

Transforming Ocean Sensor Quality Control with Artificial Intelligence (AI)

October 2025

Customer:

A large Federal Government defense agency

Team:

Koniag Government Services (KGS), through a contract with its 8(a) wholly owned subsidiary, Koniag Emerging Technologies, LLC

Customer Challenge:

The customer provides critical environmental intelligence to enable operations worldwide. Their mission spans global oceanographic and atmospheric monitoring, modeling, and forecasting to support missions such as anti-submarine warfare, navigation safety, and operational planning. The customer operates at worldwide scale—fusing data from satellites, sensors, and autonomous platforms and running simulation models using advanced high-performance computing (HPC) systems. Their end users range from tactical operators at sea needing real-time conditions to strategic planners making long-horizon decisions.

Solution:

KGS developed a machine learning-based system for automated quality control (QC) of oceanographic sensor profiles to detect anomalous sensor readings and deliver accurate, real-time environmental intelligence to operators. Trained on millions of historical, expert QC decisions, the model replicates complex, expert judgement in detecting and removing anomalous sensor readings. The system enables faster, more informed decision-making and drastically reduces time spent on manual QC review.

AWS SageMaker provided KGS with the scalable infrastructure needed to train and evaluate machine learning models for the effort, leveraging frontier GPU instances and parallel training jobs for rapid experimentation. This environment allowed KGS to efficiently process millions of sensor profiles, accelerate model development, and evaluate its performance against human benchmarks.



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Key AWS services included:

- **Amazon SageMaker Training** for long-running, multi-node ML training jobs
- **Amazon SageMaker Studio** for notebook GPU instances and rapid prototyping
- **Amazon S3** for storing raw and processed oceanographic sensor data

Outcomes, Results, and Benefits:

The ML-based QC prototype demonstrated strong potential for operational integration, delivering highly reliable, real-time environmental intelligence while drastically reducing manual analyst workload.

KGS' ML-based QC system improves anomaly detection rates by 43% over traditional automated methods, reduces false positives by 85%, and processes more than 300,000 sensor profiles per minute. By applying machine learning for sensor QC processing, the system provides scalable, data-driven assurance of sensor integrity, drastically reduces time spent on manual QC review, and lays the groundwork for the delivery of real-time, high-quality environmental intelligence to operators.

Learn More:

If you would like more information, please contact KGSinfo@koniag-gs.com. In your email, be sure to reference the title of the use case document and include any specific follow-up requests or details you'd like us to provide.