

# Workshop Report: Land & Marine Information Integration

International Workshop held at The Grand Hotel, Malahide, Dublin, Ireland on 21-23 March 2007

## Workshop Information

### Background and Purpose of the Workshop

With climate change, rising sea levels pressing harder year on year and the need to manage our resources more carefully in this dynamic environment, the inability to join up land and marine base information is an increasing problem in many countries. The absence of a seamless spatial information framework prevents the execution of standard practice of locating and referencing spatial information across the land-marine interface where so much pressure and development is taking place.

This also inhibits the use and sharing of information by those organisations in the front line of stewardship, it leads to data duplication often resulting in a proliferation of discrete data collection projects, and these can be substantial investments. Often here the data is generally captured once (for a specific purpose) and used only once.

For the European Commission and Member States of the EU this topic is very relevant to INSPIRE, as part of cross theme data consistency (coordinate systems, several data themes, data matching and semantics). It is applicable to a number of themes in Annex I-III across the land and marine environment such as the Elevation, Hydrography/Hydrology, Transport networks, Protected sites, Buildings, Land use, Oceanographic geographical features, Utility information, Addresses, Geology, etc. Specific themes that might also need to be referenced are the: environmental monitoring facilities, area management, natural risk zones, sea regions, bio-geographical regions, habitats and biotopes, species distribution & energy resources etc.

At the organisational level a further complication arises from the fact that in the marine environment, the task of surveying and "mapping" is normally undertaken by a hydrographic organization which is usually separate from the land mapping authority. The hydrographic function to provide charts, nautical publications and update services is primarily for the safety of navigation. The International Hydrographic Organisation (IHO) has however recognised the importance of establishing a marine spatial data infrastructure and in November 2005, the German hydrographic office hosted an SDI seminar in Rostock Germany. The focus of the seminar was "*The Role of Hydrographic Services with Regard to Geospatial Data and Planning Infrastructure*". This was followed by a workshop in February 2007 (in conjunction with GeoCuba, Havana), to determine the need for IHO members to pursue the concept of a Marine Spatial Data Infrastructure (Marine – SDI). The workshop concluded with the following resolution:

## GEOMATICA 2007

### Workshop on MARINE / HYDROGRAPHIC SPATIAL DATA INFRASTRUCTURES Havana, Cuba, 12 February 2007

#### RECOMMENDATIONS

1. IHB to communicate with IOC to cooperate on the development of the spatial data standard S-100, with a view to facilitate marine/hydrographic data exchange.
2. IHB to advertise and promulgate S-100 to the wider spatial data user community, including land mapping organizations
3. The Workshop supported reinforcing the need for IHO to move forward on developing a strategy for designing and implementing Marine SDI, including an assessment of associated benefits to society.
4. IHO Regional Hydrographic Commissions to have "Progress on Marine SDI Development and Land-Sea Data Integration" as a standing agenda of their meetings.
5. IHB to establish on the IHO website a special page dedicated to Marine SDI developments, including the outcomes of regional workshops on the matter.

These recommendations and the outcomes of the Malahide workshop are to be used as inputs to the IHO General Assembly in Monaco in May 2007.

## The Aims of the Malahide Workshop

The aims of the workshop were to determine and document the state of the art and progress at national level and across Europe in integrating maintained national land and marine databases, specifically by exploring:

- the drivers for integration at national level
- current status
- issues that require attention
- examples of best practice
- future steps

*An advance notice of the workshop was issued in late 2006 and was updated at intervals as the programme developed.*

## Sponsors of the Workshop

The workshop was sponsored by **EuroSDR** on behalf of the European national mapping agencies and the **International Hydrographic Organization (IHO)** for the hydrographic offices. The workshop was also supported by the **Joint Research Centre of the European Commission** and by **EuroGeographics**. **Ordnance Survey Ireland** sponsored the workshop dinner and the **Society of Chartered Surveyors of Ireland** sponsored the audio-visual arrangements at the workshop.

# Workshop Report

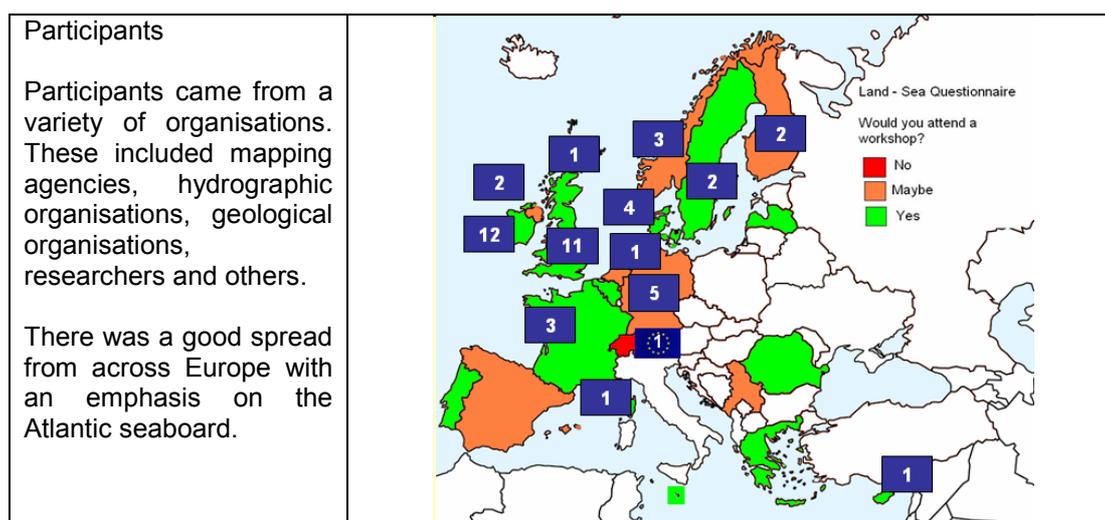
Fifty delegates from 14 countries across Europe attended the Land-Marine Information integration workshop held at The Grand Hotel, Malahide, near Dublin, Ireland on 21-23 March 2007.

The Programme was divided into four separate sessions relating to the primary topic areas:

1. *Opening*
2. *Setting the Scene*: The need for integrated Land-Marine information
3. *State of Progress*: The state of the art today across Europe
4. *Technical Challenges and Solutions*: Issues and challenges to be addressed
5. *Moving Forward*: A selection of views of the ingredients for success.

Sessions 2-4 of the programme were followed by twin breakout sessions. These then reported back to the plenary group and the final session concluded with a panel discussion.

Generally all the reports demonstrated a level high interest in the topic across participants and a positive need to move forward was identified.



## Opening Introductions from Sponsors

Kevin Mooney, Secretary General welcomed participants on behalf of EuroSDR. He outlined the role of EuroSDR and how it was facilitating discussion of topical issues. This workshop was originally proposed at the EuroSDR [Features and Objects Workshop](#) held in Munich in April 2006.

Tony Pharaoh for the International Hydrographic Organization [IHO] also welcomed participants. He outlined the goals of the IHO and its members in charting the oceans and seas of the world and how it works with members to set standards.

Katalin Toth of the Joint Research Centre [JRC] of the European Commission described in her presentation the role of the JRC and emphasised the need for joint working across Europe to solve key issues and meet the challenges.

Finally Keith Murray welcomed participants on behalf of EuroGeographics

## Session 1: The need for integrated Land-Marine information

As Chair of the opening session, Horst Hecht of Bundesamt fuer Seeschifffahrt und Hydrographie [BSH] (Germany), set the scene. He outlined the growing interest in the topic of the workshop. Society was becoming more aware of its responsibilities for better management of the environment yet the boundaries and governance of the national bodies created a barrier to solving these problems. New and appropriate technologies were also helping, such as the internet and the ability to collect and access information more easily today. There was often an abundance of geographic datasets but these are still largely sectorially managed and independent, reflecting the historical boundaries of the custodian organisations.

Seventy percent of the world is covered by water, yet we know little about that part of the Earth. We know that to understand climate change we need to take a holistic view of the globe so that we can answer the questions “why...” and lead on to “how...”. Spatial data research is key to understanding, and from research we can identify possible solutions.

Katalin Toth of the Joint Research Centre of the European Commission and who provides the Commission link to the Data Specifications Drafting Team of the INSPIRE development began her presentation *'Role of Integrated land and marine information'* by outlining some of the issues facing the European Community today and therefore the requirement for the INSPIRE Directive. The presentation demonstrated the need for a collaborative approach - “Environmental problems have to be adressed globally” - by using illustrations and typical questions from everyday processes in planning and stewardship. As regards the land – marine environment twenty-two of the 27 EU member states have a coastline, together the EU has a coastline seven times longer than that of the US and four times that of Russia; the Maritime Regions of Europe account today for almost half of the EU population and Gross Domestic Product (when the coastal zone is considered to reach 70 km inland) and 80% of ocean pollution results from land-based human activities.

Therefore there is a need to make the land and marine infrastructures interoperable so that planning, management and solutions can be identified in a seamless and holistic way. The INSPIRE Directive will support this cause and the Implementing Rules and Data Specifications will be the vehicle to achieve this. Draft documents will be reviewed by organisations registered with the Commission this year (as Legally Mandated Organisations [LMO] or Spatial Data Interest Communities [SDIC's]). Work on the draft specifications for the themes of INSPIRE will start later in 2007.

For the International Hydrographic Organisation Tony Pharaoh reflected the changing demands on their members in his presentation *“IHO perspective on Marine SDI's”*. In it he presented the updated definition of “hydrography” and described the traditional role of a typical hydrographic office and how the IHO plays a role in coordinating these activities and setting standards. This work includes a coordinated global programme of mapping (GEBCO) and links with the UN-UNESCO and other bodies. The data collection methods were outlined and these currently lead to the production of paper and electronic navigational charts. There are still gaps in coverage and these are being addressed as well as improving the density of existing surveys. The new S-100 specification is a significant step forward and will support a more holistic view of the data and its usage. Building on a workshop in Rostock in November 2005 to consider the topic of Marine SDI's, this had now been supplemented by the Havana recommendations (February 2007) and the formation of a IHO Marine SDI working group will be recommended to the General Assembly in Monaco in May 2007.

Keith Murray, as President of EuroSDR Commission 4 and of Ordnance Survey, Great Britain report on the findings of the questionnaire [*Results of the EuroSDR Questionnaire*] sent out to all European mapping agencies, hydrographic offices and geological organisations in late 2006. Since the workshop the results have been verified and three more countries have provided information. The latest status is reported below (note that the maps shown below are therefore more up to date than the corresponding graphics shown at the workshop):

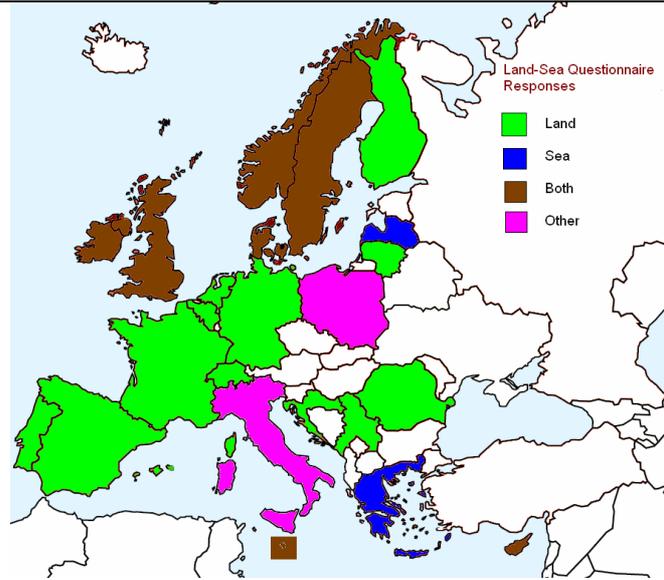
## Responses

A total of 30 responses were received from 14 countries.

In most countries the mapping agency and the hydrographic office are separate organisations. In others eg Denmark, Norway they are part of the same organisation.

The strength of the response demonstrated the level of interest in the topic across Europe.

Note: Switzerland has similar issues as well – on shared lakes containing international boundaries!

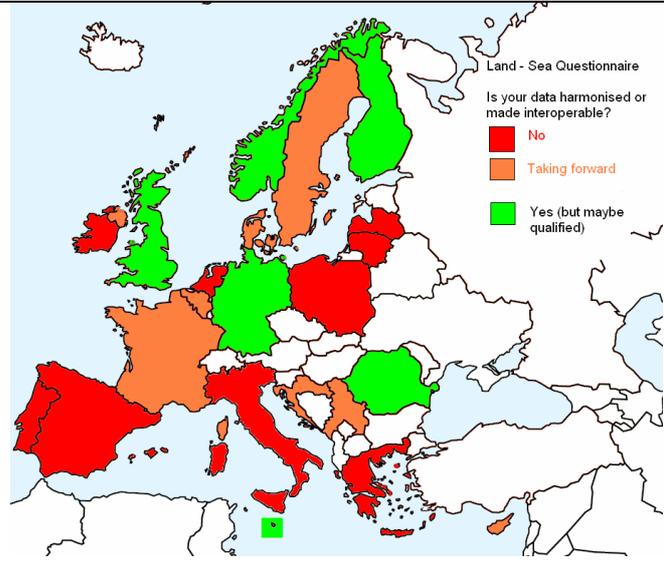


## Harmonisation – Status

While most countries are aware of the problem of disconnected land and marine information, few have at this stage committed to resolving the problem.

This is partly because it is more complex as it requires two or more organisations and users to identify and address the key issues. In some cases it is a lack of funds.

In many others at this time the focus is on research and identifying solutions.

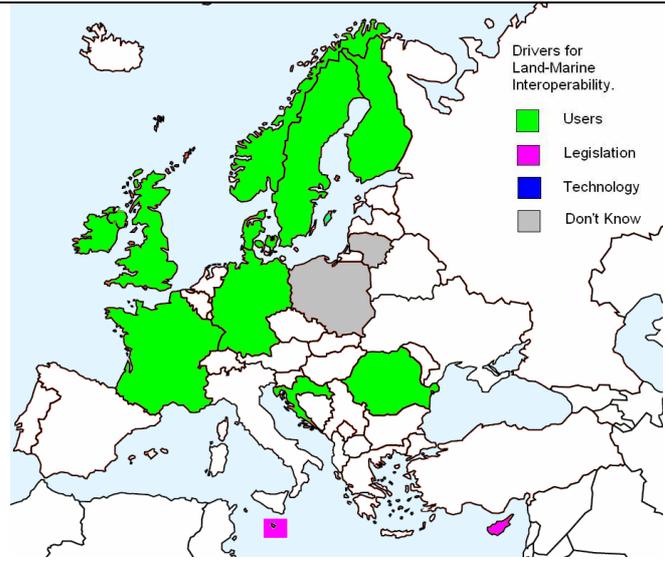


### Drivers

In most but not all cases – user needs were cited as the main drivers.

In some cases policy drivers have taken precedence or added weight to the initiative.

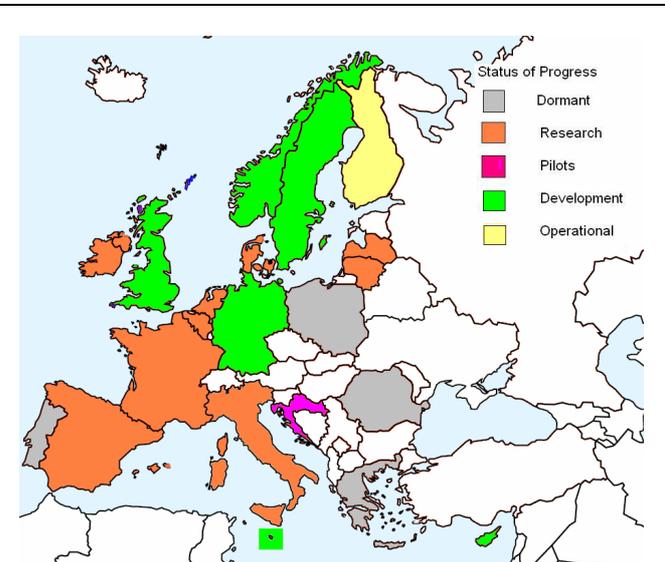
There were no cases identified where technology was driving the agenda, this is not surprising given the collaborative issues that lie at the heart of this topic.



### State of Progress

Few countries claimed to have reached an operational level of completion.

Most are either conducting research (when they can afford to) eg France, Denmark or are moving from research towards an operational environment eg UK, Norway.

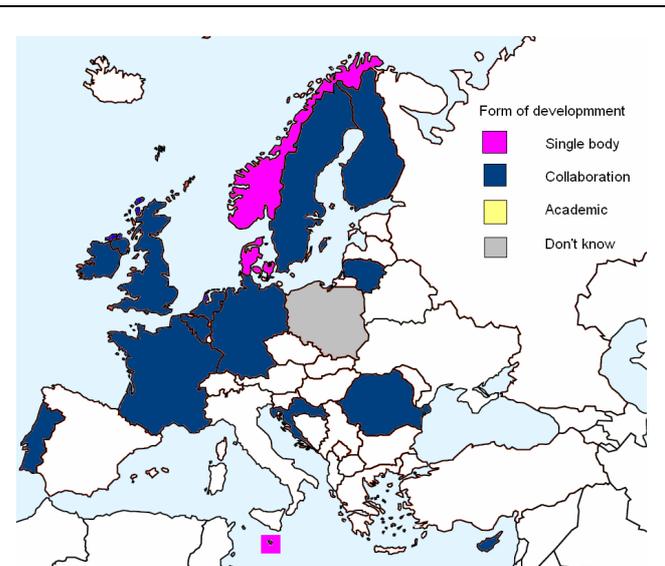


### Form of Development

In a small number of cases the land and marine information is managed by a single organisation.

In others collaboration across two or more organisations is required (typically national mapping agency, hydrographic office and sometimes the geological organisation).

Establishing such a consensus is the first step but it also helps to share the task.



The conclusion is that this is an opportune moment with a) best practice starting to emerge but b) many countries exploring the issues but as yet undecided how to proceed. The INSPIRE Directive will also provide some momentum. It was therefore hoped that the workshop would determine whether there is a strong enough need and a will to move forward in a coordinated way.

Conor Skehan of the Dublin Institute of Technology [DIT] provided a powerful view of the need for better integrated land and marine information in his presentation '*Planning on the Edge: Existing and emerging issues for spatial planning and environmental protection across the Land-Marine Interface*'. Conor highlighted what he considered are the three priorities that demand better integrated land and marine information. The first was Wealth and Demographics – research by the Futures Academy in Ireland had shown that the demographics of Ireland will change over the next 25 years with the majority of the population of Ireland attracted to live nearer the coast ('eastern corridor' and the 'western necklace'). This would put more pressure on the land-marine environment through greater demand for development and the consequential increase in effluent and pollution. The second priority was Climate Change which would require greater attention to coastal protection and change management. This would require inventories of habitats, coastal infrastructures and time-series measurements; without a common referencing framework to analyse and forecast impacts and predicted events the task could not be coordinated effectively. The third priority was the Water Framework Directive which is also demanding information assimilation, measurements and the need to "standardise the approach to data assembly and retrieval"

### **Breakout Session 1:**

The opening breakout session considered the question "What are the Primary Drivers and Obstacles for land-marine integration?"

Two separate groups reported back their conclusions. Horst Hecht and John Pepper collated and refined the combined findings as follows:

#### **The Primary Drivers were seen as**

##### **A. SOCIETAL**

1. **Natural forces** (Sea level rise; Coastal erosion)
2. **Cost and time efficiencies** (capture once, use many times)
3. **Knowledge economy**; public expectation (e.g. WWW & Google Earth) coupled with greater awareness and focus on temporal aspects.
4. **Pre-emptive action** (e.g. EU legislation) to limit adverse impact of natural forces and processes.
5. **Demographic movement** towards coasts – Leisure and recreational pursuits.
6. **e-Government agenda**

##### **B. COMMERCIAL**

1. **Demand through increased uses** in the land-marine interface – Commercial exploitation versus conservation perspective.

##### **C. TECHNOLOGICAL**

1. Ubiquitous **Position Fixing technologies** (Expectations –should be able to move from one realm to another “seamlessly”)
2. Ability to do it “**because it is possible**” (Linking databases; accessibility / usability)

### The Major Obstacles were identified as

#### A. SOCIETAL

1. **Resistance to commercial development** - NIMBYism
2. **Access to information / data**
3. Data provided for a sectoral purpose ignoring the wider perspective for use.
4. **Resources** (high cost of marine data acquisition) and **Budgets** (under funding of geospatial data capture)
5. **Data availability and access**
6. **Education and Training** – cross discipline appreciation and knowledge

#### B. COMMERCIAL

1. Lack of **information and knowledge exchange**

#### C. TECHNOLOGICAL

1. Diversity of **Reference systems** and **Object (Feature) Catalogues**
2. **Data precision / accuracy**
3. Standardisation - **Technique and Specification differences** in onshore/offshore areas (e.g. MHW/MLW)
4. Historic approach to **Charting and Mapping** disciplines reflecting different purposes
5. **Lack of Metadata**
6. **Technical limitations** (lack of tools)
7. The **influence of the 4D oceanographic perspective** on the tidal zone not yet embedded within data management frameworks

### **Next Steps**

1. Examine the obstacles wrt. further research through EuroSDR.
2. Examine effect of legacy datasets on the land-marine data user community to adopt holistic data standards.

## **Session 2: The state of the art today across Europe**

Katalin Toth of the JRC opened the second session on the Thursday morning which was aimed at identifying the state of the art by reporting progress and developments in integrating land and marine information in different countries.

Mike Osborne of Seazone Solutions Ltd (a wholly owned subsidiary of the UK Hydrographic Office) started by describing the developments in the UK. In his presentation *Coastal Mapping Improvement in the UK* Mike described the aim in the UK which is to treat the marine seabed as a topographic surface as if it was land. Given rigorous and definitive horizontal and vertical transformations this has been achieved so that any marine data can be brought within the land coordinate system (or vice versa). There is an overlap in objects along the foreshore and UK Hydrographic Office and Ordnance Survey GB have been working together since the ICZMap pilot in 2000-2001 to reconcile the position and *classification of these objects*. Work will also start soon on making the bathymetry and the Ordnance Survey DTM interoperable. Water “can then be reintroduced” and modelled as associated objects etc.

A different approach was described by Michalis Savvides of the Department of Lands and Surveys in Cyprus in his presentation *A Land and Hydrographic GIS driven Data Base, as a tool for the Management of the Coastal Zones and Preservation of the Natural Resources of Cyprus*. Much of the recent development and tourist growth in Cyprus has been around the coast – this has put the coastline under pressure and the DLS has initiated an Integrated Coastal Management Plan supported by operational tools. This solution includes horizontal, vertical and temporal information integration of different data types. While the tidal range is limited in the eastern Mediterranean (around 80-100cm) it is already possible to determine coast line changes with the new tools. The project continues to progress and is gaining support from a wider number of users.

David Flamanc of the Institut Geographique National (France) and Jean Laporte of SHOM (France) outlined a recent pilot project in the Gulf of Morbihan in their presentation *Litto3D(R) - The seamless coastal model of France*. The motivation was the need for better integrated information to help protect and manage the coastal environment and to respond effectively when emergencies occur (eg oil tanker groundings/leakages the costs of which ran in €billion) and to manage our response to rising sea levels. Various data (new and old) are available and each will yield slightly different results. The two goals were to merge the IGN-F and SHOM data to create a seamless model and to create a new (LIDAR) survey of the basin. Several issues came out of the Litto3D project and this knowledge will now be used in planning a second pilot on the Mediterranean coast and also loading the data into the IGN-F Geoportal.

In the final paper of the second session Johannes Melles, Bundesamt fuer Seeschifffahrt und Hydrographie (BSH), Germany described progress in Germany in building a Marine SDI and linking that to the land in his presentation *Development of a SDI at the Federal Maritime and Hydrographic Agency (BSH)* Whilst BSH is the hydrographic office for Germany – the emphasis there is on spatial data (ie not charts as such – although hardcopy is still well used). The data is supported by a network and a geoportal to provide access to the data. The aim also is to integrate this with the German Spatial Data Infrastructure (GDI-DE), which in turn will feed into INSPIRE. Several examples of the use of the geoportal were demonstrated supported by a development programme over the next two years. His presentation included a perhaps wise quotation: “*When confronted with market disruption and technology revolution, your biggest challenge is letting go of comfortable old behaviours before they kill you*”

## **Workshop Breakout 2: The need to standardise the approach**

In the second breakout again two breakout groups considered the question relevant to this session: “Is there a need to standardise the approach?”

The findings have been collated and summarised below:

## Standardisation

- It was agreed that standards are important, but many also questioned what this meant in practice and others reflected the need to continue to fulfil business needs and therefore standards must assist those processes (or be neutral) and certainly not interfere with them where this would make it difficult to meet primary business objectives.
- It was recognised that INSPIRE will bring about a positive degree of standardisation, to meet EU needs and generally this was seen as a step in the right direction, however few understood just what this meant for them at this time. The outcome needs to be a balance between a common approach across Europe – with a level of flexibility for member states to fulfil their commitments and the needs of their national bodies.
- There was need to establish a common land – marine surface and agree on the boundary of the two domains for responsibility, maintenance and how it connects up at the national level.
- It was agreed that best practice should be identified, shared and promoted. From this it is possible that a level of standardisation will emerge.
- Examples of best practice can be lodged with INSPIRE – though the marine community was not well represented in INSPIRE.
- A need for organisational cooperation at national level was noted. This has not been commonplace in the past.
- There is no single body to support land – marine integration. The need for a pan European Forum to keep the Land & Marine communities working together was noted.

## Session 3: Challenges in data integration:

Kevin Mooney of EuroSDR and the Dublin Institute of Technology (DIT) chaired the afternoon session which reviewed some of the key issues and challenges to be addressed in making land and marine information interoperable.

Archie Donovan of the Geological Survey of Ireland (Ireland) opened with his presentation '*INFOMAR and the current Irish land/sea mapping position*'. The Irish National Seabed Survey has now mapped 300,000km<sup>2</sup> to water depths of 200m and a further 30,000Km<sup>2</sup> deeper than 200m and the survey to date has cost €33million. Another 225,000Km<sup>2</sup> are in the programme for future completion and this includes the seabed around Ireland and inshore including ports and bays (as a priority) etc. Some of the technology issues and results of surveys were described and resolution of the issue of relating vertical datums on land and offshore was highlighted as a critical issue to be addressed.

Marek Ziebart of University College London (United Kingdom) described work undertaken by UCL on behalf of the UK Hydrographic Office developing a relationship between the land and offshore height datums around Britain and Ireland. His presentation *A Tale of Many Datums: the UK Vertical Offshore Reference Frame* showed how the various datums could be related supported by several other data forms eg gravity data, satellite altimetry and tide gauge data. Recent tests, including sea trials, demonstrate that the VORF solution is well within expectations and is a significant step forward in relating the land and marine vertical datums.

Keith Murray & John Pepper on behalf of Digital National Framework [DNF] Technical Group (United Kingdom) reported in *Integrating objects at the land – marine interface* how the

Ordnance Survey (GB), the British Geological Survey and the UK Hydrographic Office had commenced work on a template Feature Catalogue to the ISO 19110 standard. As part of the pilot Ordnance Survey had entered OS MasterMap Topo object definitions and the British Geological Survey had started as well. The work had already had been seen as beneficial in clarifying object types, their suitability for referencing and reconciling where common objects overlapped across the three organisations.

Risto Kuittinen of the Finnish Geodetic Institute (Finland) described the vertical datum issues in Finland and across Scandinavia where the land is still rising following the melting of the ice in the last ice age 10,000 years ago in his presentation *Continuous land uplift and land-marine information integration*. The land continues to rise by up to 9mm per annum though this is not uniform. This clearly has a significant impact on the national infrastructure over time e.g. difference in height, relative height to the location of ports (which have to relocate at intervals) and estuaries.

Ariane Mascaret of the Institut de Recherche de l'Ecole Navale (France) described research that she had been doing to integrate marine and land height datasets in *Land/ Sea data integration with a landscape approach*. This involves different approaches to height data integration ranging from simple cut and paste to averaging and other techniques. Issues arise with each of the methods. Residual artefacts in the output data can be identified but significant supervision is required. Further research is planned including quality control techniques to support the process.

### **Workshop Breakout 3: RESEARCH: are the challenges all resolved? - is there scope for more research?**

In the third breakout the two groups reviewed what aspects of land and marine data integration required more research.

The findings have been collated and summarised below:

- Coordinate Systems and easy transformation from one to another is fundamental – this allows users to use the predominant system for their industry but to be able to transform to another system and easily share information about objects and events (linking objects will always maintain a relationship).
- Primary Data Capture: Understanding different sensor types and the advantages and disadvantages (airborne and water surveys) such as LIDAR, InSAR, multi-spectral.
- Automation: how can we capture information using automated processes? Will the sensor web help? RFID's? automated instrumentation eg tide gauges.
- Secondary Data Capture and Classification. Is it possible to harmonise classification schemes (or desirable) – if not how do we make them interoperable? Are ontologies an aid or an aspiration?
- Interoperability and harmonisation: how does this work and achieve satisfactory data integrity that is fit for purpose. Where are the examples of best practice and how can we translate between national systems? It is required in the coordinate systems, in the data (objects and classifications) and in the access services.
- Data Quality and Metrics. Quality levels must be defined and data measured against those levels (accuracy, consistency, currency and completeness) to determine whether they are fit for purpose.
- Understanding market demands and needs. These are constantly changing but we need to start somewhere. There is a need for use cases to support this (and the

INSPIRE) process. There is a wide variety of users from local, to regional, national and European levels who execute processes across the land – marine divide eg planning, licensing, environmental management and so on; These people need to be brought on board in such a way that a consistent geographic framework helps them to do their job easier and better.

- Access to data and free data. Better access is required but this involves cost as well as user support – how is this funded? How do you get the data to the citizen who is not a technical expert? If data is collected by the state should it not be free – but who will pay for the updating of the data?
- Disruptive technologies – do they aid or divert us eg Web 2.0? Need to test them using use cases and other objectives taken from the user community.
- Funding and opportunities There needs to be a return on investment (measured in scientific and/or financial benefits). Can FP7 help the kick start some of the research processes?

## **Session 4: A selection of views of the ingredients for success.**

Keith Murray chaired the final session on the final morning which heard six short papers from software companies and from other projects and initiatives that have common links with the topic of the workshop.

Haico van der Vegt of CARIS (Netherlands) outlined how CARIS, as a supplier of software tools, support land and marine information integration in the *Use of CARIS HPD to integrate Land and Marine information*. He outlined a case study in Quebec where land and marine information integration had been tested. The issue of datum transformation and data disconnects and discontinuities were highlighted. He emphasized that there is no out-of-the-box solution as many of the issues lie in the data itself.

Peter Woodsford of both 1Spatial and Snowflake Software, (UK) described how we as information engineers need to consider more carefully how we approach our task in *Modern Tools for Schema Design, Schema Translation and Data Cleaning and Validation*. Our databases attempt to model the real world to meet our business needs. Increasingly our businesses need to talk to each other, but the models can be incompatible. By better describing the data it can then be translated to enable that communication. Equally faults may lie in the data itself and may require cleaning and consistent referencing to make it fit for purpose using quality improvement programmes.

Matt Harrison, British Geological Survey (UK) highlighted a little known issue in his presentation *Creating Seamless and Interoperable Geological Maps: Filling in the coastal white ribbon around the UK*. Geology has traditionally been undertaken on land or offshore and the resolution varies due to the ease of access on land vs difficulties of sampling and surveying the sea bed. This sometimes leaves a small ribbon between the two surveys along the coast. The presentation examined ways of infilling the gap. Matt also gave the audience something to think about when he reflected from his own experience (in the context of the launch of [www.onegeology.org](http://www.onegeology.org)); the way the media responded was that “interoperability is cool!”

John Pepper UK Hydrographic Office for the IHO outlined the new S100 development that is now emerging. In *Building a global data model that supports Marine SDI's (S100)*. He contrasted the S-57 specification and while both support an object based approach, he showed how the new model is more universal and will support marine spatial data as well as continuing charting needs. Over time it is expected that S-57 users will migrate to S100 and adopt a ‘capture once use many’ approach in terms of publishing the information.

Dave Cotton, Marine Data Information Partnership, (UK) showed how a diverse community in the UK came together connected by a common cause – information in the marine domain. On his presentation *MDIP - building a Marine Data and Information Framework for the UK* he outlined the issues of data silos, lack of access, uncertainty over licensing, which data are interoperable? etc and how the community is starting to tackle these issues.

In the final presentation Vicki O'Donnell, Coastal and Marine Resources Centre, University College Cork and Irish Coastal Forum (Ireland) outlined how the centre was using all kinds of information in *GIS and Remote Sensing Applications for Coastal and Marine Research*. She described several current projects, how data is accessed through <http://mida.ucc.ie>. This now links up several initiatives but several issues remain: data retrieval speed, regularity of data updates, duplication among tools and poor data overlays. She also described the work of the Irish Coastal Forum that brings together several key players in managing geographic datasets in the coastal zone.

## Final Session Panel Discussion. Taking the initiative

A panel of Katalin Toth, Vicki O'Donnell, Tony Pharaoh and Kevin Mooney chaired by Keith Murray took questions from the floor.

The panel discussion covered several current issues complementary to the discussion from the earlier break out sessions. The main topics were:

- Framework developments: INSPIRE.
  - The need to engage and participate in the development and evolution of the European Spatial Data Infrastructure [ESDI].
  - The need to participate in review of draft Implementation Rules and in call for Thematic Working Group Experts (due this summer)
  - The requirement to define better the user needs and to populate use cases (note: given the right people – use cases can be assembled quickly).
  
- Data Components
  - New technologies and data acquisition methods need to be understood in terms of relative merits over other methods.
  - New developments such as water penetrating LIDAR (is there a need for a state of the art report and tests<sup>1</sup>?)
  - We also need to have the knowledge to correctly integrate these methods and different data types in a harmonised way with inherent data integrity.
  - We also need the tools to support these processes (software and industry standards)
  
- Funding models
  - Several countries were keen to progress the issues discussed but there was often a lack of funding (or sometimes willpower) to do anything.
  - Some saw issues over charging as a barrier to take up.
  - Generally such issues are more complex – if data is to be frequently maintained (not all of it does eg sea bed surveys) and the quality levels adhered to, there needs to be assured levels of funding over a period of time to make the datasets sustainable in the short, medium and longer term.

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<sup>1</sup> References to existing research:  
<http://www.tenix.com/Main.asp?ID=30>,  
& <http://www.blomasa.com/bece/en>

<http://www.fugro-pelagos.com/lidar/tech/index.html>  
<http://www.optech.ca/prodshoals.htm>

- This comes down to member states and organisations and the requirement to satisfy a national need and understand what users have to achieve.
- Pan European Forum
  - Most of the participants had found the workshop very valuable and would take the perspectives discussed over the last 2-3 days back to their organisations.
  - It was agreed that there need to be a pan-European Forum to keep the Land-Marine communities together, to synchronise ideas and to share best practice while moving forward.

## Conclusions and Actions

In closing Keith Murray highlighted some other aspects that had come out of the presentations. While national and European initiatives can help the process, in the end, results come from individuals:

- Establishing a common vision & endpoint – the vision
- Common framework – establishing some basic ground rules balancing flexibility with a level of standardisation
- Leadership – getting things done
- Collaboration – organisations, especially in the public sector will have to work together and co-operate much more in the future than they have in the past
- Initiative – thinking big and starting small, like any construction
- Innovation – thinking out of the box and what the future needs and solutions might be
- Funding – someone has to pay at the end of the day – how that works will vary, but in offering solutions to problems will always be a key aspect of the plan.

He said that the organisers would discuss the options for a forum or something of that nature.

He went on to thank the Organising Committee, the DIT staff, the speakers, chairs, facilitators, rapporteurs, the sponsors and most of all – all those present in making the event a very successful workshop through their active participation.

### Afternotes:

1. In May 2007 the IHO approved the recommendation to establish a Marine-SDI working group to support best practice across its members.
2. At the Rotterdam meeting of EuroSDR in May 2007 the Steering Committee agreed to support further co-working with the IHO and the European Commission in developing and supporting best practice in making land and marine information interoperable.
3. At the EC GI&GIS workshop in Porto 4-6 July members of the organising committee met with EC colleagues to determine their level of interest and support for the land – marine integration initiative and the idea of a forum or something of that nature. This proved to be very positive and the European Environment Agency expressed strong support in the direction and issues arising from the workshop since a lot of the data they collect and reference falls into the coastal zone. These include e.g. shallow water bathymetry, seamless climate and weather data, and other marine and terrestrial data layers relevant for the monitoring and assessments of environmental changes and management related issues. There was insufficient time to discuss possible solution and whether any of the current funding opportunities might be of benefit.
4. The UK Hydrographic Office participated in the review of two INSPIRE Data Specification technical document (D2.3 – Definition of Annex Themes and Scope, D2.5 – Generic

Conceptual Model) and was invited to the comment resolution workshop. This contribution brings one step ahead the land-marine harmonisation process.

The next steps (including discussion with the European Commission) will be explored once this report is publicly available and reported back to EuroSDR and the IHO Marine SDI working group before the end of 2007.

Keith Murray

27 July 2007

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