



**Session #6 - Towards an Integrated Ocean Observing System  
Part 2 - Optimizing Ocean Monitoring and Data Sharing Capabilities**

# Information Interoperability: Building Interoperable Ocean Observing Systems with Sensor Web Technology

Simon Jirka (52°North GmbH) - [jirka@52north.org](mailto:jirka@52north.org)

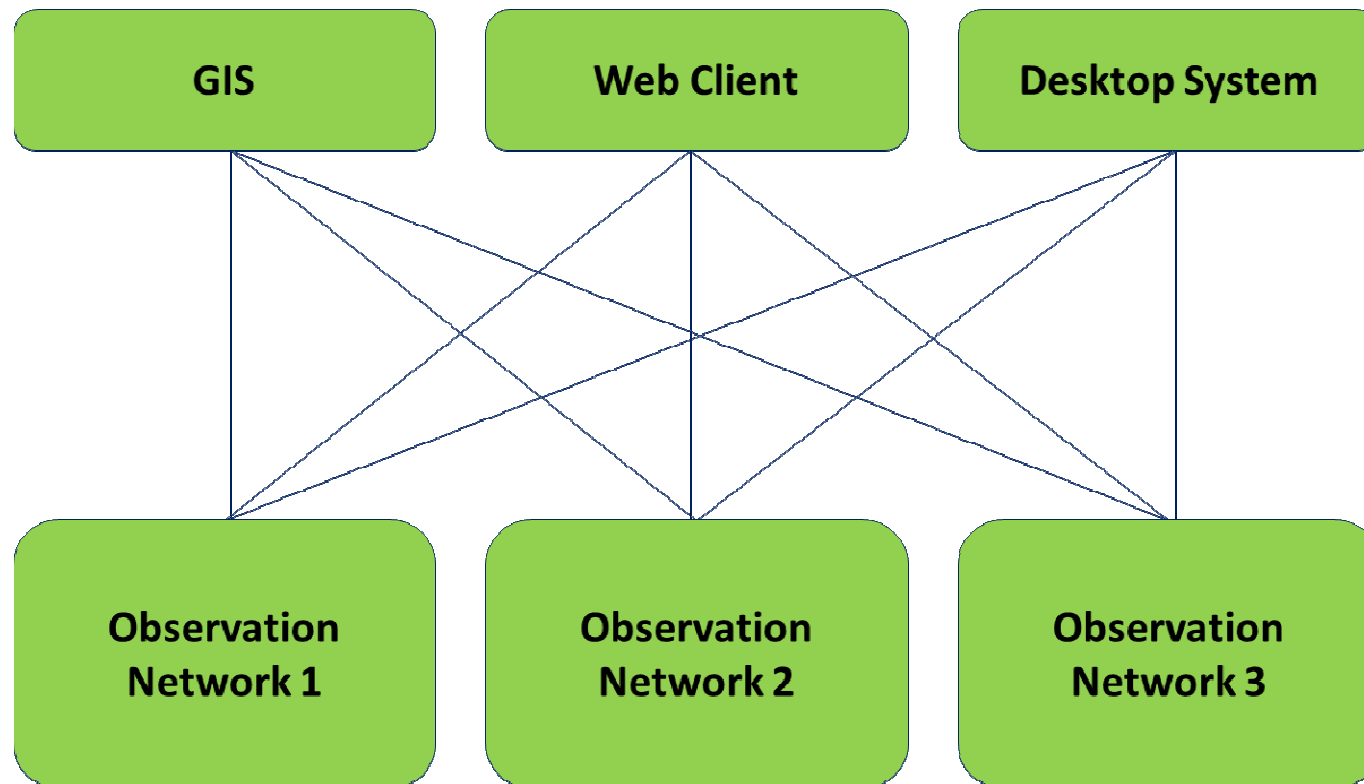


# Introduction

- NeXOS (FP7, Ocean of Tomorrow 2013)
  - New low-cost, compact and integrated sensors with multiple functionalities
  - Multiplatform integration
  - Sensor and data interoperability
- 52°North GmbH
  - Sensor Web architecture and interoperability
  - Develop open source Sensor Web implementations

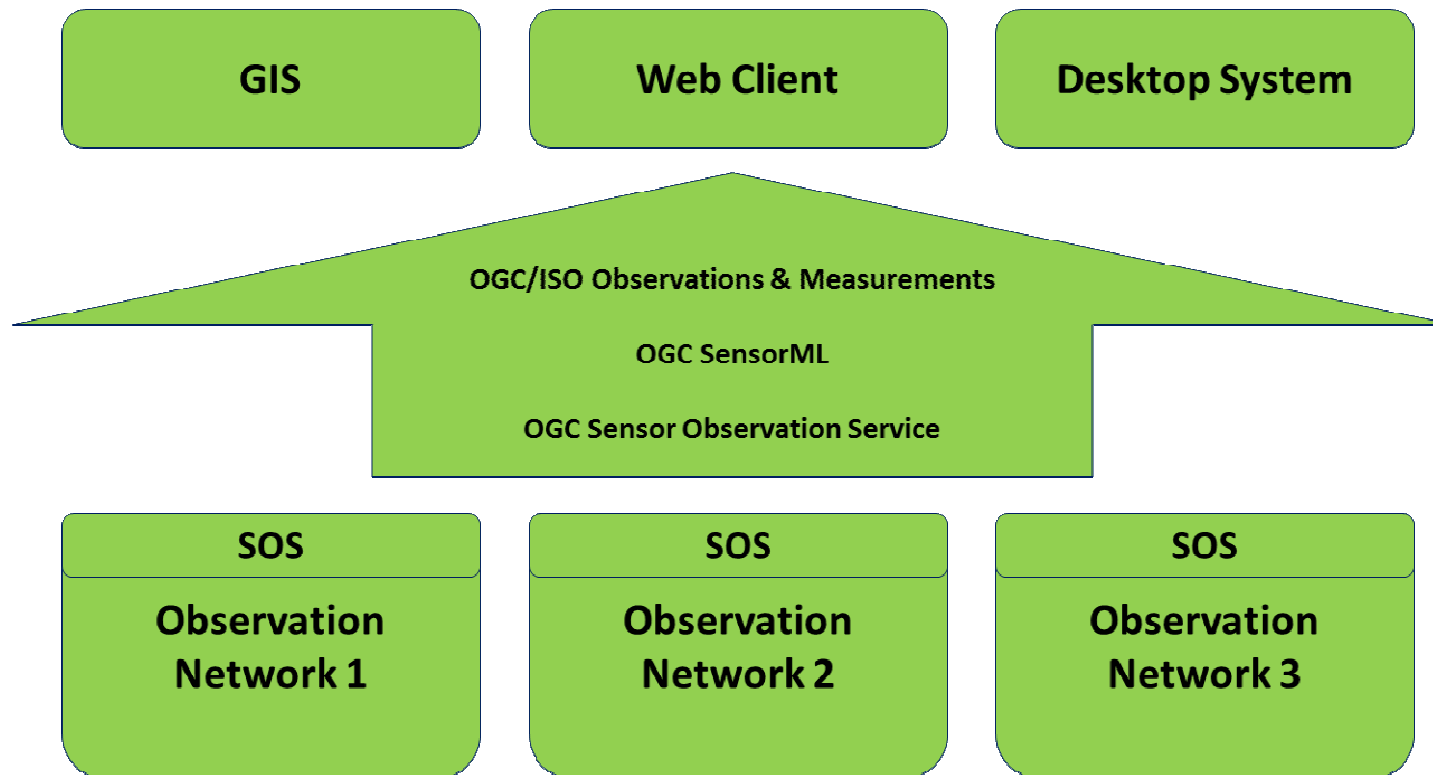


# Motivation



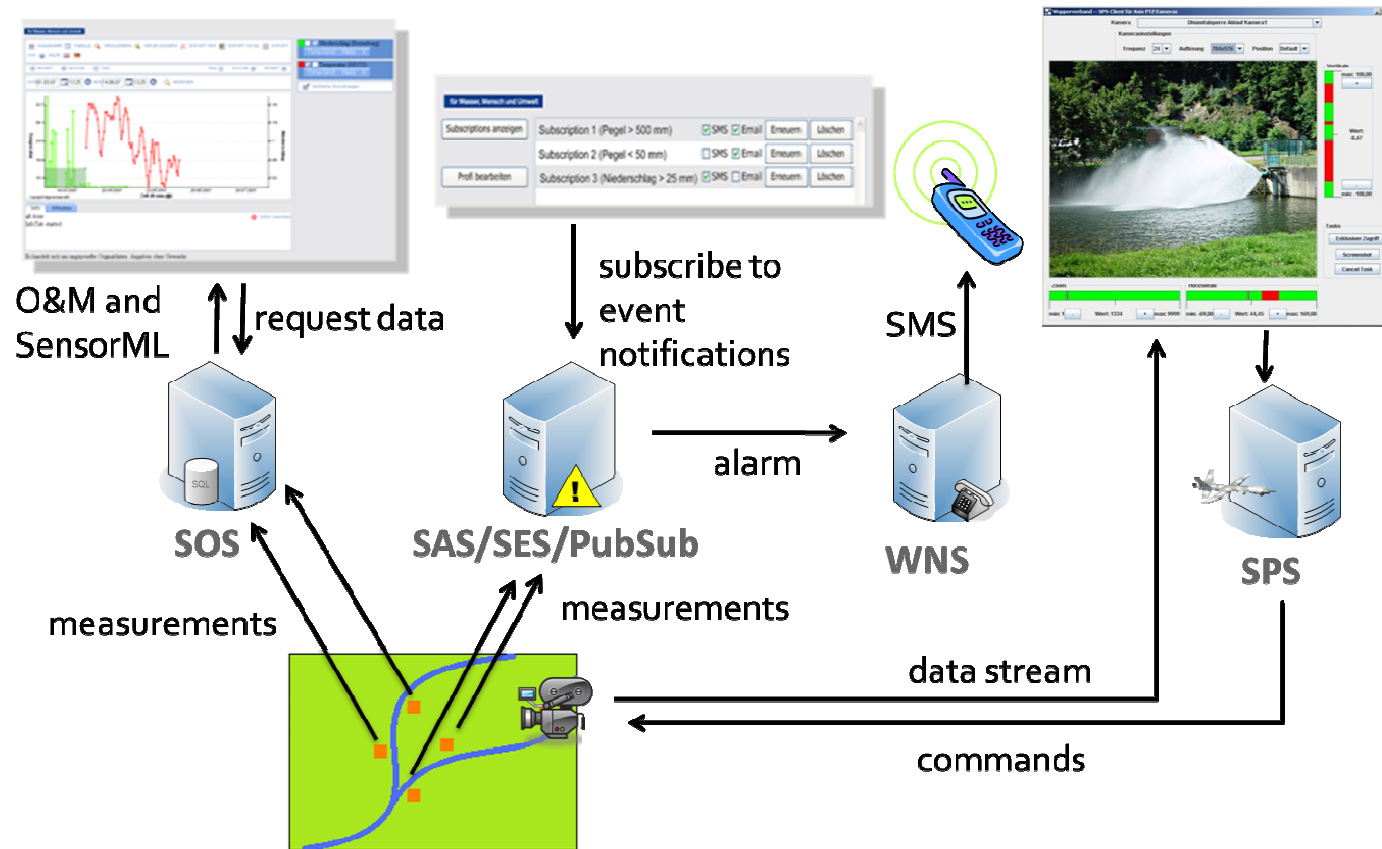


# Motivation





# Sensor Web





# Marine Sensor Web Profiles

- Many projects and organizations in oceanology start to use OGC Sensor Web Enablement standards
- Common approach needed: How to apply these standards?
  - Which metadata elements are needed?
  - How to structure instrument/platform metadata?
  - Which observations types are needed?
  - Which functionality is required?
  - Which terms shall be used?



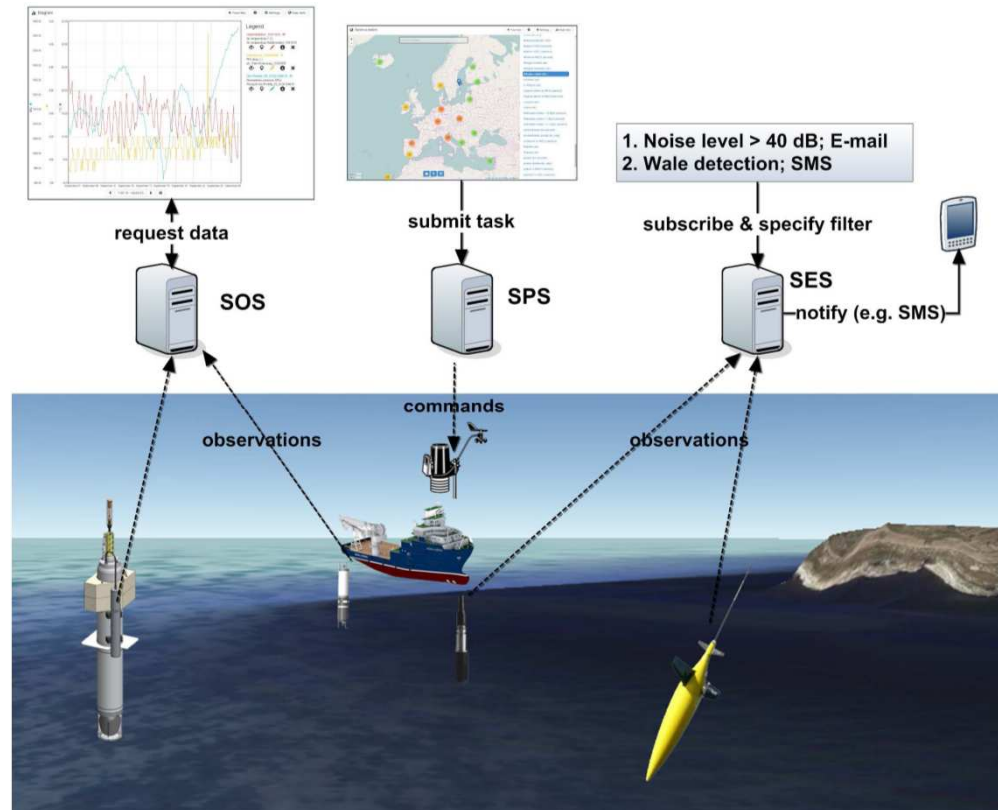
# Marine Sensor Web Profiles

- Cooperation between different Ocean of Tomorrow Projects
- Work in progress
- Aim: Develop best practice guidance
- Provide implementations
- May serve as link to GEOSS → harvesting by GEOSS DAB
- Outlook: Cover further aspects, e.g. processing, event detection





# Application in NeXOS



Source:  
UPC/NeXOS





# Application in NeXOS

The screenshot displays the NeXOS application interface. On the left, a map shows the coastal region of Vilanova i la Geltrú, with various roads and landmarks labeled. A search bar at the top left contains the text "search for address...". The main panel on the right is titled "Station: OBSEA" and lists several data series with their current values and timestamps:

- sea\_water\_temperature**:  qualityobsea\_ctd01 (sea\_water\_temperature) ☆  
15.676 °C (28.05.16 01:59)
- conductivity**:  qualityobsea\_ctd01 (conductivity) ☆  
4.549 S/m (28.05.16 01:59)
- salinity**:  qualityobsea\_ctd01 (salinity) ☆  
36.711 Pa (28.05.16 01:59)
- pressure**:  qualityobsea\_ctd01 (pressure) ☆  
19.636 g/kg (28.05.16 01:59)
- sound\_velocity**:  qualityobsea\_ctd01 (sound\_velocity) ☆  
1511.1 m/s (28.05.16 01:58)
- air\_temperature**:  qualitymeteoboyamda (air\_temperature) ☆  
17.1 °C (28.05.16 01:59)
- wind\_direction**:  qualitymeteoboyamda (wind\_direction) ☆  
329.6 ° (28.05.16 01:59)
- wind\_speed**:  qualitymeteoboyamda (wind\_speed) ☆  
2 m/s (28.05.16 01:59)
- canvi\_wind\_direction**:  qualitymeteoboyamda (canvi\_wind\_direction) ☆  
11.2 ° (12.01.15 01:59)
- pressure**:  qualitymeteoboyamda (pressure) ☆  
1013 g/kg (28.05.16 01:59)
- sea\_water\_temperature**:  qualityobsea\_ctd02 (sea\_water\_temperature) ☆  
15.697 °C (18.12.15 08:42)

On the far right, a sidebar titled "All Phenomena" lists various data categories: air\_temperature, canvi\_wind\_direction, conductivity, pressure, salinity, sea\_water\_temperature, sound\_velocity, wind\_direction, and wind\_speed.



# Application in NeXOS



[http://nexos.demo.52north.org/client/#/?timespan=2016-05-01T09%3A23%3A18%2B02%3A00%2F2016-05-02T09%3A23%3A18%2B02%3A00&ts=esonet\\_1%2Ctrios\\_ts\\_831d2f1059cd99838009f7c304fc3ef4](http://nexos.demo.52north.org/client/#/?timespan=2016-05-01T09%3A23%3A18%2B02%3A00%2F2016-05-02T09%3A23%3A18%2B02%3A00&ts=esonet_1%2Ctrios_ts_831d2f1059cd99838009f7c304fc3ef4)

# Recommendations

- Re-usable implementations including client applications
- Best practices and guidance
- Profiles of standards
- Vocabularies
- Consider the whole chain from instrument to application
- Next step: interoperable data processing

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10TH GEO EUROPEAN PROJECTS WORKSHOP | 31 MAY - 2 JUNE 2016, BERLIN

# Thank you for your attention!

Contact: Simon Jirka - [jirka@52north.org](mailto:jirka@52north.org)