Request for Proposals

Automation of Data Processing: Passive Acoustic Monitoring (PAM) Instruments

RFP Release Date: Friday, March 6, 2020
Proposal Due Date: Friday, March 20, 2020 (5 pm AST)

Contract Manager

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1. Introduction

The Offshore Energy Research Association of Nova Scotia (OERA) is an independent, not-for-profit research organization that funds energy research aimed at reducing risk and encouraging the sustainable development of Nova Scotia's energy resources.

Consistent with this mandate, the Nova Scotia Department of Energy and Mines (NSDEM) in collaboration with the Fundy Ocean Research Centre for Energy (FORCE), NRCan and private sector partners have funded OERA to develop a multi-instrument, subsea platform to aid with environmental effects monitoring of tidal turbines at the FORCE tidal demonstration site in Minas Passage, Bay of Fundy. This effort, the Pathway Program, consists of a number of sub-projects, including the work described in this Request for Proposals (RFP).

Environmental monitoring sensors used for monitoring marine renewable energy devices collect enormous amounts of data, which must be screened for quality to increase the signal to noise ratio (SNR), by removing outliers and false signals, then processed into useable datasets for analyses. Currently, this data processing step requires substantial time and effort before the data are available for analyses and visualization. This adds to compliance costs and prevents the reporting of results within a timeframe acceptable to the Canada Department of Fisheries and Oceans (DFO), the federal regulator.

2. Objectives

To build and sustain regulatory confidence in monitoring capabilities and the provision of results from monitoring activities, particularly as required by DFO. It is critical that marine mammal monitoring data around tidal energy turbines are reported in a timely manner.

To that end, the objective of this work is to reduce the time between passive acoustic monitoring (PAM) data *collection* and the *reporting* of marine mammals around tidal energy devices. To achieve this objective this RFP seeks technical expertise to automate the processing of pressure time series data (i.e., *wav files) collected by hydrophones and automation of analyses to address i) frequency of detections, ii) abundance estimation, and iii) distribution relative to a tidal energy turbine.

3. Scope of Work

This project aims to develop a computing solution (i.e., machine learning algorithm or similar method) to automate data processing and analysis of the large volume of PAM data as it relates to the monitoring of marine mammals, specifically harbour porpoise (*Phocoena phocoena*) in the Bay of Fundy. The solution will:

a) comprise software capable of fetching and transferring PAM data from the monitoring device, processing the data using a porpoise click detector and classifier (either standalone or interfacing with PAMGuard or similar software (e.g. CODA, LUCY)), and producing publication-quality results (i.e., figures, table) and summary documents;

b) decrease the time between the collection of PAM data and the reporting of monitoring results for harbour porpoise around tidal energy devices;

c) apply advanced statistical approaches (e.g. machine learning algorithm or similar) to automate marine animal detection and classification and analyses of raw pressure-time series data (*.wav files) from PAM monitoring technologies;

d) be validated using a data set with known harbor porpoise detections provided by OERA/FORCE during development of the solution;

e) improve accuracy of detections (i.e. reduce frequency of false-positive detections) against existing algorithms, and increasing the signal to noise ratio;

f) reduce compliance costs to developers, and

g) not be exclusively compatible with any particular PAM device (i.e., generic in its applicability to *.wav files collected by PAM technologies).

4. Deliverables

The proponent must explain or describe the final deliverables in the proposal and explain how they will demonstrate the project objectives have been achieved. At a minimum, the deliverables must consist of:

1) the software and processing algorithms;

2) a PowerPoint presentation delivered in person or via webex demonstrating proof of performance and describing the performance metrics used; and

3) a draft report submitted with the presentation above and, following receipt of OERA management committee comments, a final report incorporating those comments.

The proponent is also expected to host project status meetings on a monthly basis (at minimum) via webex. OERA will host the project initiation meeting.

5. Proponent Qualifications

The proponent must demonstrate applicable experience with PAM or similar devices, software and algorithm development. This competition is open to both Canadian and non-Canadian entities although experience in the Bay of Fundy's unique environmental conditions will be considered an asset.

6. Project Timelines

The following timelines outline OERA's general expectations with respect to timing.

1. RFP release date: 6 March 2020

2. **Proposal due date:** **20 March February 2020 (5 pm AST)**

3. Project award 23 March (week of)

4. Project completion : 31 July, 2020

This provides approximately 16 weeks for the project. We emphasize that project timelines are critical:

the project must be completed and deliverables received <u>no later than July 31, 2020</u>. Our expectation is that the final product will be demonstrated via webex presentation **around the end of June,** at which time the draft report would also be submitted for review and comment.

7. Proposal Requirements

1. The proposal should be concisely worded with clearly described objectives, methods, milestones and outcomes. Maximum 15 pages excluding appendices.

2. The proposal should include a description of the Respondent's <u>company</u> and its relevant experience with similar projects. The Respondent must also describe the relevant work experience of the key <u>staff</u> assigned to this project and their roles on the project. This material should be summarized in the body of the RFP and can be presented in more detail, if needed, in appendix.

3. Please describe the key milestones that will indicate progress and show them in a schedule.

4. Please provide a task-cost breakdown showing rates and time for project personnel as well as the overall project cost.

5. A single electronic document is sufficient; hard copies are not required.

6. The electronic copy should be uploaded in WORD and/or PDF format to the OERA-FTP site available at https://oera.sharefile.com/r-rd87338b9e5048e58.

9. Questions and Clarifications

The OERA will accept questions from interested applicants until March 11 2020. A Q&A page will be available on the OERA website under 'Opportunities' here. The names and organizations of those submitting questions will remain anonymous; only the question and OERA response will be posted. Interested parties are encouraged to check the Q&A page for updated information and/or clarifications that may help in completing their proposal.

Please submit your questions by email to Luiz Faria (lfaria@oera.ca).

10. Evaluation

This project will be administered through the OERA. As shown below, proposals will be quantitatively evaluated against a set of criteria by the project management committee.

Factor	Weight
Experience and Knowledge: Qualifications, experience and capabilities of the company and delivery team; demonstration of local knowledge relevant to this study.	30%
Project Plan, Approach and Methodology: Proponent demonstrates an understanding of the project service requirements and has outlined a clear and effective work plan. Proposal describes the objectives, methodology, milestones and deliverables, and a sound approach in undertaking this project. Communication format and frequency between the Respondent and OERA are clearly described.	30%
Timeline: Proponent describes an achievable timeline with well-defined milestones and demonstrates the ability to complete the work on or before the desired completion date.	15%
Cost: The project will offer very good value for the proposed budget. The budget is clear, complete and well described.	25%
Total	100%