52north
exploring horizons

Interoperable Provision of Research Vessel Tracking Data via OGC SensorThings API and Sensor Observation Service

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Geospatial Sensing | Virtual 2020

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Overview

- EMODnet
- EuroFleets+
- Architecture
- Harmonizing Data Models
- Outlook

EMODnet

European Marine Observation and Data Network

EMODnet

- Collect data once and use it many times
- Develop standards across disciplines as well as within them
- Recognize that marine data is a public good
- Discourage cost-recovery pricing from public bodies
- Thematic Portals
  - Bathymetry
  - Geology
  - Seabed habitats
  - Chemistry
  - Biology
  - Physics
  - Human activities

EMODnet Ingestion

- Aims to reach out to all kind of organizations with marine data
- Motivate and support potential data providers to publish their data to EMODnet
- Transfer of the data to European datacenters, infrastructures and portals
- Help users to provide the data in the most appropriate format

EMODnet

EMODnet, the European Marine Observation and Data Network, has over 160 organisations that work together to assemble and harmonise marine data, metadata and products, making them more accessible to Blue Society.

The ***Data Ingestion Portal*** facilitates submitting marine datasets for further processing, Open Data publishing and contributing to applications for society.

EMODnet
European Marine Observation and Data Network

EMODnet Data Ingestion
WAKE UP YOUR DATA
Set them free for Blue Society
The Data Ingestion Portal facilitates submitting marine datasets for further processing, Open Data publishing and contributing to applications for society.
emodnet-ingestion.eu
EMODnet

EuroFleets+

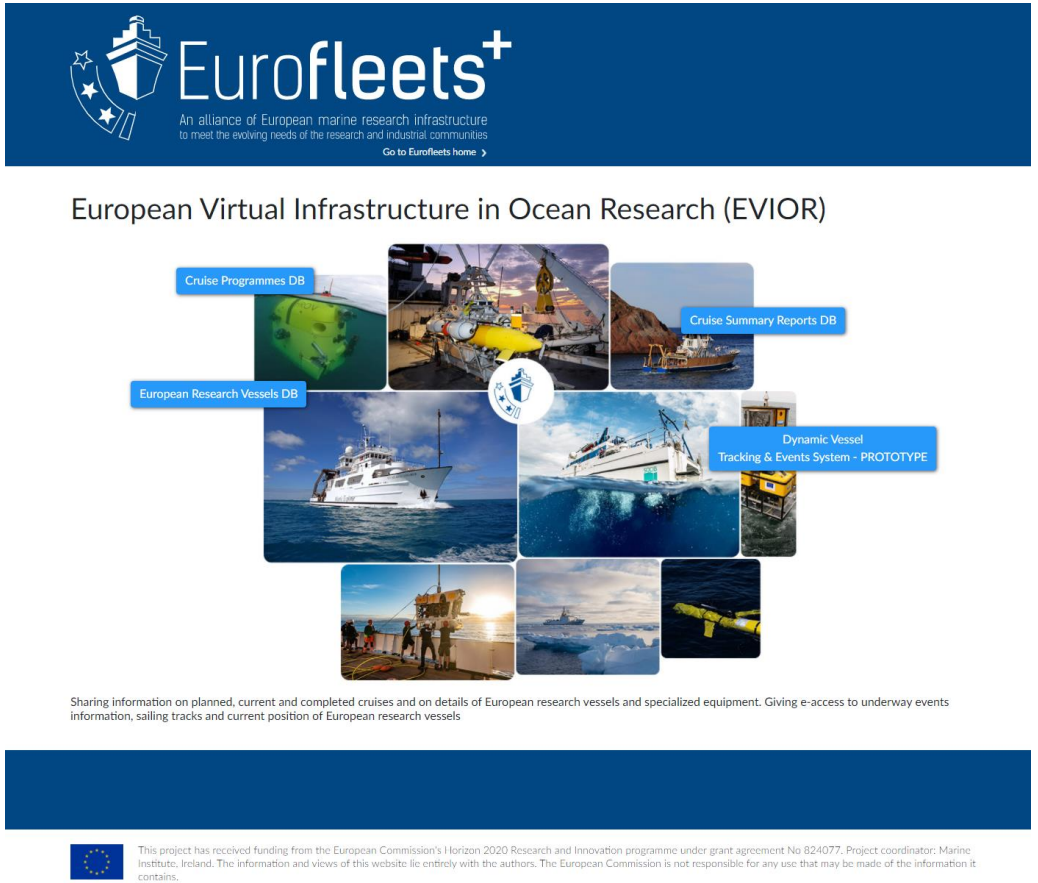
EuroFleets+

- Aims to integrate and advance the European Research Vessel infrastructure
- Fleet of 27 state-of-the-art research vessels
- Several ROVs and AUVs
- Multiple transnational access programs for researchers

EVIOR

European Virtual Infrastructure in Ocean Research

European Virtual Infrastructure in Ocean Research (EVIOR)



European Virtual Infrastructure in Ocean Research (EVIOR)

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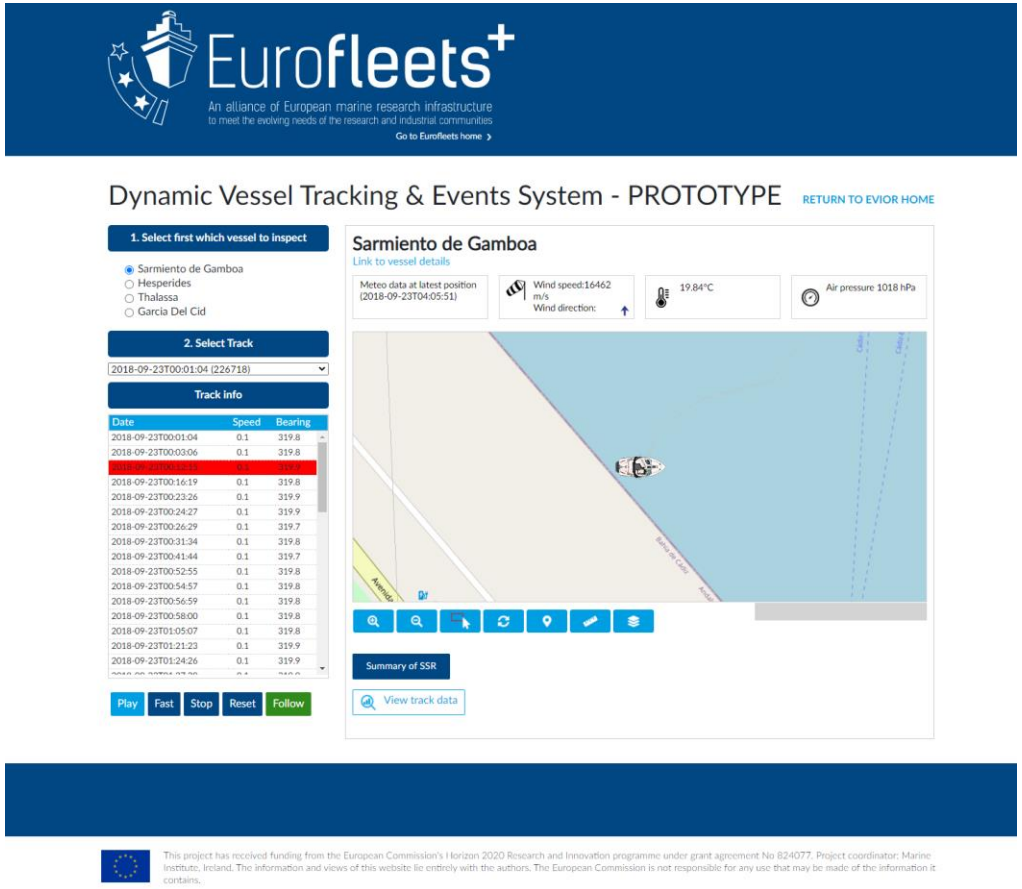
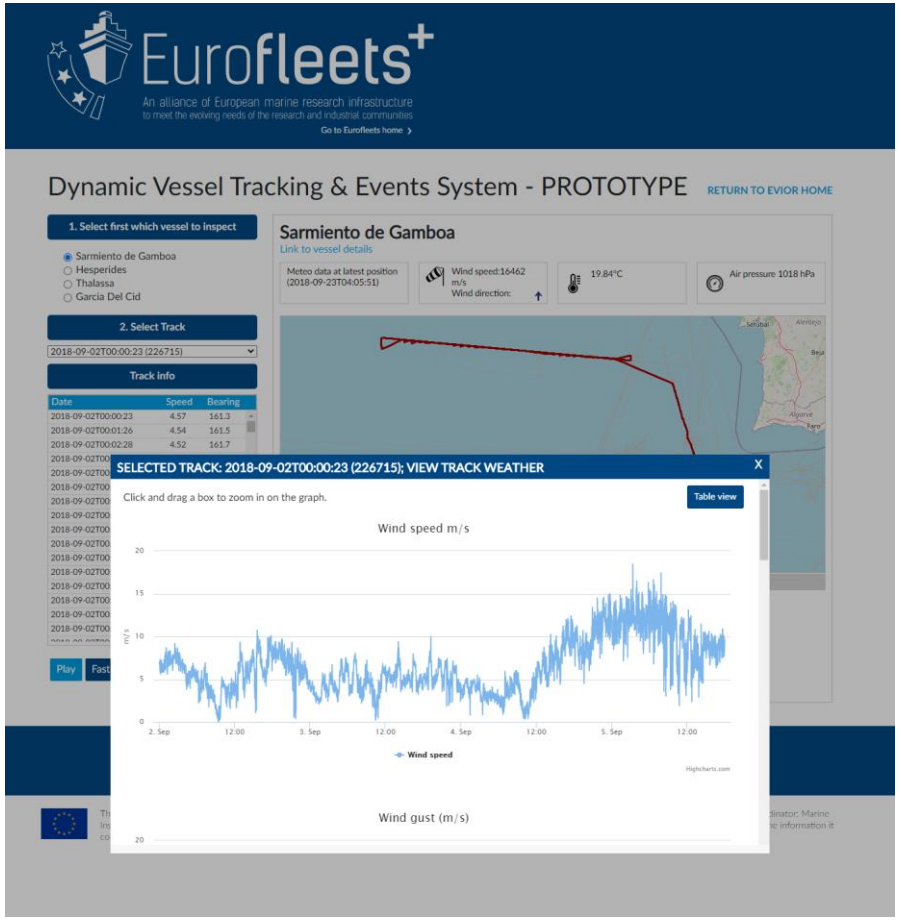




European Virtual Infrastructure in Ocean Research (EVIOR)

Navigational

- Longitude/Latitude
- Heading
- Speed
- Depth
- Course Over Ground
- Speed Over Ground

Meteorological

- Wind Speed
- Wind Direction
- Air Temperature
- Humidity
- Solar Radiation
- Atmospheric Pressure

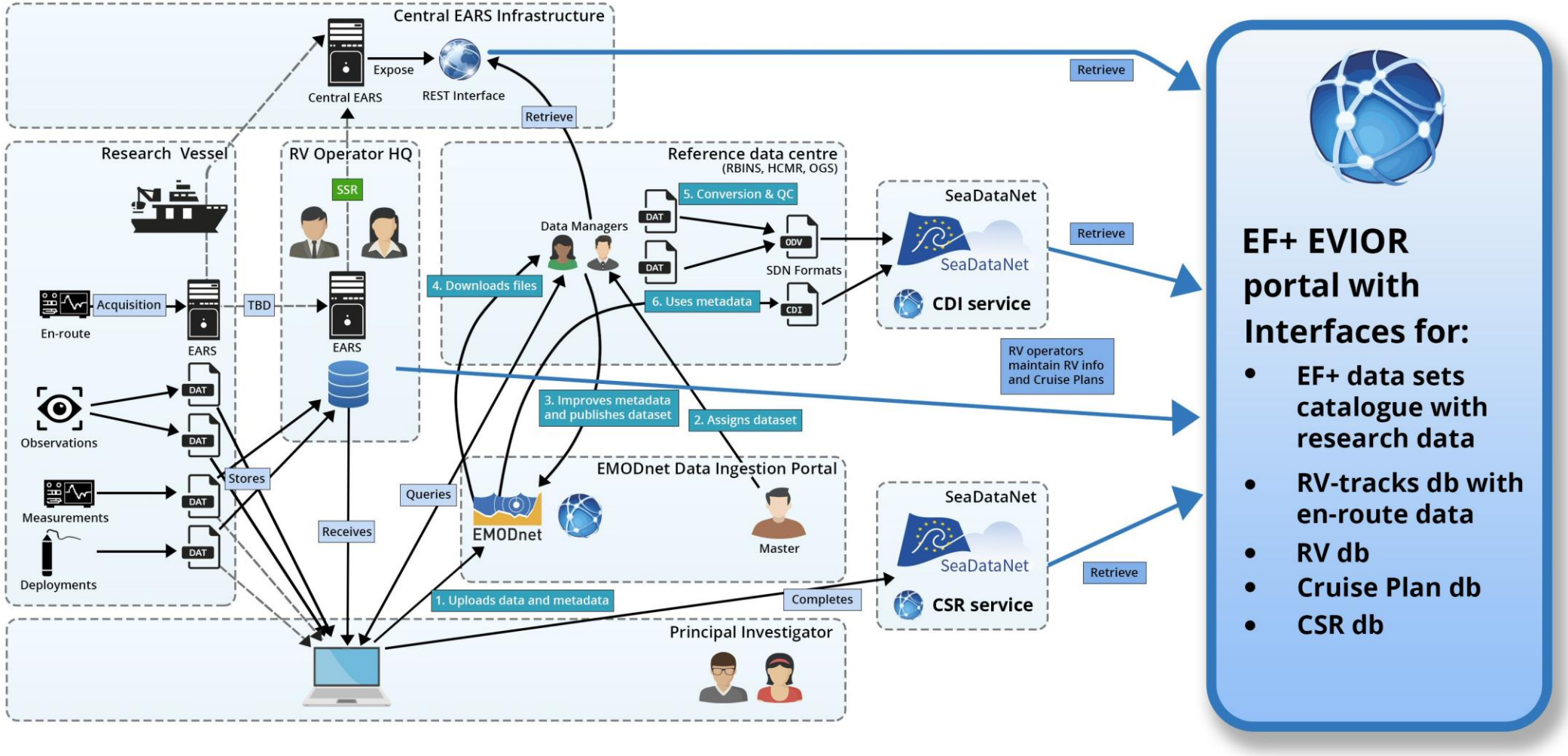
Thermosalinity

- Salinity
- Water Temperature
- Raw Fluorometry
- Density (σT)

All mapped to definitions in the NERC Vocabulary Server

Architecture

Architecture



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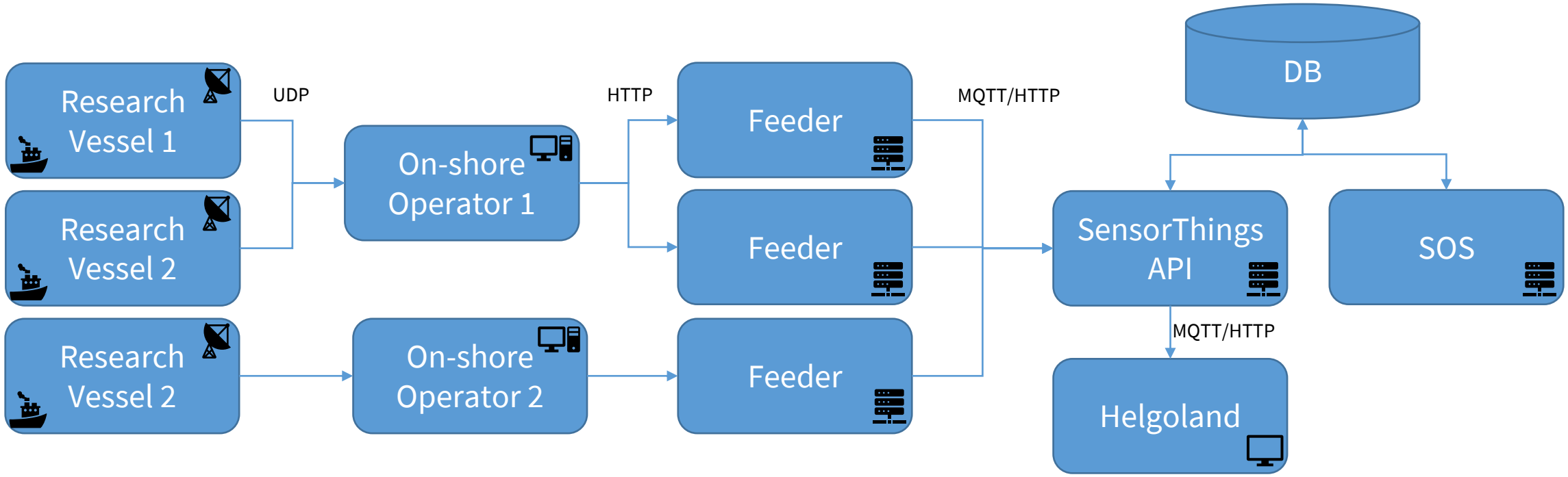

Initial Deployment

- Single deployment at CSIC, Spain
- Inclusion of 4 test vessels for development and testing
- Testing on two cruises from EuroFleets+

Test Vessels

R/V Sarmiento de Gamboa, Vigo (Spain)

R/V García del Cid, Vigo (Spain)

Test Vessels

R/V Belgica, Zeebrugge (Belgium)

R/V Thalassa, Brest (France)

Pilot Vessels

R/V Árni Friðriksson, Reykjavik (Iceland)

R/V Dana, Hirtshals (Denmark)

Pilot Vessels

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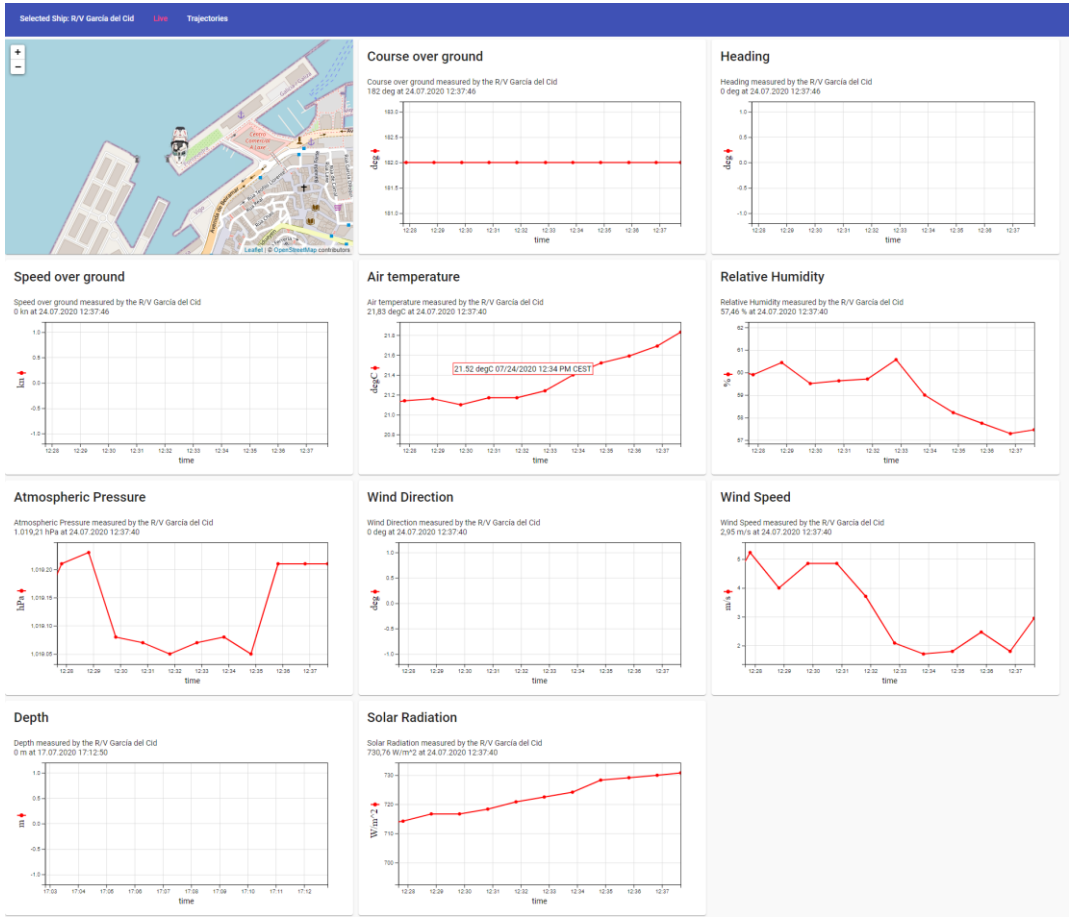
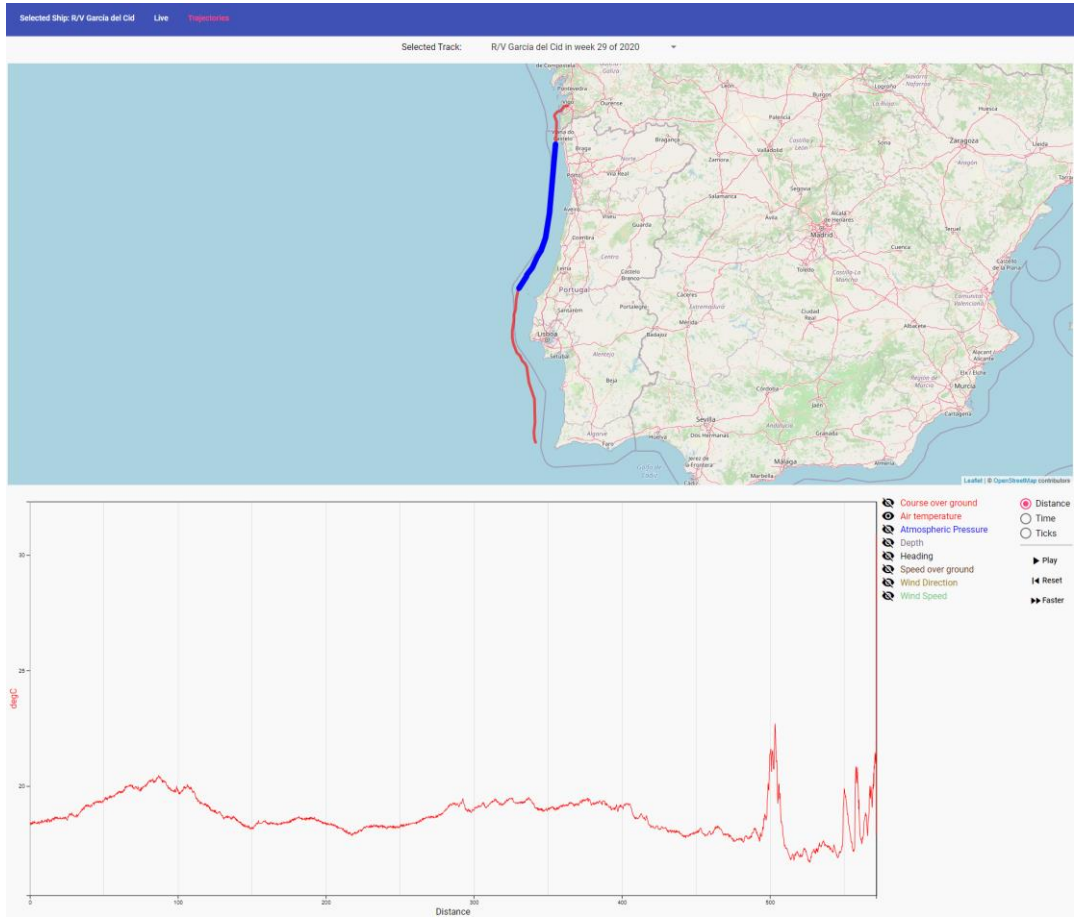
R/V Dana, Hi[illegible] (Denma[illegible])

POSTPONED

EuroFleets+ Dashboard



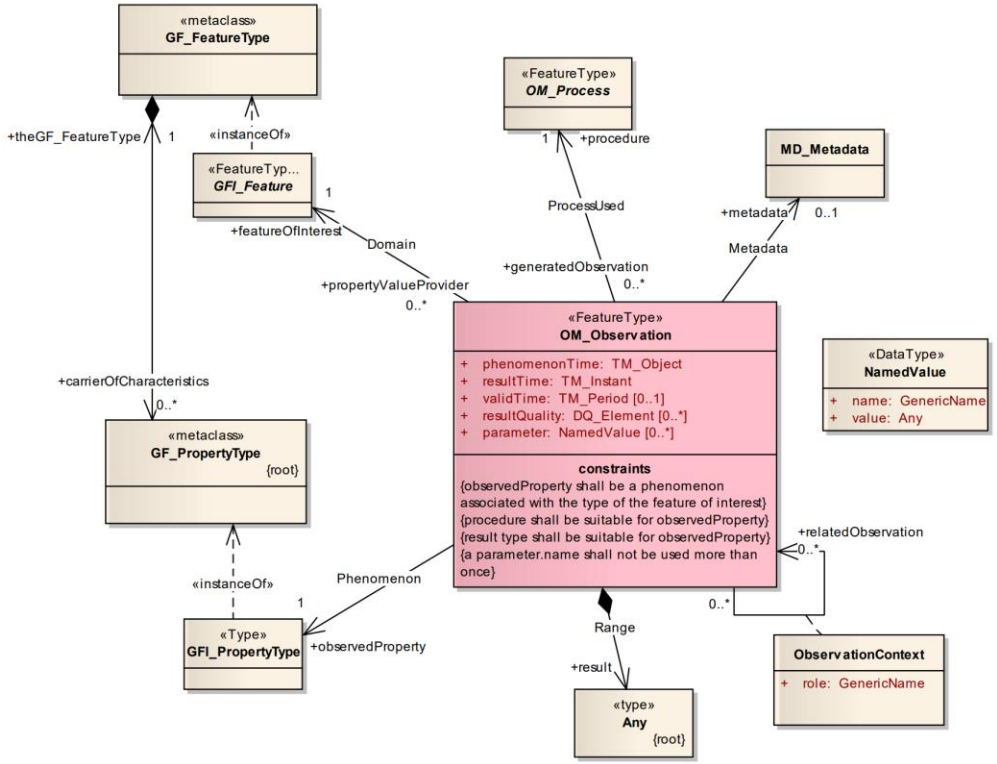


Harmonizing Data Models

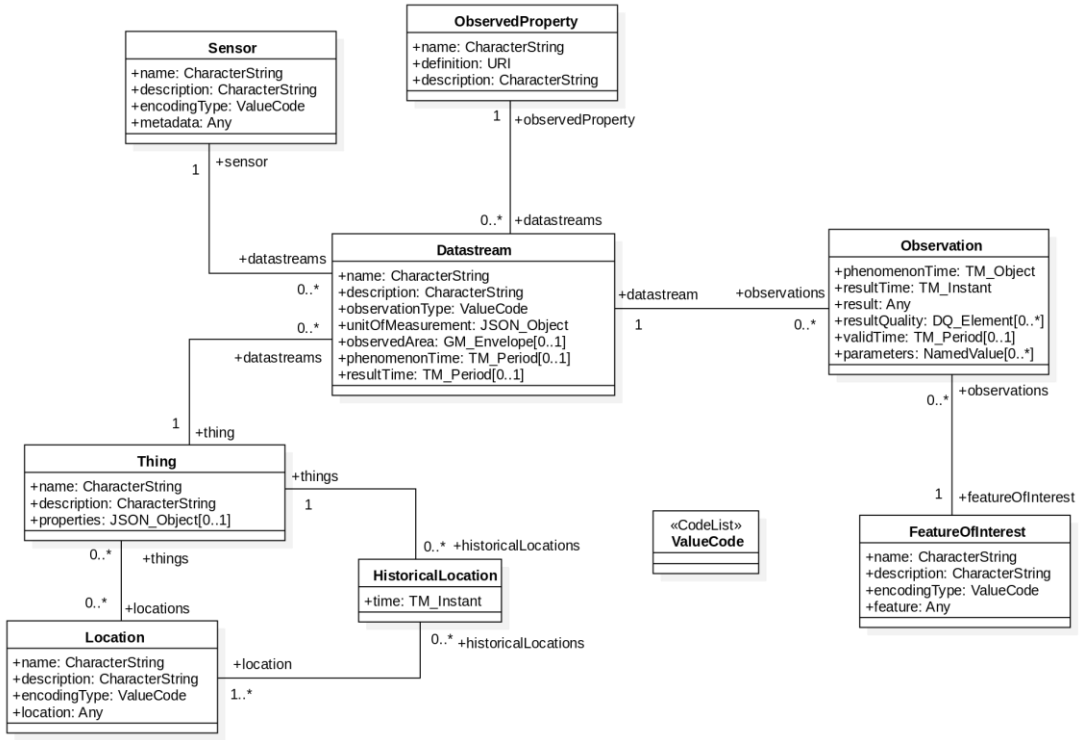
Sensor Observation Service vs. SensorThings API

Harmonizing Data Models

Observations & Measurements



SensorThings API



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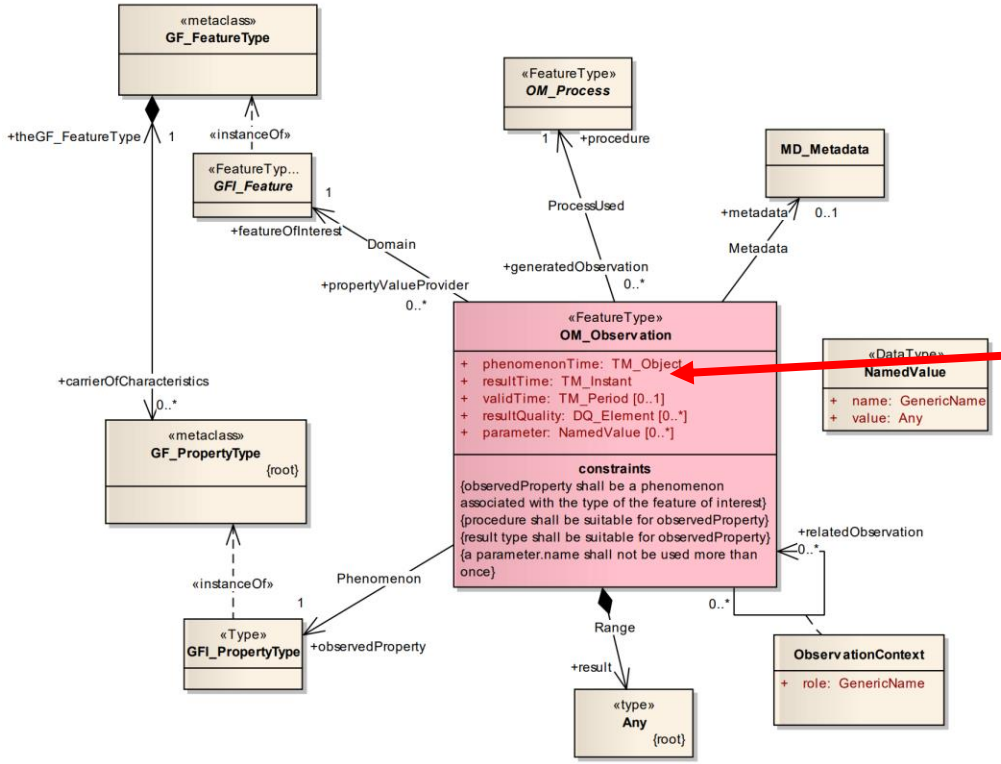

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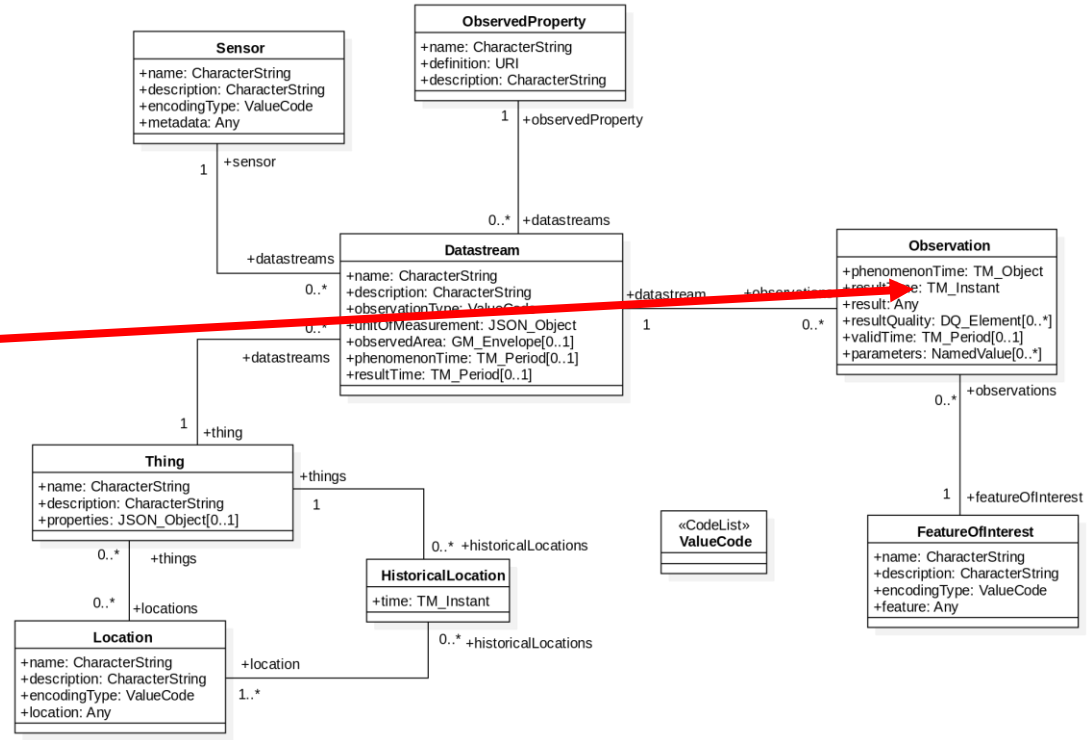

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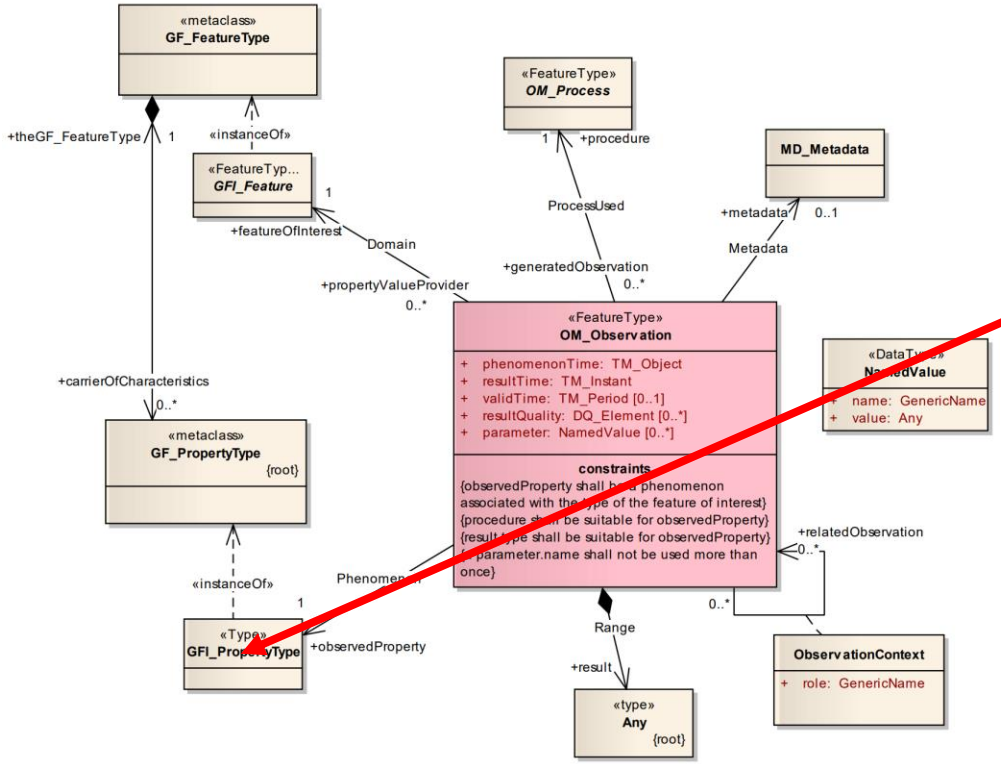

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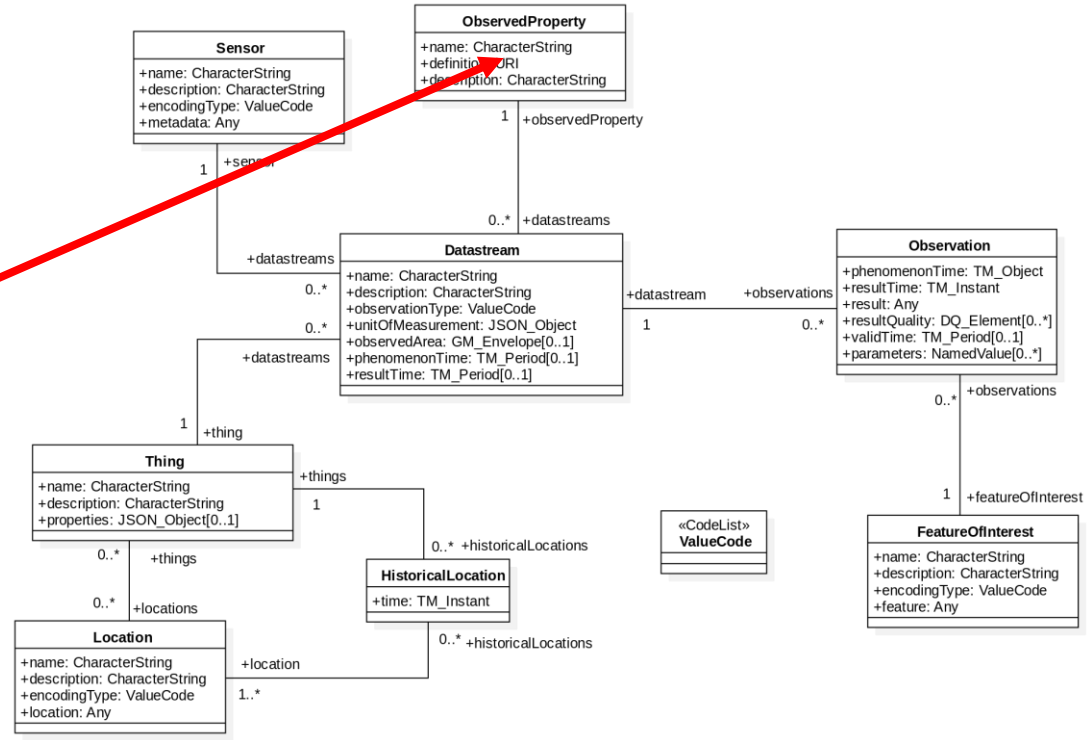

Harmonizing Data Models

- Feeder only communicates with SensorThings API
  - Initially via HTTP
  - During the feeding only via MQTT

- But SOS requirements are clear:
  - One Procedure and Offering per vessel
  - Observation should comply with the Spatial Filtering Profile
  - One Feature Of Interest (FOI) per cruise
  - Position updates should be appended to the LineString so that the FOI contains the complete track

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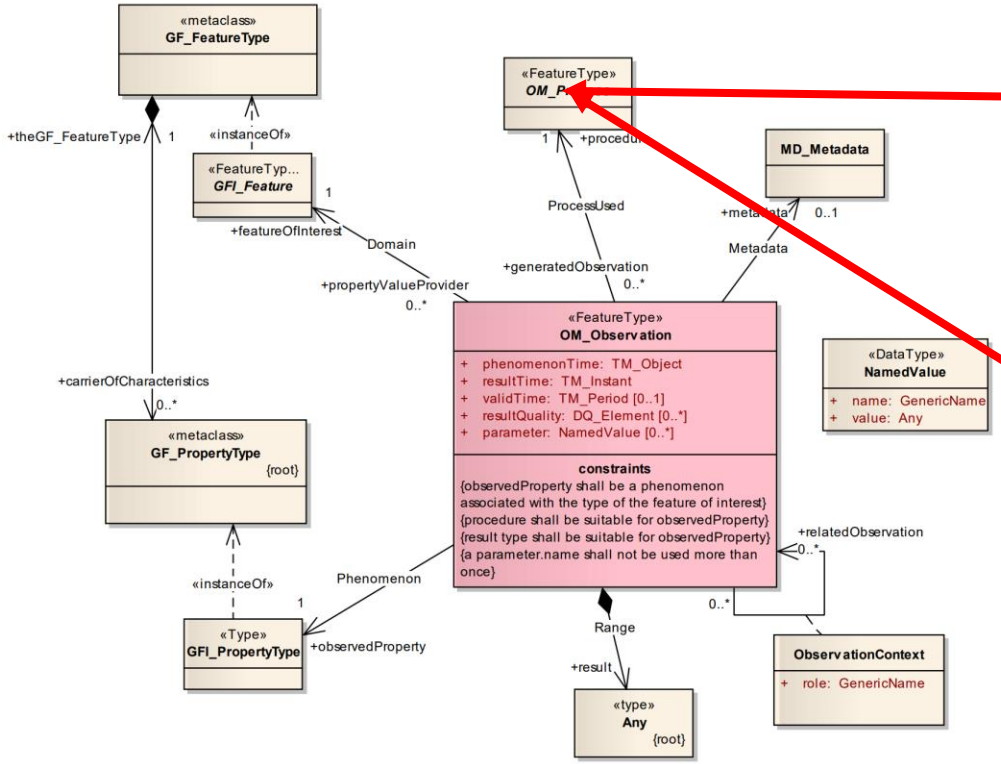

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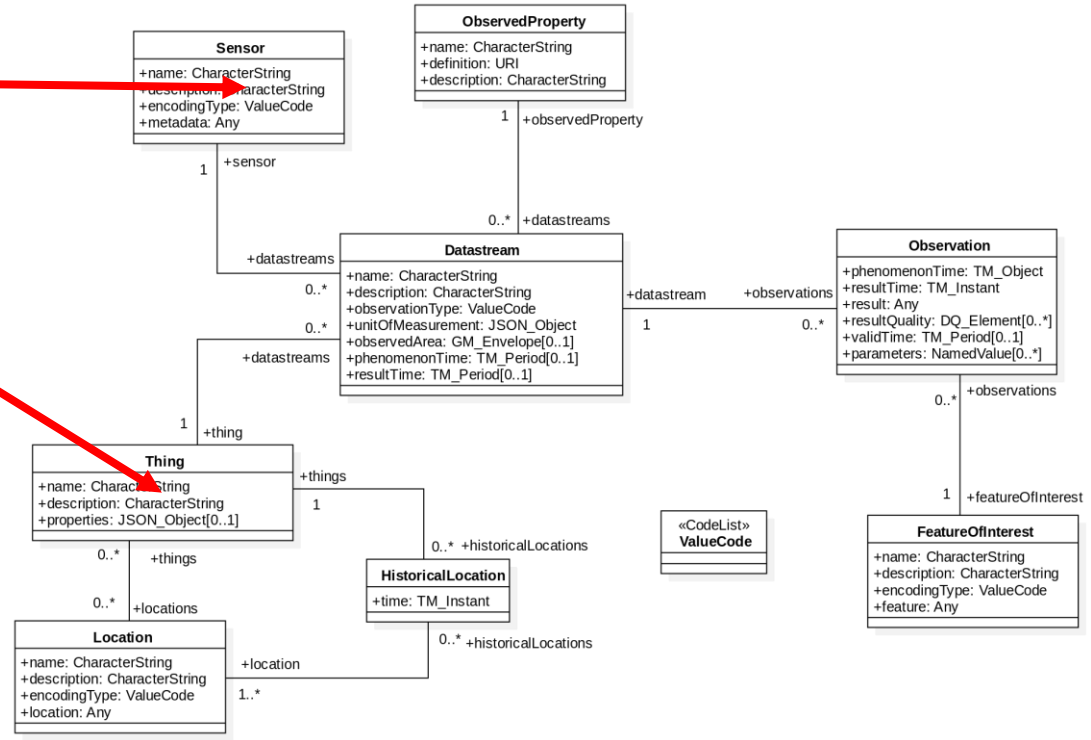

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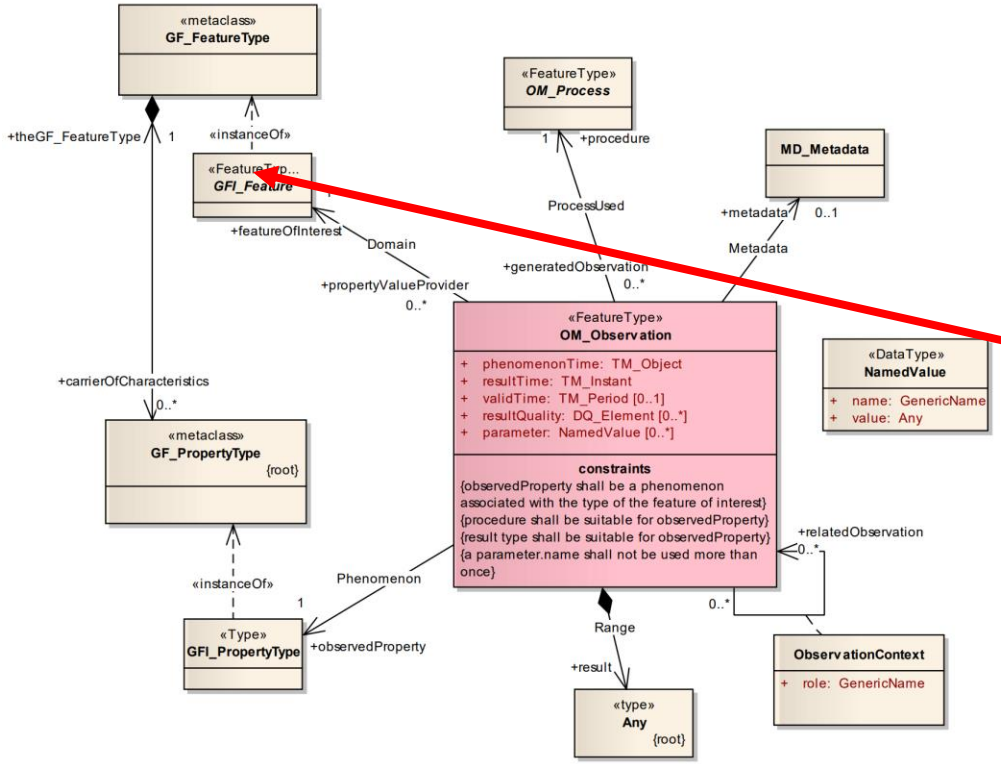

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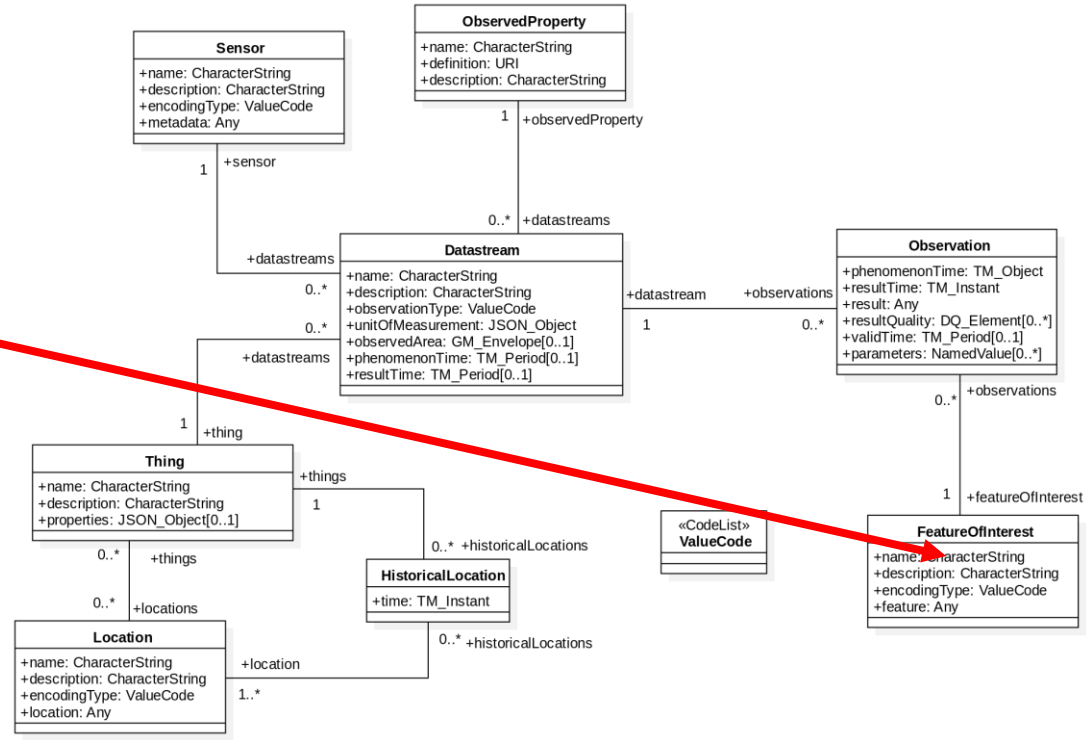

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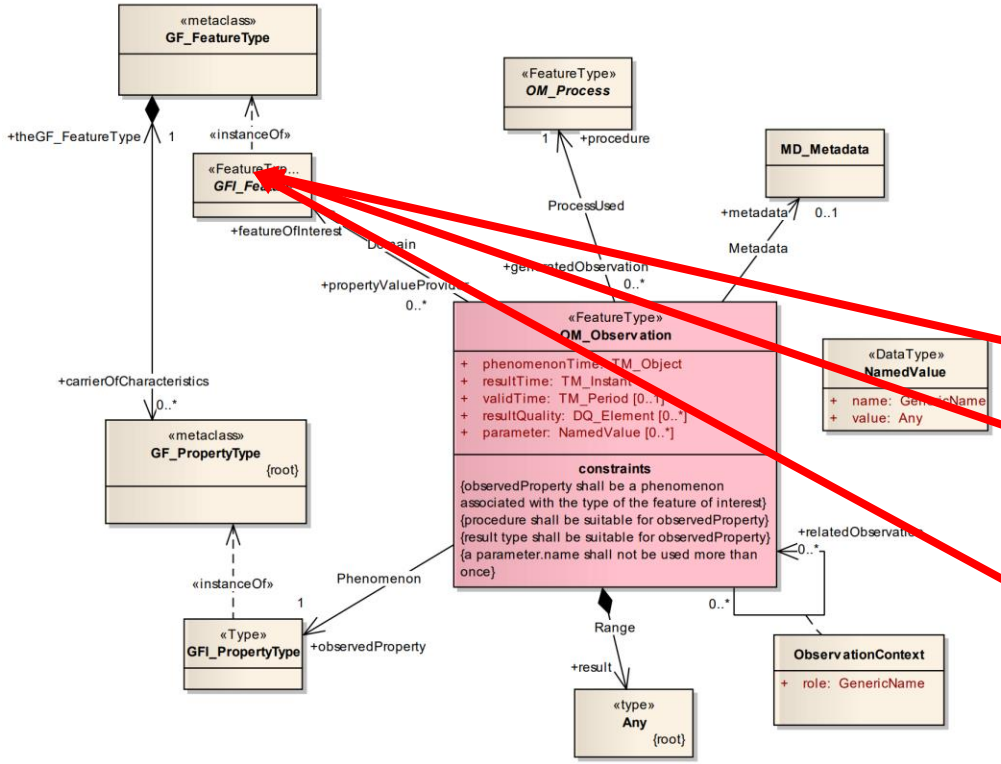

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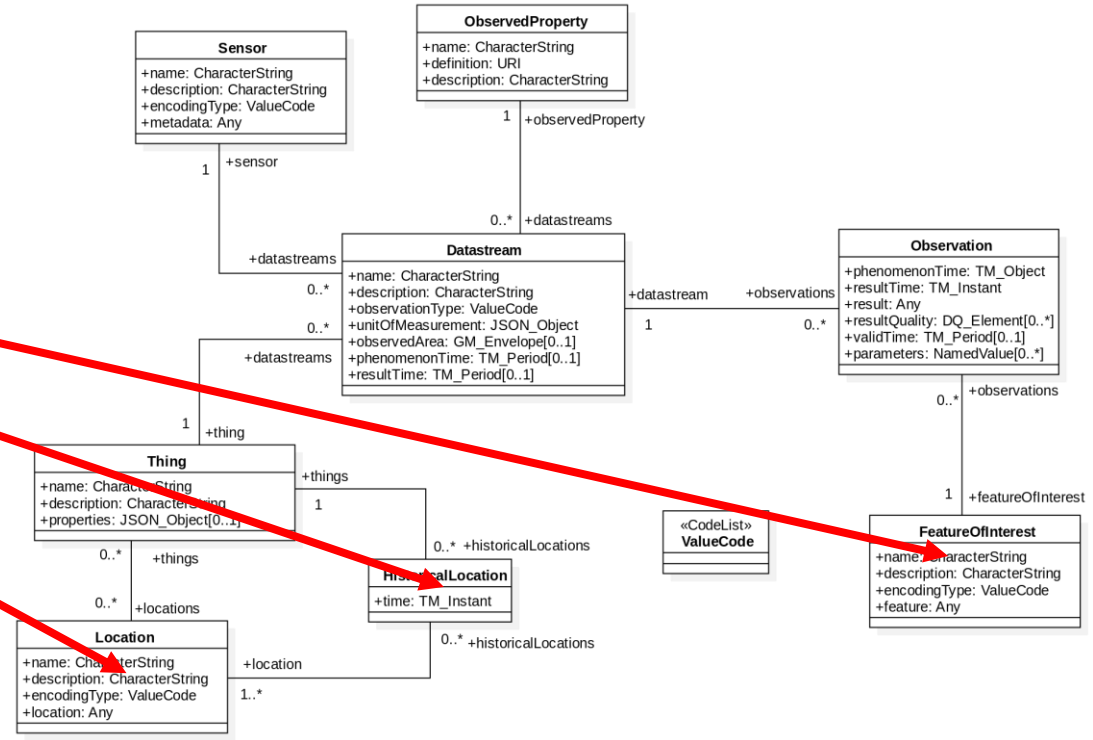

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  - Initially via HTTP ✓
  - During the feeding only via MQTT
    → Allow publishing on more topics then the standard allows (/Locations) ✓
- But SOS requirements are clear:
  - One Procedure and Offering per vessel
    → Vessel = Sensor = Thing = Procedure ✓
  - Observation should comply with the Spatial Filtering Profile
    → STA-Implementation was extended to recognize this special observation parameter ✓
  - One Feature Of Interest (FOI) per cruise
    → Not really possible, interim solution: one FOI per week ✗
  - Position updates should be appended to the LineString so that the FOI contains the complete track
    →New configurable feature of our STA implementation: a configured FOI is automatically updated (via Locations and Observations) ✓

Outlook

- Deployment to more RV operators
- Federation into the EVIOR portal
- Push-based data flow
- Richer Metadata (SensorML) descriptions
- Transmission of events and inclusion in SensorML
  - E.g. sensor calibration and deployments

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Thanks!

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