

Summary of Proceedings

iMarDIS Stakeholder Workshop

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Overview

The SEACAMS iMarDIS workshop set out to identify data and information requirements of renewable energy businesses and other stakeholders that could be met by SEACAMS.

The workshop took place at Bangor University Marine Centre Wales on 25-26th January 2018 and was attended by around 35 delegates from a range of sectors as shown in Figure 1.

Delegates by sector

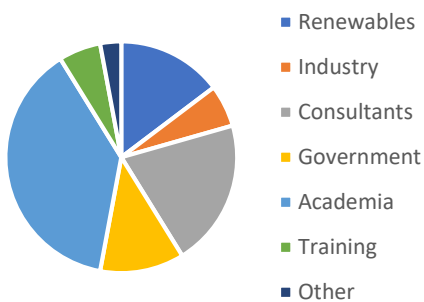


Figure 1 The workshop delegates by sector

The workshop [flyer](#) provides further background to the workshop. The presentations are available on the iMarDIS [website](#). After a short series of presentations the workshop proceeded through a number of parallel sessions that addressed a series of question related to data and information requirements of the renewables sector and to the priorities for iMarDIS developments. In keeping with SEACAMS priorities the renewables sectors within scope at the workshop comprised tidal stream, waves and tidal range. The sections below describe workshop planning, summarises the discussion under several key headings

and presents key points arising. References to *users* below are assumed to be users of the SEACAMS iMarDIS infrastructure.

Workshop planning

The preparation for the workshop was overseen by a steering group comprised of:

- Paul Ellsmore - ORE (Offshore Renewable Energy) Catapult;
- Kate Smith – NRW (Natural Resources Wales);
- Ian Hutchison – ORJIP (Offshore Renewables Joint Industry Programme) Ocean Energy;
- David Jones – MEW (Marine Energy Wales);
- James Ingram – Independent consultant;
- Dave Mills, Colin Jago, Graham Worley, Jon King – School of Ocean Sciences, Bangor University

The workshop agenda is also available on the iMarDIS [website](#).



Picture 1 Jonny Lewis, MarineSpace addresses the workshop

Outcome to discussions

The following points comprise an overview of user requirements, general feedback and is followed by a series of tables that capture specific issues raised in discussion at the workshop that will be used to inform future iMarDIS developments.

What users want:

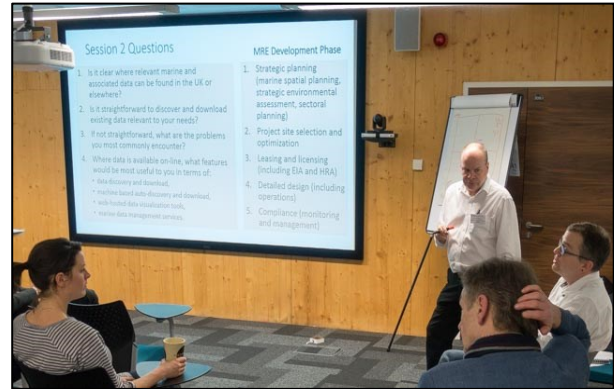
- Why do people want data?
 - important to capture information from searches carried out by users of iMarDIS;
- Users wanted access to
 - FAQs, 'How To' guides, case studies, linked publications;
- Mechanisms to allow dialogue between iMarDIS users and Bangor University scientists would be regarded as a unique aspect of iMarDIS;
- Should iMarDIS be used to house other marine data? (e.g. from consultancies and other sources e.g. Local Authorities.) in order:
 - to manage data;
 - make data accessible;



Picture 2 Jessica Campbell, Crown Estate addresses the workshop

- It was noted that much data that was gathered was not published;
- As requirements for new data collection (e.g. monitoring) for MRE's (Marine Renewable Energy) sector's activities increases then increased demand for housing new data are anticipated;
- Participant generally agreed for the need for a 'one-stop-shop' for Welsh marine (renewables) data with iMarDIS identified as a potential candidate

- Users raised concerns about longevity of iMarDIS – ERDF funding ends July 2019;
- Discussions primarily focused on data – rather than derived products;
- No single place to go for discovering data within the marine renewables sector (in Wales) ;
- MEDIN (UK Marine Data and Information System) – some workshop delegates reported that not enough information about the data was available to determine if the quality of the data was good enough to use for the purpose the user requirements a particular problem for non-specialist user ;
 - regarded as a particular problem for non-specialist user (potential for inappropriate use!);



Picture 3 Paul Ellsmore leads a group discussion

Recorded Issues

The tables below capture workshop feedback in a series of tables highlighting issues to be addressed in the future development of iMarDIS.

Data discovery

Issue	Description
1.1	Many places offering different kinds of data. Don't know where to go to get it.
1.2	Data is hard to find and when you find it, gaining access to the data is even harder.
1.3	Data is held and not publicised. How do you know you can request data from organisations that do not publicise it
1.4	Hard to find the specific data you want. Results can be vague, incomplete or misleading.
1.5	Though the data may not be spatial, it should still be discoverable in spatial search.
1.6	Some searches display the geographical outline of a dataset in the form of a bounding box which misrepresents spatial extent. e.g. a bounding box covering the Menai Strait is only a tiny percentage of the bounding box that the Menai Strait would fit in.

Data Access

Issue	Description
2.1	When data is found on portals it is rarely available for direct download.
2.2	Bureaucracy. Found the data that is needed but need to fill out forms, wait for approval etc.
2.3	Data in nonstandard format or requires proprietary software
2.4	Retrieving the whole dataset is slow when only a small subset of the data is required.

2.5	Visualisations are great but you need access to the underlying data that creates them. E.g. EMODnet displays maps using WMS servers but the exact data is not available.
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Data Gaps

Issue	Description
3.1	The data doesn't always exist. Knowing what data doesn't exist is important.
3.2	A failed search is just as important as a successful search. If iMarDIS does not have the data, does someone else?
3.3	Knowing where there the gaps in data coverage are is very useful for identifying what data needs to be collected.
3.4	The only way to find out when a data gap has been filled is to periodically check each data portal that may have the data.

Risk

Issue	Description
4.1	Data is not always fit for purpose. Without enough information about the data, datasets will be excluded from use as the quality of the data cannot be determined.
4.2	Increased data accessibility increases potential for data misuse from non-specialist customers.

Data use

Issue	Description
5.1	Age of data is important. How recent is the data? Is the data set still valid?
5.2	QA of data. Evidence that some level of quality assurance has been passed
5.3	How do users use the data? Data is often in a proprietary format. Once the data has been retrieved users then find out they do not have the relevant software to process/analyse the data.
5.4	Many potential users (e.g. developers) have low capacity/capability to interpret and interrogate the data.
5.5	If data is used for planning/regulatory activities then it needs to be auditable.
5.6	May not have the correct hardware (e.g. storage requirements)/software to view/analyse the data.
5.7	Is there open source software that can be used with the data?
5.8	Licensing is often hard to understand as portals have multiple licenses for different data sets. The same data can appear multiple times on aggregator sites under different licenses.

Portal solutions – data

Functional Requirement	Description
6.1	All data should be represented spatially even if there is no spatial aspect to the data its self. The metadata around the data should record the

	geographical area represented as a polygon reducing the number of false positive results from bounding boxes.
6.2	Data should be retrievable in open formats, avoiding proprietary formats where possible.
6.3	Data should be retrievable in multiple formats based on the users' choice. e.g. csv/netcdf etc
6.4	Detailed metadata should be available within the portal to help identify if a dataset is fit for the purpose intended by the user.
6.5	Once a dataset has been identified, the data related to this should be downloadable immediately through the browser without having to request approval from the data owner.
6.6	Users should be able to perform simple analysis on the data before downloading it. This analysis can help identify if the data is fit for the purpose they require.
6.7	Users should be able to see individual datasets visualised and dynamically change these visualisations to fit the question they are trying to answer
6.8	Frequently Asked Questions should be available at a data/data type level to help Inform users of how the data can be processed, what software is required, what is available that is open source etc.
6.9	Users should be able to download subsets of a dataset which match the users' specific query.
6.10	Users should be able to see what the data has been used for. Linking in publications based off the data could help users answer the question they are looking to answer using the data
6.11	Spatial data should also be made available through WFS/WMS servers to improve integration with tools such as ArcGIS and QGIS.
6.12	Users should be able to see a live dashboard showing any real-time streamed data, for example if streamed from marine observatories.
6.13	When multiple datasets match a search, the data files should be packaged up into one zip so it is easy to download the required files in one go.

Portal solutions – data discovery

Functionality	Description
7.1	Users should be able to select the exact area that they are interested in when searching for data (Polygons or bounding boxes).
7.2	Failed searches should signpost to potential alternative sources of data when it is not available on iMarDIS.
7.3	If a user succeeds at finding data on an external source when directed there from iMarDIS, the user should be prompted to see if the external sources helped them in anyway. This will allow recommendations to evolve and display how successful they have been in past searches.
7.4	Users should be able to register potential external sources of data that we can redirect to. This can be verified by the iMarDIS team before being displayed on the portal. User driven content is a very powerful tool that should considered.
7.5	Users should be able to search using everything from the simplest search (e.g. all data in a bounding box) to more complex searches (e.g. data type, age of data, resolution, bounding box, QA information).

7.6	Users should see recommendations identifying related data sets when viewing a particular data set. e.g. 'Users who viewed/downloaded this data set also viewed/downloaded...'
7.7	Users should be able to perform a geographical search of reports and publications linked to datasets within iMarDIS.
7.8	Licensing should be available in a summary form as well as the full license.
7.9	Users should be able to setup notifications to send them emails when data that meets their search criteria is added to iMarDIS.
7.10	Users should have access to a coverage map showing the overall coverage of each datatype we have within iMarDIS.
7.11	Users should be able to search in iMarDIS for data that is held within other data sources such as BODC (via MEDIN). This reduces the number of portals users have to visit helping establish iMarDIS as the 'One Stop Shop' for Welsh marine data.

Analytics

Functionality	Description
8.1	iMarDIS should track usage of iMarDIS to help build up information about commonly linked datasets etc.
8.2	Users should be given the option to 'opt in to user tracking' to improve portal usability and experience. This should be configurable in user settings
8.3	Users should be given the option to 'opt out of anonymous tracking'. This should be configurable in user settings.
8.4	Failed Searches should be recorded to help build up a map of high demand data that is not available.

User experience

Functionality	Description
9.1	When users sign up for the portal they should fill out a form regarding their role (Academic, consultant etc), industry and other interests.
9.2	User's experiences should be customised based on the user profile.
9.3	In the long term iMarDIS could follow the freemium model. Free simple access with premium options for subscribing to some of the services.

User support and feedback

Functionality	Description
10.1	Potential use of discussion board (or similar) to support users who have queries around how to process the data. Helps build a community which will assist each other.
10.2	Use questions raised in the forums to create a comprehensive FAQ section to automate user assistance
10.3	Users should be able to contact the collector of the data with questions about the data. This can be done without exposing contact information of data collectors. Queries can be added into a specific FAQ about that data set.

10.4	Users should be given the option of providing feedback on what they have used the data for to help build up a case studies section so showcase iMarDIS
10.5	Users should have a place to send recommendations on improvements to the portal to the iMarDIS team. This could highlight any bugs as well as new potential functionality.



Picture 4 James Ingram leads a group discussion assisted by Graham Worley

Next steps

The workshop provides a rich source of information that will guide future developments of the iMarDIS infrastructure.

In the first instance and based on the outcome of the workshop the specification for the portal has been drawn up. Work to implement the specification will be commissioned externally via a tender process.

Future work to develop iMarDIS will particularly take into account information acquired under the following series headings.

Products and Services

A key question for future development of iMarDIS concerned to potential for developing products and services. Users views are summarised below but it should be remembered that not all sectors were equally represented.

Users preferred:

“a functionally powerful portal that was used by many rather than a simple portal and bespoke products used by the few”

Specialist users believed:

“it is not feasible (worthwhile) to create more generic products that could be used by many people as the products would have to be over simplified”

For specialist users the focus should be:

“more on providing programmatic access and tools/libraries to the specialist users to allow them to create more useful tools for their user base”

The non-specialist users:

“desired less emphasis on derived data products”

Both specialist and non-specialist users wanted:

“services to help analyse and visualise data within the portal”



Picture 5 Panel discussion with Dave Mills, James Ingram, Jessica Campbell and Paul Ellsmore assisted by Thomas Prebble

Programmatic access to data

Users, especially specialised users, were very keen on libraries to programmatically access data through iMarDIS. They were already going to have access to this through the iMarDIS Rest API but this could be enhanced and simplified for the users by creating language specific libraries for R, Python and Mat lab.

This access would also be extended for real-time data, allowing users to query available observations and pull back the most recent data or data over a time series.

WMS/WFS servers with simple filtering capabilities

There was a need by the specialist users for WMS/WFS servers so they can be viewed within ArcGIS. As iMarDIS would have a range of data types, the server urls should accept simple filters so the user only sees the datatypes that they are interested in.

External Data Services

Implement interfaces for data held at other portals allowing users to access this data seamlessly through iMarDIS APIs as if it is held within iMarDIS. When external interfaces are not available, we could harvest the data periodically into iMarDIS so the data can be used within products and services.

Catalogue of WMS/WFS servers

A community driven catalogue of WMS/WFS servers that are useful for this area/sector. Users would be able to submit WMS/WFS servers and once approved by the iMarDIS team, they will be added to the catalogue. This idea links into the theme of iMarDIS being the 'One Stop Shop' for Marine data/the renewable energy industry in Wales.

Semantic Searching

The ability to perform more complex semantic searches on data. This links into the idea of search for the answer to a question and not the data self. For

example, 'what areas have low mammal abundance and a peak water velocity over 2 m/s?' This was a topic that came up multiple times over the workshop and seemed to be aimed more at non-specialist users.

Analysis and Interaction of Model Output

From the non-specialist users there was an appetite for a dashboard to provide tools to analyse model output providing visualisations of the model outputs. Some examples of this (or similar ideas) are <http://portaldoclima.pt/en/>, <http://www.chonos.org/#> <http://www.renewables-atlas.info/explore-the-atlas/>

Virtual Research Environments

Some specialist and non-specialist users didn't believe they would be able to do enough analysis in the browser and it would be easier to download the data and perform the analysis locally. In some cases the data sets would be too big for their machine and an alternative is to create virtual research environments to analyse the data using R or Python without the users ever having to download the data. This speeds up analysis time, allows users to share how they analysed the data with others in the community and reduces cost due to the reduction of downloads. This option could also be rolled out for all datasets as it reduces the dependency of users to have specific software/libraries to access and analyse the data.

Sustainability of iMarDis

The issue of post SEACAMS funding was raised and below are some of the comments:

- Users would not mind paying a reasonable fee in order to obtain valuable, trustworthy data
- Partnering with Regulators/Institutions for funding
- Freemium model. Basic data services are free. More advanced services required a subscription
- Though we are concentrating on just MRE companies at the moment, bringing in other related marine industries could increase user base, save regulators and developers costs as they are all using the same datasets
- If iMarDIS gets user buy-in then potential future funding will be easier. This will require case studies showing how iMarDIS has helped (e.g. speed up the process, reduce costs, support innovative solutions, reduce uncertainty)
- Be a leader. If iMarDIS can lead the way, showing reuse of academic data and research results in supporting industry then there is scope for further funding
- WEFO support leans more towards increasing revenue than reducing costs. Further support for iMarDIS may be contingent on helping to drive economic growth