NEWSLETTER

Summer 2012

INIS HYDRO
Ireland
Northern Ireland
Scotland
Hydrographic Survey

Welcome...

by André Cocuccio, INIS Hydro Project Director

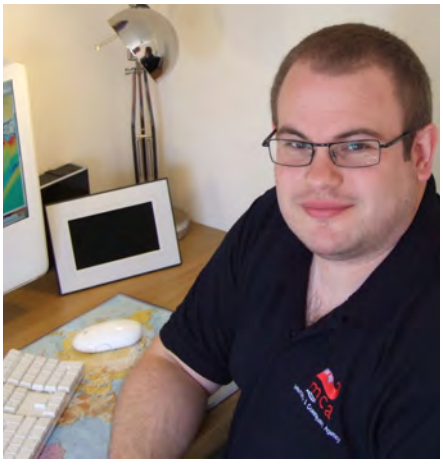
...to the first edition of our bi-annual newsletter bringing you the latest news and updates from the INIS Hydro seabed mapping project.

INIS Hydro has been up and running for 17 months now, and during that time we have commenced survey operations along the east coast of Ireland and Northern Ireland and conducted survey trials off Oban.

2012 promises to be our most productive year with work on the INIS Hydro survey specification drawing to a close, and surveys off Ireland, Northern Ireland and the west coast of Scotland generating valuable hydrographic data sets.

Underpinning all this effort is the cross-border co-operation between seven INIS Hydro project partners from across the UK and Ireland.

To my colleagues I extend my thanks for their professional approach and support of the project, and I look forward to continuing to work alongside them for the next 16 months.



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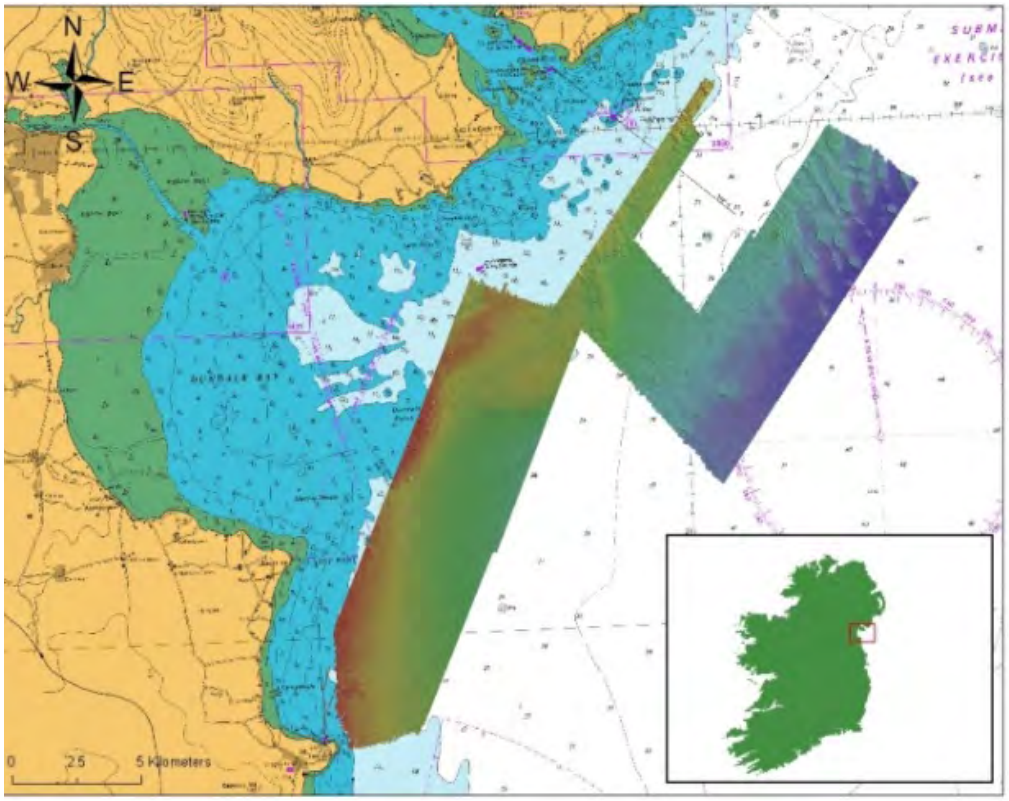

Irish Marine Institute: charting the seabed of Dundalk Bay...

Figure 1:
Bathymetry of Dundalk Bay, acquired using a EM3002 multi-beam system to International Hydrographic Organisation Order 1a standard.

Chris Martin
Marine Institute

Setting out the task...

As part of the EU funded INIS Hydro project, the Marine Institute of Ireland aims to survey 170 km² of seabed within the deeper area of Dundalk Bay.

On the 2nd September 2011, the Marine Institute's research vessel R.V. *Celtic Voyager* (see image below) began surveying the outer part of Dundalk Bay. During mobilisation in Howth representatives from partner organisations were present.

Our multi-beam system

The *Celtic Voyager* currently uses a Kongsberg Simrad EM3002D multi-beam system.

This is a dual frequency system operating within the 300 KHz band with a total of 512 individual sonar beams. It is well suited for detailed seafloor mapping and has a maximum swath width of up to 10 x water depth in depths between 1m and 200m in cold-water conditions.

Ground truthing

On the 14th September, the *Celtic Voyager* commenced sampling as part of the ground-truthing campaign. The sampling was carried out with a mechanical instrument called a Shipek Grab. This is a spring-loaded device that, upon hitting the seafloor, snaps closed and scoops up a bucket of seabed material.

A total of 23 ground truthing samples were taken at selected locations of interest. These were retained, sealed and la-

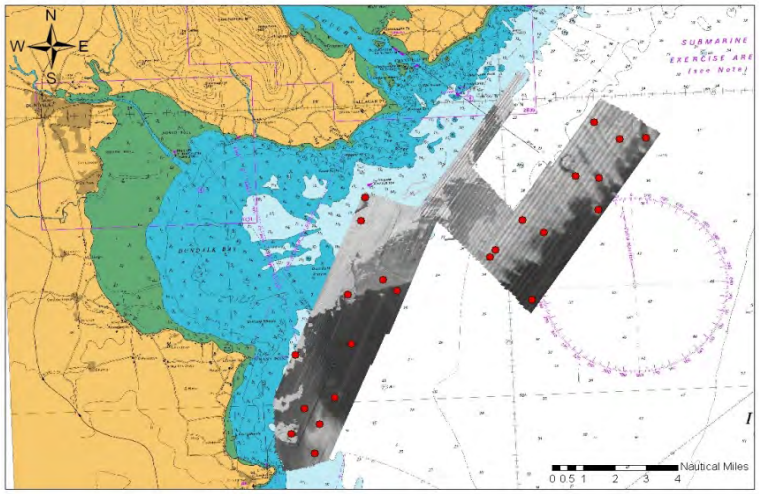

Figure 2: Geo-coded backscatter data acquired during survey operations onboard the *Celtic Voyager* between 2nd and 13th September 2011. This data will enable seabed classification and the identification of sediment types. The red dots show the sites where the team collected samples for ground truthing.

beled on the vessel and will undergo particle size analysis to classify sediment type.

What we found

During the survey, the remains of three wrecks were surveyed. Two of these had been previously charted, but the new data pinpoint the locations of the wrecks with much greater accuracy. Initial investigations of existing databases suggest that the two known ship wrecks are the 50 m SS *Topaz* and the 113 m long *Crusader*.

The third and final wreck we surveyed during this campaign is an unknown rectangular feature, with a flat top surface and a long mast-like structure as shown in figure 4. The wreck lies at a minimum water depth of 17.9m, is 113 m long and 1-3m high. These dimensions were calculated from multi-beam data using Caris Hips and Sips software.

The shallow challenge

With the deeper areas of Dundalk Bay complete, the shallower areas will be mapped using the Geological Survey of Ireland's vessels, the RV *Keary,* and the 7.5m RIB, RV *Geo*. These vessels are currently working in tandem on the shallower coastal areas within Dundalk Bay.

This will then produce a complete set of hydrographic information on the areas mapped by the *Celtic Voyager* right up to the shoreline between Clogherhead in the South and Carlingford Lough in the North.

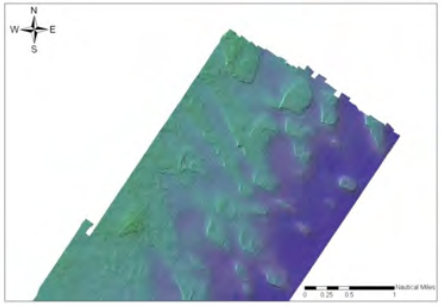

Figure 3:
The image shows a multi-beam shaded relief image of sand waves in the North East region of the survey area.

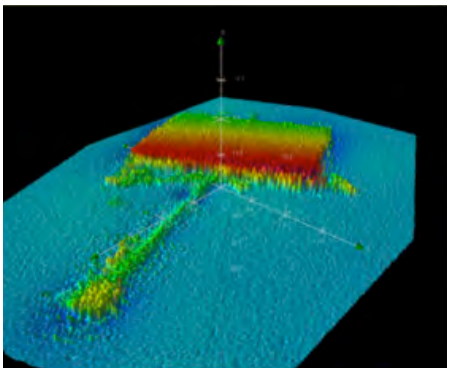

Figure 4:
Multibeam echosounder image of a newly discovered wreck lying at
55° 55.4309 N
006° 05.38 W

Northern Ireland is surveying:

- **Dundrum Bay**
- **SE Mourne Coast**
- **Carlingford Lough and Approaches**

Dr James Strong
AFBI

A friendly start

The survey commitment of Northern Ireland's Agri-Food and Biosciences Institute (AFBI) to the INIS Hydro project started in March 2011, when the RV *Corystes* spent 10 days collecting multibeam echosounder (MBES) data in Dundrum Bay. In the spirit of cooperation, learning and spreading best practice, the AFBI scientists were joined by Chris Martin from the Irish Marine Institute who provided invaluable advice on our survey operations.

Chris is also a floating chess grand master. But when he confidently stated that he had never been beaten in chess, AFBI's Jay Calvert quickly corrected that boast with his unique chess strategy.

Enter the mighty UKHO

The weather was kind at first but deteriorated quickly requiring the ship to take shelter in Belfast Lough. This brief delay made it easy to collect David Parker from the UK Hydrographic Office. Nervously, we welcomed David onboard the RV *Corystes*, half expecting a deluge of difficult questions, exasperation and dismay at our working practices from the mighty UKHO. To our huge relief David was extremely encouraging and patient whilst explaining the finer point of the International Hydrographic Organisation (IHO) data standards. There was no doubt: as a bunch of biologists we had a steep learning curve about MBES gathering but David guided us gently through the whole process. The rest of the first cruise quickly settled back down into the comfortable routine of survey operations.

Genuine knowlede exchange

The spirit of sharing experiences and knowledge between partners has been apparent in the second and third AFBI cruises of 2011. Sam Harper

from the UKHO joined us for the second cruise near Kilkeel (Northern Ireland) back on the RV *Corystes*. With each visitor we learnt more about the careful process of IHO Order 1a data collection and processing.

On the final MBES cruise of the year, Andrew Lessnoff (UKHO) joined us whilst surveying near Dundrum Bay. Even if we had had the entire CARIS software development team onboard I'm not sure we could have learnt more about data post-processing than we did from Andrew. He was also a dab hand at Wee golf much to the frustration of our afloat champion Gavin McNeill.

The third cruise was blessed with the best weather I have experienced in 10 years of working at sea.

Ground truthing

On either side of the three MBES cruises AFBI have also undertaken significant amounts of ground-truthing of their INIS Hydro areas. March saw the collection of over 60 grabs that have since been processed for infauna and particle size. On the September cruise we used drop-down cameras to collect video footage of the epibenthic communities on all 60 stations.

On reflection...

2011 was a highly productive year as AFBI were able to collect over 200 km^2 of high quality order 1a data in the INIS Hydro area.

Staff at AFBI have learnt a staggering amount of information which underpins all of our MBES surveys now.

Looking ahead

With the 'big ship' work complete, 2012 looks to be an equally busy year as AFBI move to the FPV BU and the painfully slow shallow water work.

But as the order 1a bathymetry and associated backscatter will be used for a new issue of local admiralty charts, our hard work will ensure safe navigation for local seafarers.

Equally, AFBI have started using INIS Hydro data to produce high quality habitat and 'Essential Fish Habitat' maps which will underpin much of the science undertaken locally.

With the high level of partner cooperation, productivity and learning, AFBI look forward to another year of involvement with INIS Hydro.

INIS HYDRO LAUNCH

Belfast, 4 July 2011

The Belfast Harbour Commissioners Office was a magnificent venue for the launch of the £3.2 M EU INTERREG IVA funded INIS Hydro project. On a balmy Monday evening around 40 attendees from academia, government, funders and the media gathered to celebrate the start of this new seabed mapping initiative.

Sir Alan Massey, Chief Executive of the Maritime and Coastguard Agency (see left) and Michelle O'Neill MLA, Minister for Agriculture and Rural Development in Northern Ireland, outlined the wider societal benefits of this project in areas such as safety of life at sea, the sustainable development of marine resources, marine spatial planning, conservation and education.

Project director André Cocuccio from the MCA then explained the details, highlighting that the INIS Hydro data will be of highest quality and freely accessible to anybody who requires knowledge of the survey areas. INIS Hydro will survey seven areas of a total of 1,400 km^2 of coastal seabed off the west coast of Scotland and east coast of the Republic of Ireland and Northern Ireland.

Under the leadership of the MCA, INIS Hydro will be delivered by a cross-border partnership of organisations with hydrographic capabilities from Scotland, Ireland and Northern Ireland. The UK Hydrographic Office is the seventh partner responsible for quality control.

The project is based on the principle of cooperation and knowledge and skills exchange between the partners and the wider hydrographic and user community.

SAMS: Preparing to survey the Firth of Lorn

Philip Crump
SAMS

The Firth of Lorn

The Firth of Lorn is the largest survey area within the INIS Hydro project, with 553 km^2 between Oban and Scarba awaiting to be surveyed covering water depths of 2 m to over 100 m. The task to survey this area falls to the Scottish Association for Marine Science (SAMS), who are based at Dunstaffnage near Oban.

Developing capabilities

Before SAMS became involved with INIS Hydro, several of its scientists had been conducting multibeam surveys in the area for a range of research needs using the Institute's research vessel *Calanus.*

However, these surveys never had to comply with the strict data requirements set by the International Hydrographic Organisation for data used to update admiralty charts.

To deliver its INIS Hydro obligations, the R.V. *Calanus* system thus required some equipment and software upgrades:

A new high accuracy GPS - which provides heading and position - was needed as was a new CTD probe. The main upgrade was loaned from the Maritime and Coastguard Agency: a Reson 7125 multibeam echosounder and a new motion reference unit – a POS MV.

Ready to go!

These upgrades alongside new data acquisition software got the SAMS team and vessel ready to start their surveying season on 28 May 2012.

Outreach

Terrestrial maps are something most people are familiar with and use from time to time. Even young children experience them as highly accurate and reliable when they study them for example for orienteering events.

Most people falsely assume that nautical charts are similarly detailed and accurate, although anyone keen on boating, diving or other watersports may be more aware about the less detailed nature of most seabed maps.

A large proportion of the public have little or no experience of reading nautical charts and are unaware of the process of compiling them. The INIS Hydro partnership ths plans to showcase hydrographic surveying and nautical charts to people living near to survey areas, with a particular focus on young people.

The INIS Hydro public engagement programme started in Scotland where about 160 people on the Isle of Mull and over 200 people in Oban had the opportunity to learn about INIS Hydro and their local seabed. Of these 360 people, 140 were school children.

The next generation

Hydrography is a great topic for children to explore: It is colourful, happens on boats and is a little mysterious. It also helps develop their problem-solving and technical skills. Learning about hydrographic surveying raises the children's general awareness about the sea and furthermore introduces them to a host of future employment options.

Learning about INIS Hydro in Scotland...

The first group of children to learn about INIS Hydro were 24 pupils from Lochnell Primary School in Benderloch (situated on the Firth of Lorn). The children - who were learning about boats - came aboard RV *Calanus* during a sunny March day to find out from Phil Crump what hydrographers on the INIS Hydro project do. They had such fun that they stayed for most of the day...

Festival of the Sea

Finding out what the seabed close to their homes may look like interests many people living in coastal communities. INIS Hydro surveyors Dr John Howe and Phil Crump from SAMS certainly got a feel for this when nearly 140 people squeezed onboard RV *Calanus* on 23 and 24 May in Tobermory on the Isle of Mull during the Oban, Lorn and the Isles Festival of the Sea to learn about seabed mapping and the seascape of the Firth of Lorn.

80 pupils from Tobermory High School and 12 from Salen Primary School visited the vessel to learn about seabed mapping, while 20 Girl Guides attended a public evening talk by Dr John Howe about seabed mapping at An Tobar in Tobermory.

Just a couple of days later - on 26 May - back at SAMS in Oban, the team turned out again for an open day on RV Calanus, when over 200 people visited the boat over a 5 hour period to explore what seabed mapping and INIS Hydro are all about.

The feedback for all events was immensely positive and INIS Hydro was featured in the local media.

On to Ireland and Northern Ireland

INIS Hydro will take its outreach programme to schools and youth groups around Carlingford Lough, Dundrum Bay and Dundalk Bay during late summer and early autumn of 2012.

Anyone interested in arranging a visit to their group should contact:
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T: +44 (0) 1631 559 300

The Partnership of INIS Hydro

Northern Lighthouse Board, Scotland
www.nlb.org.uk

Scottish Association for Marine Science, Scotland
www.smi.ac.uk

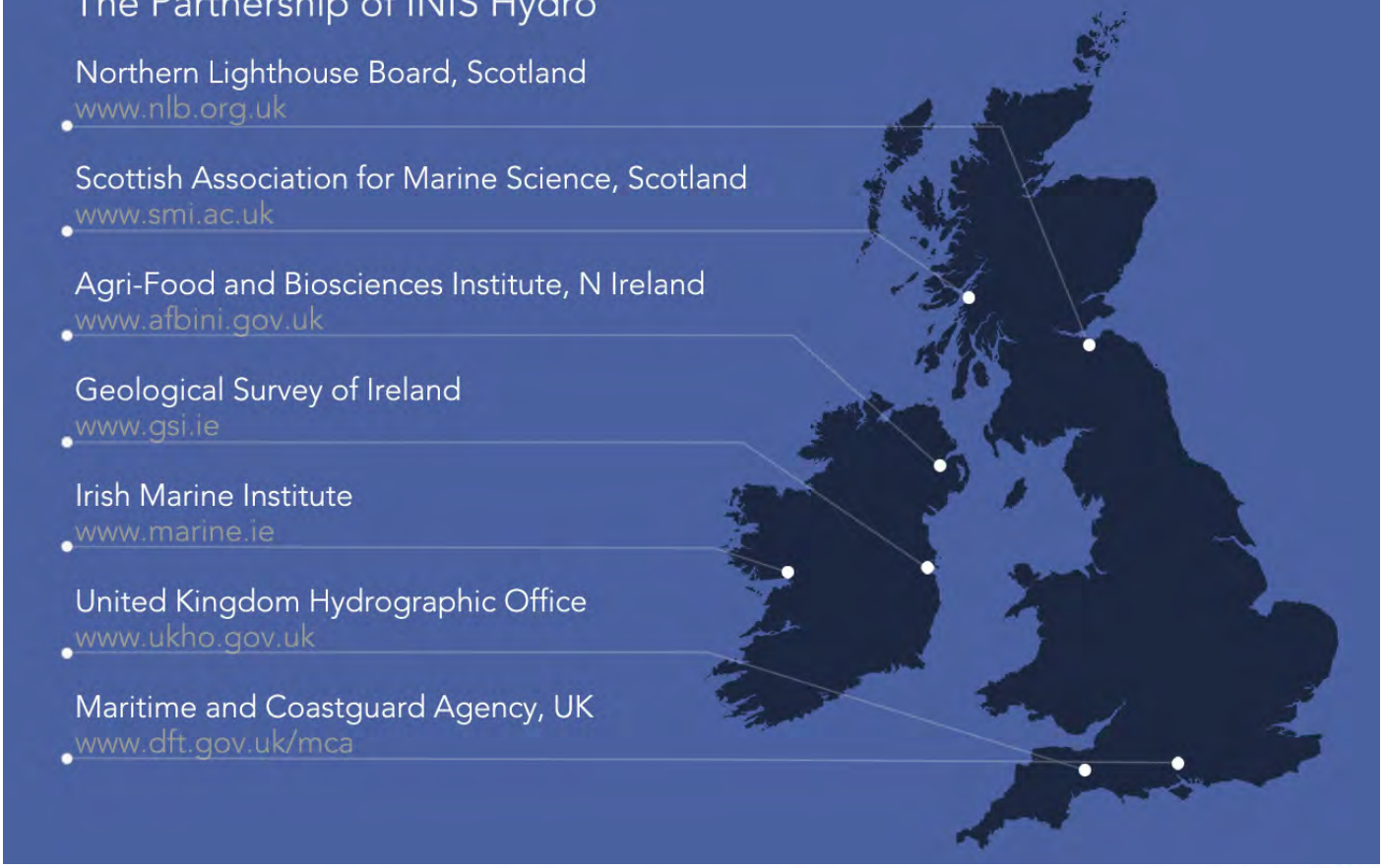
Agri-Food and Biosciences Institute, N Ireland
www.afbini.gov.uk

Geological Survey of Ireland
www.gsi.ie

Irish Marine Institute
www.marine.ie

United Kingdom Hydrographic Office
www.ukho.gov.uk

Maritime and Coastguard Agency, UK
www.dft.gov.uk/mca



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The next INIS Hydro steering committee meeting (see members in photo above) will take place on 25-26 July in Galway, Ireland.

Our Funders

This project is part-financed by the European Union's INTERREG IVA Cross-border Programme, managed by the Special EU Programme Body.

European Union
European Regional Development Fund
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