Best practice developed over eleven years of high frequency in situ measurements

Cefas

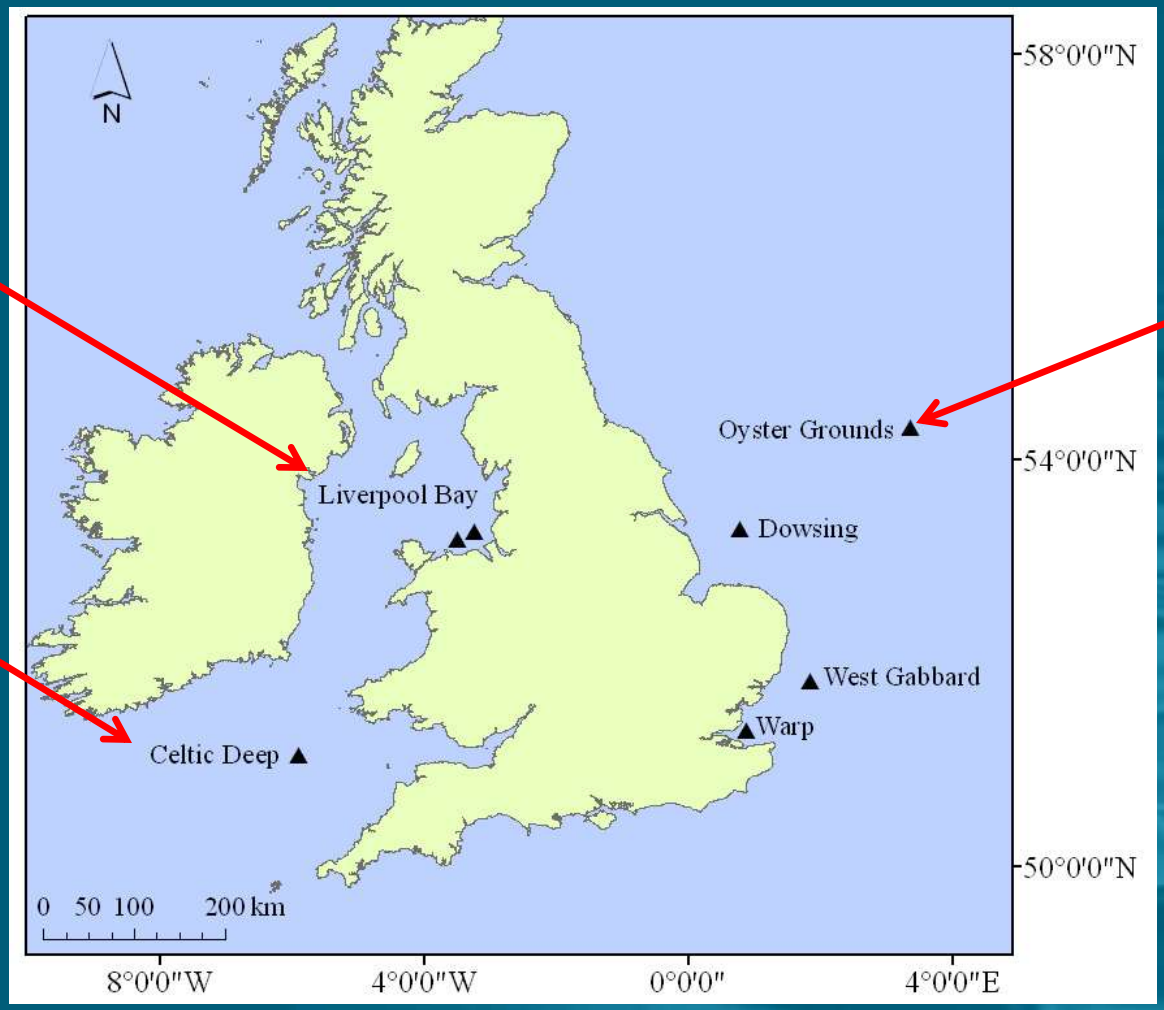
SmartBuoy Locations

7 routine monitoring sites

Cefas/AFBI /POL

Cefas/AFBI

Cefas/DNZ



Cefas

SmartBuoy Configuration

Max. weight ca. 500kg

Variable	Sample frequency
Salinity Temperature Chlorophyll fluorescence Turbidity PAR irradiance Dissolved oxygen	1Hz in 2 x 10 min burst/hr Data acquisition and control via ESM-2
TOxN (total oxidisable nitrogen	Up to every two hours
Dissolved silicate	Up to daily
Phytoplankton counts and composition	Every 4 days

Cefas

Cefas

in situ nutrient analyser (NAS-3X)

TOxN

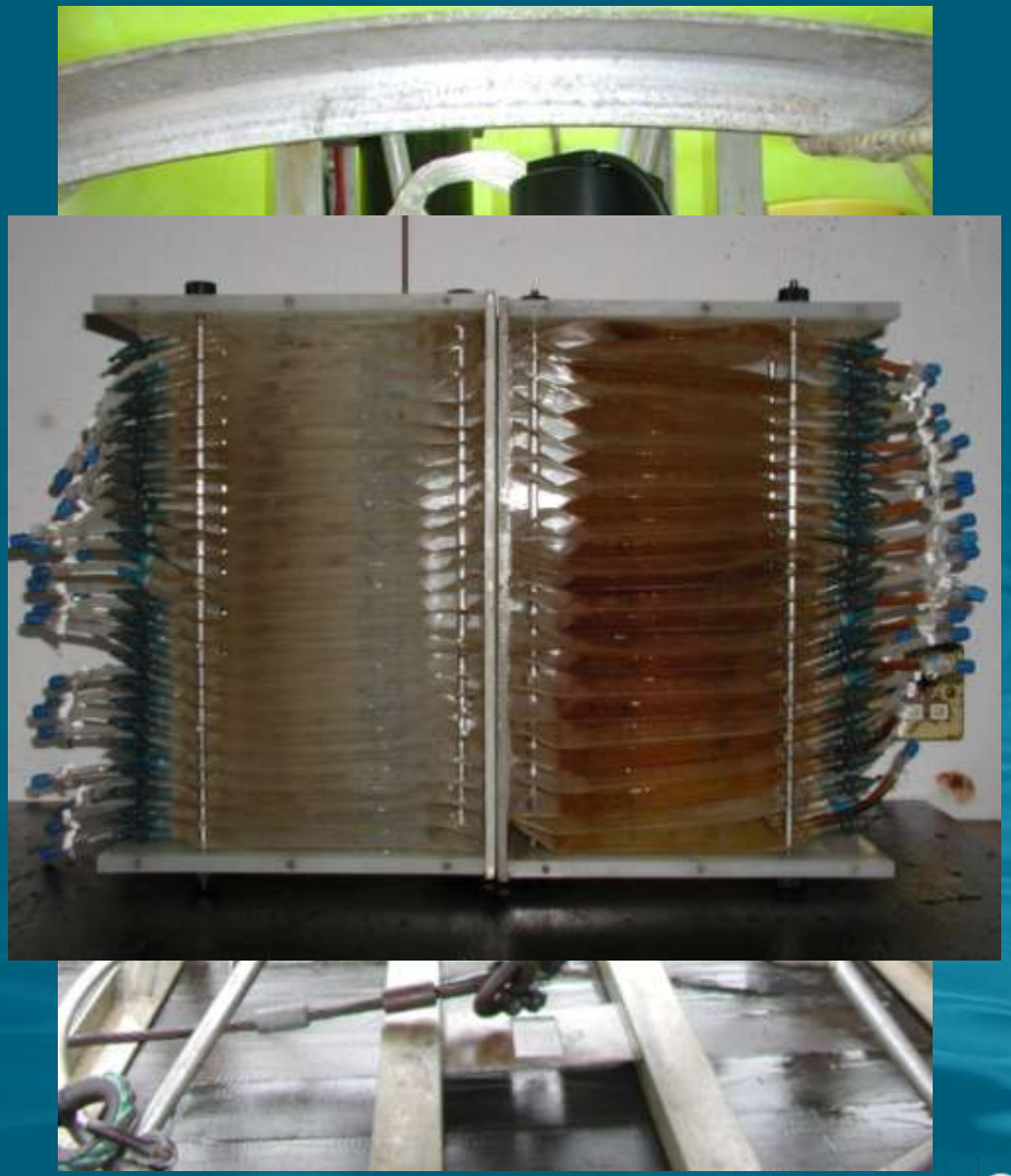
accuracy ±10.6%
precision 5%

Cefas

Water sampler (WMS-2)

TOxN, Si, PO_4

accuracy ±4.0%
precision 4%



Cefas

Overview of our “System”

- Cefas QA system (Project management, HSE PAG etc)
- Risk assessments (RA and COSHH)
- Standard Operating Procedures (SOP) for all tasks.
- SOP are bench tested and reviewed every two years.
- Checklists

Best Practice for SmartBuoys

- Maintenance
- Storage
- Transport
- Data transfer
- Data post process
- Other stuff..

Cefas

Maintenance

- SmartBuoy Workshop – most preparation of instruments.
- 2 staff full time + 2 others to help

- Electronics Workshop – in-house instruments (ESM2, Mooring Locator, Water Sampler) .
- Less than 1 man year – from 3 staff

Cefas

Storage

- Mainly at Cefas laboratory
- Hardware is nearby on a site with 5 industrial units and a big yard area. (all the stainless steel is kept indoors to prevent theft).
- Hardware is maintained by P&O Maritime Services who also look after the RV Cefas Endeavour.

Transport

- Locally all sensors and instrumentation are moved by the SmartBuoy team – rental vans.
- Pallet Line to Holland and Belfast (monthly)
- Hardware is moved by POMS
- Each survey has a (long) pre-requisite list of forms the SIC completes.

Data transfer

- Most of the SmartBuoys send back data every two hours (every 8th burst) via Orbcomm.

- Once the buoy is serviced the logger is downloaded and data uploaded to the database.

Cefas

Pre deployment

- Logger set up on database – checks on service history of sensors, looks at deployment length battery life etc
- Serviced instruments ready to deploy (i.e. two complete sets per site)
- Use the same sensors on rotation – helps a lot with calibration
- Build before you set sail (check telemetry)

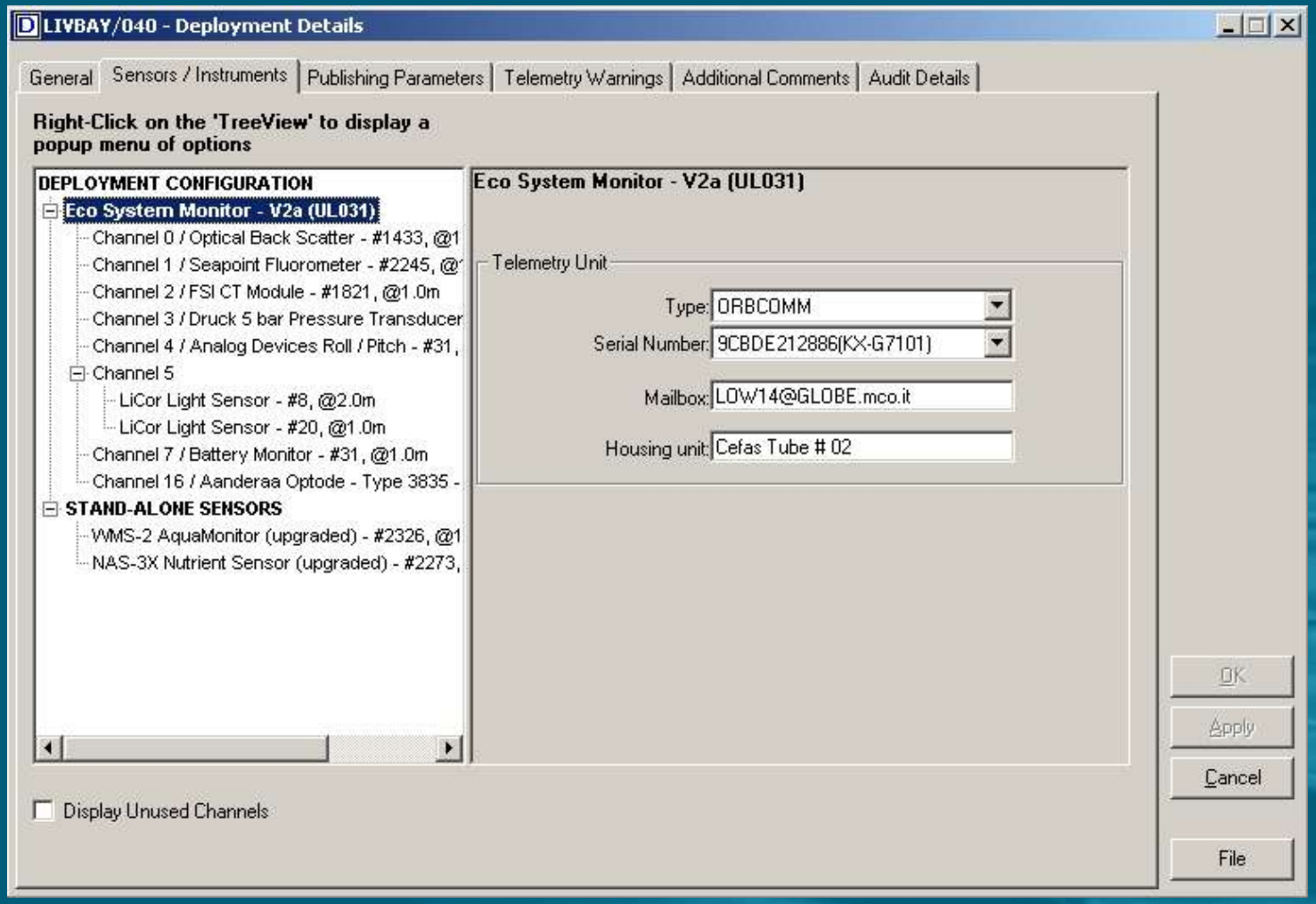
Post deployment

- Photograph all sensors – helps when assessing fouling.
- Jet wash
- Dismantle and wash and clean everything in fresh water, pack into transit cases.

- Upload data to database overnight
- Service all instruments

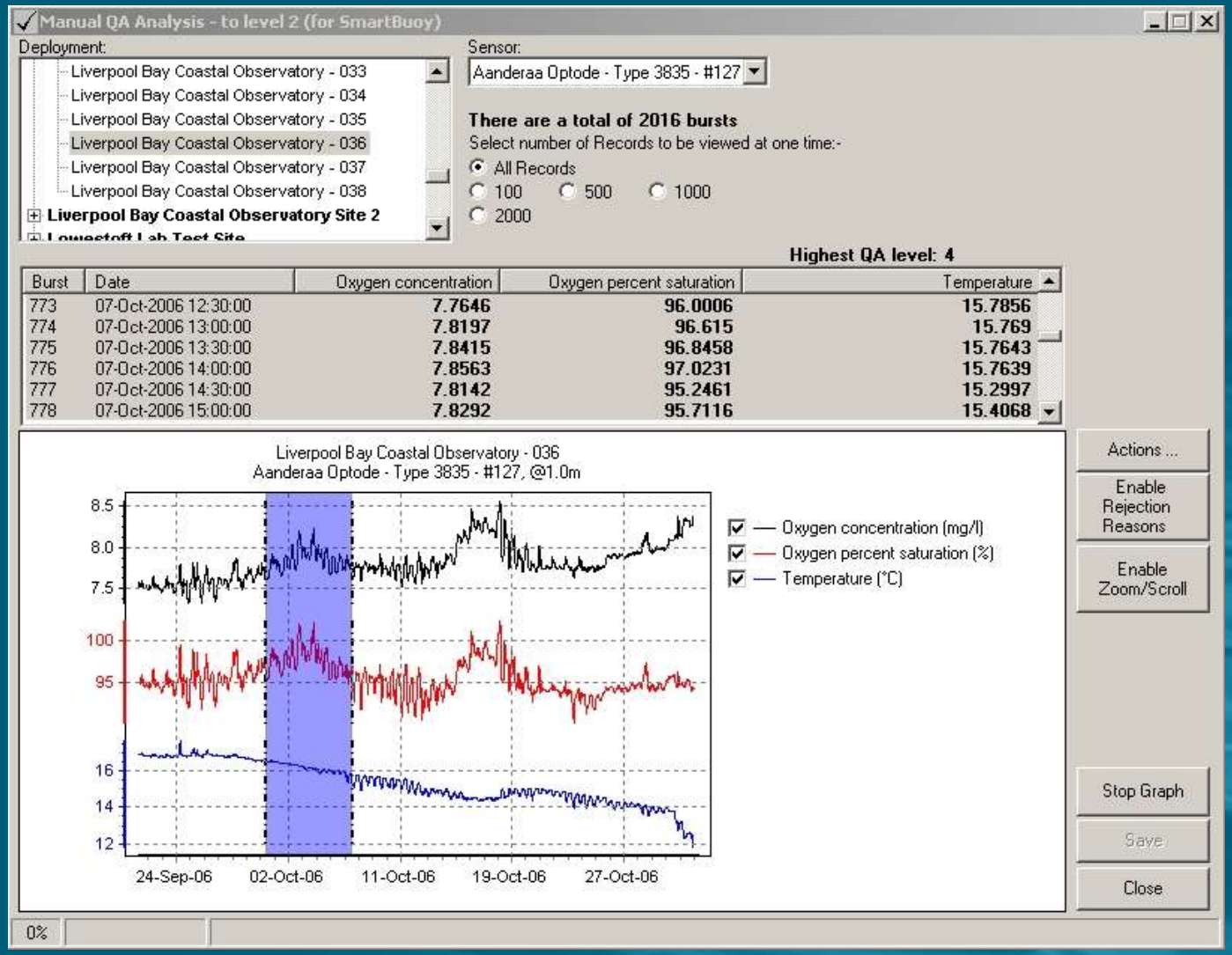
Cefas

SmartBuoy Data Management System – 1 Sensor and deployment configuration



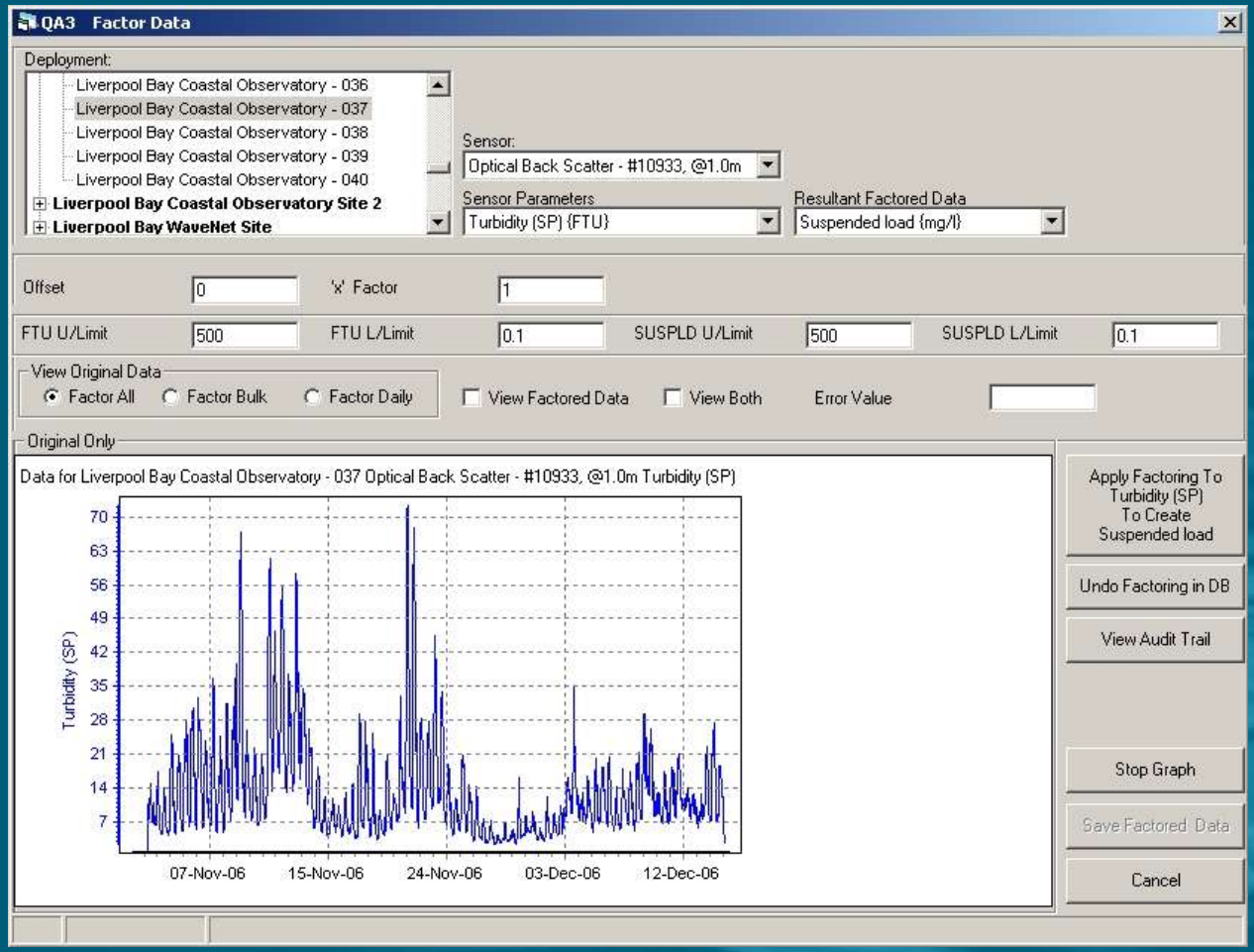
Cefas

SmartBuoy Data Management System – 2 QA Level 2 (manual QA by expert user)



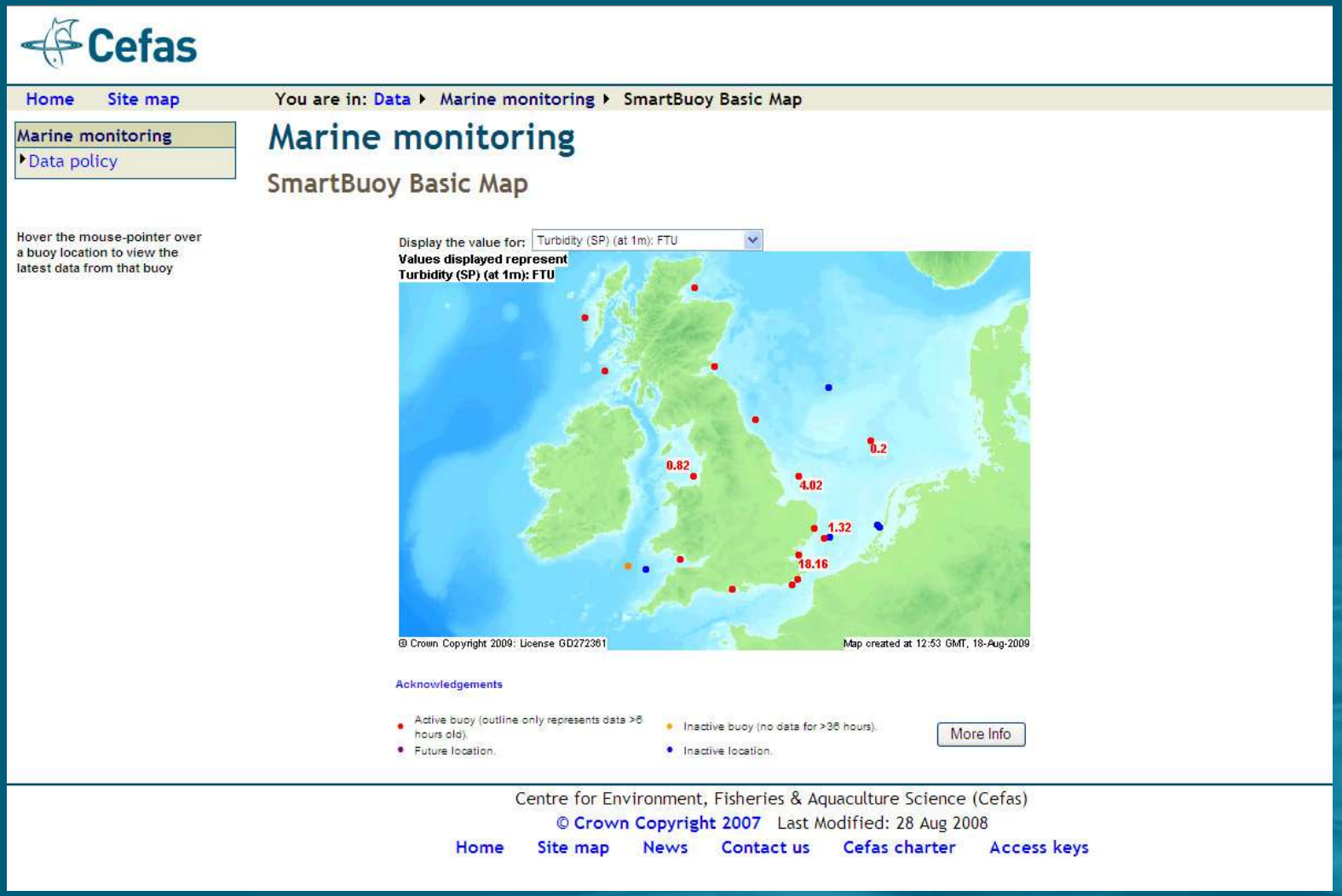
Cefas

SmartBuoy Data Management System – 3 QA Level 3 (applying field calibrations)



Cefas

Web access to data



Website: **www.cefas.co.uk/monitoring**

Cefas

Other Stuff

- Housings – If Cefas built then generally locally hand-made pressure housings (rated 200 and 450m).
- All wet pluggable connectors – mainly SubCon micro but occasionally Impulse.
- Mooring locator uses Iridium (costs around $25 per month)

More Other Stuff

- SmartBuoy database is SQL 2008
- SmartBuoy QA software is currently being re-written in .NET (from VB6) - due March 13?
- SmartBuoy logger is being re-developed – due 2014
- FerryBox database and QA system now operational

Cefas

Yet More Other Stuff

- Anti-fouling measures using Zebratech wipers – OBS, Seapoint Flu and Licor PAR
- Due to trial AAI optode wiper next month
- Full SB trial for 3 months Oct to Feb