

**MSP-OR** Advancing Maritime **Spatial Planning** in Outermost Regions

## **MS18 SPATIAL DATA INTEROPERABILITY**

June, 2024

Grant Agreement number:

101035822 — MSP-OR — EMFF-MSP-2020

www.msp-or.eu

Coordenado por





Parceiros



Secretaria Regional de Mar e Pescas Direção Regional do Mar























Cofinanciado pela União Europeia



Document information				
Project acronym	MSP-OR			
Project name	Advancing Maritime Spatial Planning in Outermost Regions			
Grant Agreement number	101035822 — MSP-OR — EMFF-MSP-2020			
Start of the project	September 2021			
Duration	36 months			

WP number and name	WP3 – Filling Gaps linked with on-going MSP processes			
Task number and name	3.2.2 Madeira Seabed and Habitat Mapping			
Milestone name	MS18 – Spatial data interoperability			
Due date of deliverable (according to GA)	June 2024			
Actual submission date	June 2024			

Partner(s) responsible Direção Regional do Mar (DRM)
---





#### Acknowledgements:

This document was produced for the MSP-OR project, which has received funding from the European Maritime and Fisheries Fund of the European Union under the Grant Agreement number: 101035822 — MSP-OR — EMFF-MSP-2020.

#### Disclaimer:

The contents of this publication are the sole responsibility of the MSP-OR and do not necessarily reflect the opinion of the European Union.

#### **Recommended Citation:**

Rodrigues, I., Nogueira, N.; Freitas, M. 2024. MS18. Spatial data interoperability. MSP-OR project, European Climate, Infrastructure and Environment Executive Agency, Grant Agreement no. GA 101035822 — MSP-OR — EMFF-MSP-2020.

#### Copyright:

The material in this report may be reused for non-commercial purposes using the recommended citation.





## **SUMMARY**

SUMMARY	3
LIST OF FIGURES	4
ABBREVIATIONS AND ACRONYMS	5
ABSTRACT	6
CONTEXT	7
Introduction	8
Spatial Data Infrastructure	9
INSPIRE Directive	10
Geographic Information Metadata	13
Spatial Data Infrastructure Framework in Portugal	14
METADATA UPLOAD	15
CONCLUSIONS	15
REFERENCES	15





## **LIST OF FIGURES**

Figure 1. Directive 2007/2/EC, 14 March 2007.	10
Figure 2. Framework of INSPIRE Directive	12
Figure 3. SNIMar metadata editor plugin in QGIS	15
Figure 4. Editing the INSPIRE metadata file	15
Figure 5. Metadata editor in QGIS	15
Figure 6. Filling in metadata in QGIS	15
Figure 7. Linking the metadata sheets to the Geoportal do Mar	15





## **ABBREVIATIONS AND ACRONYMS**

	Portuguese Translation	English Translation	
CSW		Catalog Service for the Web	
DGT	Direção Geral do Território	General Directorate of Territory	
DRM	Direção Regional do Mar	Regional Directorate of the Sea	
EM/MS	Estados Membro	Member States	
IDE/SDI	Infraestrutura de Dados Espaciais	Spatial Data Infrastructure	
ISO		International Organization for Standardization	
MarSP	Planeamento Espacial Marítimo da Macaronésia	Maritime Spatial Planning of Macaronesia	
OEM	Ordenamento do Espaço marítimo	Marine Spatial PLanning	
PSOEM	Plano de Situação do Ordenamento do Espaço Marítimo	Situation Plan- Maritime Spatial Plan	
QGIS		Open Source Geographic Information System	
SIG	Sistema de Informação Geográfica	Geographic Information System	
SNIG	Sistema Nacional de Informação Geográfica	National Geographic Information System	
SNIMar	Sistema Nacional de Informação do Mar	National Sea Information System	
WFS		Web Feature Service	
WMS		Web Map Service	
XML		Extensible Markup Language	





## ABSTRACT

The MSP-OR - Advancing Maritime Spatial Planning in Outermost Regions project (GA n.°. 101035822 - MSP-OR - EMFF-MSP-2020) aims to support Maritime Spatial Planning (MSP) competent authorities in Portugal (Azores and Madeira), Spain (Canary Islands) and France (French Guiana). The intention is to advance the implementation of the MSP processes in Portugal and Spain, which began earlier with the MarSP project (Maritime Spatial Planning of Macaronesia), and to provide support to France in the process of implementing and adopting the principles of MSP.

Within the scope of the project, the Regional Directorate of the Sea (DRM) has been working on the tasks proposed in Work Package 3 (WP3) "Filling the gaps related to ongoing OEM processes", focusing on the development and consolidation of the tools and inputs needed to ensure effective MSP in this outermost region. The WP3, characterised by a regional approach, focuses on three key areas: basic cartographic information, systems for interaction with stakeholders and analysis of the administrative systems of the different economic sectors.

Included in WP3 is the task **T3.3 "Filling the Gaps"**. This task aims to fill gaps concerning knowledge of the seabed, particularly in areas of greater human pressure and with the potential for developing other uses and activities, including aspects of conservation and protection.

To carry out subtask **ST 3.2.2 "Madeira Seabed and habitat mapping"**, DRM first plotted coastal areas, delimited by the bathymetric lines between 20 and 100 metres deep, subject to greater anthropogenic pressure and/or with a greater knowledge gap. In a second phase, a specialised technical service was subcontracted to carry out surveys in the two areas selected for high-resolution acoustic mapping. As a result of the work carried out, DRM produced Deliverable **D3.7** "Hydrographic survey and characterization of the seabed structure in Madeira island".

This document corresponds to **MS18**, which refers to the publication of spatial data catalogues resulting from Deliverable D3.7 in the Portuguese National System of Geographic Information, a collaborative infrastructure that allows geographic information to be shared, searched and accessed through the National Geographic Data Registry.



# CONTEXT



### Introduction

Within the scope of the MSP-OR project, DRM has been carrying out technical work on the tasks proposed in Work Package 3 (WP3) "Filling the gaps linked with on-going MSP processes", including MS18 "Spatial data interoperability", which consists on loading and publishing geospatial data in the "Sistema Nacional de Informação do Mar" (SNIMar- National Sea Information System) metadata profile, in order to complement the regional geographic information infrastructure within the scope of Marine Spatial Planning (MSP).

The geospatial data uploaded to SNIMar corresponds to all the geographical elements represented and identified in the Situation Plan – PSOEM (Plano de Situação do Ordenamento do Espaço Marítimo), published on 30 December 2019 by the Resolution of Council of Ministers n.º 203-A/2019, as well as the publication and/or uploading of the mosaic maps produced in the scope of Deliverable D3.7 "Hydrographic survey and characterization of the seabed structure in Madeira island".

This work has made it possible to publish and associate in a SINMar metadata profile all the geospatial data represented in the Geoportal do Mar web interface, which is hosted on DRM website - www.marmadeira.madeira.gov.pt, thus complying with the INSPIRE Directive and the project's MS18.





## **Spatial Data Infrastructure**

A Spatial Data Infrastructure (SDI) is the set of policies, technologies, institutional agreements and standards that are indispensable for the acquisition, storage, processing and publication of geographic data and metadata by public and private organizations, as well as by citizens in general (Ferreira, 2015).

Implementing an SDI comprises defining standards, methodologies, policies and technologies for sharing spatial data. However, there are some relevant challenges in its implementation, such as differences in accuracy between existing products, data incompatibility, updating map bases and data repositories, copyright, among others.

An SDI should allow users to discover and retrieve geographic data from a single data repository, and it is advisable that users can also update the stored data.

To guarantee this structure, an SDI must include at least three main components:

#### ⇒ DATA

Including georeferenced data and thematic data

#### ⇒ METADATA

- Metadata to describe the characteristics of the data, in a way that users can interpret what and how these data represent;
- Metadata catalogue: enabling metadata to be discovered, analysed and queried, including a Geographic Information System (GIS) application

#### ⇒ SERVICES

- A spatial database for creating and updating geographic data;
- Web Map Service (WMS) and Web Feature Service (WFS) server, to make geographic data and to access and view all the attributes available on the Internet;
- Server for geographic data transformations;
- Catalogue Service for the Web (CSW) server: which acts as a metadata catalogue, allowing you to publish and find information





### **INSPIRE Directive**

As mentioned above, an SDI is by nature a tool that facilitates the exchange of information between organizations, guaranteeing high levels of interoperability. In order to ensure harmonization and data sharing, producers and users of geographic information need to use technologies and a common regulatory framework.

On 14 March 2007, Directive 2007/2/EC - INSPIRE Directive - Infrastructure for Spatial Data Information in Europe (Figure 1) entered into force. It supports the implementation of knowledge-based policies and the monitoring of activities with an impact on the environment, establishing measures to remove existing barriers to the sharing of spatial data at all levels of administration in and between Member States (MS).



Figure 1. Directive 2007/2/EC, 14 March 2007.

To this end, the European Parliament and the Council of the European Union "lays down general rules for the establishment of the infrastructure for spatial information in the European Community for the purposes of Community environmental policies and for policies or activities which may have an impact on the environmental", obliging MS to manage and make available spatial information data and services in accordance with common principles and provisions, such as the management and organization of metadata, the interoperability of data and services, information sharing, among others.

With this in mind, INSPIRE focuses on spatial information that is the responsibility of the Public Authorities of the MS, referring to 34 themes distributed over three annexes that cover spatial data of a cross-sector nature and spatial data specific to the environmental sector.

INSPIRE Directive principles that MS must follow (https://snig.dgterritorio.gov.pt/):

⇒ "Data should be collected only once and kept where it can be maintained most effectively;

⇒ Geographic information from different sources should be able to be combined transparently across Europe and shared by different users and applications;

 $\Rightarrow$  It should be possible to share information collected at one level with all other levels, allowing both detailed and general analyses for strategic objectives;

 $\Rightarrow$  Geographical information to support government activity, at all levels, should be abundant and readily available under conditions that do not restrict its generalized use;

 $\Rightarrow$  The geographic information available must be easily identifiable, and it must be easy to analyse its suitability for a particular use, as well as its conditions of access and use;





 $\Rightarrow$  Geographic information must become increasingly perceptible and easy to interpret because it is properly documented and can be visualized in the appropriate context, selected in a user-friendly way."

Accordingly, and in accordance with what is defined in INSPIRE, public organizations that produce geographic information and that fall under any of the themes in the respective INSPIRE annexes (annexes I, II and III) must comply with the following rules:

- $\Rightarrow$  Availability and creation of metadata;
- ⇒ Interoperability of services and data;
- ⇒ Geographic information services available;
- ⇒ Definition of data access and sharing standards;
- ⇒ Coordination and monitoring mechanisms, processes and procedures

To make the services available at European level, the Commission has developed the EU INSPIRE GeoPortal, which provides access to national networks, allowing data and metadata to be searched and shared between and by MS (https://inspire-geoportal.ec.europa.eu/srv/por/catalog.search#/home).

To improve understanding of the thematic categories, this portal also provides online spatial data dictionaries (Feature Concept Dictionary) of INSPIRE concepts and features that define and describe the themes and their object types, as well as the INSPIRE Glossary of all terms (apart from object types) for understanding INSPIRE documentation, including component terminology (metadata, network services, data sharing and monitoring (Oliveira, 2019).

However, integrating data into INSPIRE is not a simple task, and depends very much on each country's legislative framework. The legal guidelines, which are binding specifications, provide information on how Implementing Rules may be transposed into working technical solutions (<u>https://knowledge-base.inspire.ec.europa.eu/legislation/implementing-rules en</u>) (Figure 2). On the other hand, the technical specifications, although not legally binding, specify how MS can implement INSPIRE, including additional requirements and recommendations. Included in these last ones, again there are technical specifications on (https://snig.dgterritorio.gov.pt/sites/default/files/documentos/532/Your-Guide-to-implementing-the-EU-INSPIRE-Directive.pdf):

Metadata- Metadata describes a data set, in particular its content, the license under which it is release, contact information for its maintainers and technical compatibility information. Metadata needs to be entered manually or generated automatically;

**Data Specifications**- To make data interoperable, Data Specifications describe the data model and the encoding to use. They also contain additional information such as code lists and map layers;

**Network Services**- identify common interfaces of web services. Network services provide a common way to do multiple things such as viewing, downloading, publishing and transforming data. The development of client applications can then be based on these interfaces;

**Data and Service Sharing**- This section specifies rights regarding the sharing of spatial information and services between all levels of government. Part of this process is to register the data set registration with an INSPIRE geoportal;

**Spatial Data Service**- Spatial data sets should possess the ability to exchange and execute data amongst them. These are the regulations which are concerned with the core services and interoperability of data sets;

Monitoring and Reporting- EU MS are required to annually report a number of indicators for the monitoring the implementation and use of their infrastructures for spatial information.







Figure 2. Framework of INSPIRE Directive (adapted from Amorim et al. 2018)





#### MSP-OR Advancing Maritime Spatial Planning in Outermost Regions

## **Geographic Information Metadata**

Geographic information metadata are textual descriptions of geographic data, usually encoded in an Extensible Markup Language (XML) file, and their description and documentation is fundamental for identifying and technically evaluating geographic data, as well as providing information on their origin and those responsible for their production (Ferreira, 2015).

In fact, metadata acts as the foundation that supports all the research carried out in information systems. In an architecture defined for services, a single search can represent a metadata query from different repositories (Ferreira, 2015).

In this context, with the aim of achieving a high degree of interconnection between metadata, as well as greater harmonization between them, several entities and institutions have contributed to this end, including the European Commission with INSPIRE Directive and the International Organization for Standardization (ISO).

In fact, Article 5 of INSPIRE itself calls for the adoption of implementation rules that consider existing international standards and user needs. In this context, ISO 19115, ISO 19119 and ISO 19139 are considered reference standards and are essential for the implementation of INSPIRE. The first two are of a generic nature, aimed at characterizing a variety of geographical resources, and ISO 19139 defines the metadata elements in an XML file.





### **Spatial Data Infrastructure Framework in Portugal**

Portugal was a pioneer in Europe with the introduction of Decree-Law n.° 53/90 of 13th February, which established the National Geographic Information System (SNIG), several years before the INSPIRE Directive, making the first geographic information infrastructure available on the Internet.

With the transposition of INSPIRE by Decree-Law n.°. 180/2009, of 7th August, the SNIG was revised and the national spatial data register was created, requiring geographic information produced by the Public Administration (national, regional and local) to follow the rules and principles defined by INSPIRE for metadata, services, data models and data policies.

At national level, the public body that regulates the geographic information produced by various organizations and public bodies is the General Directorate of Territory (DGT), while each of Portugal's Autonomous Regions has its own Geographic Information Infrastructure, with a representative responsible for monitoring the implementation of INSPIRE and liaising with the DGT.

In turn, the SNIMar geoportal is a thematic SNIG infrastructure that centralizes the information generated by the various entities on the marine environment in Portugal, making it easier to share, search and access data, thus helping to make the most of the effort spent by each institution on data collection (http://www.snimar.pt).

SNIMar's specific objectives are:

- ⇒ Providing information (data; metadata) to the National Geographic Information Service (SNIG);
- $\Rightarrow$  Reduce waiting times and costs for obtaining high-quality thematic information;

 $\Rightarrow$  Increase the availability of online services on the marine environment provided by the public administration;

 $\Rightarrow$  Increase the number of online registers and services on Portuguese marine waters;

 $\Rightarrow$  Ensure the transition of current databases to SNIMar in order to preserve existing data and integrate new data;

 $\Rightarrow$  Ensure that the system operates, preferably using a free license.

The SNIMar metadata profile is based on the National Geographic Information Metadata Profile (MIG Profile), which in turn is based on the ISO 19115 and ISO 19119 standards and INSPIRE requirements. The local catalogue was developed using open source technology - geoNode - which includes a metadata catalogue. Within the catalogue produced, data sets are inserted, which are then published on the SNIMar geoportal, providing an easy and targeted search for available information. SINMar supports a central catalogue that brings together all the metadata published in the local catalogues of the partner entities in the SNIMar project. This geoportal connects to each of the local catalogues through a harvesting process.

Based on this structure (Figure 3), each entity is provided with an internal tool - the local catalogue - with which it can structure its marine information and at the same time choose which information it wants to make available to the public via the SNIMar geoportal.







Figure 3. Articulation with other spatial data infrastructures.



# METADATA UPEOAD



## Metadata Upload

Following the INSPIRE Directive and within the scope of the MSP- OR project, the SNIMar metadata editor was plugged into QGIS (Open Source Geographic Information System) and a metadata sheet was created for each geographic element represented on the Geoportal do Mar, as well as for the map-mosaic obtained in D.3.7 - "Hydrographic survey and characterization of the seabed structure in Madeira island", in order to comply with the SNIMar metadata catalogue (Figure 4).

After plugging in the SNIMar metadata editor, each metadata file was edited for each geospatial element (Figure 4 and 5).



Figure 4. SNIMar metadata editor plugin in QGIS.





		- Ci L - C		conjunto de Dados Geograficos			
Abrir		Ctrl+O		érie	icheiro	Conformidade*	
Abrir	Pasta		5	erviço			С
Guard	lar	Ctrl+S	odrigi				
Guard	lar como		-				
Guard	lar lodos		odria				G
Fecha	r Maria a s		/				
Atuali	zar Metadados Area	C:/Users/					С
Serviço	Ecossistemas Marinhos	isabel.cp.i Nextcloud	rodrigi I/	a0dcf236-0e18-4b4d-9ca3-42cf	888f3d08		
Serviço	Área Protegida da Ponta do Pargo	C:/Users/ isabel.cp.r Nextcloud	rodrigi I/	a0dcf236-0e18-4b4d-9ca3-42cf	888f3d08		C
Serviço	Área Protegida da Ponta do Pargo	C:/Users/ isabel.cp.i Nextcloud	rodrigi I/	a0dcf236-0e18-4b4d-9ca3-42cf	888f3d08		C
Serviço	Área de Exclusão da Atividade de	C:/Users/ isabel.cp.i Desktop/.	rodrigi 	ab5cad9b-4d07-4469-9a45-591	14815ec81		C
Serviço	Área de Exercícios Militares	C:/Users/ isabel.cp.i Nextcloud	rodrigi I/	a0dcf236-0e18-4b4d-9ca3-42cf	888f3d08		C
	4 I	<u>.</u>					~

Figure 5. Editing the INSPIRE metadata file.

In the metadata editor interface, the mandatory fields (marked in red in Figure 6) for each metadata were filled in so that they conformed to the SNIMar profile.

INSPIRE Metadata Editor		- D >			
Ficheiro Lista de Contactos Sobre					
Lista de Ficheiros Novo Fic	theiro X exclusão_atividade_observação_cetáceos.xml X				
💼 Identificação	() Tipo de Recurso*				
	Serviço 👻				
Operações (Serviços)	(j) Tipo De Serviço*	() Acoplamento*			
🖉 Classificação &	Serviço de Visualização 👻	O serviço opera com os conjuntos de dados geográficos acoplados e outros externos 🔻			
Palavras-Chave	() Título (Português)*				
Informação Geográfica	Exclusão da Atividade de Observação de Cetáceos				
el—la Informação	() Resumo (Português)*				
Temporal	A Portaria Regional n.º 46/2014 de 22 de abril, regula a capacidade de carga inerente à atividade de observação de cetáceos na região e delimita uma área de exclusão para a observação de cetáceos. Esta área caracteriza-se por ser um babitat preferencial do políticho - roaz nava efeitos de alimentação, socialização, descanso e reprodução (Freitas et al				
💂 Qualidade	2013). A rea de exclusão da atividade de observação de cetáceos, corresponde a um total de 1021 km2. Documentação				
Restrições					
r -	() Título (Inglês)*				
🛃 Distribuição	Exclusão da Atividade de Observação de Cetáceos				
	(i) Resumo (Inglês)*				
▲ Metadados	A Portaria Regional n.º 46/2014 de 22 de abril, regula a capacidade de carga inerente à atividade de observação de cetáceos na região e delimita uma área de exclusão para a observação de cetáceos. Esta área caracteriza-se por ser um habitat preferencial do goffinho - roaz para efeitos de alimentação, socialização, descanso e reprodução (Freitas et al., 2013). A área de exclusão da atividade de observação de cetáceos, corresponde a um total de 1021 km2. Documentação				
4		•			

Figure 6. Metadata editor in QGIS.





For each metadata field, a set of attributes (title and description, author, date of creation, spatial coordinates, source, projection system, keywords, Scale, etc) corresponding to each element was loaded and associated (Figure 7).

INSPIRE Metadata Editor		– 🗆 X					
Ficheiro Lista de Contactos	Sobre						
Lista de Ficheiros exclusão_atividade_observação_cetáceos.xml 🗙							
ldentificação	Tipo de Recurso*	<u>*</u>					
Operações (Serviços)	1) Tipo De Serviço*	(i) Acoplamento*					
Classificação & Palavras-Chave	Serviço de Visualização	O serviço opera com os conjuntos d					
Informação Geográfica	Exclusão da Atividade de Observação de Cetáceos						
Informação Temporal	Resumo (Português)* A Portaria Regional n.º 46/2014 de 22 de abril, regula a capacidade de carga inerente à atividade de observação de para a observação de cetáceos. Esta área caracteriza-se por ser um habitat preferencial do golfinho - roaz para efei						
Qualidade	reprodução (Freitas et al., 2013). A área de exclusão da atividade de observação de cetáceos, corresponde a um tot Documentação						
Restrições	() Título (Inglês)*						
🛃 Distribuição	Exclusão da Atividade de Observação de Cetáceos						
Metadados	(i) Resumo (Inglês)* A Portaria Regional n.º 46/2014 de 22 de abril, regula a capacidade de carga inerente à atividade de observação de para a observação de cetáceos. Esta área caracteriza-se por ser um habitat preferencial do golfinho - roaz para efei reprodução (Freitas et al., 2013). A área de exclusão da atividade de observação de cetáceos, corresponde a um tot Documentação						
4		•					

Figure 7. Filling in metadata in QGIS.





As a follow-up to the aforementioned work, each geographical element repreented on the Geoportal do Mar" was associated with the corresponding metadata file, so that it could be made public through the Geoportal do Mar (Figure 8).







## CONCLUSIONS

xit in in



## **CONCLUSIONS**

The availability of marine geospatial data is essential to promote sustainability and information sharing between entities and organizations. Compliance with the INSPIRE Directive and the interconnection of geospatial data promotes increased knowledge of the maritime space and facilitates continuous monitoring of activities in the maritime space and marine ecosystems, also helping to identify and mitigate any existing negative impacts.

In this context, and within the scope of the MSP-OR project, the association of geospatial data in the SINMar metadata profile and its availability through the Geoportal do Mar represents a significant step for the Autonomous Region of Madeira in the integrated management and monitoring of the maritime space. It allows spatial data to be interconnected, published, and accessible to various users and organizations, saving resources, time and effort.







## REFERENCES

Amorim, A., Pelegrina, M.A., Julião, R.P. 2018. Infraestruturas de dados espaciais. In: Cadastro e gestão territorial: uma visão luso-brasileira para a implementação de sistemas de informação cadastral nos municípios. São Paulo. Editora Unesp Digital, pp. 37-52. ISBN: 978-859546-282-3;

Decree-Law n.º 53/90 of 13th February: Decreto-Lei n.º 53/90, de 13 de fevereiro, aprova o Sistema Nacional de Informação Geográfica (SNIG) e cria o Centro Nacional de Informação Geográfica. Diário da República n.º 37/1990, Série I de 1990-02-13, páginas 572 – 578.

Decree-Law n.º 180/2009 of 7th August: Decreto-Lei n.º 180/2009, de 7 de agosto, aprova o regime do Sistema Nacional de Informação Geográfica, transpondo para a ordem jurídica interna a Diretiva n.º 2007/2/CE, e revoga o Decreto-Lei n.º 53/90, de 13 de fevereiro. Diário da República n.º 152/2009, Série I de 2009-08-07, páginas 5132 – 5139.

Directive 2007/2/EC - INSPIRE Directive: Diretiva 2007/2/EC de 14 de março de 2007, que estabelece uma infra-estrutura de informação geográfica na Comunidade Europeia (INSPIRE);

Ferreira, C.A. 2015. Infraestrutura de dados espaciais para a Plataforma Tecnológica da Bicicleta e Mobilidade Suave. Relatório de estágio. Escola Superior de Tecnologia e Gestão de Águeda. 78 pp.

Oliveira, A.L.M. 2019. Harmonização de dados geográficos do cadastro predial no contexto da Diretiva Inspire. Relatório de estágio, Instituto Politécnico de Tomar. 79 pp.

Resolution of Council of Ministers n.º 203-A/2019: Resolução do Conselho de Ministros n.º 203-A/2019, de 30 de dezembro, que Aprova o Plano de Situação de Ordenamento do Espaço Marítimo Nacional para as subdivisões Continente, Madeira e Plataforma Continental Estendida;

https://inspire-geoportal.ec.europa.eu/srv/por/catalog.search#/home

https://www.dgrm.pt

SNIG | SNIG (dgterritorio.gov.pt)

http://www.snimar.pt.



