

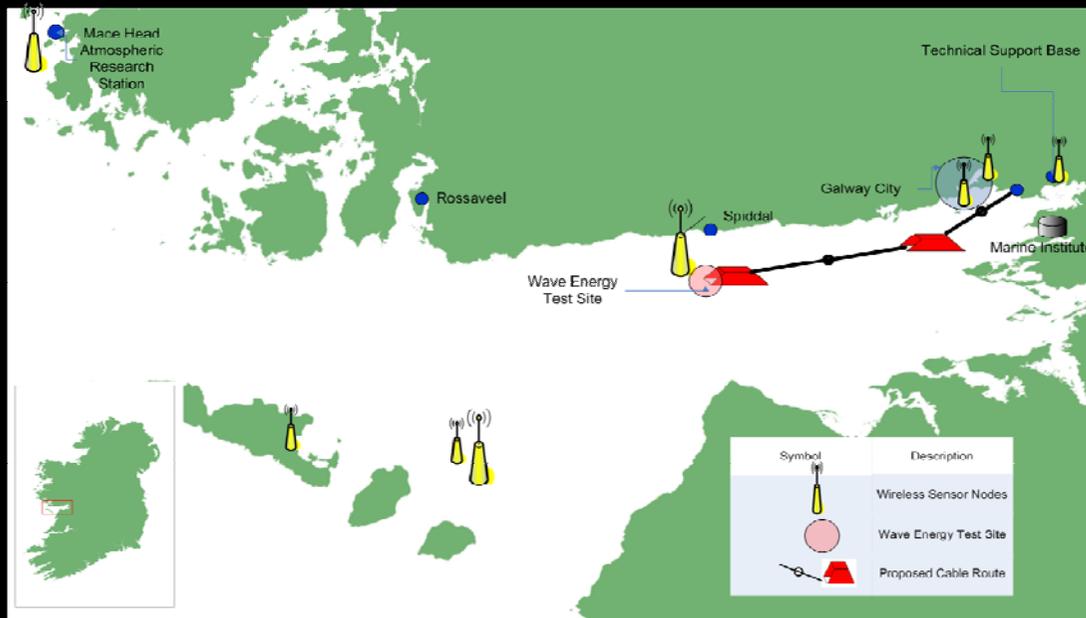


The SmartBay Ireland Collaboration: A Marine and Coastal Research and Development Platform

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The next generation advanced coastal & marine monitoring & management



From Gaughan and Kolar, Journal of Ocean Technology, 2010.



- Collaboration with the Marine Institute of Ireland
- A research, test and demonstration infrastructure for monitoring and managing aquatic environmental

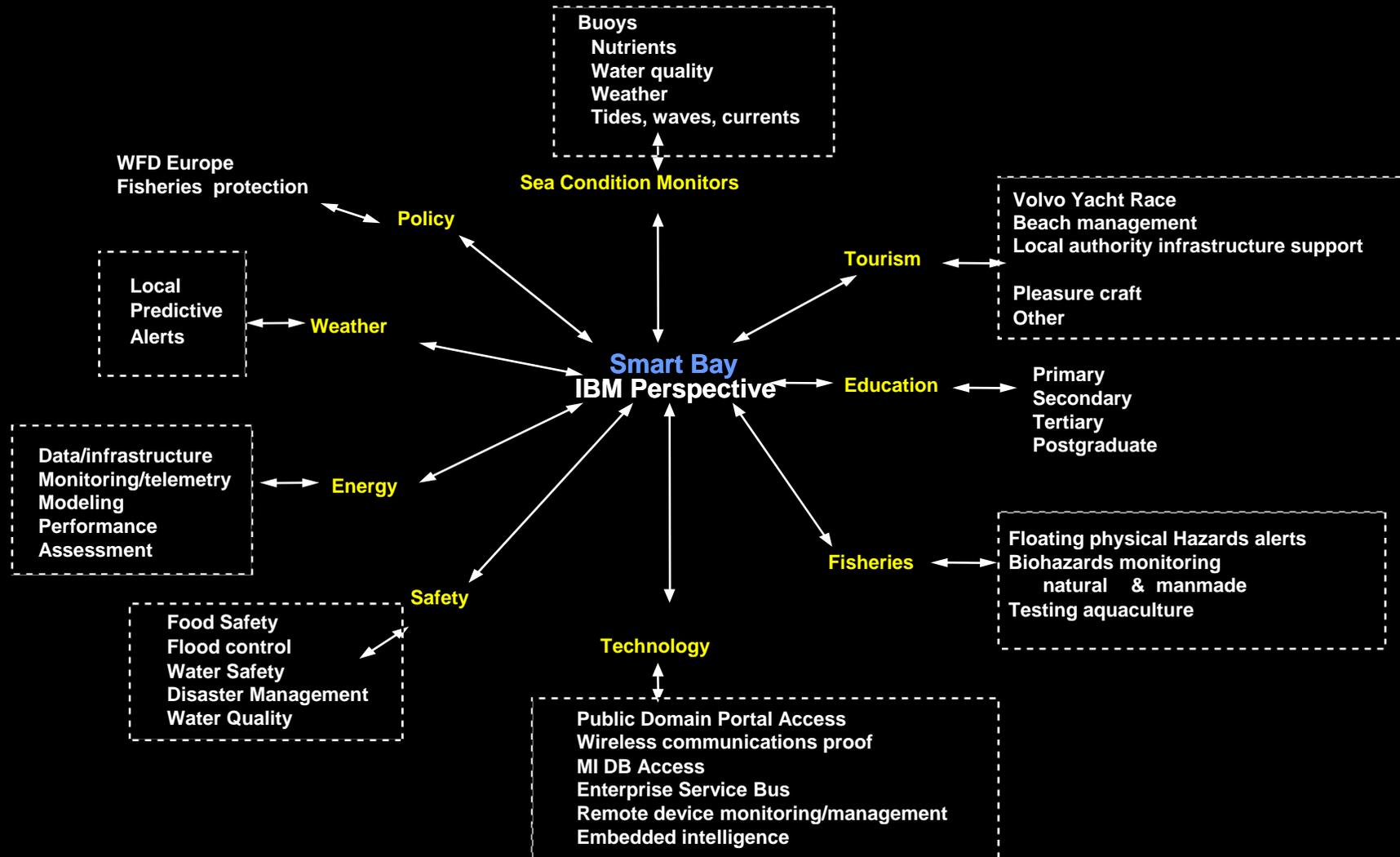
SmartBay collaboration objectives



- Design, test, and implement the next generation marine and coastal research and development platform via a collaborative approach
- Establish a foundational and “end-to-end” reference architecture with large-scale solution commercialization potential
- Develop, test, and “fastpath” a number of new technologies appropriate for water management and advanced cyberphysical systems
- Enhance the partner ecosystem for water management and sensor-based solutions through the collaboration of select multinationals, SMEs, and academic institutions



Supporting a wide range of stakeholders





Flooding

Attribute	Alert	Min	Max	Actual
Atm. Pressure		950.0	1050.0	1020 mb
Rainfall		0.0	20.0	19.0 mm
Tide Height		1.0	5.0	1.0 m
Tide Direction		240.0	60.0	60 deg
Wind Direction		240.0	60.0	230 deg
Wind Speed		0.0	20.0	5.0 m/s

EcoRhythms

Tourism And Water Safety

Boats currently docked: **0**

Boats due in next 10 hours: **0**

Report: Fisherman's Market | View More

Smartbay Navigation

Alarm

Macedair | emp Sea | emp inishmore | fish find

27% 13% 925%

List Alarms | Add Alarm

Bulletin Board

- [Mid Bay Buoy Safe in Rosseveal](#)
by: James Ryan | 18 Nov 2008 10:53
[BioToxin](#)
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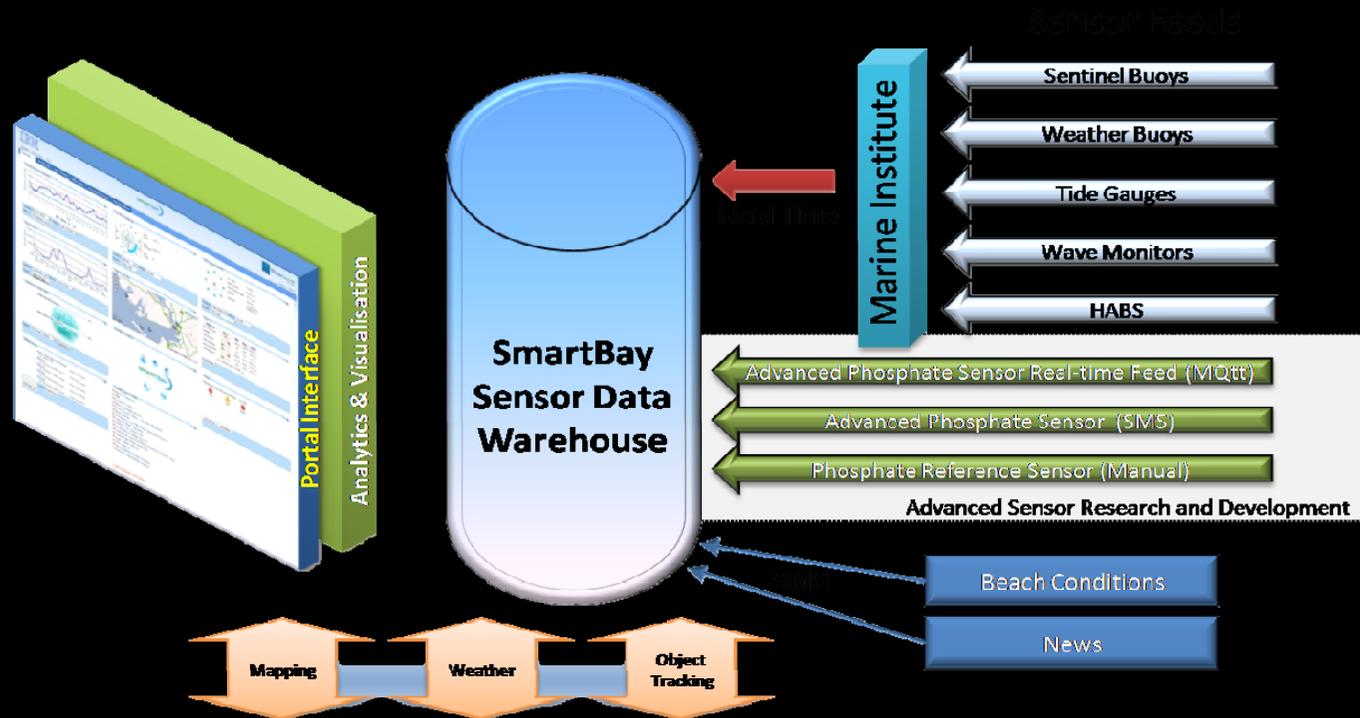
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- Dublin City University
- University College Dublin
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- Science Foundation Ireland

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The value of data



- Diverse sources
- Multiscale
- Mixed types

Data fusion

Exploit Investment



From Gaughan and Kolar, Journal of Ocean Technology, 2010.

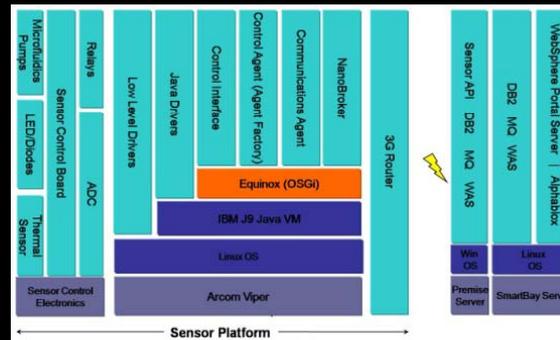
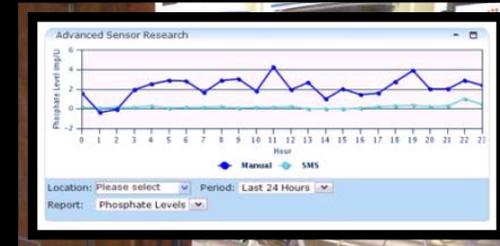
Object drift projection



Scenario

- While at sea, a fisherman observes a floating hazard
- Using a browser accessible SmartBay map-based portlet through an onboard internet connection, the location is captured by a single mouse click
- SmartBay also supports sending the longitude and latitude via simple SMS text message using a mobile phone
- Using on a complex set of weather and sea condition variables, the projected location of the hazard at every 2 hours for next 24 hours is calculated and plotted (with an error envelope as in hurricane models)
- SmartBay posts this information on a bulletin board portal and generates alerts to the fisherman and relevant authorities (e.g., Harbourmaster)

Advanced capabilities for sensors/monitoring platforms – supporting new sensor technology development



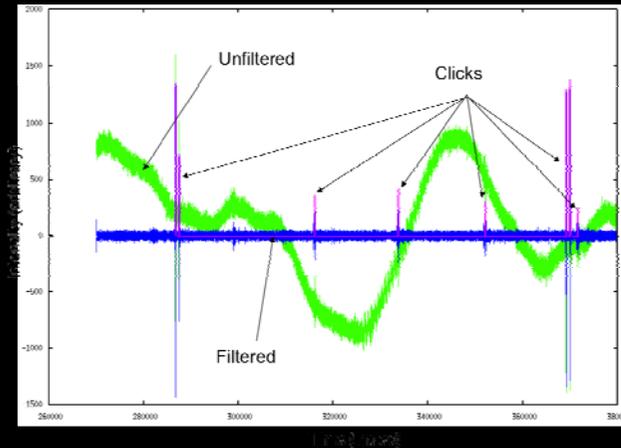
The next generation intelligent sensor platform

- Real-time decision making at the measurement/monitoring source
- Improved data quality and consistency
- High-integrity communications (no critical data loss should communications fail)
- Advanced remote device management
 - Ability to remotely provision sensor platform
 - Start/stop/load/unload software remotely



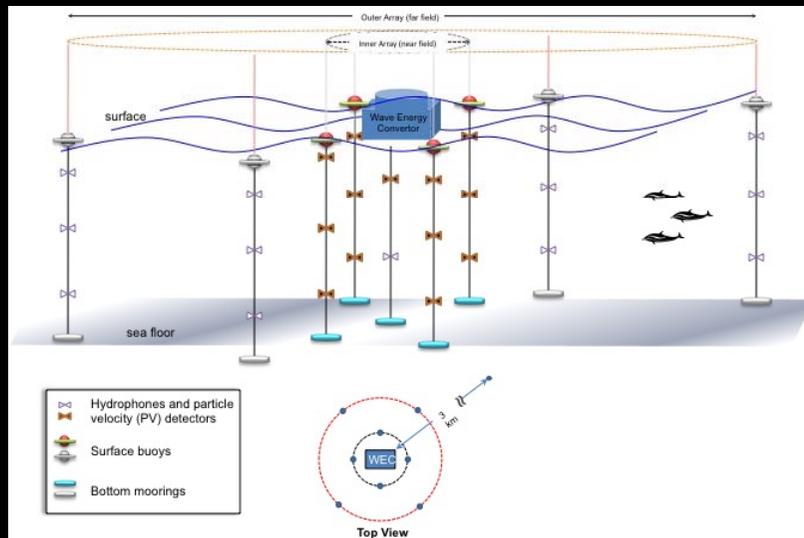
Stream analytics for marine mammal studies

- Real-time analytics of acoustic signals from hydrophones
- Identification and classification of dolphin and porpoise echolocation clicks
- Real-time dynamic filtering to compensate for varying environmental conditions



(from Kolar, et al, IEEE Oceans '11 Conference, Santander, Spain, 2011).

SmartBay has already facilitated the application of new approaches and technologies to other sectors



Statoll

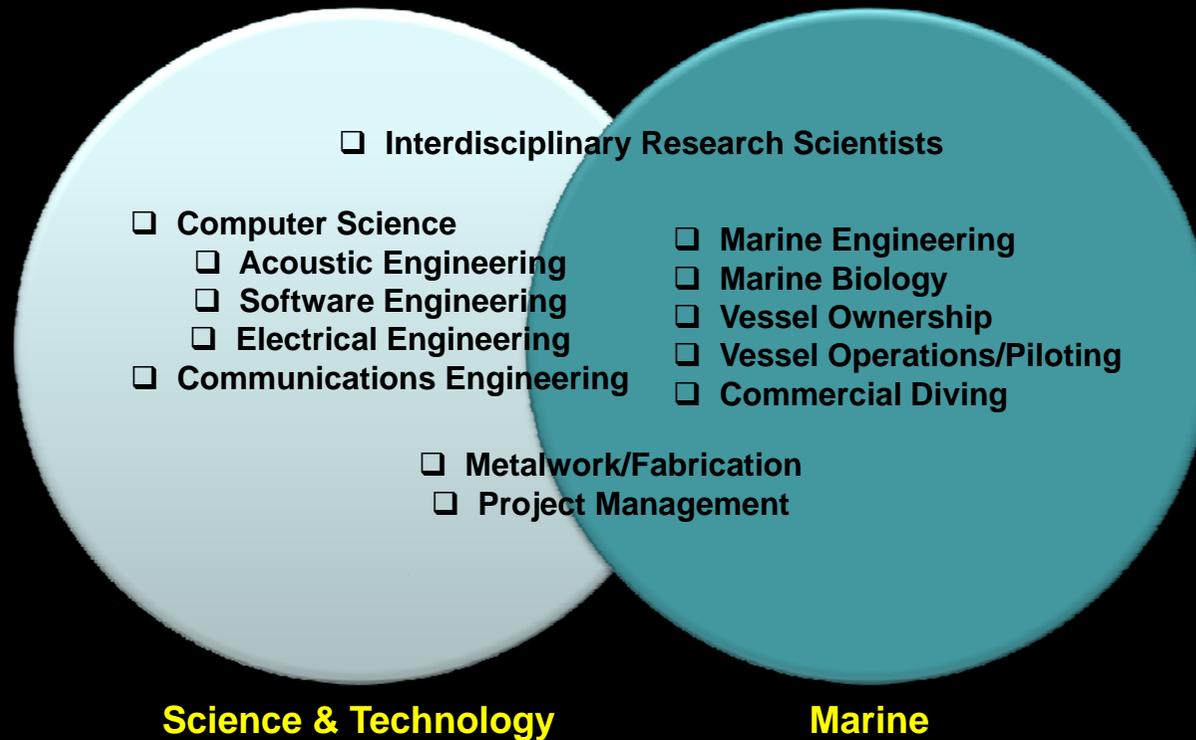
KONGSBERG

IBM

DNV

Integrated Environmental Monitoring Consortium

Ecosystem involvement example





Summary

- Benefits of establishing a research and development testbed with a suitable architecture to support varied activities and stakeholders
 - cyberphysical system approach
 - cloud computing based
 - advanced analytics and modeling
 - Improved integration level
- Private – public collaboration can produce successful results and multinationals are valuable to the ecosystem (B:B engagement)
 - Increasing and improving data, information, and knowledge
 - quality
 - quantity
 - accessibility
 - Economic development across the participant ecosystem
 - Expansion to additional sectors
 - Develop new clusters (build, test, translate)
- Path forward for SmartBay (HEA PRTL I)
 - national and European resource
 - state leadership
 - strong PI community is critical
 - clear roadmap

- MSFD
- Atlantic Strategy
- Horizon 2020

