ALFRED-WEGENER-INSTITUT
HELMHOLTZ-ZENTRUM FÜR POLAR- UND MEERESFORSCHUNG

An integrative solution for managing, tracing and citing sensor-related information

EGU2017-17495

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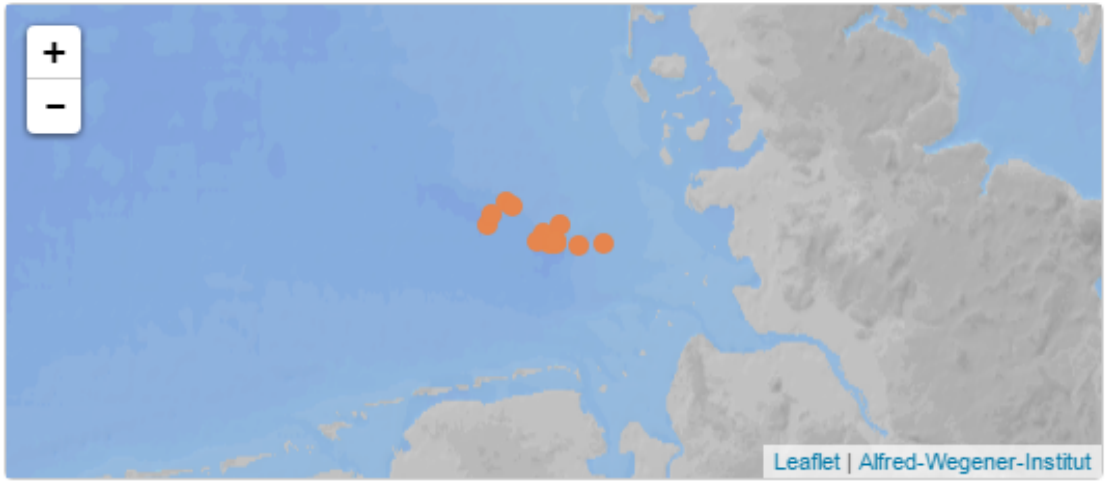
HELMHOLTZ GEMEINSCHAFT

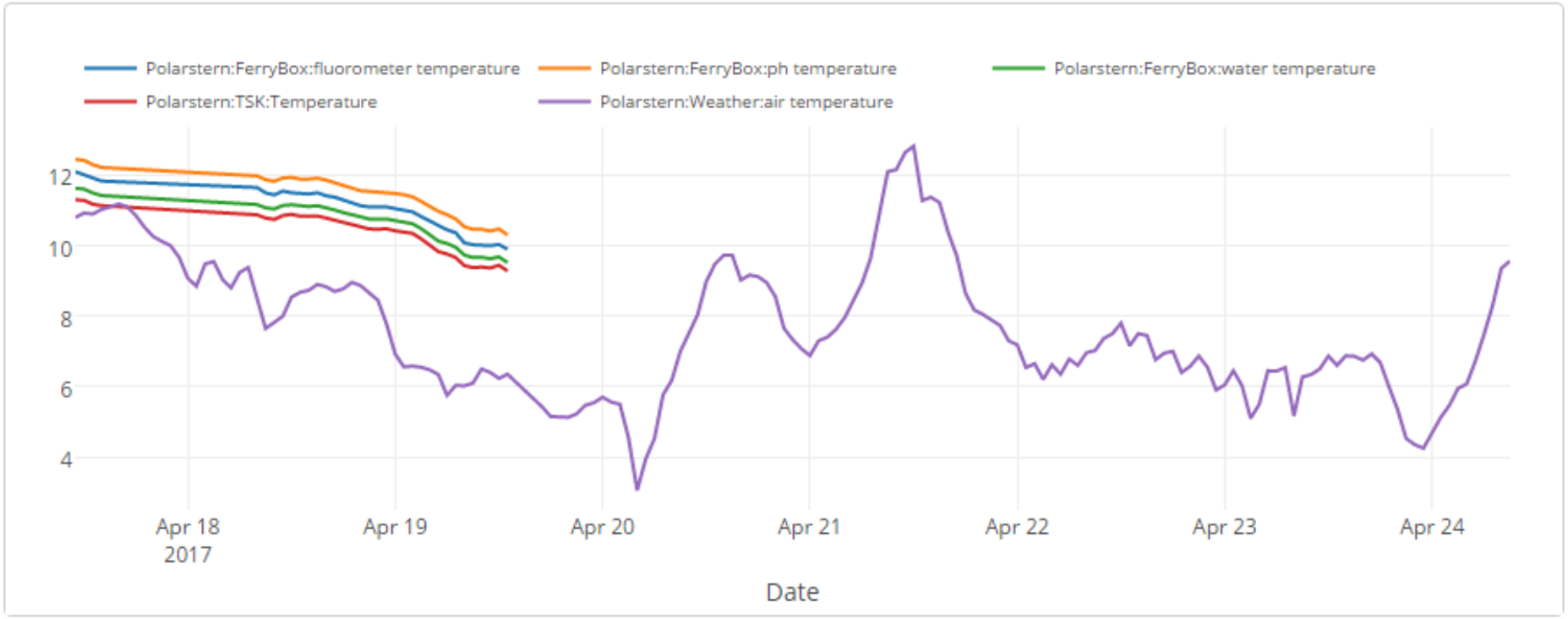
33.82 0/00
Polarstern salinity

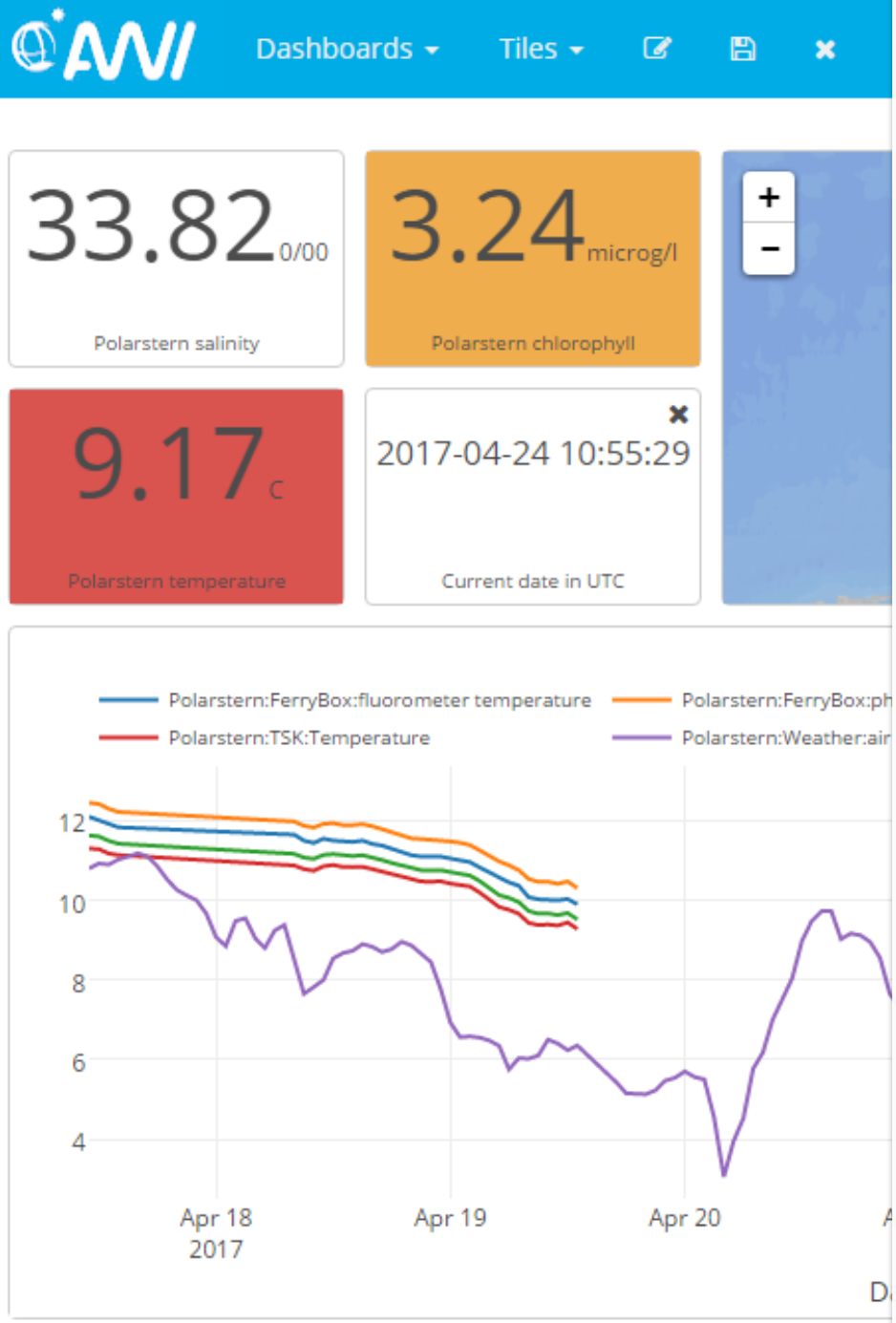
3.24 microg/l
Polarstern chlorophyll

9.17 C
Polarstern temperature

2017-04-24 10:55:29
Current date in UTC







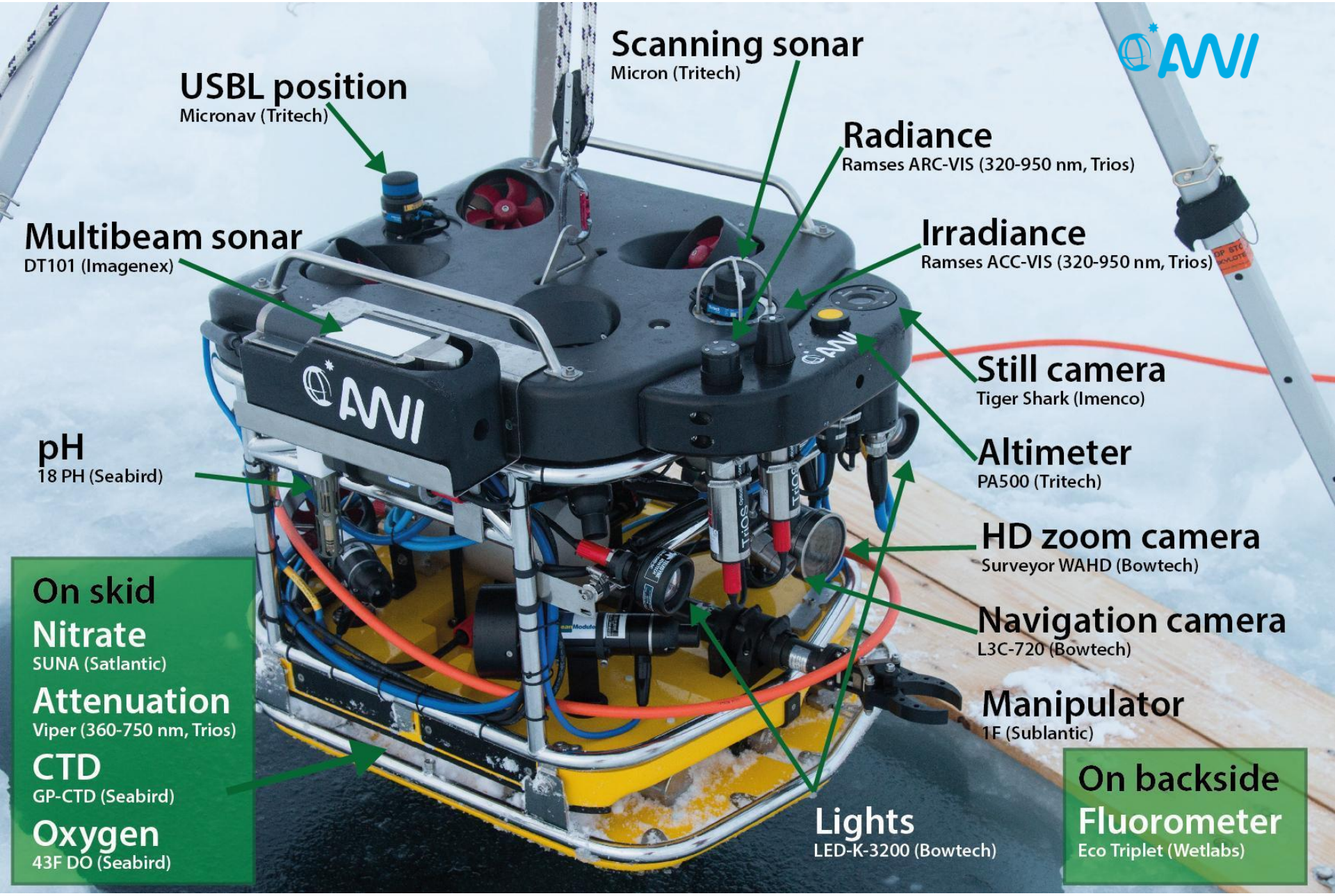
- What is my current data?
- Are my sensors working?
- Which sensors are deployed / available?
- When was the last calibration?
- What was the sensor configuration on xyz?
- …

Objectives

- Describe, manage and cite your platform, device and sensor
  - to support provenance information
  - to reduce data integration effort
    – searching for information and / in documents
- Interoperability and support standards

Challenges

- High heterogeneity of scientific needs and workflows incl. descriptions of platforms, devices and sensors
- Integration with existing solutions, e.g. for the data flow, but also with asset management
- Effort and limited knowledge on standards


Scanning sonar
Micron (Tritech)
USBL position
Micronav (Tritech)
Radiance
Ramses ARC-VIS (320-950 nm, Trios)
Multibeam sonar
DT101 (Imagenex)
Irradiance
Ramses ACC-VIS (320-950 nm, Trios)
Still camera
Tiger Shark (Imenco)
pH
18 PH (Seabird)
Altimeter
PA500 (Tritech)
HD zoom camera
Surveyor WAHD (Bowtech)
On skid
Nitrate
SUNA (Satlantic)
Navigation camera
L3C-720 (Bowtech)
Attenuation
Viper (360-750 nm, Trios)
Manipulator
1F (Sublantic)
CTD
GP-CTD (Seabird)
Oxygen
43F DO (Seabird)
Lights
LED-K-3200 (Bowtech)
On backside
Fluorometer
Eco Triplet (Wetlabs)

Our Definitions

Sensor

- A **platform** is a system (or thing) composed of devices or sensors. A platform has no parent.

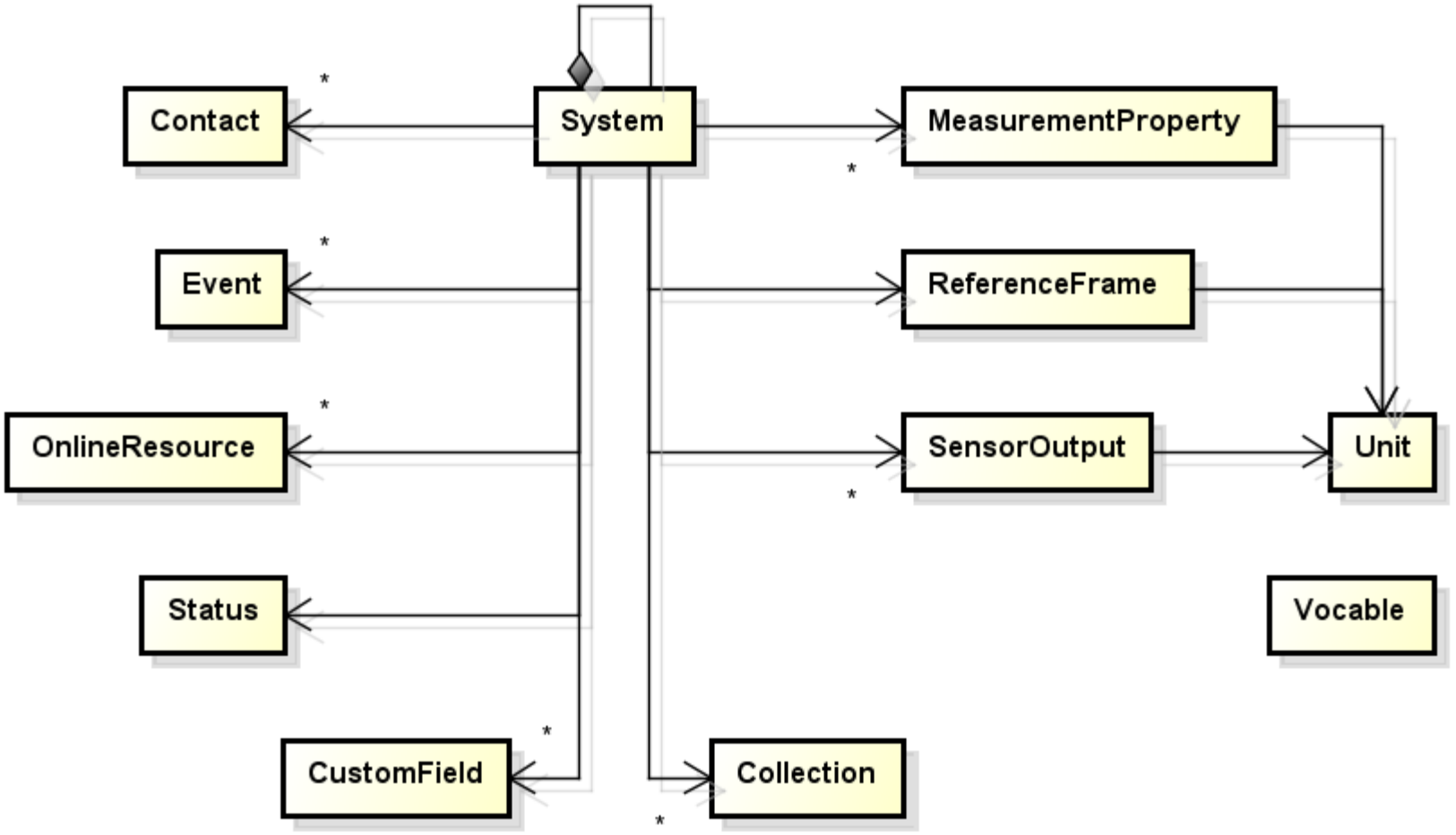
System

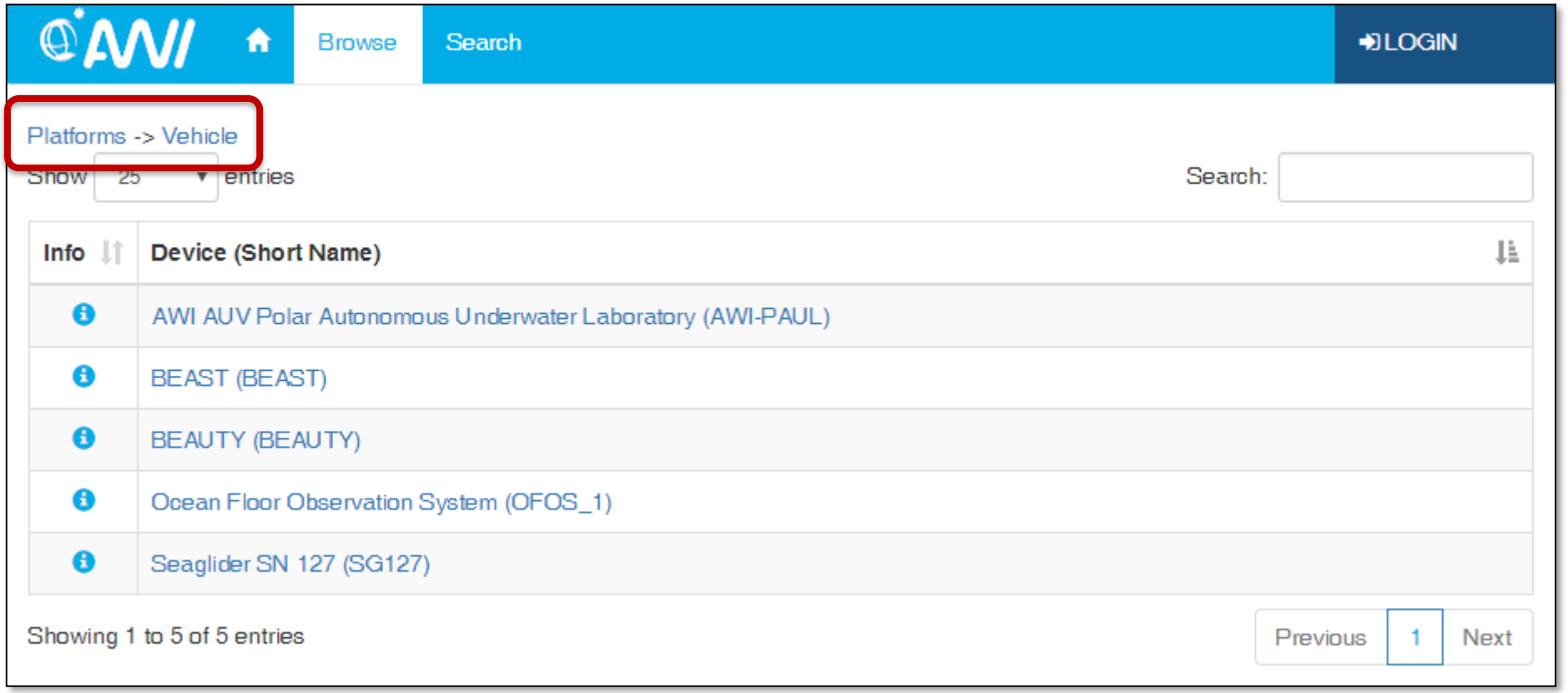
- A **device** is a system (or thing) composed of devices or sensors. A device is mounted on a platform.

Component

- A **sensor** is a system (or thing) which have characteristic outputs, e.g. digital numbers, audio, video.

Metadata Model




Browse
Search
LOGIN
Platforms -> Vehicle
Show 25 entries
Search:
Info
Device (Short Name)
AWI AUV Polar Autonomous Underwater Laboratory (AWI-PAUL)
BEAST (BEAST)
BEAUTY (BEAUTY)
Ocean Floor Observation System (OFOS_1)
Seaglider SN 127 (SG127)
Showing 1 to 5 of 5 entries
Previous
1
Next

Browse | Search | LOGIN

Platforms -> Vehicle -> BEAST

Show 25 entries

Search:

Info	Device (Short Name)
	1 Function Manipulator (1F-Manipulator)
	DT101 imaging and bathymetric multibeam sonar (DT101_multibeam(BEAST))
	ECO-Triplet Fluorometer (ECO-Triplet(BBFL2SSC-1489))
	Glider Payload CTD (GPCTD(0168)))
	HD Zoom Camera (Main Camera) (HD-Zoom-Camera)
	LED Light 1 (starbord) (LED1)
	LED Light 2 (port) (LED2)
	Micron Scanning Sonar (Micron Sonar)
	MicronNav USBL Positioning system (MicronNav USBL)
	Navigation Camera 1 (forward looking) (NavCam1)
	Navigation Camera 2 (aft looking) (NavCam2)

Glider Payload CTD

Overview | Contacts | Actions | Parameters | Resources | Properties | Position | Images

Show History

State:	Construction **Public** Store
ID:	906
Parent:	BEAST
Code	vehicle:beast:gpctd_0168__
Short Name:	GPCTD(0168))
Long Name:	Glider Payload CTD
Collections:	
Description:	Pumped CTD package including a DO sensor
Serial:	0168
Manufacturer:	SeaBird
Model:	GPCTD-DO
Type:	CTD

Integration identifier

Glider Payload CTD

Overview | Contacts | Actions | Parameters | Resources | Properties | Position | Images

Show History

Show 25 entries Search:

ID	Name	Role	Organization
44	Christian Katlein	Editor	Alfred-Wegener-Instit

Showing 1 to 1 of 1 entries Previous 1

Inherited Contacts

Show 25 entries Search:

ID	Name	Role	Organization	Inherited from
44	Christian Katlein	Editor	Alfred-Wegener-Institute	BEAST
18	Marcel Nicolaus	Editor	Alfred-Wegener-Institute	BEAST

Showing 1 to 2 of 2 entries Previous 1

Ice Mass Balance Buoy 2015T19

Overview | Contacts | Actions | Parameters | Resources | Properties | Position | Images

Show History

Show 25 entries

Search:

ID	Type	Label	Date	Location (Lat/Long/elevation)	Too
27	Deployment	deployment	08 Sep 2015 00:00	null / null / m	

Showing 1 to 1 of 1 entries

Previous 1

	Calib 2015C13 (2015C13)
	Calib 2015C14 (2015C14)
	Calib 2015C2 (2015C2)
	Calib 2015C3 (2015C3)
	Calib 2015C4 (2015C4)

Ferrybox

Overview | Contacts | Actions | Parameters | Resources | Properties | Position | Images

Show History

Show 25 entries

Search:

ID	Name	Sensor Output Type	Units	Tool
411	CDOM	chromophoric sensor	ppb	
403	conductivity	conductivity	mS/cm	
396	flourescence chlorophyll a (raw)	fluorescence	microg/l	
410	flourescence chloropyll a (TR)	fluorescence	microg/l	
400	flow	flow	l/min	
398	fluorometer temperature	temperature, water	°C	
802	NH3	colorimetric	mol/l	
409	nitrite	nitrite	µmol/l	
407	NO2	nitrogen dioxide	µmol/l	
408	NO3	nitrate	µmol/l	

Ferrybox

Overview | Contacts | Actions | Parameters | Resources | Properties | Position | Images

Show History

Show 25 entries

Search:

ID	Name	URL	Role
29	Factsheet: Ferrybox on R.V. Polarstern	http://hdl.handle.net/10013/epic.45639.d001	Factsheet

Showing 1 to 1 of 1 entries

Previous 1

	GPS-Receiver Trimble Marine (TRIMB_2)
	HYDRINS (HYDRINS)
	pCO2 Analyser (pCO2)
	Television Multicorer (tvmuc)
	Thermosalinograph Bow (TSB)

Ice Mass Balance Buoy 2015T19

Overview | Contacts | Actions | Parameters | Resources | Properties | Position | Images

Show History

Show 25 entries

Search:

ID	Name	Lower Bound	Upper Bound	Units	Measurement Type	Too
183	barometric pressure	920	1050	hPa	Min/Max limit Value	
184	barometric pressure	-1	1	hPa	Measurement Precision	
182	GPS position	-3	3	m	Measurement Precision	
187	H030	0	5	°C	Min/Max limit Value	
188	H120	0	8	°C	Min/Max limit Value	
185	temperature	-0.125	0.125	°C	Measurement Precision	
186	temperature	-40	15	°C	Min/Max limit Value	

Showing 1 to 7 of 7 entries

Previous 1

Ice Mass Balance Buoy 2015T19

Overview | Contacts | Actions | Parameters | Resources | Properties | Position | Images

Show History

Origin Metadata:	
Units:	
X:	
Y:	
Z:	

C

- Calib 2015C14 (2015C14)
- Calib 2015C2 (2015C2)
- Calib 2015C3 (2015C3)
- Calib 2015C4 (2015C4)

Ferrybox

Overview | Contacts | Actions | Parameters | Resources | Properties | Position | Images

Show History

Automatic Weather Station BAS 2016W3

Overview | Contacts | Actions | Parameters | Resources | Properties | Position | Images

Deployment PS96-ANT31/2
2016-01-25 19:08:00

Now
2017-04-26 11:28:38

Hide History Edit

State:	Construction **Public** Store
ID:	709
Parent:	
Device URN:	buoy:2016w3
Short Name:	2016W3
Long Name:	Automatic Weather Station BAS 2016W3
Collections:	
Description:	
Serial:	300234063608760
Manufacturer:	BASAWS

Metadata Serialization

- JSON for internal and versioning
- SensorML to standard fields and vocabularies

marine-swe-profiles

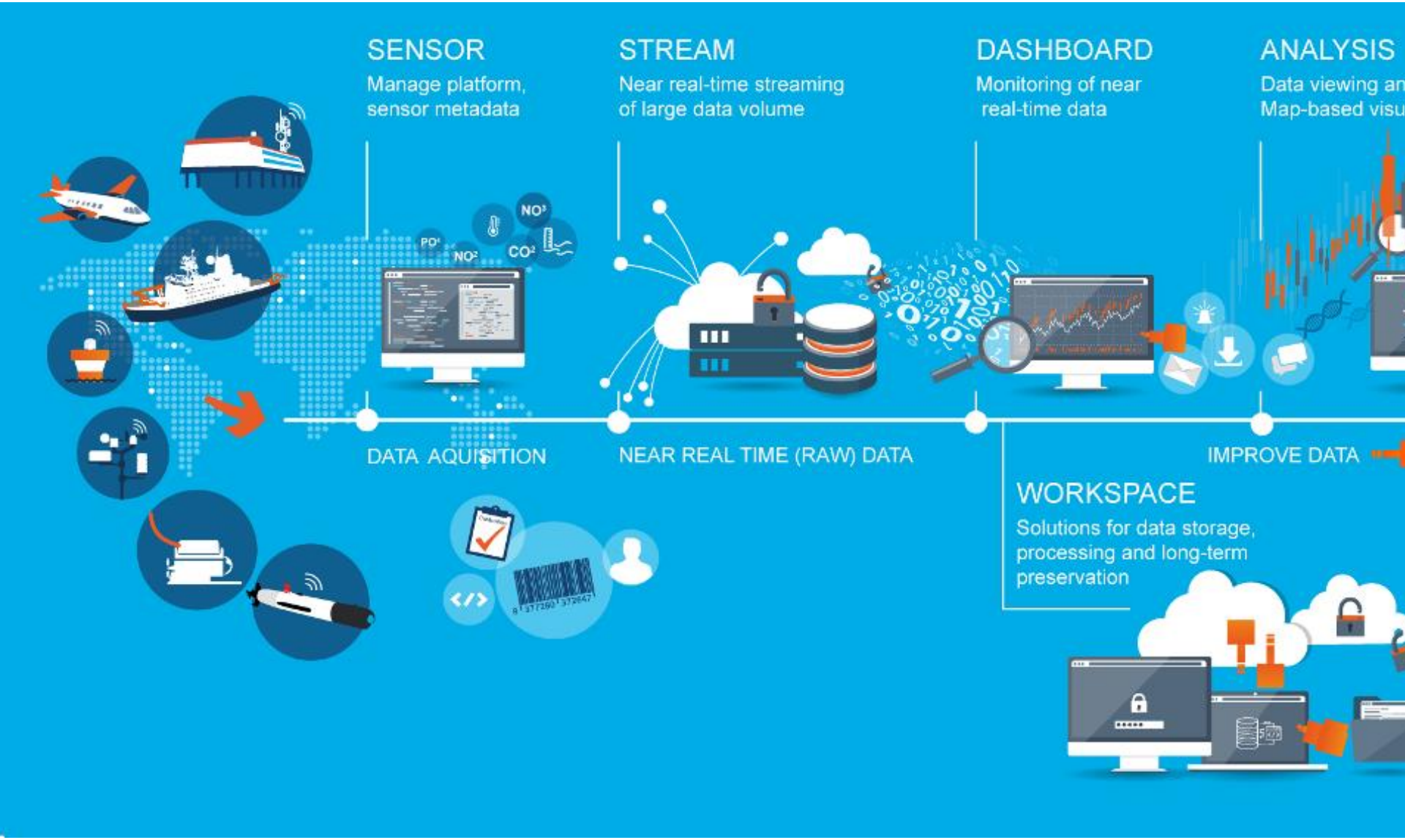
```
<sml:identifier>
  <sml:Term definition="http://sensorml.com/ont/swe/property/ModelNumber">
    <sml:label>Model Number</sml:label>
    <sml:value>SBE38</sml:value>
  </sml:Term>
</sml:identifier>
<sml:identifier>
  <sml:Term definition="http://sensorml.com/ont/swe/property/Manufacturer">
    <sml:label>Manufacturer</sml:label>
    <sml:value>Seabird</sml:value>
  </sml:Term>
</sml:identifier>

<sml:classifier>
  <sml:Term definition="DeviceCategories">
    <sml:label>DeviceCategory</sml:label>
    <sml:value>http://vocab.nerc.ac.uk/collection/L05/current/133</sml:value>
  </sml:Term>
</sml:classifier>
```

Features

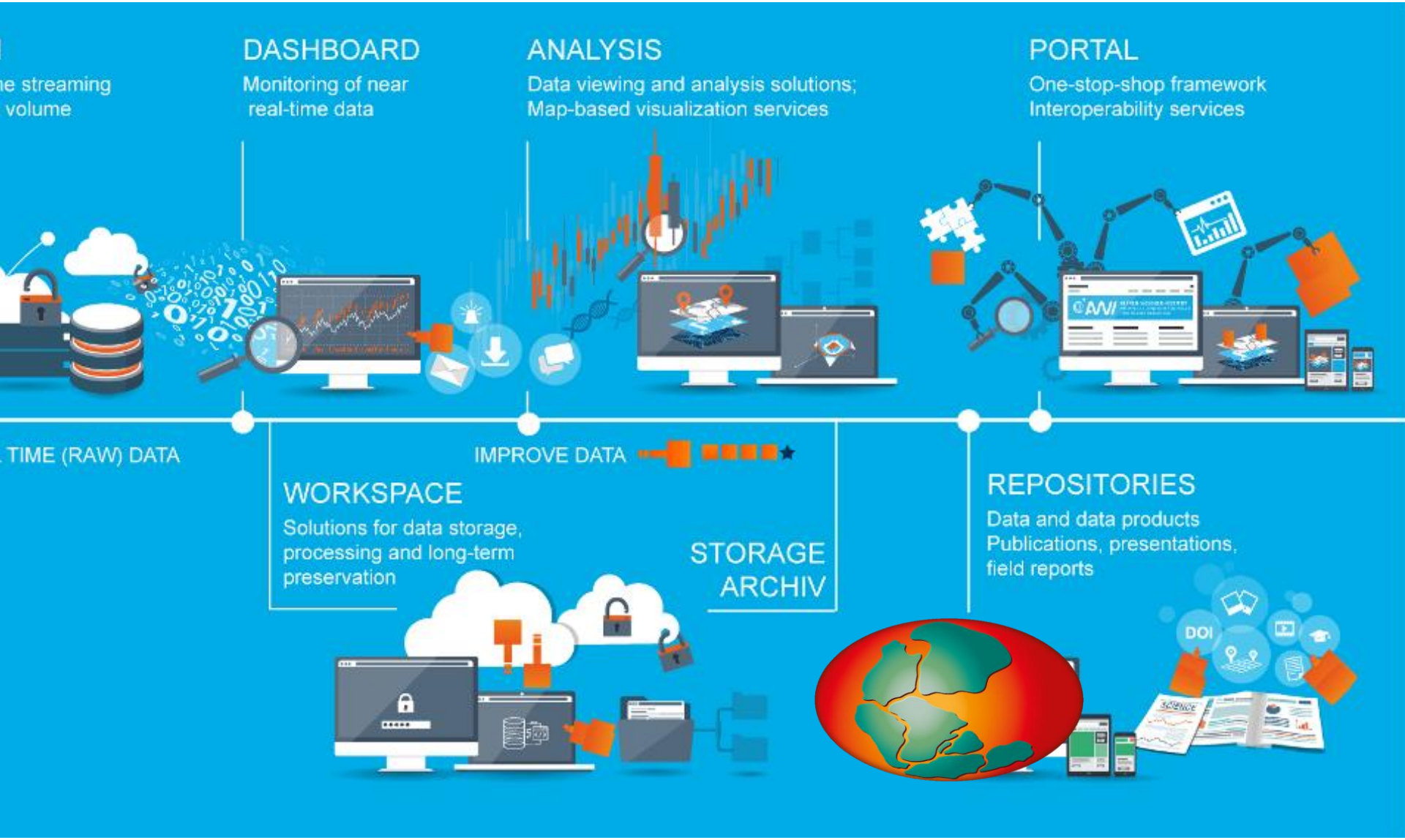
- Versioning
  - triggered by adding specific actions
    → deployment event
  - storing JSON and SensorML representation
  - indexing for full-text search
- Cite-ability of versions and configurations
  - e.g. hdl:10013/sensor.90#1 or ?

RDA data citation WG

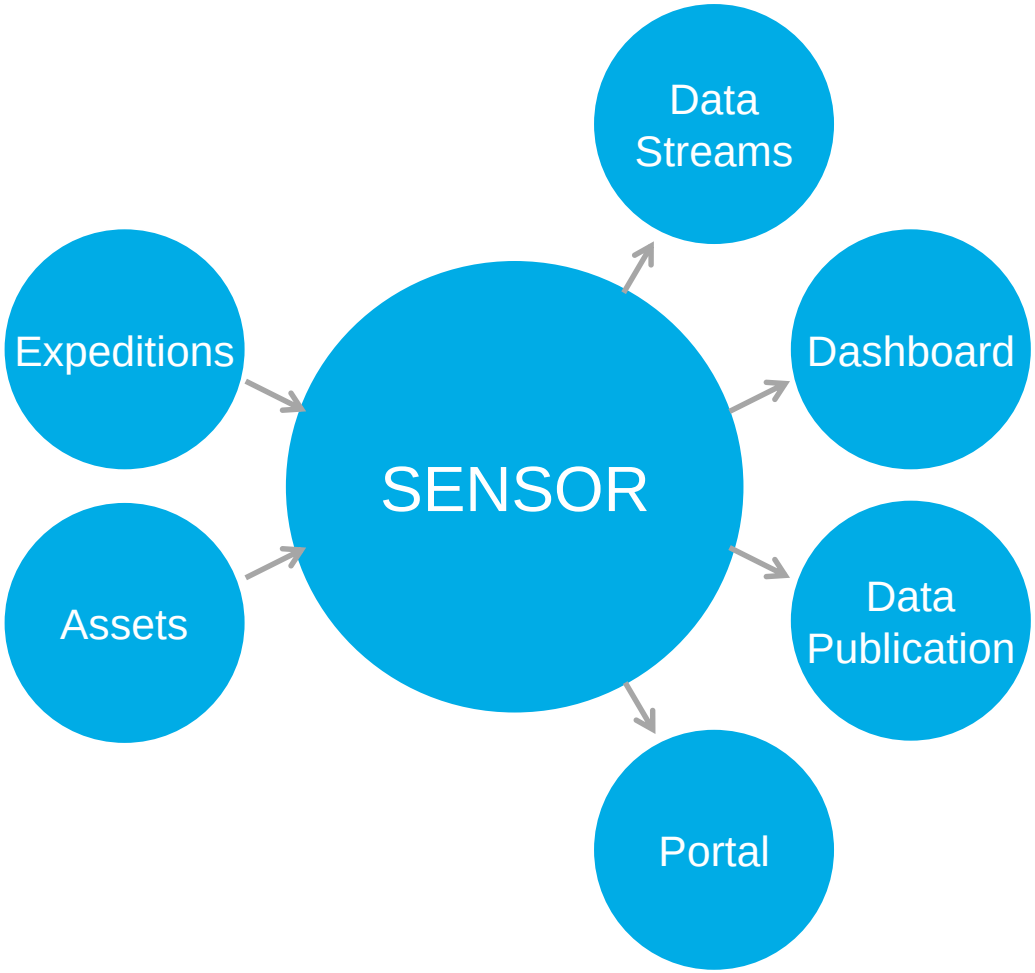
Integration – Data Flow Framework



Integration – Data Flow Framework



Links and relations



Links and relations

- Linking actions with events and expeditions
- Linking with administration information
  - Purchasing and inventory department (SAP)
- Linking with real-time and delayed-mode data
  - Configuration of automatic data collection (e.g., FTP, Mail, ...) and preparation for data archiving
- Linking from dataset publications
- Linking with vocabularies
  - re-use of standard names

Wrap up

- Integration from data acquisition to publication
  - SensorML used for near real-time based SOS
- FRontiers in Arctic marine Monitoring
  - Large scale infrastructure project 25M €
  - Supports our work for a generic data flow framework
- More than 1000 devices described
  - Continuous improvement and extension of metadata
- Mostly self-managed by our scientist
  - Editors for systems with inheritance to children
- Next: going live with next version incl. handles

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