Procurement Specification: Integrated Multibeam Echosounder System

1. **Stutt lýsing**

Tilboð eru umbiðin til eina fullfíggjaða fleirstráluekkólodsskipan, á enskum nevnt Multibeam Echosounder (MBES) system, íroknað MBES høvd/mátitól og INS/IMU skipan, og allan hjálparbúnað og uppmátingarforrit.

2. **Short Description**

Tenders are invited for a complete Multibeam Echosounder (MBES) system, including MBES head, RTK GNSS and INS/IMU system, including all ancillary hardware and acquisition software.

3. **Background**

The Faroese Hydrographic Office (FHO) lies within the Faroese Environment Agency (Umhvørvisstovan) and has the responsibility of creating and updating the official nautical charts. However, FHO needs to be able to produce bathymetry data as well as backscatter data that can be used for other purposes. The Hydrographic Office was established in 2020, following the takeover of the activities from the Danish Hydrographic Office (Geodatastyrelsen – GST). The Faroe Islands is a very small country, with a population of around 55,000 people and a land area of approximately 1,400 km^2. However, the Faroese Fisheries Zone has an area of approximately 300,000km^2. The new multibeam system will be used to survey the waters between and around the islands, on the Faroese Plateau, which have depths reaching just over 200 m.

The waters around the islands can be very deep. The islands are separated by sounds and fjords that can reach 5 km or so in width. The depths in some of these sounds can reach depths of over 200 m, with steep rocky slopes.

In 2025, the FHO hired a complete multibeam system for 3-weeks and conducted surveys during this period. The system was mobilized on a small research vessel, shown in figure 1. This proved very successful.

Figure 1, The complete MBES system mobilized on the RV Andrias Reinert.

Project Overview

The objective is to procure a turnkey Multibeam Echosounder (MBES) system capable of performing high-resolution bathymetric surveys, resulting in high quality depth and backscatter data. The system must include integrated high-precision GNSS positioning and an Inertial Navigation System (INS) / Inertial Measurement Unit (IMU) for motion compensation, ensuring compliance with **IHO S-44 Edition 6.2.0** standards for Exclusive Order, Special Order and Order 1a surveys.

4. **Technical Specifications**

Tenders are invited for a complete integrated system, comprising of a MBES, IMU, RTK GNSS, SVP on the head as well as a portable SVP, as well as all required cables and connectors.

Multibeam Echosounder (MBES)

- **Operating Depth:** Optimized for shallow to medium waters from 0.5m to at least 250m.
- **Frequency:** Frequency agile between 200 kHz and at least 400 kHz to balance range and resolution.
- **Beamwidth:** Minimum focused beamwidth of 0.5° x 1.0° (or better) at maximum frequency to meet strict feature detection requirements.
- **Swath Coverage:** Selectable sector up to at least 140**°** equidistance, and at least 160° equiangle.
- **Sounding Density:** Ability to generate at least 512 soundings per ping (Equidistant/Equiangular modes).
- **Ping rate** at least up to 50 pings/s.
- **Pulse length** of at least 15 – 1000μs.
- **Pulse type** CW and FM.
- **Depth resolution** better than 10mm.
- **Operating temperature range** of at least -5°C to +30°C.
- **Data communication,** ethernet.
- **Sound Velocity Sensor** shall be provided at the sonar head interfaced in the system (if needed for beam corrections).
- **Backscatter data** from the MBES must be streamed into the acquisition software.
- **Water Column data,** Multibeam shall be able to stream Water Column data to acquisition computer.
- **System interfacing,** Full communication between systems.
- **Input voltage,** 230VAC 50 Hz.
- **Transducer cable length,** Minimum 15 meters.
- **Mounting bracket for transducers,** Transducer shall be delivered with a mounting bracket which will be installed to an over the side pole mounted system, Figure 2.

- **Installation of equipment,** Tenderer shall ensure and be responsible for Harbour Acceptance Tests (HAT) and Sea Acceptance Tests (SAT) in collaboration with the FHO.

Positioning and Orientation System

- **Preference** for an embedded IMU/INS in the MBES. Alternatively, a subsea IMU located on the MBES head.
- **GNSS Positioning:** Dual-frequency GNSS (GPS, GLONASS, Galileo, BeiDou) supporting **RTK/PPK** for centimetre-level horizontal and vertical accuracy.
- **Motion & Orientation (IMU/INS):**
    - **Roll/Pitch Accuracy:** ≤ 0.02° (RTK/PPK).
    - **Heading Accuracy:** ≤ 0.04° with a 2-meter antenna baseline.
    - **Heave:** Real-time heave (5cm or 5%) and delayed "True Heave" or "Delayed Heave" (2cm or 2%).
- **Integration:** Preference for tightly-coupled GNSS/Inertial systems to maintain accuracy during GNSS outages or challenging manoeuvres.

Ancillary Equipment

- **Sound Velocity Sensors:** Includes a real-time **Surface Sound Velocity (SSV)** sensor at the transducer head and a portable **Sound Velocity Profiler (SVP)** for water column corrections.
- **Mounting Hardware:** The FHO already have an over the side mounted pole. This consists of a 2m long beam for the GNSS antennas, as well as a standard MBES mounting head. A suitable mounting flange will be provided in the tender to attach the MBES head to the pole, Figure 2. If a tender is supplied using a subsea IMU that is not integrated into the MBES head, then a suitable mounting bracket will be provided in the tender to attach the IMU to the MBES. However, an integrated MBES/INS system is preferred.
- **Carrying cases should be provided.** These should be sturdy hard-shell cases, with roller wheels for easy transport. The internal of the cases should be lined with foam inserts crafted to the shape of the equipment.

Figure 2, The mounting pole, top half right and bottom half left.

5. Compliance and Standards

- **IHO Standards:** The entire system—when installed and calibrated—must meet or exceed **IHO S-44 Special Order** requirements for Total Vertical Uncertainty (TVU) and Total Horizontal Uncertainty (THU).
- **Feature Detection:** Must be capable of detecting a 0.5 m^3 cube in depths up to 40 m (Exclusive Order) and 2 m^3 in greater depths. The topography of the seabed around the Faroe Islands can be steep and rocky, therefore the system must be able to operate comfortably in such environments.

6. Software and Deliverables

- **Acquisition Software:** Real-time data logging, visualization, and quality control (QC) tools (e.g., HYPACK, QPS QINSy).
- **Processing Suite:** The FHO uses Caris HIPS/SIPS to clean and process multibeam and backscatter data. The acquisition software must be able to provide data that is compatible with our software.
- **Training:** On-site installation, commissioning, and a minimum of 3 days of operator training.
- **HAT and SAT** will be required immediately after delivery.

7. **Other Requirements**

- **Offices** must be located in Europe.
- **Proven experiences** with supplying and supporting systems to European and preferably Nordic companies, preferably Hydrographic Offices.
- **The technical support** will be provided in English.
- **Technical Support** will be available over the phone as well as through email/internet.
- **Delivery** will be within 12 weeks, ideally sooner. The supplier should state the delivery time.

8. **Supplier Response Requirements**

Interested suppliers must address the above requirements, and provide:

1. **Technical Data Sheets** for the MBES, INS, and GNSS components.
2. **Uncertainty Models** (TPU) demonstrating IHO compliance at 250 m.
3. **Warranty and Support** details (minimum 2-year manufacturer warranty preferred).
4. **Technical Support** is required over the phone as well as online. Ideally, the company will have Cat A or Cat B Hydrography (or equivalent) qualified personnel.
5. **Reference List** of previous hydrographic survey clients using the proposed configuration.

All proposals must be submitted in **Danish Krone (DDK)** and include all cost and expenses of any kind arising from the purchase/work including operating costs.

All changes in price SHALL be negotiated and approved by both buyer and seller. Offers in other currencies will not be accepted. All proposals should be sent to gethinr@us.fo

Selection of Tenders

The following criteria will be used to evaluate tenders

- Offered Price (50%)
- Competence and Experience (20%)
- Technical Assessment (30%)

Points for price are calculated in the following manner:

Points for price = (Lowest price / Tender price) * 50

Any tenders not fulfilling our requirements may be rejected.

Disputes

Cases that may arise because of the transactions covered by this invitation to tender SHALL be referred to the District Court of Tórshavn.

Contact Details

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Timeline

2026

26 January to 6 February	Questions can be sent about the tender
20 February 1700 (Faroese time)	Tender submission deadline
27 February	Announcement of successful tender
22 May	Deadline for delivery of all equipment