Chelsea Technologies Group

Commercialisation of the FerryBox Concept;
Finding new markets

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4th FerryBox Workshop 2011 Helmholtz-Zentrum Geesthacht
Introduction

• Review of previous CTG FerryBox systems
• Environmental monitoring from Military Surface Ships
• Flow-through Plankton Sampler
• Ship exhaust gas scrubbing – sensor requirements
• WAVESENTRY
• Aqualine II FerryBox
The CTG AquaLine FerryBox System

- **AquaLine FerryBox**
  - Sensor Package
    - MiniPack providing CTD-F + other sensors on request
  - Interface Unit with Passenger Display
  - GPS / GPRS unit

- **Key Features**
  - Robust autonomous Linux based software
  - Display switches between map of vessel position & data
  - Ship to shore data transmission when entering port
Environmental monitoring from Military Surface Ships

- **Background**
  - Sonar 2081
  - CTG providing two outboard sensor packs - UK submarine fleet-fit
  - Sonar 2115
  - Incorporates both Sonar 2081 plus Deck End Equipment & Software
  - Fitted to Astute class submarines

- **Requirement for surface ship based system**
  - Enhance the MOD oceanographic data collection & knowledge
  - Produce oceanographic data suitable for scientific analysis by NOCS
  - Enable increased understanding of S2081 and S2115 data sets
  - Capability to host additional sensors
  - To improve the recognised environmental picture
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Environmental monitoring from Military Surface Ships

- **Project Details**
  - Commenced October 2010, completed March 2011
  - Single Manifold design with de-aerator and fluting
  - Fitted to Polar Bjorn – now called HMS PROTECTOR
  - Sails to Antarctic Autumn 2011
  - Data to be made available for analysis by NOCS
  - Additional sensors and further installations to be considered
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Flow through Plankton Sampler for IMARES The Netherlands

- Project Details
  - Project Contacts Dr Hauke Flores & Bram Couperus (Project Leader)
  - To modify the CTG *in-situ* Plankton Sampler to a flow through device
  - To provide a system suitable for operation on a Ferry
  - Allow the Plankton Sampler Unit to be easily removed to fit gauze rolls
  - Originally fitted to MS Vlieland operating between Harlingen & Vlieland
  - System comprised of:
    - Plankton sampler
    - Watertight housing
    - Flow meter
    - Valves and Pressure Gauge
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Flow through Plankton Sampler for IMARES The Netherlands

- Application
  - the APS was installed on the VLIELAND in 2009
  - the system ran technically without problems, but the sampling efficiency appeared low
  - in 2010, IMARES stopped sampling on the ferry and developed a mobile system for research vessels to investigate ways to improve the sampling efficiency, mainly funnel systems on the mouth opening
  - Trials have shown figures of zooplankton density that are in the order of magnitude expected in the Wadden Sea
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De MS VLIELAND

Route through Wadden Sea
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Concept drawing APS system on MS VLIELAND

Not drawn at exact scale

Dimensions (mm, l x w x h)
Base: 950 x 350 x 30
Housing: 450 x 350 x 300
APS: 291 x 235 x 140

1.15 bar
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R.V. Tridens
North Sea, Nov. 2010

F.V. Jacoriwi,
Wadden Sea, May 2011

Sampling at up to 13 knots shipspeed

Improving sampling efficiency
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Improving sampling efficiency

Zooplankton density
(ind. m⁻³)

Wadden Sea transect (Texel)
Hamworthy Krystallon Exhaust Gas Cleaning

• Drivers
  – IMO regulations on emissions, operators required to use cleaner fuels and / or abatement technology
  – Lower operating costs if switching fuels can be avoided – adopt scrubbing systems

• Technology
  – Seawater scrubber can remove 99% of SOx and 85% of particulates
  – Wash Water treatment system removes both particulate and hydrocarbon waste products.
  – Monitoring of Gases NOx, SOx and CO₂
  – Wash Water discharge is monitored for hydrocarbons, turbidity and pH
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Hamworthy Krystallon Exhaust Gas Cleaning

- CTG Sensors - UVILux Hydrocarbon fluorimeter & CTG Turbidity (ISO 7027:1999)
- Third party sensors – Hach pH and Bürkert flow sensor
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Hamworthy Krystallon Exhaust Gas Cleaning
WAVESENTRY

• UK Technology Strategy Board co-funded 18 month programme
• Information and forecasting tool for managing the risks of marine operations in adverse sea states
• Integration of diverse data sources from ship-bourne sensors to novel satellite remote measurements
• Addresses the current inadequacies with regard to temporal and spatial resolution from atmospheric / ocean models
• Project Partners include:
  – HR Wallingford (Lead Partner)
  – EMU Ltd
  – Surrey Satellite Technology Ltd
  – National Oceanographic Centre, Southampton
  – Chelsea Technologies Group Ltd
  – Marine South East Ltd (Project Manager)
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WAVESENTRY

Work Programme

- Pilot Specification
- Data Harvesting and Harmonisation
- Satellite Data Harvesting, Processing and Validation
- Commercialisation Plan
- Pilot Application and Evaluation

4th FerryBox Workshop 2011 1st & 2nd September 2011 Helmholtz-Zentrum Geesthacht
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CTG Activities

- Adaptation of existing AquaLine FerryBox system
- Provision of motion sensors to log ship motion and position (from GPS)
- Use of MEMS 3-axis gyro & 3-axis accelerometer
- Roll, Pitch, Yaw, Surge, Sway, Heave, Velocity recorded
- Data to be post-processed to infer sea state along the voyage

CTG Project Input

a platform for value-added data processing 'on board', with
the specialist software coming from a collaborating company

CTG Aim

to offer as an additional dataset
for AquaLine FerryBox users
to engage host vessel organisations
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AquaLine II FerryBox

- Adopt recent developments within Hamworthy Krystallon project (reducing costs)
- Adopt, as standard, automatic cleaning routines for all systems
- Revert to single manifolds for each sensor to provide complete flexibility
- Provision of system pump
- Divorce passenger screen from interface unit for improved flexibility
- Offer as option data of ships motion through transect