SmartBay Ireland - Overview

SmartBay Ireland manages the national marine test facility for the development of innovative products and services for the global maritime sector.

This includes the trial and validation of novel marine sensors, prototype equipment and the collection and dissemination of marine data to national and international users of the facility.

Sectors and industries

SmartBay Ireland provides key marine, information, communication and technology services to the following sectors and industries:

- Ocean Energy
- Sub-sea Sensors & Equipment
- Shipping & Security
- Aquaculture
- Environmental
- Research & Development

SmartBay Ireland supports the testing and validation of novel sensors and equipment for its clients. SmartBay provides surface platforms and sub-sea facilities for the demonstration and validation of new technology and solutions. Clients can access SmartBay’s cyber environment to validate innovative solutions for marine and related sectors.

Our team of marine, communication and electronic technicians allows us to offer a range of marine services to all users of the facility. This allows users of the facility to focus on data analysis, device validation and product development. Each project is guided from initial concept through to commercialisation.
Marine Services

Our experienced technical team provides innovative solutions to the unique problems that testing sensors and equipment in a marine environment presents. We follow a systematic testing and integration process which includes:

1. Pre-deployment, scope and planning.
2. Bench test equipment to prepare for deployment.
3. Field test equipment.
4. Post deployment assessment and analysis.

Marine ICT Services

Our ICT personnel provide an open platform for our user community. A secure and bespoke environment for any organisation conducting proprietary trials, testing data analytics or software development, is provided by our team of software engineers. Bespoke in-house solutions have been developed which include:

- Real-time data capture (multiple sensors, multiple datasets).
- Data Management (storage and parsing of raw data).
- Customised data presentation.
- Data visualisation.

Facilities

SmartBay’s infrastructure includes:

- Fleet of Mobilis DB5800 buoys
- Sensor Hardware
- Communication Systems
- Data Acquisition Systems
- Bespoke Web Portal
- Access to a range of vessels (Including Dive Support, Rigs, Tugs and Multi-Purpose Research Vessels)

A sub-sea cable is currently being installed at Galway Bay’s ¼ scale test-site which includes:

- Fibre optic data and 400v power cable.
- High speed communications via 4 pairs of optical fibres and which will host a variety of sensors and equipment and which can be tested and demonstrated in near real-time.
- The cable end equipment will have 23 ports, 15 of which will be dedicated to the test and demonstration of new and novel equipment.
- The “SeaLab” facility will provide additional power to, and dissipate power generated by, Ocean Energy (OE) devices. The SeaLab will also support the test and validation of OE component devices.
SmartBay Ireland - Services

Our core multidisciplinary team has been purposely selected to provide users of SmartBay’s facilities with the scientific, technological, ICT and business development support necessary to develop, test and validate innovative solutions for the maritime sector. We also provide users with bespoke software and analytical solutions to meet their specific requirements.

The team is comprised of marine technicians, advanced scientists, engineers and software developers, supported by marketing and business development professionals with extensive industry knowledge. This combination of skills allows SmartBay to offer its users an end-to-end service from initial product conception to validation.

Marine Services

SmartBay Ireland offers a complete range of marine services to all users of the national marine test and demonstration facility.

The experienced technical team can provide bespoke innovative solutions to the unique problems that testing in a marine environment presents.

This allows users to focus on data analysis, device validation and product development, secure in the knowledge that marine activities are being managed by the experienced SmartBay technical team.

“Turn-Key” Marine Services include:

- Health, safety and environmental management
- Day-to-day marine operational support
- Project management
- Vessel support
- Specialist technical and engineering support
- Electronics and electrical support
- Dive support
- Device validation
- Techno – economic assessment
- Design, development and testing
- Commercial support
- Integration, testing and verification
**Marine ICT Services**

SmartBay provides a real-time data acquisition system for transmitting, collecting, parsing and storing data, which is then made available via our website. We also offer bespoke data management and presentation solutions to our clients, including:

- Data collection
- Data management
- Data visualisation
- Secure access
- Real-time floating device visualisation
- Range of file formats
- Test site hindcast data sets: Weather, wave height and tidal

**Translation Support Services**

SmartBay is fostering commercialisation initiatives to develop ICT products and services for the global maritime sector. SmartBay provides technical business support to local SMEs and MNCs to develop maritime related applications. SmartBay brokers partnerships which include both national and international researchers, SMEs and MNCs. The ultimate aim is to translate research into innovative products and services which will result in economic growth and job creation for Irish companies.
SmartBay Ireland - Facilities

The test site is part of Ireland’s national marine test and demonstration facility which is located 4.5km East of Spiddal, approximately 1.5km offshore and in water depths of c. 23m.

The ¼ scale test site allows smaller scale devices, or those at an earlier stage in their development, to gain sea experience in less challenging conditions than those experienced at full-scale wave test sites.

**Sub-sea Cabled Observatory**

The sub-sea cabled observatory includes: fibre optic data and 400v power cable; high speed communications via 4 pairs of optical fibres and a sub-sea cabled sensor platform which will host a variety of sensors and equipment which can be tested and demonstrated in near real-time.

The cable end equipment will have 23 ports, 15 of which will be dedicated to the test and demonstration of new and novel sensors.

Of these 23 ports:
- 4 will be optical
- 18 electrical (Serial or Ethernet)
- 1 coaxial port which will be dedicated to the high definition camera and lights.

The cable will also host an acoustic array on one of the optical ports; this array will incorporate 18 hydrophones (6 hydrophone lines with 3 hydrophones per line), over 2km of cable and transmitting nearly 200 Mbps of data.

Along with the HD Camera and the acoustic array the cabled observatory will also host, on a permanent basis the following sensors:
- Fluorometer/turbidity
- Acoustic Doppler Current Profiler
- Conductivity, Temperature and Depth
- Dissolved Oxygen.

The cabled observatory will also host an umbilical which will provide power and data connectivity to a floating sea laboratory which will allow ocean energy devices and component parts to be tested and monitored in near real-time in a marine environment.

The “SeaLab” facility will provide additional power to, and dissipate power generated by Ocean Energy (OE) devices and/or components of OE devices, in addition to supplying high-speed data transmission for real-time monitoring.
Buoy Network

SmartBay operates a fleet of Mobilis DB5800 buoys which are used for testing and validating a range of novel sensors and to efficiently gather metocean time series data. The buoys can host a variety of communications protocols to shore including: GPRS, Satellite, VHF, Wimax, GSM, 3G and Wi-Fi. These services will allow simple high-speed backhaul connectivity for devices located in, or near the test site. The buoys 3G HPSA+ communications include download speeds up to 21Mbps, and uploads speeds up to 5.76Mbps, taking advantage of nearby next generation mobile sites.

SmartBay buoys can have single, bridle, or multipoint moorings through the hull compartment allowing for diverse and easily adaptable deployment solutions depending on specific requirements. The data buoys allow for interchangeable components enabling easy integration of test sensors with standard wiring looms. The Mobilis DB5800 also have a large power capability and have the ability to power multiple sensors. They have the capability to generate autonomous power including Solar PV and Wind Power harvesting.

SmartBay Services to the Ocean Energy Sector

The team is composed of marine technicians, marine scientists, engineers and software developers, supported by marketing and business development professionals with extensive industry knowledge. This combination of skills allows SmartBay to offer its users an end-to-end service from initial product conception to final validation.

SmartBay’s Data Delivery Portal

We provide a real-time data solution for transmitting, collecting, parsing and storing data, which is then made available to our clients via our web portal. SmartBay’s custom built portal offers:

• Sensor data collection from NMEA and non-NMEA sensors
• Tailored data acquisition timing intervals
• Customised data pre-processing, validation and parsing
• Data brokering, storage, and processing services
• Collection and access to raw and parsed data
• Access to both historical and real-time data
• Access to data in a variety of formats e.g. csv, json, kml
• Integration of federated data sets
• Secure data access, including:
  - User authentication
  - User authorisation
  - Data encryption

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SmartBay Ireland -
Services to Ocean Energy
Device Developers

**Galway Bay 1/4 Scale Ocean Energy Test Site, NE Atlantic, Ireland**

SmartBay Ireland manages Ireland’s 1/4 scale marine test site which is ideally located within the confines of Galway Bay. The test site area is clearly delimited by 4 cardinal marks at each corner of the site to indicate restrictions on vessel traffic within the area.

The test site is ideal for developers wishing to undertake low-cost sea trials and validation of devices and components at various technology readiness levels (TRL’s; TRL 5-6).

SmartBay is responsible for the management of an underwater cabled observatory which will run to the ocean energy test site (operational by Q4 2014). The hybrid optical/electrical cable will terminate at an underwater node and will provide up to 4kW of power to, and collect data from, the subsea node. Several optical and electrical connectivity options will be available.

The “SeaLab” facility will provide additional power to, and dissipate power generated by, Ocean Energy (OE) devices. The SeaLab will also support the test and validation of OE component devices.

**Facilities and Supports include:**

- Fully licenced 1/4 scale test site for ocean energy converters.
- Site located 1.5km’s offshore with water depths ranging from 20m – 23m.
- Access to a floating sea laboratory facility “SeaLab”.
- Comprehensive time-series of weather, wave and current data for the site.
- Proximity to ports and associated facilities.
- A dedicated operational team providing end-to-end marine support.
- ICT team for data acquisition and transmission support.
**SmartBay Ireland**

We are a provider of innovative solutions to users of the test site and are experienced in supporting prototype ocean energy device trials, ranging from; planning, deployment, bespoke high-speed wireless data transmission, device recovery, certification and validation.

**SmartBay Services to the Ocean Energy Sector**

The team is composed of marine technicians, marine scientists, engineers and software developers, supported by marketing and business development professionals with extensive industry knowledge. This combination of skills allows SmartBay to offer its users an end-to-end service from initial product conception to final validation.

**SmartBay has experience in delivering the following services and supports:**

- Assisting in funding application preparation
- Pre deployment planning
- Mooring configurations
- Device Mobilisation
- Deployments
- Ongoing Operations & Maintenance (O&M)
- Data acquisition and transmission
- Device demobilisation and decommissioning

SmartBay has established an extensive local supply chain to compliment in-house expertise, and to provide a range of supports, including:

- Naval Architect
- Marine Surveyor
- Device Validation
- Device Certification
- Techno-economic assessment
- Vessel Provision
- Dive Support
- Steel Fabrication
- Welding
- Port Facilities