SAMOS Metadata Exchange

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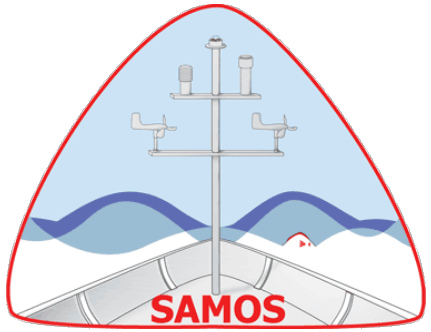


The SAMOS Initiative

History

- Providing high-quality underway navigational, meteorological and oceanographic data from research vessels to the scientific community since 2005.

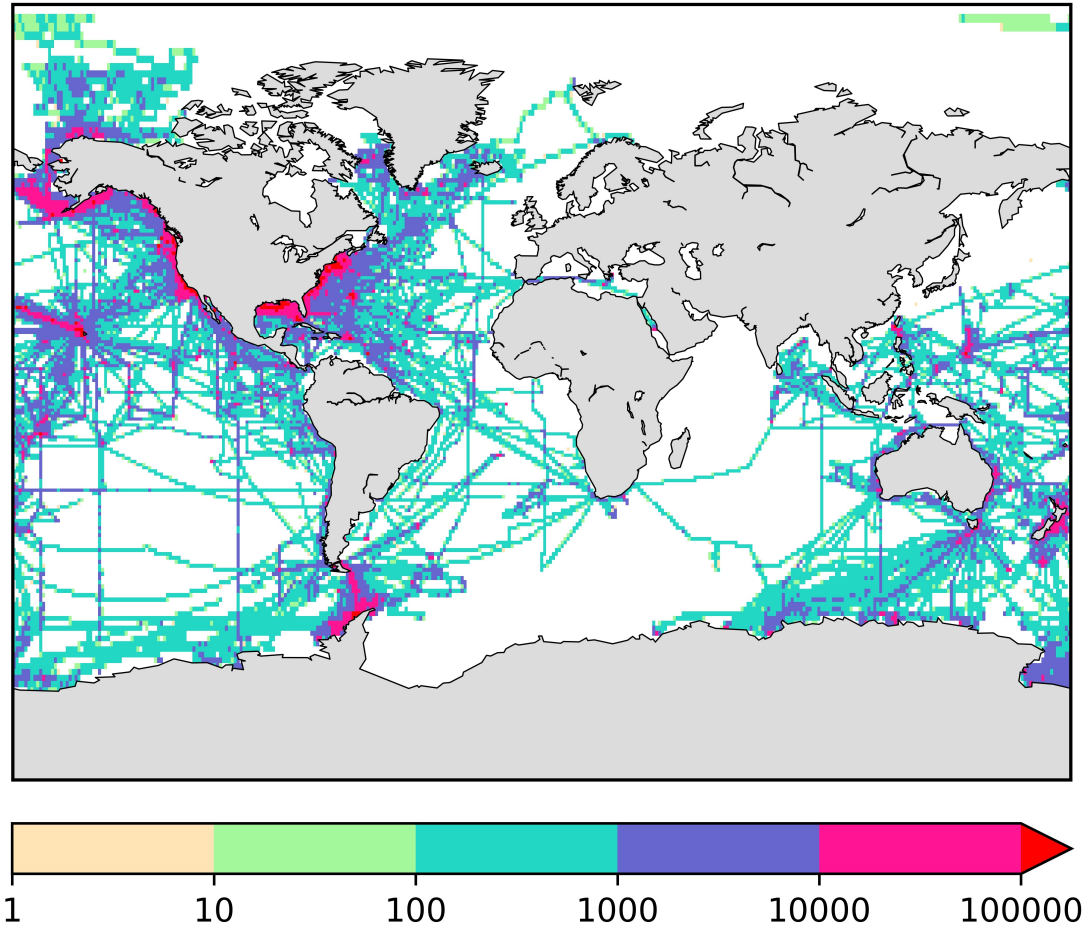
Status

- 33 vessels active in 2021
  - Operated by NOAA, WHOI, SIO, UA, UH, UW, USCG, USAP, IMOS, SOI, LUMCON, BIOS
  - ~30-40K one-minute observations/month/vessel
- Global coverage from Arctic to Antarctic oceans.

Users

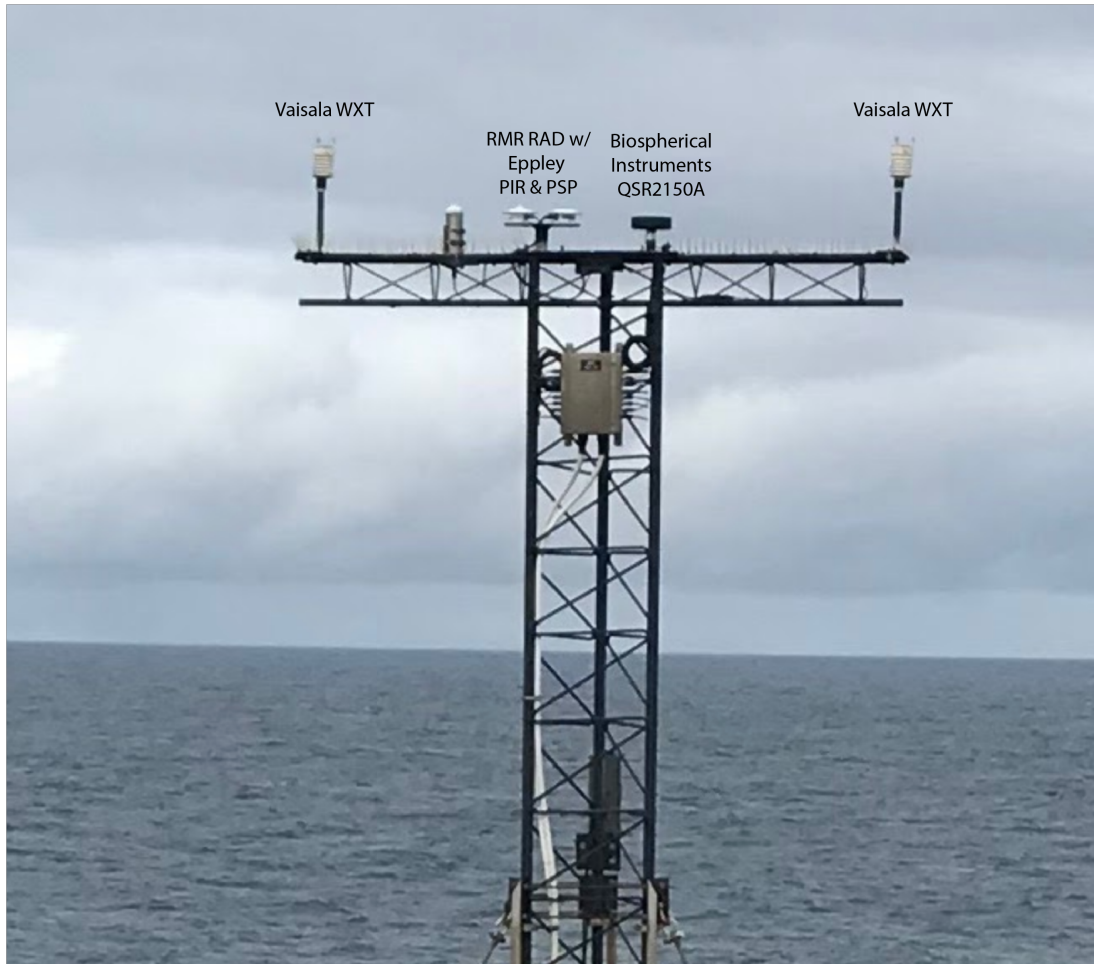
- Satellite algorithm developers
- Researchers investigating air-sea exchange processes
- Ocean and atmosphere modelers
- Operational forecasters (IMOS)

Number of Observations 2005-2017



RV Data Managed by SAMOS

- Routine observations:
  - **Navigation:** position, heading, course and speed over ground
  - **Meteorology:** relative and true winds, air temperature, humidity, pressure, radiation, precipitation
  - **Oceanography:** sea temperature, salinity, conductivity
- Potential additions:
  - Vessel pitch, roll, heave; visibility; present weather; ceiling height; swell and waves
  - Transmittance, alkalinity, pH, oxygen, florescence, DIC, etc.
- Sampling rates 1 minute or less
  - Daily data file transmitted via email



RV Neil Armstrong MET mast, Image credit WHOI

SAMOS Metadata

- Collect both vessel and instrument level metadata
- *Challenge:* keeping rapidly changing information up to date
  - Presently rely on operators notifying us of changes
- *New vision:* automate metadata exchange
  - Operators enter information once onboard vessel
  - Data acquisition software submits to SAMOS

sea temperature

Designator	SEATEMP1	Date Valid	02/19/2021 to Today [Today]	
Descriptive Name	Data Type	Units	Original Units	
remote sea temperature	float	celsius	celsius	
Instrument Make & Model	Serial Number	Last Calibration	TS Sensor Category	
SeaBird SBE38	1019	20201208	condenser inlet	
Observation Type	Distance from Bow	Distance from Center Line	Height	
measured	2	-0.5	-2.5	
Intake Distance from Bow	Intake Distance from Center Line	Intake Height	Intake Distance to Sensor	
2	0.5	-2.5		
Average Method	Averaging Time Center	Average Length	Sampling Rate	
average	time at start of period	60	2	
Data Precision				
0.001				

Automated Metadata Harvesting

- XML metadata exchange now in beta.
- Code support in two data acquisition systems:
  - Oregon State Univ. - CORIOLIX
  - NOAA - SCS 5.0
- Streamlining the metadata capture process:
  - XML received by SAMOS as auxiliary attachment to daily email
  - SAMOS processing code unpacks Vessel and Instrument metadata via XML field keys (e.g., callsign, samos-designator, etc.)
  - Ensures metadata are accurate and up-to-date


```
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vessel-freeboard="2.0" vessel-draught="6.1" contact-person-name="Jasmine Nahorniak" contact-person-email="jasmine.nahorniak@oregonstate.edu"
alternate-contact-email="kwatkins@ceoas.oregonstate.edu" technician-1-name="" technician-1-email="" technician-2-name="" technician-2-email=
logging-system-version="CORIOLIX Version 0.13.0 dated August 06, 2020" file-format="SAMOS" format-version="001" file-compression="gzip" emai
data-reporting-interval="60" cruise-id="">
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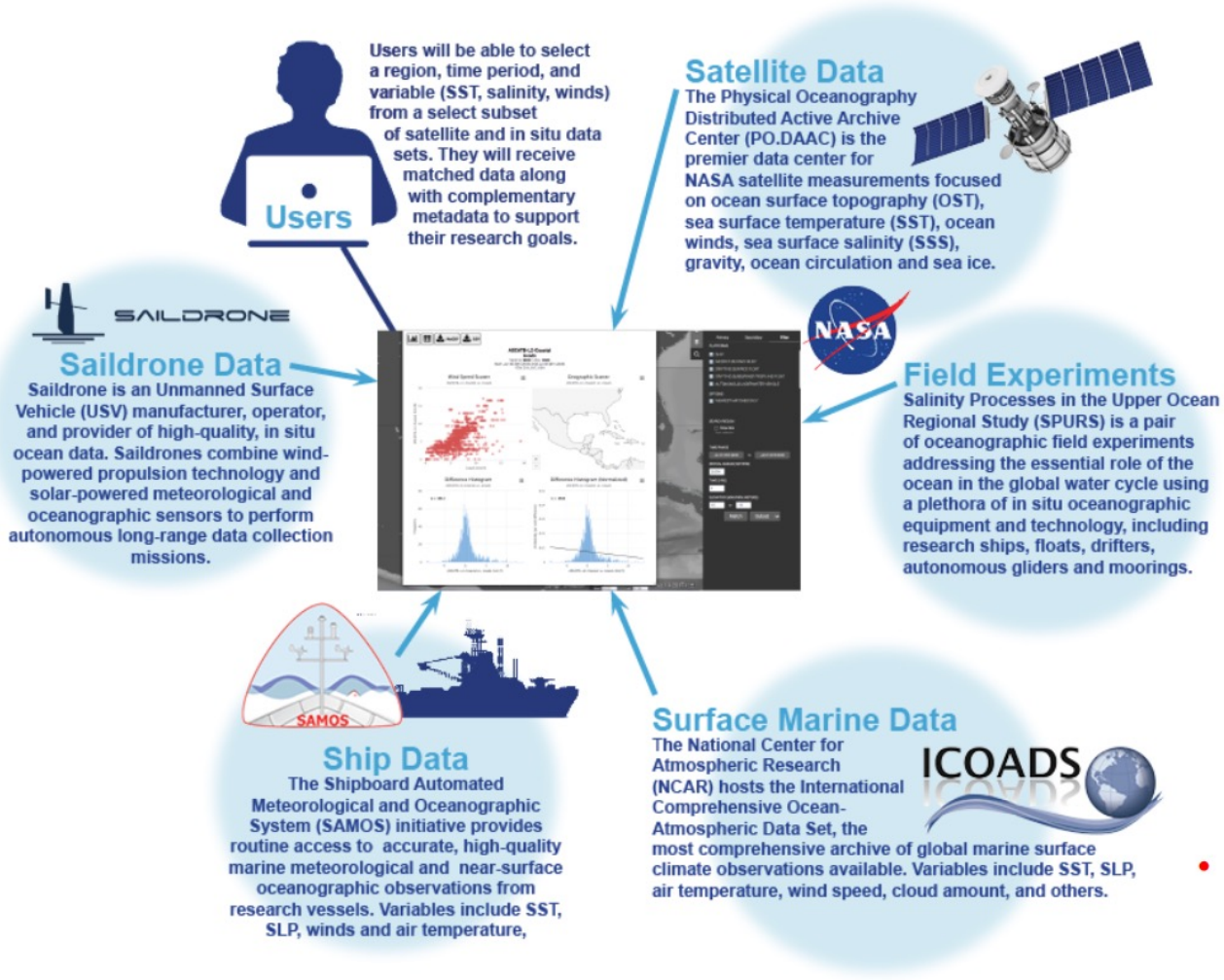
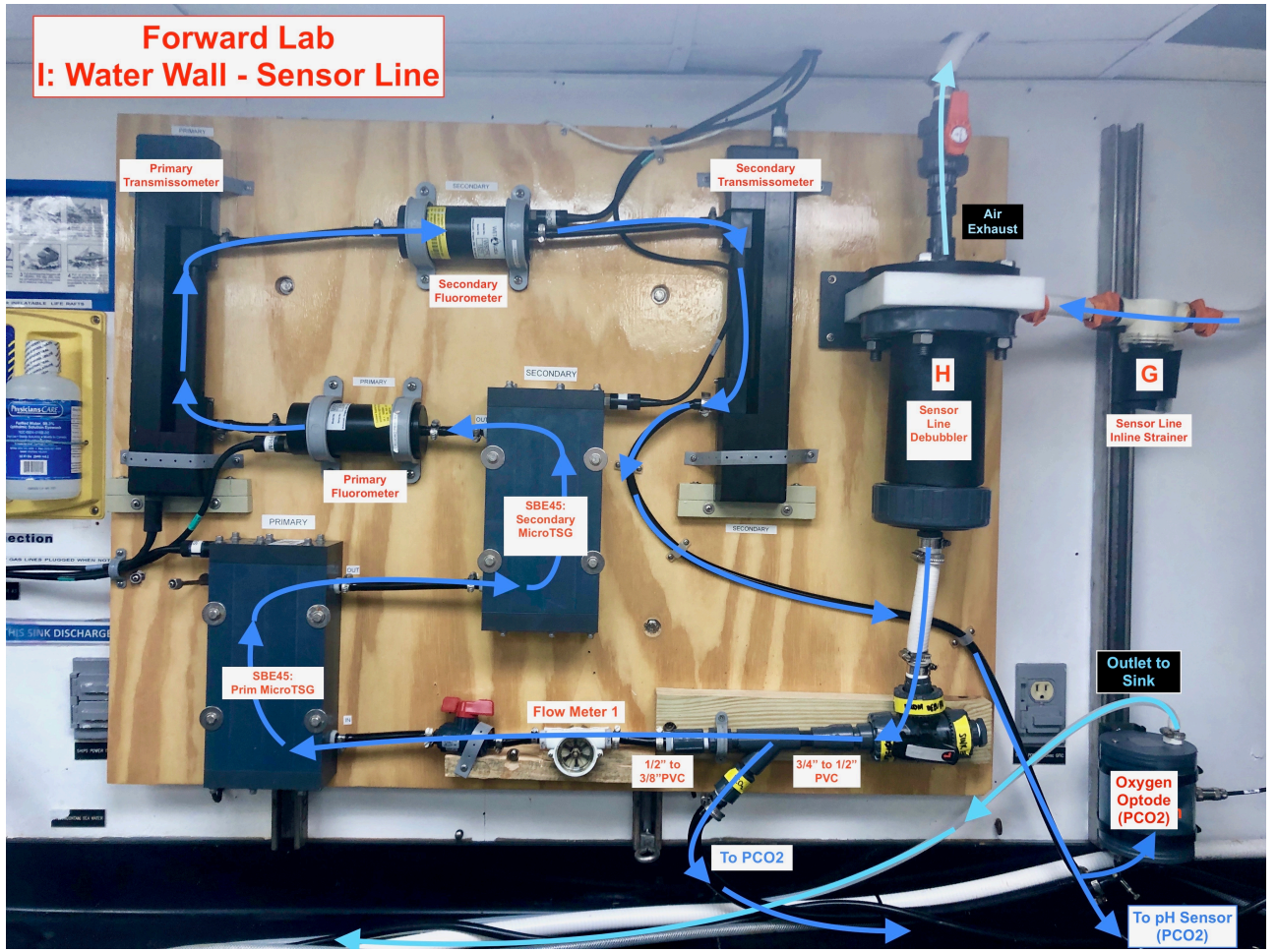
Why We Care: Interoperability Example



- Cloud-based Data Match-up Service (CDMS)
  - Open-source tool to match in-situ and satellite ocean observations
  - Challenge: Different terminology in metadata
- Vocabs supporting in-situ data exchange:
  - SeaVoX platform category (NERC LO6)
  - SeaDataNet device category (NERC LO5)
  - CF standard names (NERC P07)
  - IODE primary QC flags

New Frontier: Underway Biochemistry

- SAMOS looking to expand to include other parameters from flow-through sea water system
- Need to track
  - Water flow rates
  - Thresholds for “good” flow
  - Pipe run lengths
  - Intake in use
- Need input from science and technical experts in field!



Science seawater system, RV Atlantic Explorer, Image credit BIOS

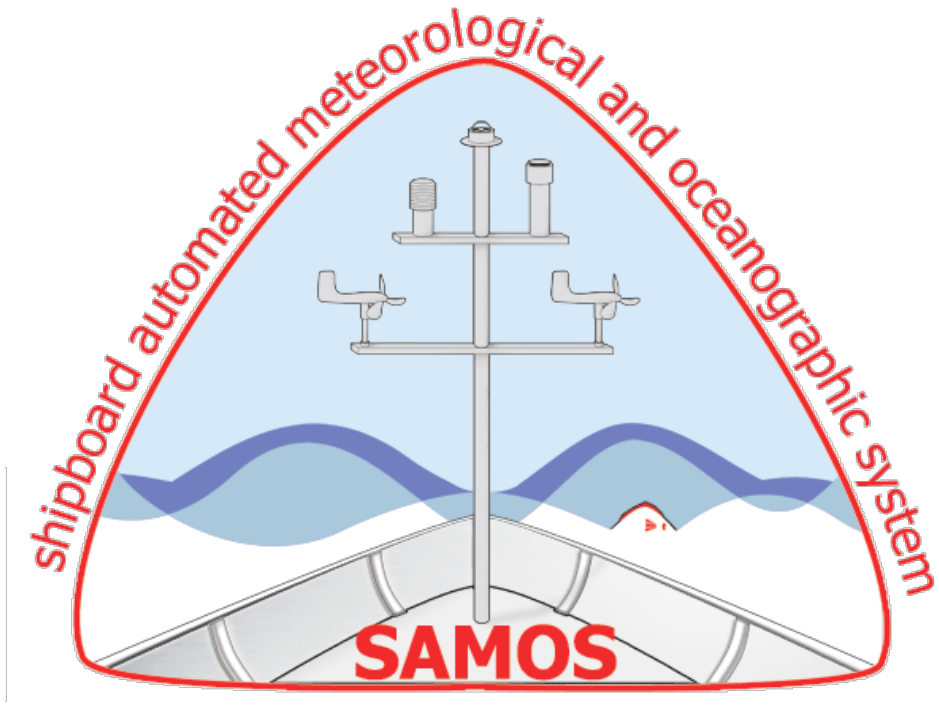
Discussion Topics

- How to engage biochemistry experts?
  - Need input on underway parameters useful to community
  - Minimum quality control requirements

- Knowing which vocabulary (and at what granularity) to use is still a challenge.
  - NERC is our primary choice for existing projects
  - What vocabularies exist for biochemistry devices and parameters?
  - Are there standards for device location on a platform?

- Any interest in expanding use of XML metadata exchange format?
  - Present focus is on vessel and device metadata.

Questions?



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