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## D2.1

### GROOM RI Access Policy and Rules

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**Deliverable abstract**

Access to nodes and their observational capacity by the scientific community and other interested stakeholders (e.g. scientists, industries, civil protection institutions, educational institutions, etc.) is vitally important, and GROOM RI will provide high-quality services to a large and varied community. Previous efforts have identified several themes for European ocean observatory access and services.

Internally, GROOM RI will promote the formulation, negotiation and conclusion of agreements between node owners, building on the work of GROOM-FP7 and GROOM II. Externally, GROOM RI will increase the accessibility of MAS to all stakeholders including the research community, and industry for trials and testing of new/novel technology, procedures, and materials. GROOM RI will develop an Access Policy including rules of access and application procedures setting-up a system to collate access requests as defined in the principles of open access established by the European Commission and in line with the European Charter for Access for Research Infrastructures<sup>1</sup>. Moreover, efforts in aligning access with other RI's and projects such as EMSO ERIC, EuroFleet+, EUMR and JERICO S3 are foreseen. Synchronised and common calls are indicative actions.

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<sup>1</sup> <https://op.europa.eu/en/publication-detail/-/publication/78e87306-48bc-11e6-9c64-01aa75ed71a1/>

### Deliverable executive summary

This document provides the access policy and rules for the future GROOM RI. During the work done to create this document, it has become clear that this is a very complex task: the MAS facilities that will become the future GROOM RI nodes are all governed by very different rules derived in many cases from certain funding and national rules. The services these facilities provide to users are also of a different nature and heterogeneous across the GROOM II partnership. Excellence-driven access remains a point of friction, with the funder imposing a set of rules, this is in no case a showstopper as there are plenty of examples of GROOM II partners implementing it under EU projects in the form of transnational access.

Even with the complexities mentioned, it is possible to find common ground in the form of common rules and principles that will allow a future GROOM RI to aggregate in a single offer the member capabilities. The most obvious one is the usage of a market-driven access model. This model has the advantage of leaving all the RI nodes enough freedom to operate following their own set of rules. To make this really useful to users, the future GROOM RI must implement a telematic way for the users to find the resources available, providing easy contact to the nodes providing services and to their local rules. This tool must also provide the central RI office enough visibility to act as an intermediary between potential users and the nodes when there is the need to design complex campaigns. This will lead to the implementation of coordinated access by the RI, since this type of access is another layer on top of the market-driven access. The implementation of this access model and this schema would bring real value to the RI landscape and its users, as it is highly complementary to other initiatives and with the different national landscapes. Indeed, coordinated access is the way forward for optimizing the use of MAS in Europe. Building on the availability of few assets in each GROOM RI node, one can envisage ambitious observational programs that could not be possible otherwise.

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## List of Abbreviations

<b>Argo</b>	Scientific international programme for ocean observation using a fleet of robots
<b>ASV</b>	Autonomous Surface Vehicle
<b>AUV</b>	Autonomous Underwater Vehicle
<b>EC</b>	European Commission
<b>EECP</b>	European Cluster Collaboration Platform
<b>EMBRC</b>	European Marine Biological Resource Centre
<b>EMODnet</b>	European Marine Observation and Data Network
<b>EMSO</b>	European Multidisciplinary Seafloor and water column Observatory
<b>EOOS</b>	European Ocean Observing System
<b>EuroArgo</b>	European contribution to the Argo Programme
<b>GROOM RI</b>	GROOM Research Infrastructure
<b>GOOS</b>	Global Ocean Observing System
<b>IOC</b>	Intergovernmental Oceanographic Commission
<b>IMOS</b>	Integrated Marine Observing System
<b>IOOS</b>	Integrated Ocean Observing System
<b>JCOMM</b>	Joint Technical Commission for Oceanography and Marine Meteorology
<b>JERICO</b>	Joint European Research Infrastructure of Coastal Observatories: Science, Service, Sustainability
<b>MRI</b>	Marine Research Institute
<b>MS</b>	Member States
<b>OCG</b>	Observations Coordination Group
<b>R&amp;D</b>	Research & Development
<b>SME</b>	Small and Medium Enterprise
<b>TNA</b>	Transnational Access
<b>WP</b>	Work Package

### DISCLAIMER

The contents of this publication are the sole responsibility of the project partners and do not necessarily reflect the opinion of the European Union.

## 1 Introduction

The European research infrastructure offers a variety of physical infrastructures, services, and human expertise. The GROOM II partnership comprises nodes across Europe with different capabilities in operating gliders and other MAS. This document aims to explain how to utilise resources better and provide future users with access to the MAS capabilities of GROOM RI. It is worth noting that GROOM RI will not manage a physical pool of MAS; instead, the nodes will own the physical capabilities. The current GROOM II partnership provides vast geographical coverage but is not the sole operator of gliders and other MAS across Europe. As a result, the number of GROOM RI partners could increase significantly, and the policy should allow flexibility to incorporate change. The main goals of this document are:

1. to provide a clear way of accessing the GROOM RI services, simplifying the process for users,
2. to encourage and facilitate new users of the systems, and
3. to make the GROOM RI accessible to researchers, industry, and public bodies.

It is important to note that this access policy was designed before the end of the GROOM II project, and the consortium had not yet agreed on the legal form GROOM RI would adopt. The policy has been designed to work for a European Research Infrastructure Consortium (ERIC) or an "Association Internationale Sans But Lucratif" AISBL, which is an International non-profit association seated in Belgium. As a result, this is a high-level policy, and some details may not become clear until the preparatory and implementation phases. Nonetheless, this document should provide readers with enough information on how to access the future GROOM RI and its general rules and modes of access.

## 2 Access across European MAS facilities

### 2.1 EXISTING ACCESS MODELS

Many European research infrastructures offer access to their partners' facilities. The access is usually managed through direct funding or project-level funding. In the marine domain, there are several access mechanisms available, such as those used by EMSO (ERIC), EMBRC (ERIC), Eurofleets+ (EU Project), MINKE (EU Project), and the Ocean Facilities Exchange Group (OFEG).

#### 2.1.1 Review of Approaches to Coordinating Access

The multiple possible access models to a European RI and other types similar organizations can be classified as follows:

- **Market-driven access**, used by the European Marine Biological Research Centre (EMBRC). In this model, the RI offers services on demand at any time, with users requesting those services. This mode does not specify a funding model, and it may be paid for by the end-user or funded by the infrastructure itself.



- **Excellence-driven access, used by EMSO, Eurofleets, or MINKE.** In this model, the infrastructure opens calls for external access that are (normally) funded by the RI. It is a competitive process in which the RI evaluates the feasibility and quality of the proposed access, funding the ones considered of high quality. The RI core funding or EU projects can fund the call. Some European projects and RIs have named excellence-driven access trans-national access (TNA).
- **Barter mechanism used by the Ocean Facilities Exchange Group (OFEG)** of which nodes (ship and infrastructure access) of the participating countries can be interchanged. The exchange is structured into running costs such as fuel (this is paid by the user to the provider) and use of infrastructure (tracked via “points” that value access days to a respective RI). Such an approach can work between the individual nodes but is irrelevant for external access. A GROOM RI could eventually be added to the existing OFEG system that already exchanges large AUVs today. However, the focus here is on vehicle access, while GROOM RI has many aspects of sharing and European coordination. OFEG is a trust-based system, and there is no recourse around any defaults, so it may not be appropriate for some partners. It would require further processes and policies to be implemented around the quantification of points used. Due to being a complex mechanism, this doesn’t appear to provide as many benefits for autonomy as it does for ship operations.

### 2.1.2 Challenges to Coordinating Access to MAS facilities at European level

The GROOM II partnership is made up of a variety of facilities that differ in terms of their funding, governance and operation. These facilities range from national research institutions and university science groups to philanthropic organisations and commercial businesses. As a result, the access models and user costing models for each facility are equally diverse. In the future, any new GROOM research infrastructure will consist of similarly varied access models, which may become even more diverse as the future RI partnership expands beyond the core GROOM II team.

Figure 1 provides a schematic of the access process for individual MAS Facilities, illustrating the different funding sources used to access the facilities, the support funding for each node (e.g. governmental, philanthropic, etc.), and the associated goods and services from other institutions and nodes required to provide access to the platforms.

This has not been defined yet, but should be compliant with the

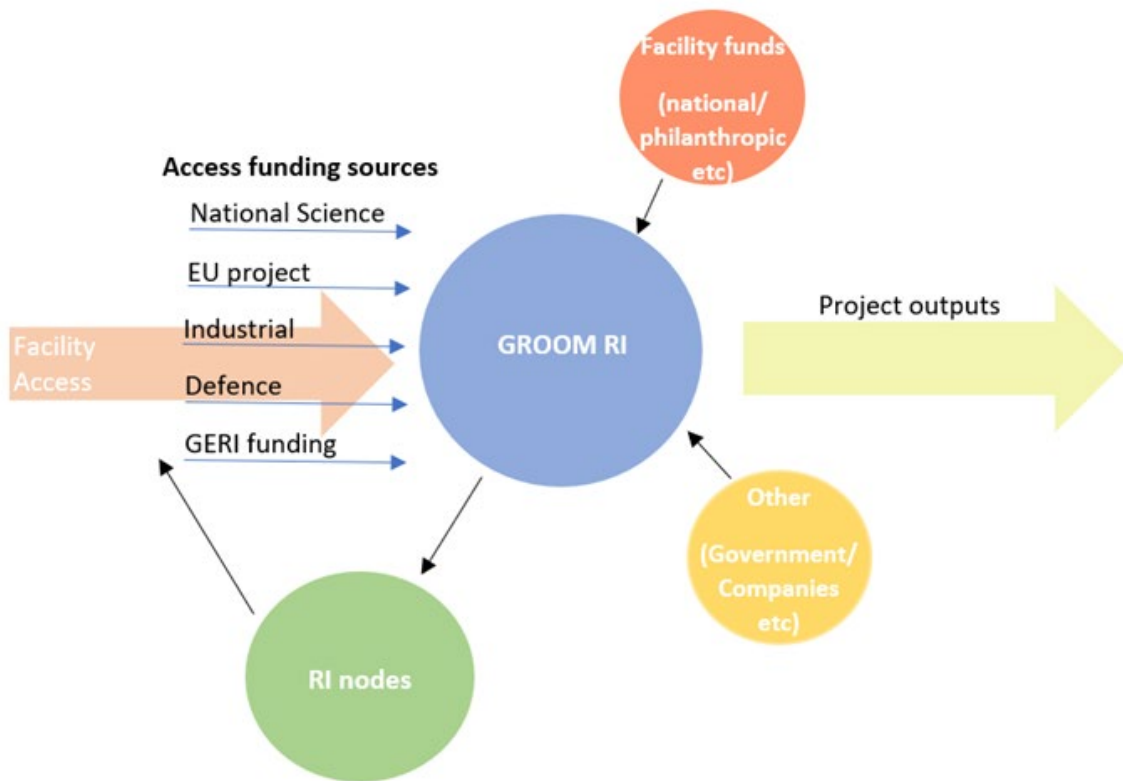


Figure 1 - Potential funding sources of the GROOM RI.

*It is relevant to understand that some of those funding sources can impose restrictions on the access model at both the international level (GROOM RI) and national level (nodes).*

Currently, the individual facilities that will form a future GROOM RI are accessed using their own processes. Projects from a number of different funding sources will access the node using the same individual node-based processes. If the node is supported via government funds, this may apply constraints on the access model. Likewise, funding sources may have their own access rules. Thus, each individual node will have its own set of access constraints and cost models, which will be different to the other nodes hence, harmonising to a single model is currently very complex, but it will be taken into account when creating the GROOM RI access model, attempting to harmonise rules and regulations of which could enable GROOM RI to provide access to all users without it being dependant on different funding streams. Considering the wide variety of European rules and regulations, users trying to access nodes from different countries on their own may find themselves unable to navigate this complexity. The future GROOM RI must help with this situation.

**Recommendation [1]: GROOM RI must provide expert resources to help users apply to nodes in different countries if they want to access resources and services from those nodes.**

The future GROOM RI will work with the nodes to provide access to the individual facilities and coordinate access across the GROOM RI infrastructures.

## 2.2 COMMON MODALITIES OF ACCESS

EU Research Infrastructures usually provide different ways to interact with the provided services, for clarity, we call this modality of access. The descriptions we present here have been taken from the H2020 Minke Project<sup>2</sup>:

- Physical access is “hands-on” access when users physically visit an infrastructure or receive some equipment from the infrastructure providing the access. The available services or resources are not unlimited, and a competitive process is required following a defined procedure and criteria for selecting users.
- Remote access is access to resources and services offered by the RI without Users physically visiting the node. Similar to Physical access, the services or resources are not unlimited and a competitive selection is required.
- Virtual access means free access to Users provided through communication networks; the available services or resources can be simultaneously used by an unlimited number of users and the users are not selected. Virtual access typically concerns access to data and digital tools.

## 2.3 LEGAL ISSUES OF OPERATING MAS

The current framework for undertaking Marine Scientific Research (MSR) in a coastal state’s territorial waters is provided by the UN Conventions of the Laws of the Sea (UNCLOS)<sup>3</sup>. Thus, undertaking MSR in another country’s waters (see Figure 2) requires permission from the nation-state. This is potentially problematic as the majority of the European seas and oceans form parts of one nation’s waters or another (see Figure 3).

The national state is encouraged to provide agreed access for MSR, but as per Article 248 of UNCLOS, a minimum of six months’ notice is expected from receiving the application to providing access. This can be very restrictive for reactive science deployments. Thus, having a distributed infrastructure would allow the nation-state’s infrastructure to perform the MSR, removing the need for diplomatic clearances.

Alongside the diplomatic clearance issues, there are likely to be local constraints requiring permitting etc. For any access models, the GROOM RI must provide planning support to help the user navigate these local challenges during the initial planning phases of any missions.

**Recommendation [2]: GROOM RI should provide support to complete diplomatic clearances for the RI nodes.**

A clear added value of the GROOM RI is to offer the option to RI nodes to complete diplomatic clearances on their behalf as an additional service, this will benefit RI nodes who do not have

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<sup>2</sup> <https://minke.eu/services/rules-to-access/>

<sup>3</sup> [https://www.un.org/Depts/los/convention\\_agreements/texts/unclos/unclos\\_e.pdf](https://www.un.org/Depts/los/convention_agreements/texts/unclos/unclos_e.pdf)

experience with diplomatic clearances to utilise, which would minimise risk and restrictions to other RI nodes either existing or new.

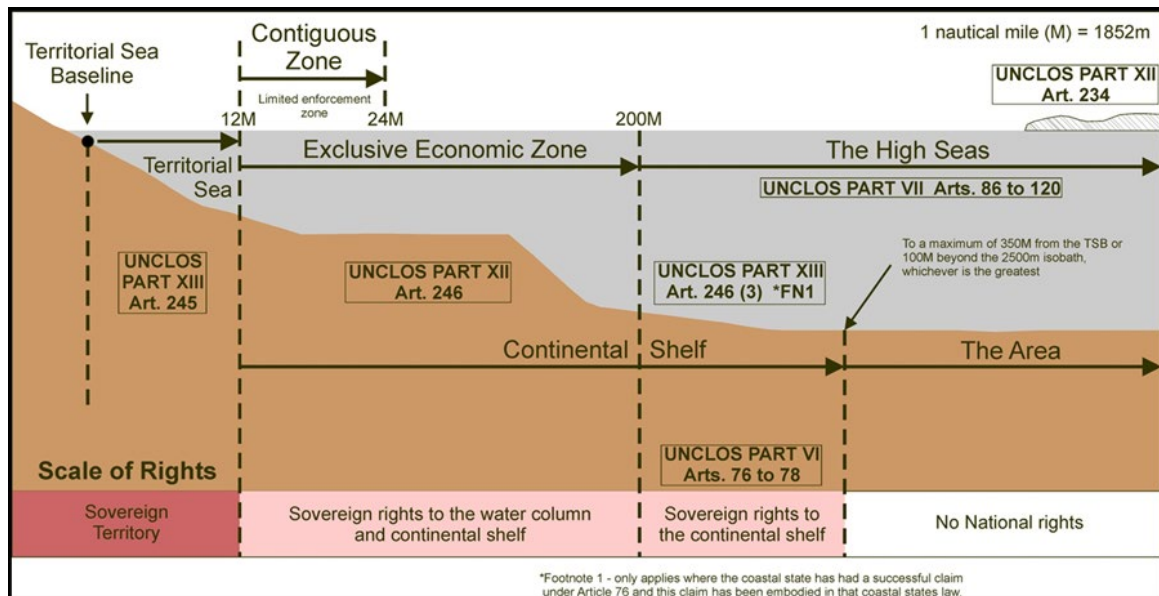


Figure 2 - UNCLOS territorial water definitions.

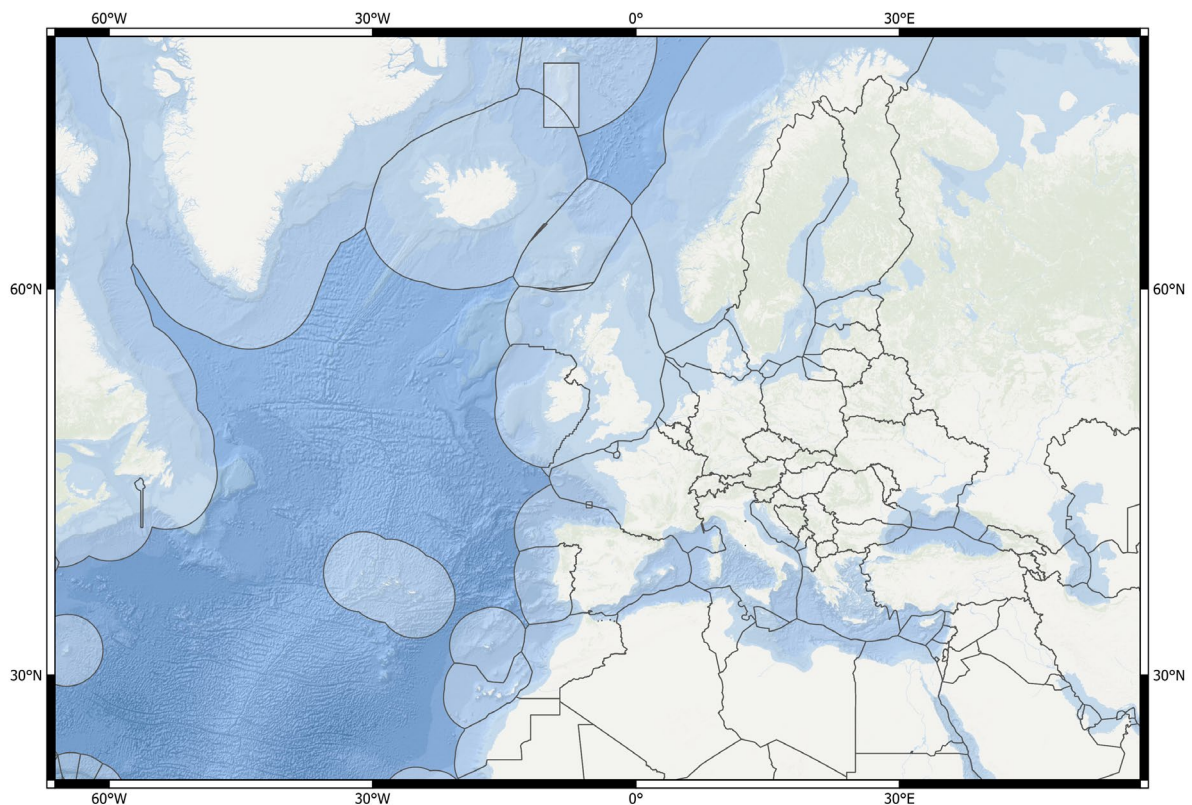


Figure 3 - European Countries Exclusive Economic Zones

The complexity of operating MAS can be seen in areas of very close EEZs. For some studies requiring access to multiple EEZs the process can be quite complex, time-consuming and tedious.

### 3 GROOM RI Access Modes, processes and Interactions

Providing a single consistent access system for all MAS Facilities is challenging due to different national frameworks, as each RI node will have its own national funding models, policies and procedures. GROOM RI will define two main access modes:

- The first, market-driven access model, acknowledges the GROOM RI partners' diversity and the associated access constraints. In this approach, similar to the EMBRC system, the GROOM RI would act as a facilitator between the potential user and the individual nodes. The final contractual relationship would be between the user and the individual node.
- The second, excellence-driven access model, would be used for situations where the GROOM RI is funded (e.g. through European projects) to provide free or subsidised access to the facilities. In this model, the GROOM RI would sub-contract the individual nodes using pre-arranged agreements between the RI and the individual nodes.

This section describes how we propose implementing the different access modes within the future GROOM RI. It is important to note that the European Charter for Access for Research Infrastructures<sup>4</sup> provides a very open definition of the access modes, letting the different RIs customise the modes to be fit for purpose in the context of their different activities.

#### 3.1 MARKET-DRIVEN ACCESS

Given the complexities of access for the different MAS Facilities the market-driven model (or broker model) is preferred for accessing the individual facilities of each node.

In this process, the GROOM RI will be approached by a user with an access request. The GROOM RI will provide the node and contact details for the relevant nodes and assist the client in introducing the original node. Once the initial introductions have been completed, the GROOM RI will step back, and the individual contracting relationship between the node and the user will be completed. It is expected that even under this light-touch approach, the associated GROOM RI nodes will provide services using the standard data workflows, best practices and tools developed or endorsed by the GROOM RI, providing consistency across the RI.

**Recommendation [3]: GROOM RI should provide an online portal or tool to allow external users to explore services (catalogue).**

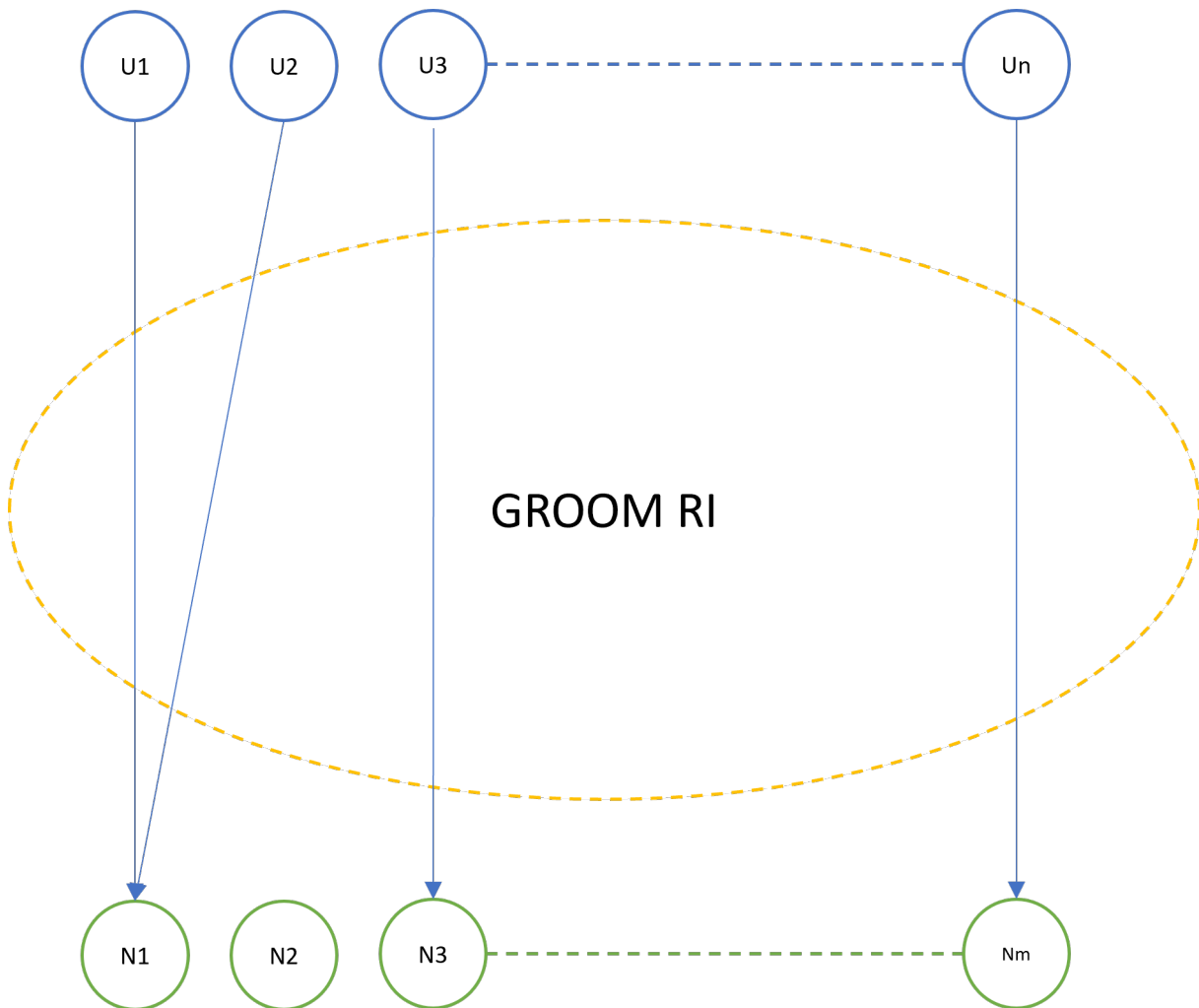
GROOM RI will need to provide an online tool/website for all users that will give access to all node services and facilities that can be provided, for example, the marine facilities planning tool (MFP.) This will allow the user to provide specific details that the GROOM RI can use to assist with their scheduling and planning.

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<sup>4</sup> <https://op.europa.eu/en/publication-detail/-/publication/78e87306-48bc-11e6-9c64-01aa75ed71a1/>



**Recommendation [4]: GROOM RI should provide an online tool to show RI users the current GROOM RI partner's operations, allowing more effective planning and sharing of resources.**



*Figure 4- Market-driven access or broker model.*

*The GROOM RI acts as a broker or intermediary, the users (at the top of the figure) come to GROOM RI with needs and then GROOM RI will find the nodes with capability and availability to deliver.*

To support this model, the GROOM RI must provide the individual nodes with standard contract templates and infrastructure to support access. These templates' best practices and approaches would be adopted as necessary by the individual nodes.



**Recommendation [5]: GROOM RI should provide a light touch standardised template to allow users to request their requirements for access.**

The individual node would need to follow the “European Charter for Access to Research Infrastructures” guidance document<sup>5</sup>, but it would not be consistent across all the different MAS facilities. This would encourage the individual European MAS facilities to follow best practices and would increase the overall performance of the European MAS community. Providing a standard template will allow users to select the services or facilities they specifically require and timeframes for this to be then submitted to GROOM RI to enable scheduling validation, and the requests can be sent to the available GROOM RI nodes for response to the users.

The human resources within GROOM RI, tools, and standardised templates will allow for oversight of the availability of all RI nodes' specific facilities and services. This will allow for better scheduling and utilisation of services across the network. Furthermore, it allows for the user's requirements to be sent to the RI nodes with scheduling availability so they can provide availability and a breakdown of costs to the user to fulfil their specific requirements. GROOM RI would then look to provide harmonisation within nodes as described in deliverable 6.1 (WP6.)

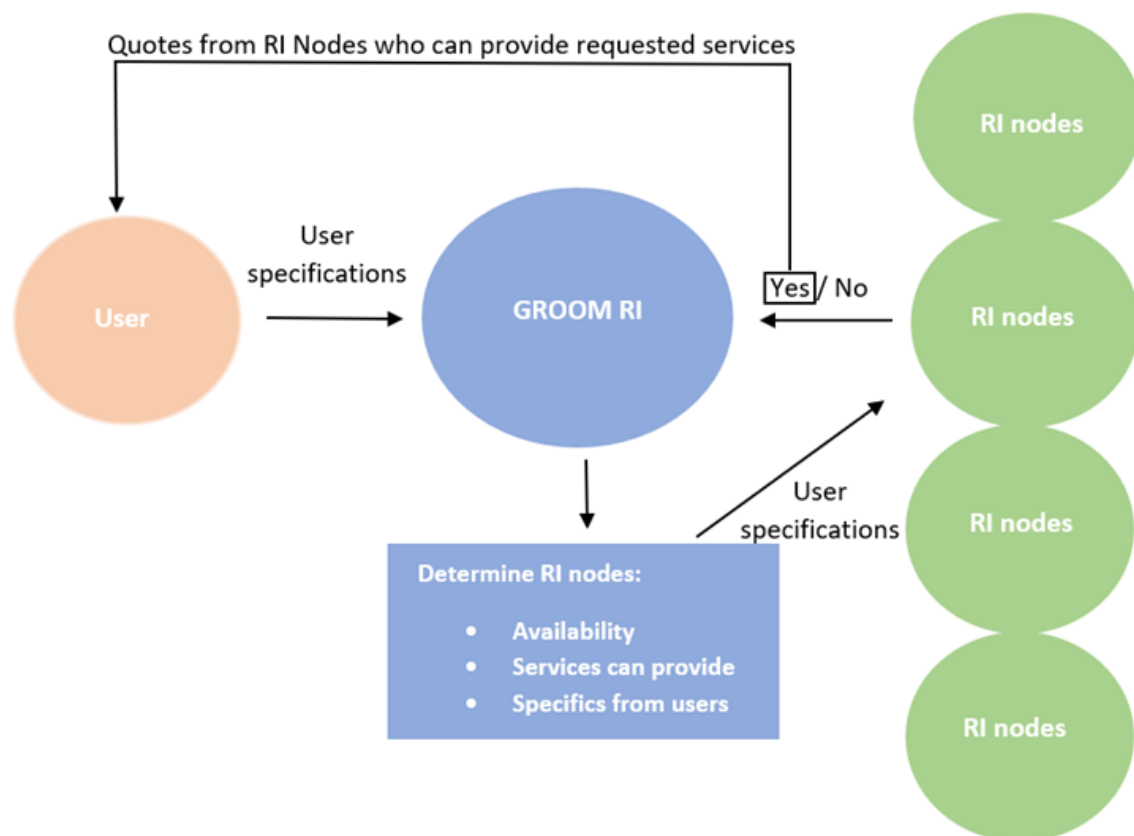


Figure 5 - Envisioned workflow for external users accessing the RI following the market driven access or broker model.

<sup>5</sup> <https://op.europa.eu/en/publication-detail/-/publication/78e87306-48bc-11e6-9c64-01aa75ed71a1/>

### 3.1.1 Managing the program - The MFP

GROOM RI will make it easier to identify and optimise the use of MAS resources, including the MAS itself, associated facilities and the human resources involved. To do this, the GROOM RI must know the partners' resources and how they have been scheduled. We recommend the usage of an online tool to enable that programming.

For this example, we will use Marine Facilities Planning (MFP); the MFP is a tool initially developed by a Dutch company called MAAS Software for the Royal Netherlands Institute for Sea Research (NIOZ, NL) and for the National Environmental Research Council (NERC, UK) to allow their National Marine facilities to do the planning and scheduling of ship activities, but with the increased use of autonomy in the UK, gliders and other autonomous platforms have been included in the system. Rather few other international actors now use the MFP; GEOMAR (DE), CSIC(SP), SYKE(FI), University of Gothenburg (SE), Institute of Marine Research (NW), VLIZ (BE) and BGR (DE), with new partners coming soon like UNOLS. The maintenance and subscription costs for the MFP (the latter is per equipment piece) can be substantial; thus smaller organisations, e.g. universities, may never be able to implement MFP.

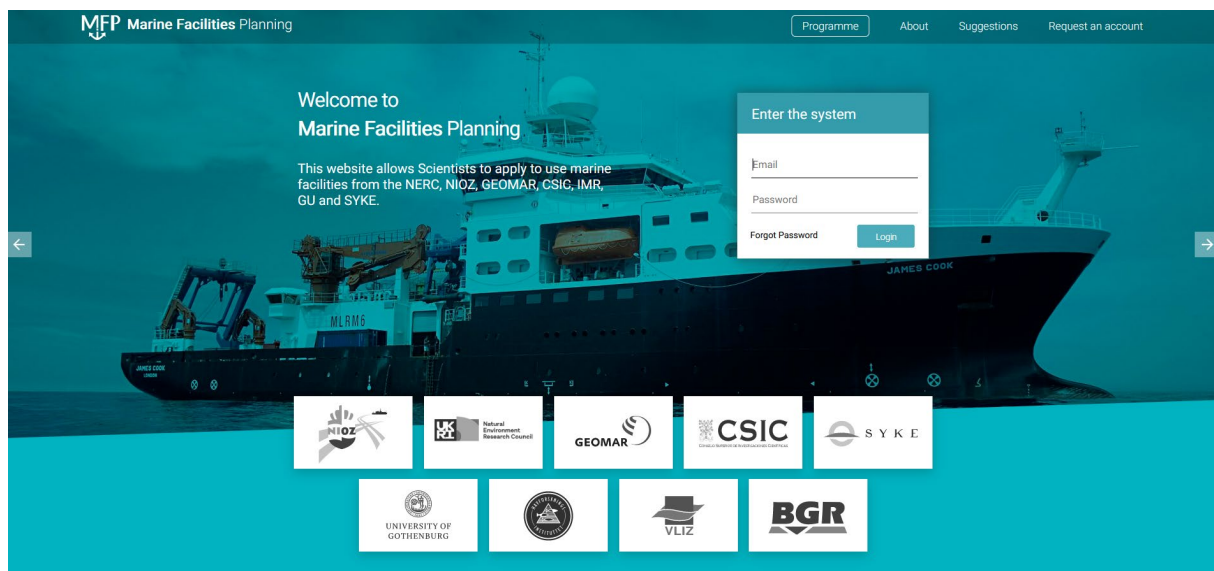


Figure 6 - The MFP landing page in Europe (there is an American instance).

One of the ship operators' aspirations with the MFP is to have all the ship plans from different organisations and countries on the same site to increase visibility and help them better coordinate their resources. This is a similar ambition to the GROOM RI access. Therefore, we propose the adoption of the MFP (or a similar tool), to allow the GROOM RI nodes to declare their resources and scheduling in the system. This would allow the GROOM RI to see availability and steer external users to the different nodes that could fulfil their requirements.

Currently, the MFP covers ships' associated equipment, gliders, and some other autonomous platforms, plus the associated sensors. Still, it doesn't include shoreside facilities like calibration facilities, e-infrastructure or sensor integration; hence if the GROOM RI adopts it, that capability would need to be developed.



**Recommendation [6]: If the GROOM RI adopts the MFP, the system must develop and include access and planning for shoreside facilities.**

We have described in our access model that users would request GROOM RI access to gliders, other MAS or the associated infrastructure so those users can perform their activities. The MFP already allows this in the form of what is called workflows, so users of the MFP can request a national node (one of the current MFP users) for particular equipment. For GROOM RI we propose a higher-level activity, as currently, MFP users operate at the national level, needing to know what different facilities offer. In the GROOM RI case, we envision the end users making the request directly to the RI, and then the RI completes the work of finding the available resources within the GROOM RI nodes using the MFP. Figure 7 shows the request form for autonomous assets within the NERC workflows. The workflows have many steps (steps can be seen on the left sidebar of the image). Those different steps guide the user through questions and details needed to identify equipment, areas of operation and times to identify resource availability.

Figure 7 - Form to request autonomous assets from the UK National Marine Equipment Pool.

The GROOM RI will need to collate the user requirements, get into the program of the different RI nodes, and check availability. Figure 8 shows the timeline of operations of many organisations currently on the MFP. Using this tool, the GROOM RI would be able to identify gaps.

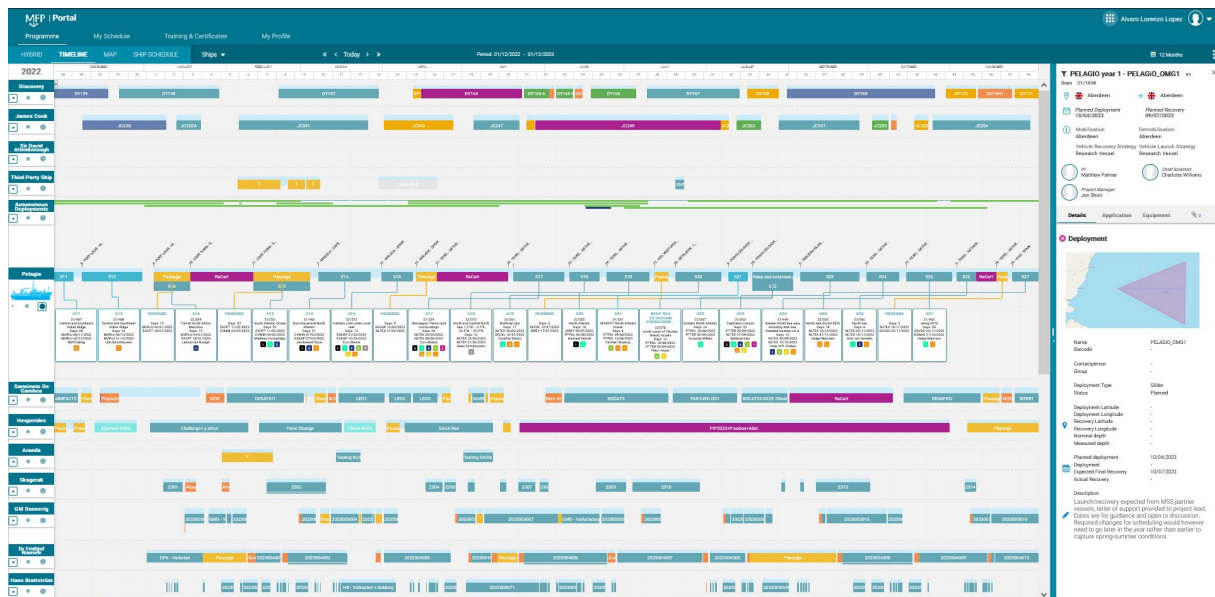


Figure 8 - The timeline view of the MFP shows the different ship scheduling across different European ship operators.

After identifying the availability of resources with the nodes, the RI will respond to the users with different options, connecting both users and nodes. This may be the point at which the work of the RI finishes and the endpoints (user and node) talk directly. Ideally, the whole process would be embedded and done through the MFP to keep traceability.

### 3.2 COORDINATED ACCESS

For specific projects GROOM RI will act as the contracting party for a project. For example, in the case of EU calls, the GROOM RI could act as the project partner. The GROOM RI will then contract the individual nodes based on the user's specifications to provide technical support for the project. This would allow simpler contracting from the project perspective.

The nodes will be contracted individually by the GROOM RI using the mechanism laid out in the market-driven model and recommendations, but with the GROOM RI being the client.

The GROOM RI would provide a harmonised access model using the “European Charter for Access to Research Infrastructures<sup>6</sup>” guidance document.

The individual nodes will need to agree with the GROOM RI before bidding so the GROOM RI could reasonably call on the facilities to deliver the contract without going through too much bureaucracy. For example, they would need an agreement in principle with the individual GFs to allow the GROOM RI to call on the GFs without needing a specific agreement beforehand. Therefore, the below considerations will need to be addressed in advance:

1. Each node would need to have contracted in place with the GROOM RI
2. Clear mechanisms would need to be in place with who gets contracted

<sup>6</sup> <https://op.europa.eu/en/publication-detail/-/publication/78e87306-48bc-11e6-9c64-01aa75ed71a1/>

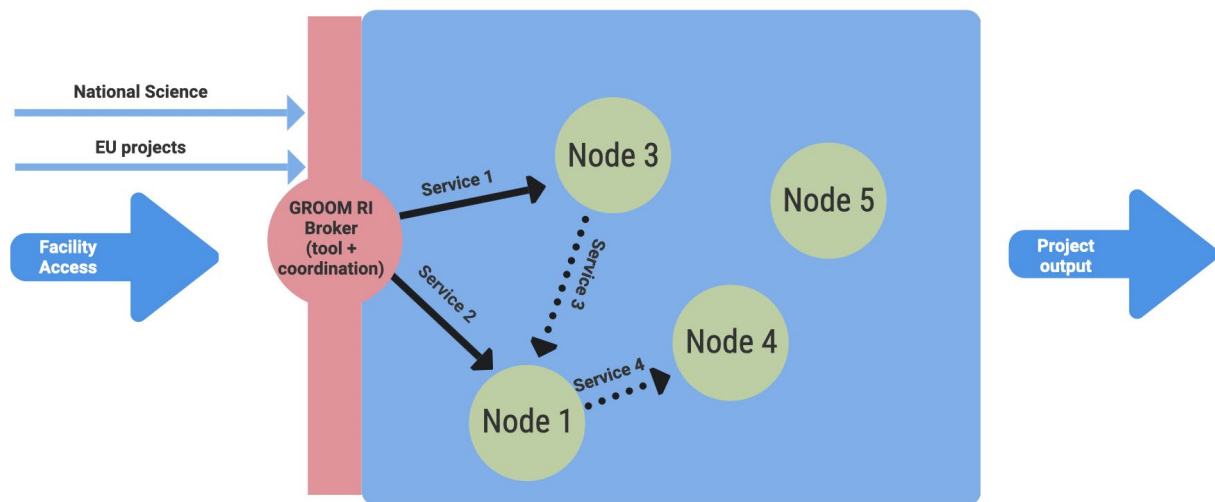


Figure 9 - Coordinated access model:

The GROOM RI centralises user requests, dealing directly with the nodes and contracting them directly. This model can be used in situations when the RI is managing the operations, as in EU programs or emergency situations when reactivity is key.

### 3.2.1 A practical example - An emergency requiring multi-node contribution.

The sub-contract model can be advantageous in emergencies when autonomy needs to be deployed quickly in reaction to an unforeseen phenomenon. Examples include the 2010 BP Horizon oil spill in the Gulf of Mexico and volcanic eruptions in the Canaries in 2011 and 2021. In each case, gliders and surface vehicles were deployed to help monitor the events and help authorities with the decision-making. In each case, mobilising the fleet wasn't trivial, and in the cases of the Canaries, not many platforms were available. This is the scenario under which a GROOM RI could more effectively find available resources in the network than individual organisations.

### 3.2.2 Excellence-driven access

GROOM RI will have excellence-driven access based on EU-specific projects. The specific funding call will define requirements for the access on top of the GROOM RI-specific requirement, which would need to be factored into the individual calls. The model is to follow the ESFRI Transnational Access (TNA)<sup>7</sup> process.

Funding will be controlled by the GROOM RI and will, in effect, subcontract the individual MAS Facilities as per the subcontracting model.

<sup>7</sup> <https://www.esfri.eu/esfri-white-paper/23-access-ris-including-trans-national-access>

### 3.3 WIDE ACCESS

By default, if an access generates observations, the near real-time data must be FAIR and open (see deliverable 6.2). To guarantee this, the user must create a data management plan and a recognised/endorsed GROOM data centre before deploying any assets.

**Recommendation [7]: To guarantee wide access to data, GROOM must work with data centres across Europe, producing consistent data workflows and data outputs independent of the data centre so users of GROOM will know that no matter which GROOM node operates the MAS and which data centre manages the data, the results are of the same level of quality and the data is delivered following the same mechanisms.**

GROOM RI will nurture the development and evolution of Best Practices, cooperating with international efforts like the Ocean Best Practices and coordinating European efforts in that front (see deliverable 6.3). Access to those best practices will be wide and free of charge to anyone.

Finally, the future GROOM RI technical framework (deliverables 6.1 and 6.4) requires the development of an ambitious cyber infrastructure. The code developed for that purpose (or most of it) will become open-source, managed by the RI. The open-source nature of the code will automatically mean that it falls under wide access.

## 4 GROOM RI Access Rules

Any organization providing access to facilities and services must provide rules to set up the expectations and basic regulations for such access that both the users and the providers of the service of the facility must follow. Providing an intensive set of access rules at this stage, without knowing the final form that the GROOM RI will take is impossible, but we offer a number of basic rules and principles that any form of the future GROOM RI will follow.

Rules for the nodes

1. If the access generates observations, the data must follow FAIR and be open. Exceptions to this rule will be considered if there is an apparent reason for not opening the data (e.g., a test of a new commercial sensor).
2. If the access generates observations, a data management plan must be created.
3. The GROOM Nodes providing facility access must follow the GROOM RI-approved working practices and the GROOM RI-endorsed best practices.
4. While nodes are free to define which services they offer, once they do, they must treat users fairly and in a non-discriminatory way in compliance with the future GROOM RI ethics policy. The latter has not yet been defined, but will be compliant with the code of conduct for Research Integrity<sup>8</sup>.
5. Nodes will provide clear costings to users following a GROOM RI standard costing template.
6. Nodes will establish the appropriate start and end times for facility access. Likewise, it will ask for the necessary documentation to support and justify access. This documentation will explain

<sup>8</sup> [https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/european-code-of-conduct-for-research-integrity\\_horizon\\_en.pdf](https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/european-code-of-conduct-for-research-integrity_horizon_en.pdf)

the type of service provided and provide a record of the users' names, nationalities and home institutions.

7. Nodes must have clear and documented terms and conditions specific to the services they offer. Those terms and conditions must specify the consequences for failed missions or loss of assets.

#### Rules for the users

1. If the access generates observations, the data must follow FAIR and be open. Exceptions to this rule will be considered if there is a clear reason for not opening the data (e.g., a test of a new commercial sensor).
2. If the access generates observations, a data management plan must be created. This is the same rule as the one that the nodes. There will be a single data management plan for both the node and the users.
3. GROOM RI will have an ethics policy. Users must comply with that policy.
4. Users must agree to the local rules of the Node.
5. The applicant, or most applicants within a group, must be employed by an organisation established in an EU Member State or an associated country.

## 5 Conclusions

This document tries to provide the access policy and rules for the future GROOM RI. During the work done to create this document, it has become clear that this is a very complex task. The MAS facilities that will become the future GROOM RI nodes are all governed by very different rules derived in many cases from certain funding and national rules. The services these facilities provide to users are also of a different nature and heterogeneous across the GROOM II partnership. Excellence-driven access remains a point of friction, with the funder imposing a set of rules, this is in no case a showstopper as there are plenty of examples of GROOM II partners implementing it under EU projects in the form of TNA.

Even with the complexities mentioned, it is possible to find common ground in the form of common rules and principles that will allow a future GROOM RI to aggregate in a single offer the member capabilities. The most obvious one is the usage of a market-driven access model. This model has the advantage of leaving all the RI nodes enough freedom to operate following their own set of rules. To make this really useful to users, the future GROOM RI must implement a telematic way for the users to find the resources available, providing easy contact to the nodes providing services and to their local rules. This tool must also provide the central RI office enough visibility to act as an intermediary between potential users and the nodes when there is the need to design complex campaigns. This will lead to the implementation of coordinated access by the RI, been this type of access is another layer on top of the market-driven access. The implementation of this access model and this schema would bring real value to the RI landscape and the users, as it is highly complementary to other initiatives and with the different national landscapes.

## 6 Recommendations

**Recommendation [1]:** GROOM RI must provide expert resources to help users apply to nodes in different countries if they want to access resources and services from those nodes.

**Recommendation [2]:** GROOM RI should support the complete diplomatic clearances for the RI nodes.

**Recommendation [3]:** GROOM RI should provide an online portal or tool to allow external users to explore services (catalogue).

**Recommendation [4]:** GROOM RI should provide an online tool to show RI users the current GROOM RI partner's operations, allowing more effective planning and sharing of resources.

**Recommendation [5]:** GROOM RI should provide a light touch standardised template to allow users to request their requirements for access.

**Recommendation [6]:** If the GROOM RI adopts the MFP, the system must develop and include access and planning for shoreside facilities.

**Recommendation [7]:** To guarantee wide access to data, GROOM must work with data centres across Europe, producing consistent data workflows and data outputs independent of the data centre so users of GROOM will know that no matter which GROOM node operates the MAS and which data centre manages the data, the results are of the same level of quality and the data is delivered following the same mechanisms.

## 7 References

European Charter for Access for Research Infrastructures: <https://op.europa.eu/en/publication-detail/-/publication/78e87306-48bc-11e6-9c64-01aa75ed71a1/>

H2020 Minke Project : <https://minke.eu/services/rules-to-access/>

UN Conventions of the Laws of the Sea (UNCLOS):

[https://www.un.org/Depts/los/convention\\_agreements/texts/unclos/unclos\\_e.pdf](https://www.un.org/Depts/los/convention_agreements/texts/unclos/unclos_e.pdf)

ESFRI [Transnational Access \(TNA\)](https://www.esfri.eu/esfri-white-paper/23-access-ris-including-trans-national-access) <https://www.esfri.eu/esfri-white-paper/23-access-ris-including-trans-national-access>

EMSO (ERIC) will produce a pilot call to provide physical access to the infrastructure:

<https://emso.eu/physical-access/>

European Marine Biological Resource Centre EMBRC (ERIC) : <https://www.embrc.eu/services>

Eurofleets+ : <https://www.eurofleets.eu/access/>

Ocean Facilities Exchange Group (OFEG): <https://www.ofeg.org/np4/home.html>

## 8 Appendix 1: Access model examples

### 8.1.1.1 EMSO (ERIC)

The European Multidisciplinary Seafloor and Water Column Observatory (ERIC) was established in October 2016. It consists of several fixed observing stations at key locations in European waters. These facilities typically consist of mooring and fixed seabed observing stations regularly serviced. In 2022, the EMSO (ERIC) will produce a pilot<sup>9</sup> call to provide physical access to the infrastructure. This access is free of charge to the user and goes through a rigorous proposal evaluation process, as shown in Figure 10. The access to the node is ultimately limited by the funding available to support this access model, and so it uses an excellence-driven access model.

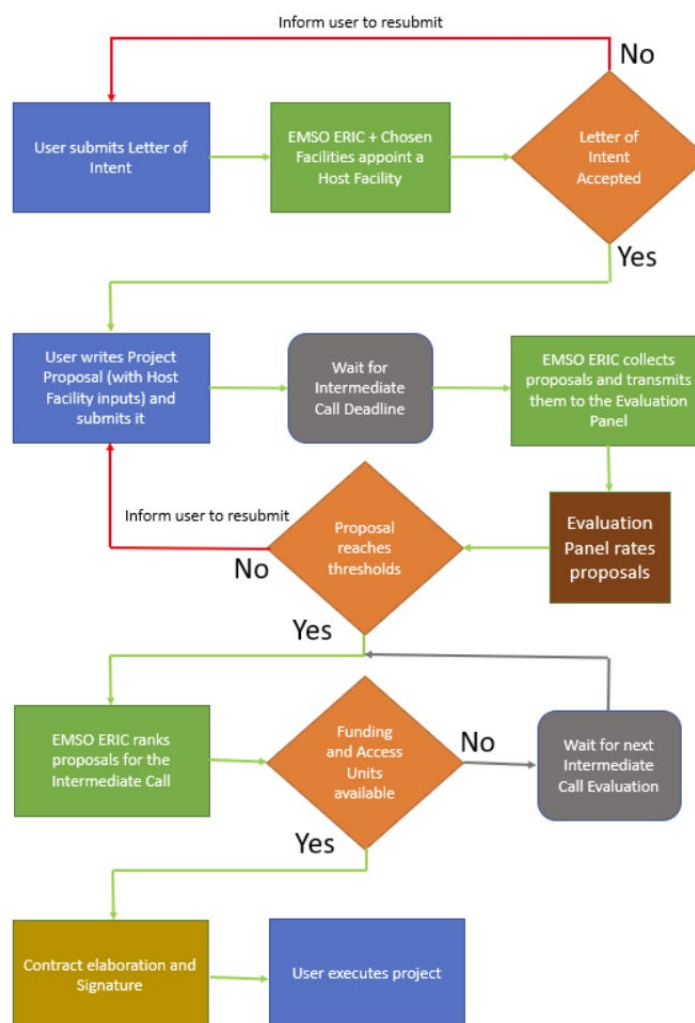


Figure 10 - EMSO ERIC application process

### 8.1.1.2 EMBRC (ERIC)

Another access model is provided by the European Marine Biological Resource Centre (ERIC). The EMBRC was formed in February 2018 and consists of many European marine biological laboratories spread across 10 European Countries. The ERIC provides many services to the academic and private

<sup>9</sup> See <https://emso.eu/physical-access/>



sectors. These services range from physical access to marine habitats through experimental facilities to training and library services, amongst others. The access model<sup>10</sup> for this complex set of stakeholders is a relatively light touch and goes through the steps outlined in Figure 11. After the initial Eligibility and ethical check, the details of the access are handled by the site access officer.

The full application is managed using an online application.

## The application process illustrated

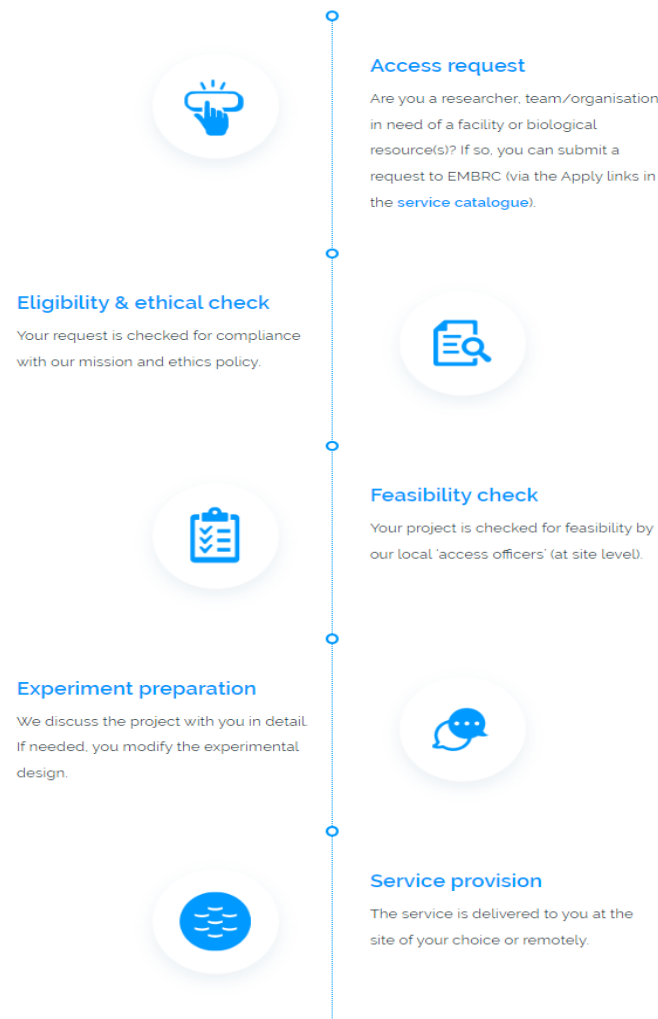


Figure 11 - EMBC Application Process

### 8.1.1.3 EuroArgo (ERIC)

Euroargo offers wide and free access to the data collected by the Argo array.

<sup>10</sup> See <https://www.embrc.eu/services>



#### 8.1.1.4 Eurofleets+ (EU project)

The Eurofleets+ project is “An alliance of European marine research infrastructure”, and provides access<sup>11</sup> to a large number of research vessels, ROVs and AUVs.

Three infrastructure access classes are available through a series of proposal calls.

1. **Ship time and marine equipment** – This provides access to vessels and equipment with both ocean and regional vessels in different calls
2. **Co-PI programme** – This is aimed at early career researchers who can work on their own projects while participating in a EuroFleet+ cruise.
3. **Remote Transnational Access** – This provides remote access to Eurofleets+ vessels and equipment without being physically on the cruise.

The Eurofleets+ project will fund the use of the vessels and infrastructure, and travel expenses for the science and technical team and their equipment and samples. As access is provided free of charge, access is prioritised through scientific excellence with a focus on sustainability and ocean health. Applicants are encouraged to research from nations with limited marine infrastructure and diverse backgrounds.

Given the cost of the limited resources, high demand, and project costs, a rigorous evaluation procedure for all applications is applied. The proposal is through an electronic portal and consists of two parts. Part A consists of the general proposal information. In contrast, Part B consists of the scientific and financial description of the project, the CVs of the researchers and the cruise data management plan. These applications are reviewed according to the Excellence-driven Access mode. This is achieved through peer review conducted by external experts from the Scientific Liaison Panel.

#### 8.1.1.5 MINKE (EU project)

The Metrology for Integrated marine management and Knowledge-transfer network is funded through INFRAIA-02-2020: Integrating Activities for Starting Communities call.

“MINKE is an INFRAIA project that brings together 16 key European marine metrology research infrastructures to coordinate their use and development and propose an innovative framework of ‘quality of oceanographic data’ for the different European actors in charge of monitoring and managing the EOVs (Essential Ocean Variables) and marine ecosystems.”

As part of the project, trans-national access is provided to a range of calibration laboratories, marine observatories, Ferry boxes and low-cost sensors. The TNA provides free-of-charge access to eligible researchers and consists of several calls for access. A team of two independent experts will evaluate each proposal and will be sent to the MINKE Evaluation Committee for a final decision.

<sup>11</sup> See <https://www.eurofleets.eu/access/>

It is important to note the MINKE project only provides one method of access to the facilities and simply provides a method of getting funded access to the infrastructure.

#### **8.1.1.6 OFEG – A bottom-up approach to access**

Another approach to providing access to research infrastructures is provided by the Ocean Facilities Exchange Group (OFEG)<sup>12</sup>. OFEG comprises many European Oceanographic research organisations and provides a mechanism for coordination and bartering of Global and Ocean class research vessels and large infrastructure (e.g. ROVs and seismics equipment) between the groups. User access is managed by individual RIs, but through OFEG, they can draw on a larger pool of ships and equipment. The goal of OFEG is to reduce costs for all parties by maximising the scientific impact of the informally pooled infrastructure.

All barter arrangements use points which can be exchanged for ship time or the use of large infrastructure. The benefits to those concerned are twofold. Firstly, ship programmes can be created more effectively, reducing passage legs between science campaigns. This reduces costs for all concerned. Secondly, access to large, expensive equipment is informally pooled to make it more widely available. This is necessary, as typically, the equipment is not fully utilised by an individual organisation. Still, by sharing equipment and the associated technical, the original investment in the equipment is maximised and swapped for access to other equipment.

Commonly, all shared equipment and vessels are operated on a “hold harmless” basis. This means the risk of damage to equipment or vessels is accepted by the owner of the equipment, this is done to simplify the sharing arrangements between the OFEG partners.

OFEG is run on a trust-based system of like-minded institutions with agreements made using an agreed points-based system. Each partner will incur all the cost of the deployment/cruise in exchange for points, which can be redeemed later. As the partner institutions are large government-backed organisations, there is little chance of a default and the organisations can carry the cost of paying for a cruise now with the expectation of getting a “free” cruise later. Finally, the considerable benefits each partner gains from being part of OFEG means that all partners' incentives are aligned, so the system works very well.

## **8.2 APPENDIX 2: EXAMPLES OF ACCESS TO SERVICES**

This appendix aims to showcase will explain how the market-driven model and the coordinated access will work for the GROOM RI-defined services.

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<sup>12</sup> See <https://www.ofeg.org/np4/home.html>

### 8.3 Operations and Maintenance

GROOM RI will assist partners with the implementation of protocols and capability to deploy, launch a mission, and recover MAS, as well as with the preparation and maintenance of these instruments.

This service can follow both the broker model and the coordinated access:

- **Broker model:** Users will request access to operations and maintenance through the online tool. The GROOM RI will then search within the GROOM RI node's declared resources and availability to provide the services, contacting each node shown such availability within the online tool. The GROOM RI will then put the nodes in contact with the end user, and from that point, the end user will deal with the nodes. Nodes will keep providing information and update the GROOM RI of progress.
- **Coordinated access:** In some cases, like in some European projects, the GROOM RI itself will be the one directly contracting the operations and maintenance to the nodes, providing operations as GROOM RI.

In each case, the GROOM RI nodes providing the services will provide consistency to the users of the services following:

- GROOM RI endorsed data workflows.
- GROOM RI endorsed best practices and standard operating procedures.
- GROOM RI piloting tools or piloting specifications.

### 8.4 Hardware calibration and integration

GROOM RI will assist partners in the development of standardised protocols for instrument testing, integration of a new instrument into an MAS, as well as sensor calibration. This may be by providing expert services and connecting with the best practices GROOM RI service.

This service can follow both the broker model and the coordinated access:

- **Broker model:** Individual organisations, either external or internal to GROOM RI will request access to hardware integration and calibration through the online tool. The GROOM RI will then search within the GROOM RI node's declared resources and availability to provide the services, contacting each node shown such availability within the online tool. The GROOM RI will then put the nodes in contact with the end user, and from that point, the end user will deal with the nodes. Nodes will keep providing information and update the GROOM RI of progress.
- **Coordinated access:** In some cases, like in some European projects, the GROOM RI itself will be the one directly contracting the hardware integration and calibration to the nodes, providing operations as GROOM RI.

In each case, the GROOM RI nodes providing the services will provide consistency to the users of the services following:

- GROOM RI endorsed best practices and standard operating procedures for sensor calibration.

- In case of sensor integration, the node and clients will follow GROOM RI best practices on sensor integration, including the definition of a data and metadata end-to-end chain that will allow an easy data integration of the new sensor in the DAC-GDAC.

#### 8.4.1 Data sharing and harmonisation/ Data Access

GROOM RI will coordinate and support efforts to harmonise and standardise metadata and data (evolving and new formats) and help the uptake of MAS observations from wider user communities by collaborating with national data centres, global DACs and EU data aggregators.

While this service will mainly be an outgoing activity of GROOM RI (see D6.2), external and internal users may request this service, in particular in conjunction with other GROOM RI services, as the hardware integration. In cases of an access request for expertise in these fields:

- Broker model: Users, either external or internal to GROOM RI will request data harmonisation activities through the online tool. The GROOM RI will then search within the GROOM RI node's declared resources and availability to provide the services, contacting each node shown such availability within the online tool. The GROOM RI will then put the nodes in contact with the end user, and from that point the end user will deal with the nodes. Nodes will keep providing information and update the GROOM RI of progress.
- Coordinated access: This will be the most likely scenario for data harmonisation, with GROOM RI providing expertise as an infrastructure in European and international projects.

#### 8.4.2 Best practices

GROOM RI will facilitate and take part in establishing and evolving best practices on the operations of MAS to incorporate them along with any SOPs and manuals into the Ocean Best Practices System (OBPS) repository.

There will be no access requirement for this service. All GROOM-endorsed best practices will be part of OBPS (see D6.3).

#### 8.4.3 Software repositories

GROOM RI will provide resources to help manage open-source software repositories with software version control tools.

The repositories will be open-source code and provide both toolboxes endorsed or developed by the GROOM RI or digital infrastructure to manage or pilot gliders and other MAS (see D6.1 and D6.4).

#### 8.4.4 Training

GROOM RI will maintain and increase skills around the partners, organising targeted training (technical training on the MAS, metadata and data handling, mission planning, etc.) and scanning the landscape for training opportunities with external bodies to both offer and receive training.

This service can follow both the broker model and the coordinated access:

- **Broker model:** Individual organisations, either external or internal to GROOM RI will request access to training activities through the online tool. The GROOM RI will then search within the GROOM RI node's declared resources and availability to provide the services, contacting each node shown such availability within the online tool. The GROOM RI will then put the nodes in contact with the end user, and from that point, the end user will deal with the nodes. Nodes will keep providing information and update the GROOM RI of progress.
- **Coordinated access:** In some cases, like in some European projects, the GROOM RI will be the one directly contracting training to the nodes or even providing it directly.

In each case, the GROOM RI will provide endorsed training up to the standards of GROOM RI, which will be directly linked to best practices.

#### 8.4.5 Networking and capacity building

GROOM RI will help to identify gaps of capacity/capability in the GROOM network, facilitating and fostering collaborations among GROOM partners and external institutions (if necessary) to fill those gaps by developing new ways of operating new technology, new legal frameworks.

This will be an outgoing activity in time, but both external users and internal nodes will be able to request GROOM RI help for capacity building, examples of the type of capacity building activities will be in the form of installing digital infrastructure on different organisations, configuration of specific hardware or developing data workflows in the user or organisation requesting it.

This service can follow both the broker model and the coordinated access:

- **Broker model:** Users, either external or internal to GROOM RI will request help for capacity building through the online tool. The GROOM RI will then search within the GROOM RI node's declared resources and availability to provide the services, contacting each node shown such availability within the online tool. The GROOM RI will then put the nodes in contact with the end user, and from that point, the end user will deal with the nodes. Nodes will keep providing information and update the GROOM RI of progress.
- **Coordinated access:** In some cases, like in some European projects, the GROOM RI itself will be the one directly providing capacity building, either coming from the central HUB, through one of the GROOM RI nodes or subcontracting it to a third party.

#### 8.4.6 Piloting e-infrastructure

GROOM RI will help to deploy or give access to piloting e-infrastructures of the RI partners to users. It will, for example, provide a catalogue of e-infrastructures (offering electronic services, networks, archives, databases and databanks) available at the partner's level, facilitate collaborations and access to unique capabilities to support operations.

GROOM RI will provide on-demand piloting e-infrastructure to the nodes and on request to externals. More details of the infrastructure can be found in deliverables 6.1 and 6.4.

While the access will be virtual, the request will follow the standard models:

- Broker model: Individual external or internal organisations to GROOM RI will request piloting e-infrastructure in the online tool or through the European Science Cloud catalogue. The GROOM RI will then search within the GROOM RI node's declared resources and availability to provide the services, contacting each node shown such availability within the online tool. The GROOM RI will then put the nodes in contact with the end user, and from that point, the end user will deal with the nodes. Nodes will keep providing information and update the GROOM RI of progress.
- Coordinated access: In some cases, like in some European projects, the GROOM RI will configure and provide support on the e-infrastructure.

It is important to highlight that this service will probably require a considerable amount of resources which is uncommon in most of the currently envisioned GROOM RI nodes. At the moment of releasing this document, the best way of delivering this capability is still under discussion.

#### 8.4.7 Environmental monitoring

GROOM RI will facilitate the coordination and implementation of baseline environmental surveys on water properties, operational met-ocean studies, and monitoring services for national governments, to estimate the environmental conditions of direct influence on coastal or offshore engineering projects and to select appropriate solutions to facilitate goal achievement (e.g. implementation of marine infrastructures, sustainability of marine protected area, etc.).

This service can be either provided by a single node, or more likely require a composition of services by multiple nodes to provide a consistent offer. Let's explore how it would work. Individual external or internal organisations to GROOM RI will request environmental monitoring through the online tool. The GROOM RI will then search within the GROOM RI node's declared resources and availability to provide the services, contacting each node shown such availability within the online tool.

- Broker model: In case a single node or nodes have the capacity to deliver the environmental monitoring service, the GROOM RI will then put the nodes in contact with the end user, and from that point the end user will deal with the nodes. Nodes will keep providing information and update the GROOM RI of progress.
- Coordinated access: In most cases, this service will require a composition of the **operations and maintenance service**, the **data sharing and harmonisation service** and the **piloting e-infrastructure service**. GROOM RI will directly find availability and negotiate with the nodes providing the functionality, and it will provide the end users with a consistent harmonised service. If that instantiation of nodes assembles repeats in time, GROOM RI and GROOM RI nodes will probably negotiate ways to further streamline the process.

In each case, the GROOM RI nodes providing the services will provide consistency to the users of the services following;

- GROOM RI endorsed data workflows.
- GROOM RI endorsed best practices and standard operating procedures.
- GROOM RI piloting tools or piloting specifications.

#### 8.4.8 Support to Innovation

GROOM RI will foster industry cooperation by providing data, dedicated services and experimental facilities to the private sector. In addition, GROOM RI supports innovation by organising training possibilities for industry stakeholders and co-developing components/instruments with the private sector.

This service will be an outgoing activity, but GROOM RI will directly support innovation as part of projects, using coordinated access.

#### 8.4.9 Outreach

GROOM RI will coordinate a joint approach to disseminating the work done by the Research Infrastructure and the partners, helping the partners to better communicate with the public while saving resources by taking a common approach.

This service will be an outgoing activity, but GROOM RI will provide direct outreach support as part of projects, using coordinated access.

#### 8.4.10 Pan-European coordination

GROOM RI will leverage its position in the European landscape to collaborate with other Research Infrastructures and networks (Ocean Observation integration). It will help the partners to coordinate within other frameworks (e.g. EuroGOOS GTT) and connect with other European stakeholders as well as other global Research Infrastructures (e.g. link to the GOOS and GCOS via the Observation Coordination Group).

This service will be an outgoing core activity of GROOM RI, direct access won't be necessary.

#### 8.4.11 Legal frameworks

GROOM RI will support and facilitate the partners in fulfilling diplomatic clearances and other legal matters (e.g. shipment regulations) around Marine Autonomous Systems operations. This may be by providing expert services and connecting with the best practices GROOM RI services.

#### 8.4.12 Procurement

GROOM RI will coordinate everyday purchases on behalf of the partners to get more competitive offers from companies providing hardware (platforms, sensors ...) and services (Iridium, Argos, AIS ...).