outside the core study area).	[redacted]
QA of imagery/data/results so that pre-agreed data formats and standards (e.g. MEDIN compliance) are adhered to	[redacted]
Reporting (including provision of all associated deliverables)	[redacted]
TOTAL	**£335,093.82**

(3.2) invoicing and Payment

Four Payments will be made (each at 25% of the contract value) on receipt of detailed invoice following completion (to the satisfaction of the Natural England Nominated Officer) of the milestones detailed above and formal acceptance of the specified outputs. The first payment (25% of the contract value) will cover milestones associated with the first seasonal surveys (due to be completed in December 2022). The second payment (25% of the contract value) will cover the milestones associated with the second seasonal survey (due to be completed from January – March with the preference for the mid-point of the survey season), with the third and fourth payments (each at 25% of the contract value) covering the third and fourth seasonal surveys respectively (due to be completed from April – June 2023 and from July – September 2023 respectively with the preference being the mid-point of the survey season).

4. Invoicing Requirements

APEM Limited to quote Natural England purchase order number (TBC) and Bravo reference number ECM 66475 in their invoice.

Invoice should be emailed to Accounts-Payable.neg@sscl.gse.gov.uk or posted to:
Shared Services Connected Limited
Natural England
PO Box 793
Newport
NP10 8FZ

BY APPROVING THIS ORDER FORM, THE CONTRACTOR AGREES to enter a legally binding contract with the Authority to provide to the Authority the Services specified in this Order Form, incorporating the rights and obligations in the Call-Off Contract that are set out in the Framework Agreement entered into by the Contractor and the Authority on 27th July 2022.

Electronic Signature
Acceptance of the award of this Contract will be made by electronic signature carried out in accordance with the 1999 EU Directive 99/93 (Community framework for electronic signatures) and the uk Electronic Communications Act 2000. Acceptance of the offer comprised in this Contract must be made within 7 days and the Agreement is formed on the date on which the Contractor communicates acceptance on the Authority's electronic contract

management system (“Bravo”). No other form of acknowledgement will be accepted.

ANNEX 1

Natural England data requirements

This Annex provides high level guidance for contractors regarding Metadata and Geographic Information System deliverables. Final details of requirements for this project, with reference to section 5 of the Specification, will be agreed with the Nominated Officer.

Natural England reserve the right to check the quality of all digital data and reserve the right to return any data that does not meet these compliance requirements. If any part of this guidance is unclear, please make early contact with the Natural England Nominated Officer who will be able to provide clarification in consultation with data management colleagues.

Metadata

A generic MEDIN compliant discovery metadata record should be completed for the project outputs as a whole and for each GIS layer generated. By generating MEDIN compliant metadata, Natural England gain required compliance with both INSPIRE Directive and UK GEMINI 2.1 metadata requirements, while using term list vocabularies fit for marine purposes. There are a variety of mechanisms for generating MEDIN compliant metadata available at the following link along with a full description of the MEDIN standard, XML encoding, and guidance documentation: https://www.medin.org.uk/medin-discovery-metadata-standard. Metadata derived as part of this project must be submitted to Natural England in an XML file which Natural England will archive through Data Archive Centres (DACs). Guidance ‘MEDIN Guidance for Contractors’ can be provided to the winning contractor.

Beyond the discovery metadata requirement, it is essential that the final GI datasets are accompanied by a detailed ‘readme.doc’ describing the file structure within submitted outputs, and clearly outlining file associations (e.g. layer files for colours/ fill patterns).

Geographic Information data - format for deliverables

GIS products should be compatible with ArcGIS Desktop 10.2. Data will be supplied as a series of Feature classes in a File geodatabase (.gdb) to an attribute structure to be agreed between the contractor and Natural England on commencement of the contract. One or more ArcMap Document files (.mxd) must be provided to pull out data into distinct layers based on its attribution and these will apply appropriate layer styling.

Data in the Feature classes of File geodatabases will be supplied using the following coordinate system parameters:

Attribute	**Value**
Geographic Coordinate System	GCS_WGS_1984

Datum	D_WGS_1984
Prime Meridian	Greenwich
Angular Unit	Degree

For the purposes of this project ArcMap document files (.mxd) are to display WGS84 data projected from requested feature classes in Lambert Azimuthal Equal Area projection based on ETRS 1989, using an appropriate (eg Petroleum EPSG) transformation between WGS 1984 and ETRS 1989.