Integrated Environmental Monitoring to protect critical marine environments

Presented by **Inge Dragsund**
Project Manager
Biota Guard AS

Biota Guard

Biota Guard AS

Service & Technology Company providing Leak Detection and Real-time environmental monitoring to the Oil & Gas industry

- Established in 2005
  - By IRIS research Invest and Procom Venture
- R&D based Venture
  - Development funded by Industry partners, Norwegian Research council and Innovation Norway
  - 3x patents pending
- Markets
  - Offshore oil and gas industry
  - Onshore industry
  - Maritime industry (aquaculture, harbors etc.)
  - Monitoring of vulnerable coastal areas

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AWARD SUBSEA UPCOMING COMPANY OF THE YEAR 2010

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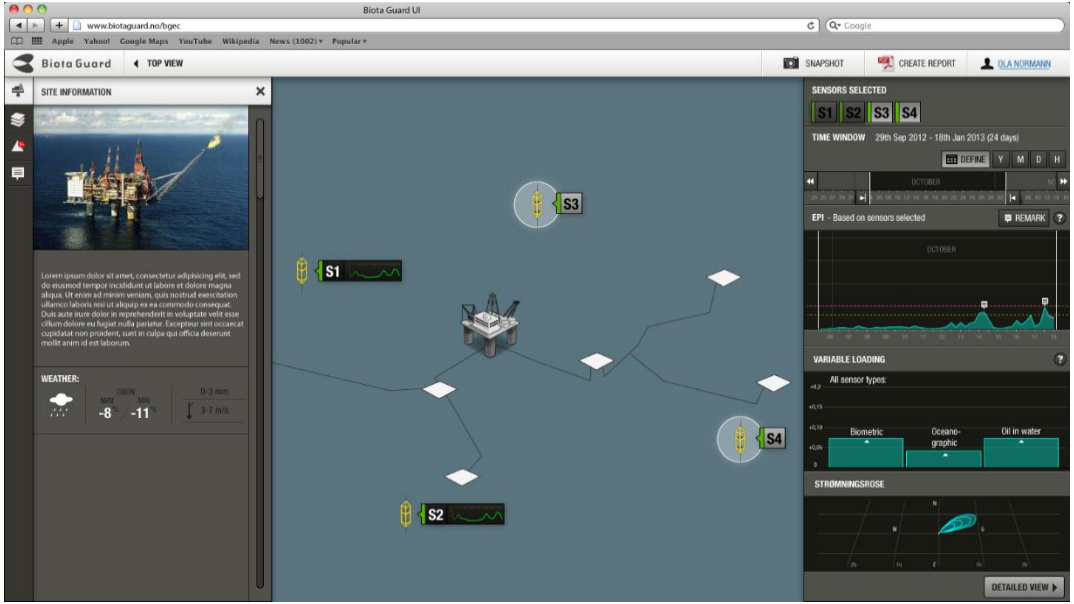
Service

Long term environmental effect monitoring

- Real-time Environmental decision support
- Unique ability to respond to a mixture or “cocktail” of contaminants
- Factual based response to strict regulation
- Creating baselines for the environment



Leak Detection

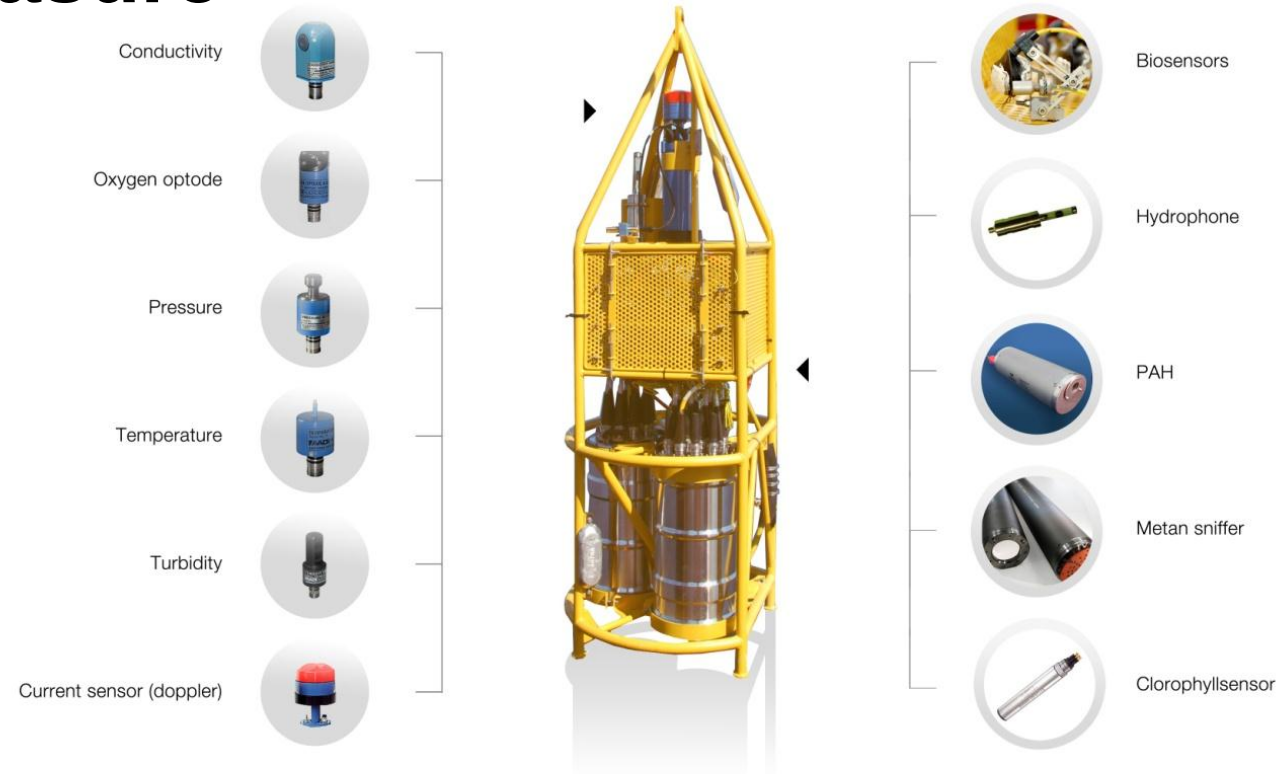
- Superior sensitivity compared to field proven conventional sensors

Integrated Environmental Monitoring

Start to measure

Holistic approach

- Process control vs recipient control
- Sensitivity
- Chemical / physical sensors
- Biosensors
- Complimentary sens array



Biosensors

Measuring toxicity

Why

- Highly sensitive
- Only sensor capable of sensing toxicity
- Ecological relevant

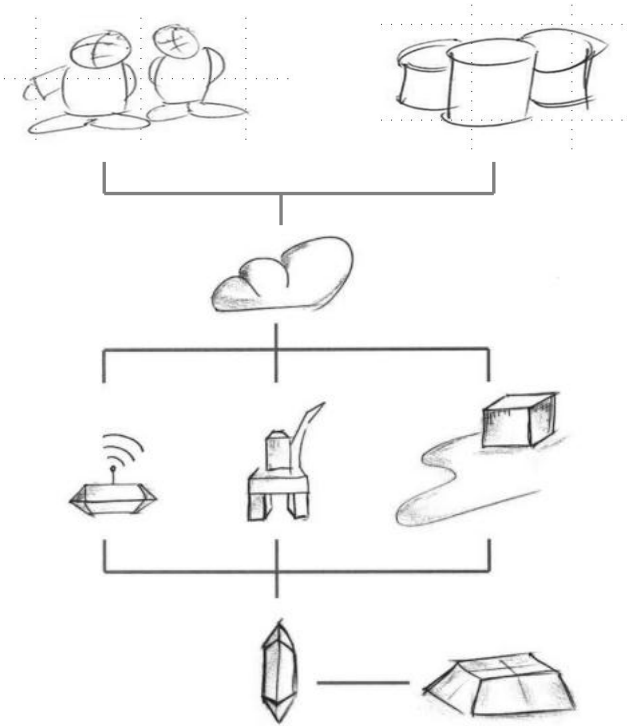
How

- Behavioral patterns are monitored. Responds significantly to toxic stress.
- Physiological characteristics of the organisms heart is measured continuously. Heart activity responds significantly to toxic stress.
- Arrays of Biosensor are integrated

When

- Leak detection applications
- Risk assessment and Environmental management

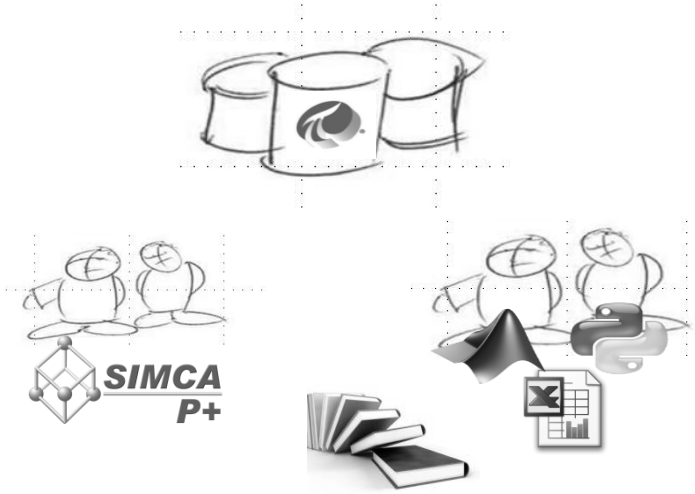
Managing the data



- Interfacing sensors
  - PI Interfaces
- Data Management
  - PI Server that archives data
  - PI Asset Framework server
- Analytics
  - PI Advanced Computing Engine (PI ACE)

We got the data – Now what?

Facilitating collaboration among parties to drive innovation

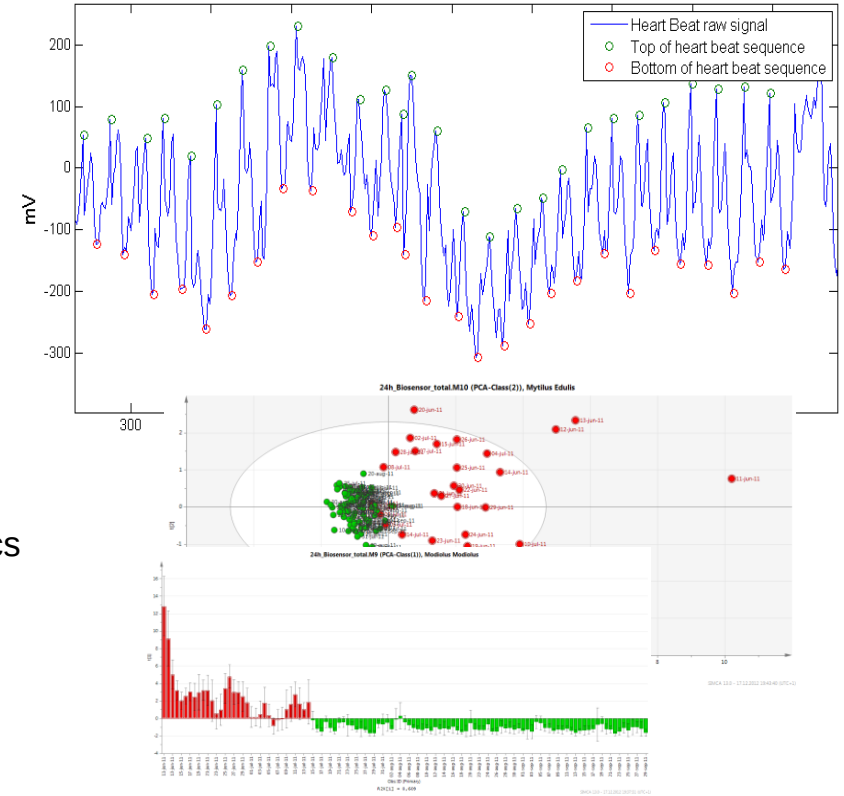


- Bridge multiple disciplines and identify methodologies and workflows for real time operation
- Implement domain knowledge in predictive models
  - Importance of context
  - Contextual visualization
  - Integration of analytical tools
  - Handling of algorithms

Data mining & Integration

Work flow

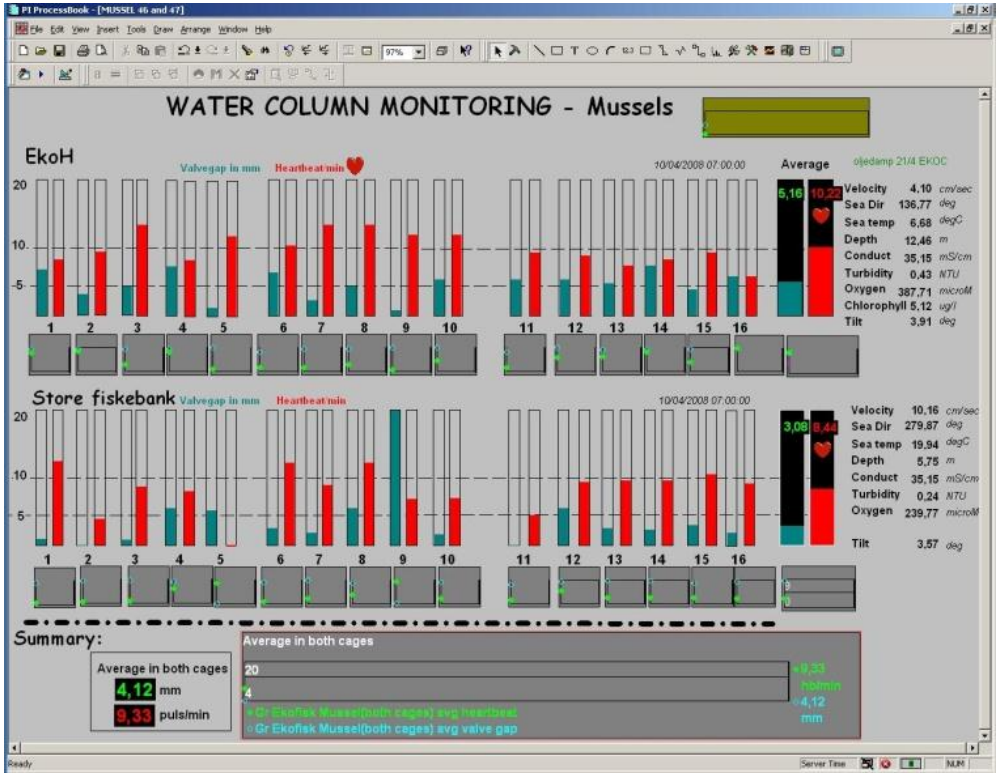
- Contextual data modeling
  - Data scientist
- Pre - processing of data
  - Data scientist
  - Human Medicine
  - Biologist, ecotoxicology, Bioinformatics
  - Metocean
- Multivariate data modeling
  - Data scientist, Multivariate experts, Bioinformatics
- Real time prediction modeling
  - System operator, PI System and SIMCA



Applied Analytics and Visualization

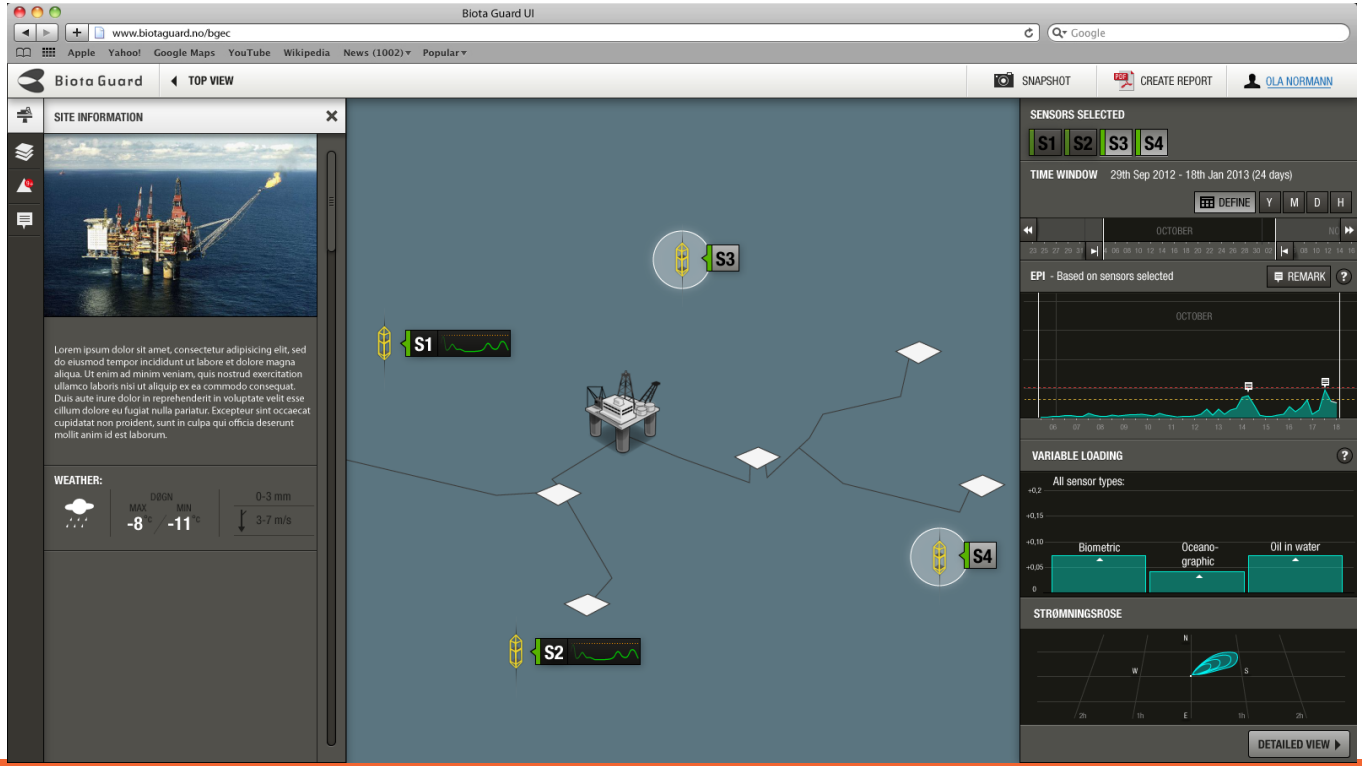
From data capture to decision

Prototype test ekofisk
– 2009 CoP



Applied Analytics and Visualization

From data capture to decision – commercial available - 2013



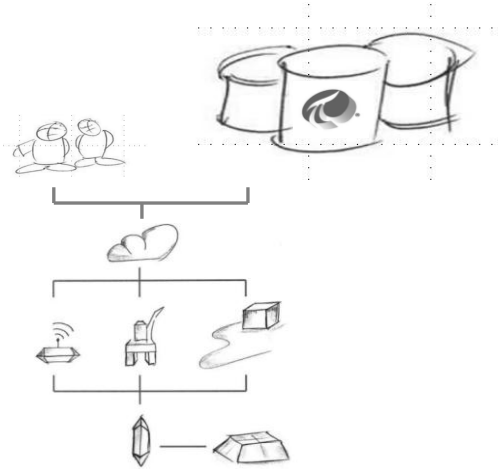
PI System

PI interfaces

- PI Interface for Modbus Ethernet
- PI Interface for UFL
- PI Interface for SIMCA 4000

Interfaced applications

- SIMCA Online Server
- Dundas
- Phyton
- Matlab

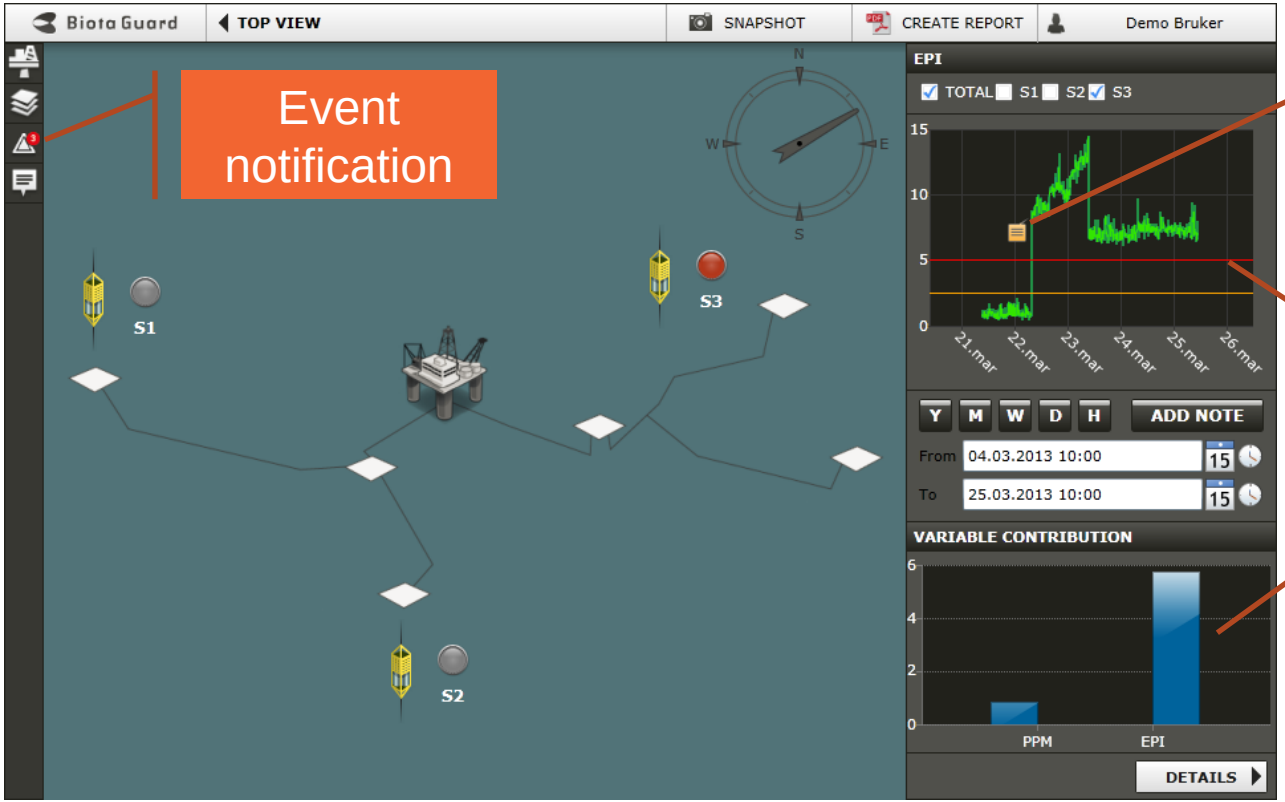


- PI Server
- PI Asset Framework server
- PI ACE
- PI Event Frames
- PI Notifications
- PI ProcessBook
- PI OLEDB Enterprise

Field trial at a depth of 500 m

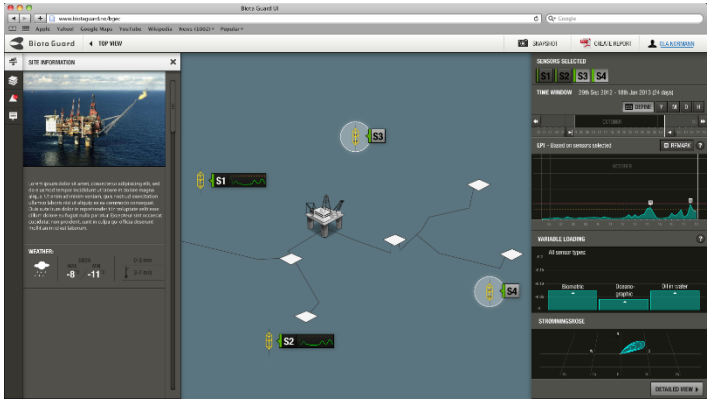
- Pushing the operational limits of biosensors
- 3 new species
- 32 instrumented biosensors
- 256 behavioral and physiological features calculated in PI ACE
- 9 Oceanographic parameters
- 4 Real time Predictive models

Leak Detection test at SINTEF



Leak detection and real time environmental monitoring

“The main objective of the Biota Guard service is to provide the Oil & Gas industry with a leak detection system, and a continuous KPI, documenting the environmental footprint and providing decision support through out life of field”



Biota Guard

Business Challenge

- Shorten time from data acquisition to decision
- Harness multidiscipline know how on one platform
- Gain industry acceptance and confidence

Solution

- Holistic data capture
- OSIsoft PI System
- Integration of process data
- Integration of Multivariate analytics

Results and Benefits

- Highly sensitive leak detection service
- Real time environmental decision support
- Final stage in Shell technology qualification of new technology process

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