Services Request for Quotes (RFQ):
Water Level Network QARTOD Implementation and Development of Water Level Station Map

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Issue Date: August 5, 2022
Submission Deadline: August 19, 2022
Period of Performance: September 15, 2022 - December 31, 2023

SECOORA is establishing a water level network that will include ~200 real-time water level sensors throughout the southeast US once fully operational. Real-time sensors must be compliant with the tests outlined in the Manual for Real-Time Quality Control of Water Level Data. SECOORA is seeking quotes to implement 1) a Quality Assurance, Quality Control of Real-Time Data (QARTOD) system with an administrative and project team interface for the SECOORA Water Level Network, and 2) develop an interactive map for the Water Level Network webpage. Responses will be due on August 19, 2022. The primary goals are to further develop QARTOD tests for real-time water level data, provide project teams with 24-hour data quality reports, create data flag queries to track station performance, and develop an interactive map for viewing data from SECOORA water level stations.

ORGANIZATION BACKGROUND

The Southeast Coastal Ocean Observing Regional Association (SECOORA) is a regional non-profit organization based in Charleston, SC and supports ocean observing and research in the coastal waters of North Carolina, South Carolina, Georgia, and Florida. SECOORA is one of the eleven coastal ocean observing regional associations partnered with the NOAA US Integrated Ocean Observing System (IOOS®). The water level network is led by SECOORA with four project team members from the southeast. SECOORA supports a data management system with Axiom Data Science (Axiom). Respondents to this RFQ should demonstrate how they will work in partnership with Axiom to ingest data into the QARTOD system and how they will work with Axiom to resubmit Principal Investigator (PI)-reviewed QARTOD data quality flags back to the Axiom data system. The current SECOORA website uses WP Engine to host and manage the SECOORA WordPress site. Website content and updates are done in partnership between SECOORA staff and Axiom staff. The new public facing map will be embedded on the SECOORA Southeast Water Level Network webpage.

SECOORA has already invested in Phase 1 of the QARTOD system and data quality dashboard. Data quality tests are run at a regular interval, usually every thirty minutes and data quality ranges for specific tests are provided by the SECOORA Deputy Director or water level network project team members. A summary data quality report for each water level station is provided every 24 hours in a tabular view for the following QARTOD tests:

- Timing/Gap Test
- Syntax Test
- Location Test

- Gross Range Test
- Spike Test
- Rate of Change Test
- Flat Line Test

The recipient of this contract will be required to build on the Phase 1 QARTOD system to complete Phases 2 and 3 under Services Requested. Phase 4 entails building a public-facing map to display installed water level stations with other relevant data and providing access to station-specific data and information.

TIMELINE

- Request for Quotes due: August 19, 2022
- Review Process: August 20, 2022 - September 2, 2022
- Expected Contract Start Date: September 15, 2022
- Contract End Date: December 31, 2023

SERVICES REQUESTED

SECOORA will obtain ownership of any text/images/graphics used/purchased for use on this project. Proposers must demonstrate how they will address the following services:

Phase 2: PI Access and Reporting

PI Access to QARTOD system

Deliverable 1: A PI login system will be implemented so that PIs can access and review the data quality related to the sensors they operate. There will be a SECOORA administrative login so that staff can review data for water level stations and by the project team. A stop-light color code will be used for good, suspect, and bad data. A 2–4-hour plot of water level data should also be available to view as a graph with the suspect/bad data available on the graph.

Deliverable 2: The daily summary data quality reports developed in Phase 1 will be revised to include a statement regarding the number of reports anticipated for each station and the number of actual reports. This will allow SECOORA and project teams to review station reporting failures (i.e. data is lost or delayed). Additionally, the report may include a statement for each station that describes the QARTOD test that failed the most in a 24-hour period.

Deliverable 3: A change log will be kept that will record changes to project team roll-up flag overrides.

Customizable Reports

Deliverable 4: Create customizable reports for water level stations so that SECOORA staff can review station performance based on QARTOD tests. Staff will be able to select specific date ranges for one or more stations and see all of the QARTOD flags associated with the data. These reports will enable staff to better view the quality tests that are suspect or bad and identify trends or patterns for the station(s).

SECOORA staff will have the option to look at recent data points (daily, weekly) and up to 12 months of data. These reports will also provide monthly "up-time" statistics so that SECOORA staff can determine if stations are meeting the 85% up-time requirement.

Deliverable 5: A change log report can be generated to review PI roll-up flag data quality changes.

Administrative Interface

Deliverable 6: Create an admin interface so that identified administrators (SECOORA staff and selected project team members) can remove stations that are decommissioned or add stations as they come online. The admin function can include the ability to modify QARTOD benchmarks/thresholds for each test.

Deliverable 7: The selected contractor will work with Axiom Data Science to determine how to pass the manually reviewed, final roll-up quality flag back into the Axiom data management system so that the official data quality rollup flag can be stored with the data in the Axiom data management system.

Phase 3: Additional QARTOD Development

QARTOD Tests

The Respondent will implement QARTOD tests of the following parameters: water level and any other associated parameters that are collected and distributed by the water level network teams (e.g., water temperature, salinity, wind speed, gust, and direction). These additional data types will be made available via THREDDS by Axiom Data Science. QARTOD results for additional tests will be integrated into the data quality dashboard.

The following additional QARTOD tests will be run on water level data:

Deliverable 8: Climatology Test: Water Level Network PIs will need to have seasonal averages of water level which can be used for the initial climatology test. At least 1 year of data should be collected before implementing the Climatology Test.

Deliverable 9: Nearest Neighbor: This test will use NOAA CO-OPS National Water Level Observation Network (NWLON) station or other SECOORA lower-cost stations as the nearest neighbor.

Additional tests beyond QARTOD

Deliverable 10: Tidal Predication and Harmonic Analysis: For some locations, a tide prediction check could be used to compare sensor data with tidal predictions.

- Run tidal prediction code for the site after 1 month. U-tide is a good option (https://www.mathworks.com/matlabcentral/fileexchange/46523-utide-unified-tidal-analysis-and-prediction-functions). This harmonic analysis can help with climatology tests and can be used to determine non-tidal residuals (observed - predicted).

Phase 4: Develop a Public View of Installed Water Level Stations

Deliverable 11: Deliver a map for the Water Level Network webpage (to replace the current map) to show installed water level stations and provide access to QC flagged data as stations are surveyed to a common datum. An example map to model for this deliverable is https://mwp.secoora.org/

For the map component, add the following web services (e.g., toggle on/off or checkbox):

- NWS Radar
- USGS Stations in coastal counties
- NOAA CO-OPS Tides and Currents stations
- FIMAN stations, if web services are available (only available in NC, only display stations in coastal counties)

On individual water level pages, users should be able to view:

- A small map of the station location
- Station information:
    - Photo, if available
    - Station Operator
    - Reporting Frequency
    - Deployment Date
    - QA/QC Status
- Graph of actual and predicted data
    - Include local flooding threshold, if available

BUDGET

SECOORA is budgeting $50,000 for the implementation of Phases 2-4. If a specific phase or deliverable will increase the cost beyond $50,000, please identify the additional cost for the phase or deliverable. SECOORA may choose to implement a subset of the phases, depending on the funding available.

SUBMISSION OF RESPONSES

Please submit your proposal materials and budget in PDF format by email to communications@secoora.org. The submission deadline is August 19, 2022, at 5 PM ET.

PROPOSAL FORMAT

Proposals must follow the required format and address the services requested.

- Title / Cover Page:
    - Include the name of the company, company website, company mailing address, and lead point of contact information (name, email address, and phone number).
    - Any additional information for outsourcing services (example: contact information for subcontractors, website designers, etc.).
    - Total budget request

- Introduction and Project Implementation
    - Team and Company Introduction: One paragraph overview of the company/contractor.
    - Detailed Overview: Describe how you will meet the services requested for each phase. Phases can be completed in parallel or sequentially. Please note how you intend to approach the development.
    - Timeline: Provide a timeline for completing the phases requested.
- Cost Proposal
    - The cost proposal must outline the overall project cost and the cost for each phase. The recipient will be able to deploy the system on existing SECOORA Amazon cloud resources. The cost proposal shall outline the categories of expected expenses for each phase which can include: salary, subcontracting fees, market research, labor, hosting services, user interface testing, etc.
- Appendices
    - References (required): Provide the names and contact information for at least two references.
    - Resumes (required): Provide resumes for key personnel identified, with listed qualifications and credentials.

RFQ REVIEW PROCESS

All submissions to this RFQ will be reviewed by a SECOORA 3-person review panel. This is an open and competitive process. SECOORA reserves the right to reject any and all responses received as a result of this process.

DIVERSITY, EQUITY, AND INCLUSION

SECOORA is committed to building inclusive research, extension, communication, and education programs that serve people with unique backgrounds, circumstances, needs, perspectives, and ways of thinking. We encourage diverse applicants from all backgrounds to apply for this competitive opportunity.

QUESTIONS AND CONTACT

For any questions related to this solicitation, please contact Jennifer Dorton, SECOORA Deputy Director, via email (jdorton@secoora.org).