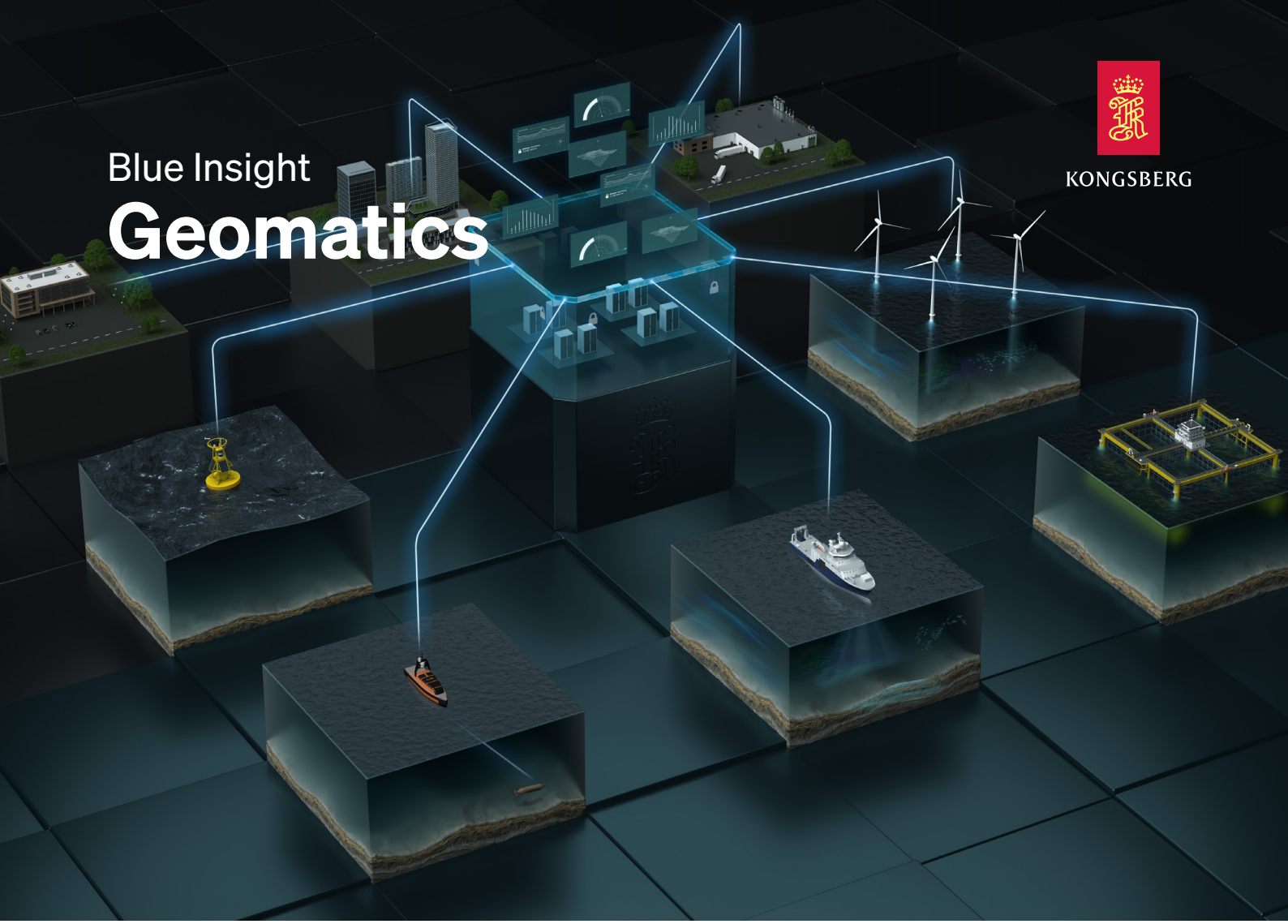
Blue Insight

Geomatics

KONGSBERG



GEOMATICS – powered by Blue Insight digital platform

Collect, organize, and distribute ocean data

Geomatics is designed to meet the increasing demand for accurate information from the oceans. It preserves and presents timeseries and acoustic data so that vessel operators can be assured their ocean data management requirements are met.

In Geomatics, *Instrument Dashboards* provide a complete view of instrument performance while *Ocean View* allows for advanced data exploration both onboard vessel and from onshore.

Simplified data management for vessel operators

- Manage bathymetric and water column data in one system
- One view across all observation plattforms (AUV, USV, RV)
- Adhere to FAIR data management principles (Findable, Accessible, Interoperable and Reusable)
- Faster access to interesting data

KEY BENEFITS

Operational efficiency

- Streamlined data collection with automated ingestion
- Instant overview with instrument Dashboards
- Allow users full access to data from anywhere (onboard and cloud*)

Scientific excellence

- Advanced data exploration toolset
- Full control of metadata for chain of custody
- Designed for automated Machine Learning

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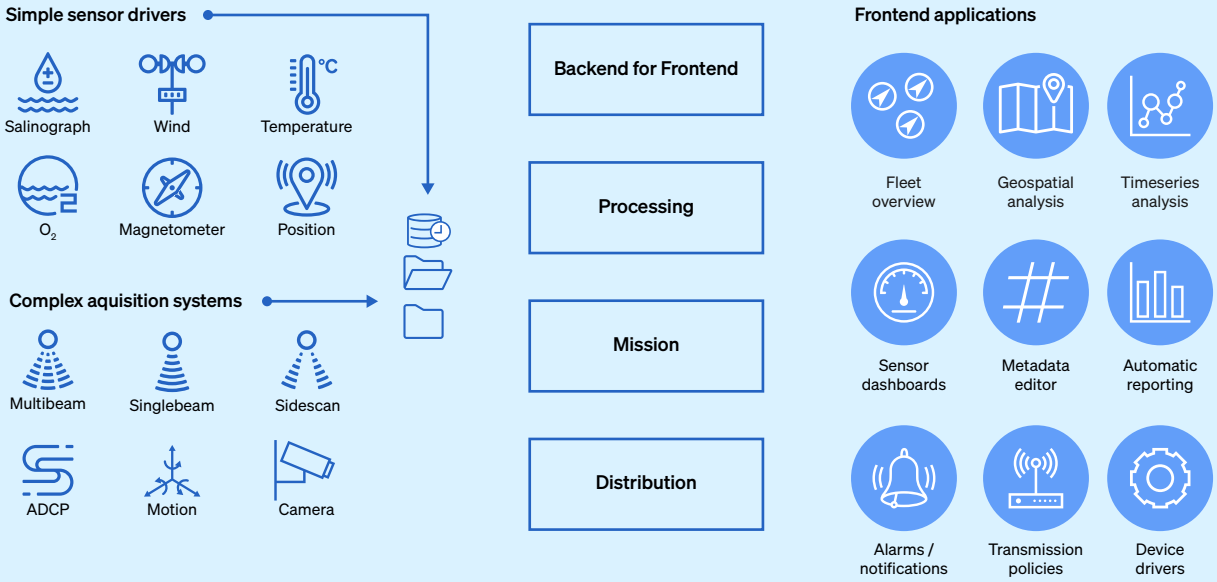
** Cloud access is optional and available upon request*

Geomatics overview:

From sensor to insight



Frontend Applications. The right side of the diagram shows various frontend applications that use the processed data:

Ocean Data Management

The Geomatics system is built as microservices and web architecture:

Data acquisition layer

Two types of data acquisition sources are depicted: "*Simple sensor drivers*" and "*Complex acquisition systems*". These represent the hardware or software interfaces that collect data from various sensors. Simple sensors might include temperature, humidity, or pressure sensors, while complex systems refer to multi-sensor platforms, acoustic instruments and camera systems.

Data processing and storage

The data collected by the sensor drivers and acquisition systems is stored and processed sequentially (filtering, analysis, or validation), to ensure it is in a usable format for further analysis or decision-making.

Backend for frontend

This component serves as an intermediary between the backend services (data processing and storage) and the frontend applications. It's responsible for optimizing data for different frontend use cases and user interfaces.

STANDARD

Fleet Overview:
An overview of a collection of assets or vehicles.

Geospatial Analysis:
Analyzing the geographic component of the data.

Timeseries Analysis:
Analysis of data that is collected over time.

Instrument Dashboard:
Display real-time or historical data from sensors.

Device Drivers (standard + optional):
This application allows users to customize settings or configurations related to the data acquisition or processing.

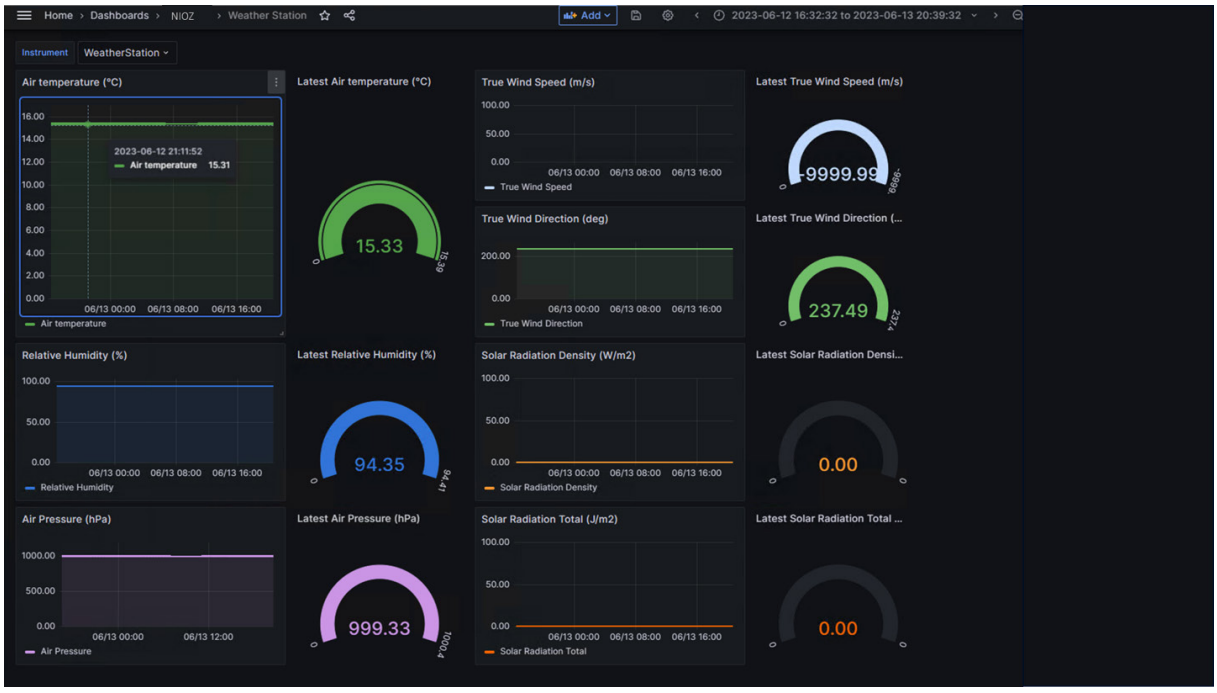
OPTIONAL

Metadata Editor:
Managing the metadata associated with the data, which is crucial for data discovery, compliance, and management.

Automatic Reporting:
Automate the generation of reports based on the collected data, reducing the need for manual report writing.

Alarms / Notifications:
A feature for alerting users based on specific triggers or thresholds being reached within the sensor data.

Geomatics provides web-based interfaces to allow users to understand data structure, format, and quality of the data which is crucial in early stages of a survey. Further, the specialists can identify patterns, trends and anomalies in the data which can guide them in formulating hypotheses or research questions.



Instrument Dashboard

GEOMATICS ensures that data from all sensors are collected and stored securely. The Instrument Dashboard provides monitoring and control of the various sensors and instruments used to collect oceanographic data. GEOMATICS facilitates:

Data accuracy and reliability

Continuous monitoring and control of instruments are vital to ensure the accuracy and reliability of the data collected. Oceanographic sensors can be subject to various environmental stresses, such as saltwater corrosion, biofouling, and extreme pressure and temperature conditions. Regular monitoring helps in detecting and correcting any deviations in the data, which might be due to instrument malfunctions or significant signal drift.

Adaptation to environmental changes

The ocean is a dynamic environment. Instruments need to be monitored and sometimes adjusted in response to changing environmental conditions, such as temperature shifts, salinity changes, or varying water currents, to ensure consistent data quality.

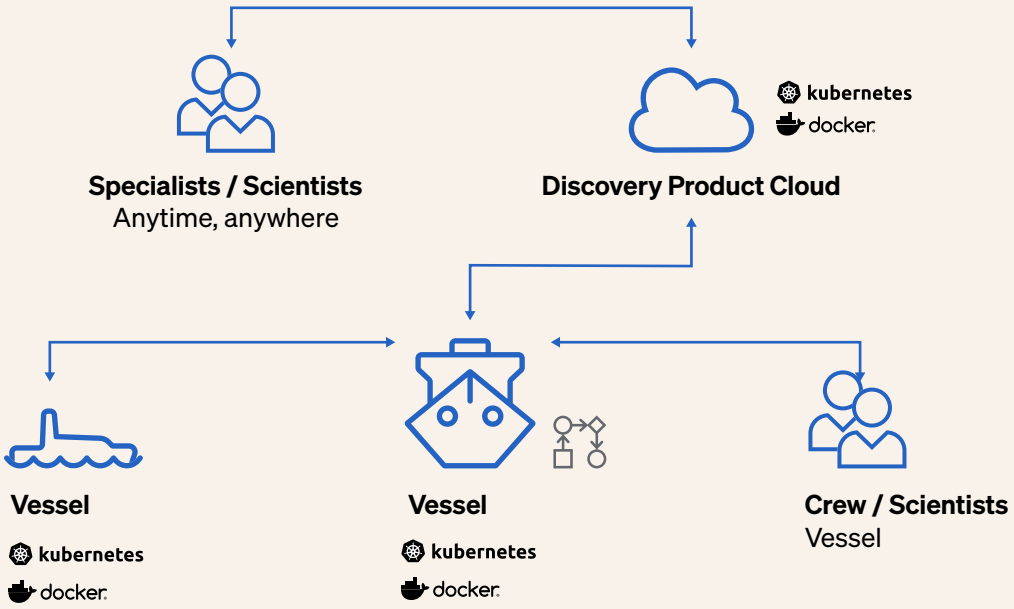
Long-term data trends analysis

For studies that require long-term data collection, such as climate change research, it's essential that the instruments function consistently over extended periods. Monitoring and control play a key role in ensuring the longevity and consistency of these instruments.

Real-time decision making

In scenarios like pollution tracking or disaster response (e.g. oil spills, tsunamis), real-time data from well-maintained instruments can be critical for timely decision-making and effective response strategies.

Simplified data management for survey operators



Data Exploration

GEOMATICS provides data exploration through the Ocean View app where datasets can be examined, layered, and filtered to understand its main characteristics, often with visual methods, before applying more complex analysis:

Discovery of new insights

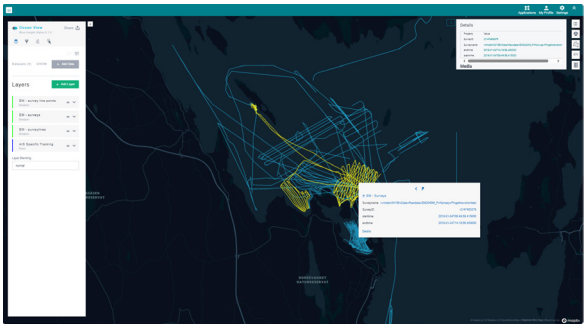
Importing external models as layers blended with live measurements can provide new insights into marine ecosystems, oceanic processes, and environmental changes. This could include understanding migration patterns of marine species, changes in ocean temperatures, or the impact of human activities on marine life.

Fostering collaborative efforts

Robust access management underpins trusted knowledge sharing and joint efforts in addressing global challenges like climate change, thereby fostering a more integrated scientific community.

Informing scientific research

Data exploration helps in forming hypotheses, guiding experimental designs, and providing evidence for scientific theories. For instance, exploring data related to ocean acidity levels could contribute to research on ocean acidification and its effects on marine biodiversity.

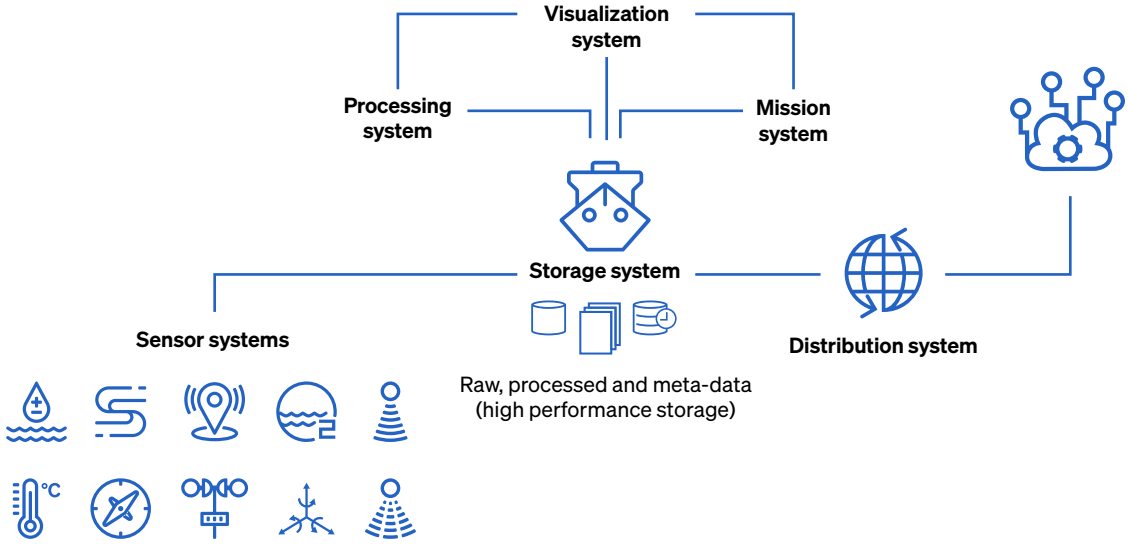


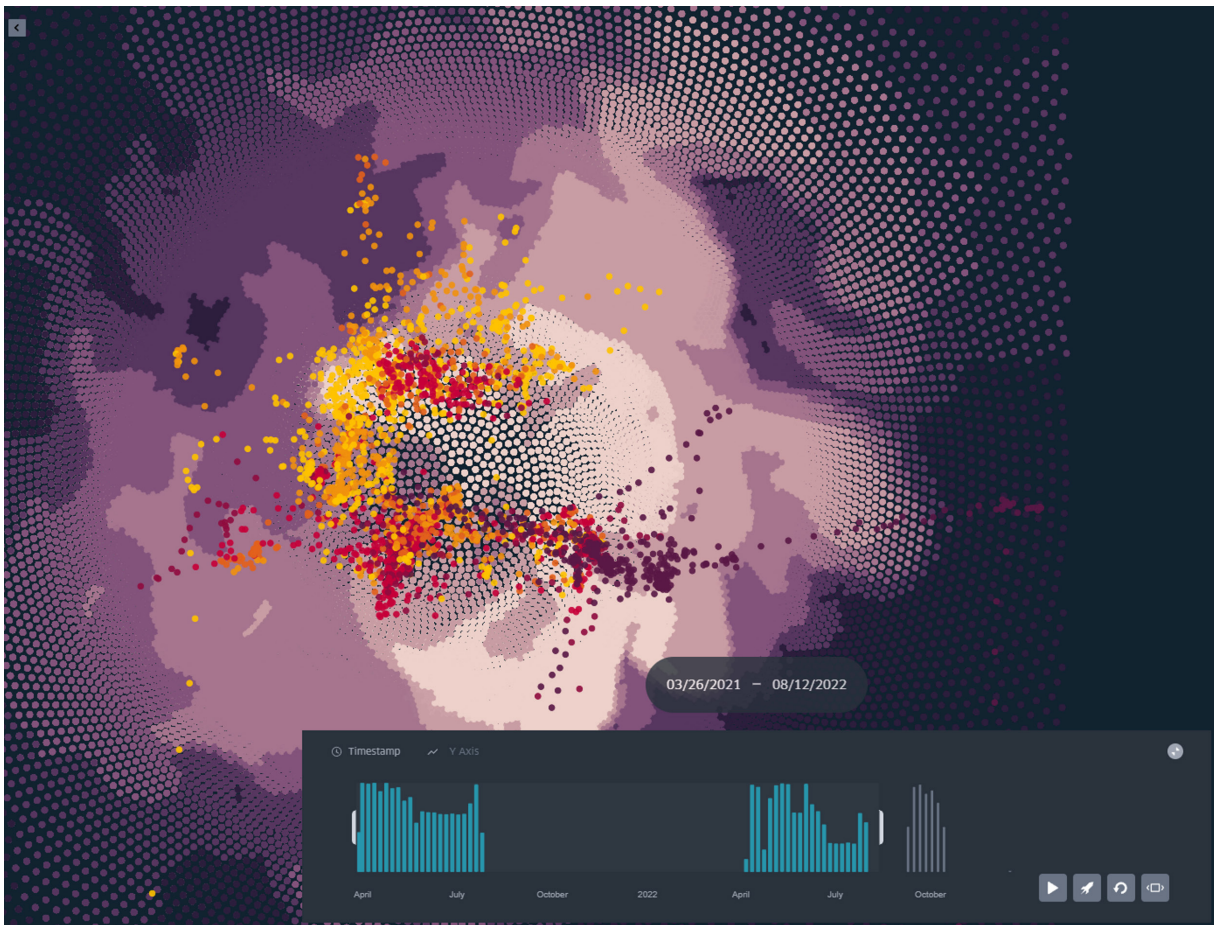
Supporting environmental protection efforts

Exploration of ocean data can reveal critical information about environmental threats such as pollution, overfishing, and climate change. This information is crucial for developing strategies to protect marine environments and sustainably manage ocean resources.

System overview

Onboard- and cloud side survey management





Analyze and present timeseries of data.

Sensors, data formats and protocols

Geomatics supports a large set of Kongsberg and third-party sensors

New instruments can be supported by adding custom parsing and ingestion handler

All geospatial, timeseries, mission and metadata available through Open Geospatial Consortium (OGC) APIs for support of FAIR principles (Fair, Accessible, Interoperable, Reusable)

Type of data	File formats
Water column data, incl ADCP	.raw, .netcdf. Zarr, .hdf5
Bathymetry data	.xyz, .las, .laz, .kmall/.all
Sidescan / SAS Sub-Bottom Profiler data	.xtf, .geotiff
3D models of objects from e.g., underwater laser scanner, photogrammetry	.gltf, .stl, .fbx, .obj
Videos incl. metadata	.mp4 + .geojson / companion file (lat long)
Photos / images, e.g. georeferenced	.jpg + .geojson / companion file (lat long)
Projected photos from e.g. Aerial drones, satellites	.geotiff
CTD & Sound Velocity data	.csv, json, txt, .netcdf, .svp

Protocol	Description
NMEA	ASCII over serial or UDP. Geomatics implements a Generic Driver for NMEA-like output from Instruments and some proprietary drivers for GPS, AIS & WeatherPak
MQTT	Publish/Subscribe interface to ingest and distribute datagrams locally on ship or to cloud
RS232/RS432	Sensors connected using a serial-to-ethernet converter to translate serial messages to UDP or TCP
Ethernet	Geomatics support sensors connected to the local network over UDP or TCP

Hardware

- Requires a Hydrographic Workstation (HWS) ship-side.
- Integrates to onboard Network Attached Storage (NAS).

HWS

- Only 1U high
- 19” rack mount
- Only 3.6 kilos
- VESA mounts behind display and under-the-desk
- Supports four displays SSD or NVMe data disks IntelCore I7-8700T
- 16 GB RAM upgradable
- 115/230 VAC
- Max 170W, 65W typical, Windows® 10
- Maritime certification

https://www.kongsbergdiscovery.online/sis/sales/hws_ds_en_a4.pdf

Optional services

- NAS infrastructure incl HW can be provided upon request.
- Cloud access can be provided upon request.

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