FINAL REPORT

July, 2017

sni mar
Sistema Nacional de Informação do Mar

eea grants

REPÚBLICA PORTUGUESA
MAR

emepc
Estrutura de Missão para a Extensão da Plataforma Continental

ICELAND LIECHTENSTEIN NORWAY eea grants

dgpm Direção-Geral de Política do Mar

PT02 – Gestão Integrada das Águas Marinhas e Costeiras

RELATÓRIO FINAL

Código do Projeto	PD-P2
Designação do Projeto	Preparation of integrated geographic information for marine and coastal water management
Designação do Beneficiário	Estrutura de Missão para a Extensão da Plataforma Continental

1 - INTRODUÇÃO

1.1 Caracterização da situação antes da realização do projeto

The extension of the Portuguese maritime domain covers about 1.71 million square kilometers. To this area, a potential 2.15 million km2 surface is added, corresponding to the extension of the Portuguese continental shelf under article 76 of UNCLOS, totalizing an area close to 4 million square kilometers of national maritime jurisdiction.
This marine jurisdiction encompasses a collection of rights and responsibilities to Portugal. These can be accomplished not only by performing scientific research and marine exploration, both in the water column or in the soil and subsoil, but also by preventing and protecting the marine environment. The activities related with this exercise demand the access to existent marine data and information in order to achieve an efficient and effective process.
The maritime activities, in the whole spectrum, are carried out by several organizations, public and private, that collect process and generate several types of marine data to fulfill their operational needs. These interact to each other in a bilateral manner in what concerns data access. The overlapping operative areas, from all implicated stakeholders usually require the use of similar data as base/background information. Although desirable, the access to a common data source to all multiple users is rarely done, implying replication of data, lack of data sync and additional time to locate and access the data.
Although all of these entities are oriented by specific guidelines, such as the EU INSPIRE Directive and the Decree-Law 180/2009 (national transcription of the EU Directive), not always prepare the information in accordance with the guidelines or set available to the target users, disabling the full usefulness of the existent marine data legacy. To overcome this limitation it was necessary to set a national policy applied to marine data and to develop an efficient Marine Spatial Data Infrastructure that addresses the issues: "What data on marine environment exist?", "Where are those data?" and "How can we access those data?".

1.2 Descrição e Objetivos do Projeto

The mission of the SNIMar project was to develop a technological solution that would increase the capacity to assess the environmental status of Portuguese marine waters, a priority defined by the Marine Strategy Framework Directive (MSFD). This led to the creation of SNIMar – the National Marine Information System [Sistema Nacional de Informação do Mar]. SNIMar is a geoportal that centralizes the marine information of the various entities, facilitating its sharing, search and access. Developed in ESRI open-source technology, the SNIMar geoportal allows users to search for marine information in the metadata catalog, and to view and download data.
The main goals of this project were:
- To increase the number of online records and services about the marine environment provided by the public administration;
- To reduce the waiting period to obtain high-quality thematic information;
- To feed the National Geographic Information Service (SNIG);
- To ensure the operation of the system, preferably through an open license.

1.2 Parcerias do Projeto - resultados alcançados

In July 2014, a partnership agreement was signed with the two donor partners: the Norwegian Mapping Authority (NMA). and the National Land Survey of Iceland (LMI).This agreement aimed to support the project in the areas of training and consulting, for which four training sessions were held in Portugal.
Within the scope (and spirit) of cooperation, the SNIMar project team visited the donor states where technical meetings were held. In December 2014, several Norwegian public institutions that work on Spatial Data Infrastructures (SDI) were visited, and in June 2016 a project presentation was held for marine-related Icelandic institutions.
All the expected results were achieved regarding the cooperation between the beneficiary state and the donnor state mainly networking, exchange, sharing and transfer of knowledge, technology and experience. By the end of the project it was possible to connect SNIMar geoportal with LMI geoportal.

2 - IDENTIFICAÇÃO DO PROJETO

2.1 Elementos Básicos da Decisão Favorável de Financiamento Inicial

Data da Decisão Favorável de Financiamento	06 / 06 / 2014	
Custo Total do Investimento	2352941,00	Euros
Despesa Total Elegível	2352941,00	Euros
Taxa de Comparticipação	85	%
Comparticipação do Fundo	2000000,00	Euros

Calendário Previsto:

Data de Início	06-06-2014	Data de Conclusão	30-04-2017

2.2 Alterações à Decisão Favorável de Financiamento

Data da Nova Decisão Favorável de Financiamento	/ /	
Custo Total do Investimento		Euros
Despesa Total Elegível		Euros
Taxa de Comparticipação		%
Comparticipação do Fundo		Euros

Calendário Previsto:

Data de Início		Data de Conclusão	

PT02 – Gestão Integrada das Águas Marinhas e Costeiras

RELATÓRIO FINAL

3 - EXECUÇÃO FÍSICA E FINANCEIRA DO PROJETO

3.1 Pedidos de Pagamento apresentados (não inclui adiantamentos)

unid: euros

Nº do pedido de pagamento	Despesa realizada apresentada pelo beneficiário		Despesa realizada validada pelo Operador de Programa		Observações
	Data	Montante	Data	Montante	
1	12-02-2015	105.305,13 €	30-06-2015	95.975,95 €	
2	27-11-2015	90.869,38 €	29-01-2016	79.503,18 €	
3	24-06-2016	213.751,72 €	12-07-2016	159.412,85 €	
4	06-07-2016	386.825,95 €	12-08-2016	158.488,74 €	
5	06-12-2016	171.981,21 €	30-12-2016	160.683,14 €	
6	28-03-2017	234.394,15 €	06-06-2017	208.368,29 €	
7	27-03-2017	270.095,55 €	06-06-2017	261.295,26 €	
8	29-03-2017	516.960,63 €	n.a.	516.960,63 €	Expenditure not yet validated
9	28-07-2017	371.800,80 €	n.a.	371.800,80 €	Expenditure not yet validated
Total		2.361.984,52		2.012.488,84	

3.2 Pagamentos efetuados pelo Operador de Programa

unid: euros

Nº de pedido de pagamento	Data do Pagamento	Valor	Relativo à Despesa Elegível Realizada e validada	Relativo à Despesa Prevista
0	Nov-14	**170.000,00 €**		
1	Jun-15	**535.754,00 €**	**95.975,95 €**	
2, 3 e 4	Ago-16	**578.778,22 €**	**397.404,77 €**	
5, 6 e 7	Jun-17	**302.874,00 €**	**630.346,69 €**	
TOTAL		**1.587.406,22 €**	**1.123.727,41 €**	**0,00 €**

* Data inscrita na comunicação da Ordem de Pagamento

3.3 Execução por Rubrica de Despesa

unid: euros

	Rúbrica de Despesa	Decisão de financiamento inicial		Alteração à Decisão de financiamento inicial (Decisão		Execução (*)		Taxas de execução	
		Custo total do Investimento	Despesa Total Elegível	Custo total do Investimento	Despesa Total Elegível	Custo total do Investimento	Despesa Total Elegível	Custo total do Investimento	Custo total Elegível
				(1)	(2)	(3)	(4)	(5)=(3)/(1)	(6)=(4)/(2)
a)	Remunerações e encargos sociais	810.708,00 €	810.708,00 €	1.095.633,46 €	1.095.633,46 €	1.066.183,00 €	1.007.998,74 €	0,97 €	0,92 €
b)	Deslocações e Ajudas de Custo	190.770,00 €	190.770,00 €	82.174,63 €	82.174,63 €	63.489,04 €	63.181,84 €	0,77 €	0,77 €
c)	Equipamentos (novos ou em segunda mão)	637.399,00 €	637.399,00 €	579.177,90 €	579.177,90 €	338.446,82 €	338.446,82 €	0,58 €	0,58 €
d)	Compra de Terrenos e Imóveis	0,00 €	0,00 €	0,00 €	0,00 €	0,00 €	0,00 €	#DIV/0!	#DIV/0!
e)	Consumiveis e suprimentos	249.744,00 €	249.744,00 €	253.458,67 €	253.458,67 €	253.458,14 €	253.458,14 €	1,00 €	1,00 €
f)	Consultadoria Técnica, estudos, Projetos, etc	361.665,00 €	361.665,00 €	269.109,87 €	269.109,87 €	266.957,85 €	266.957,85 €	0,99 €	0,99 €
g)	Custos decorrentes de exigências impostas no contrato de financiamento	40.590,00 €	40.590,00 €	11.321,25 €	11.321,25 €	11.299,64 €	11.299,64 €	1,00 €	1,00 €
h)	Outras	0,00 €	0,00 €	0,00 €	0,00 €	0,00 €	0,00 €	#DIV/0!	#DIV/0!
i)	Custos indiretos (overheads)	62.065,00 €	62.065,00 €	62.065,00 €	62.065,00 €	68.703,25 €	55.601,92 €	1,11 €	0,90 €
	TOTAL	**2.352.941 €**	**2.352.941 €**	**2.352.941 €**	**2.352.941 €**	**2.068.538 €**	**1.996.945 €**	**1 €**	**1 €**

* These number don't reflect the total elegible expenditure because there are two paymment requests not yet validated

PT02 – Gestão Integrada das Águas Marinhas e Costeiras

RELATÓRIO FINAL

3.4 Cumprimento do Cronograma físico

Componentes/Ações	Data Início prevista	Data Conclusão prevista	Data Início efectiva	Data Conclusão efectiva	Observações (justificação dos desvios)
Gestão financeira	Jun-14	Abr-17	Jun-14	Abr-17	
Reuniões: coordenação de coordenação	Set-14	Abr-17	Set-14	Abr-17	
Reuniões: *Project Management Group* (PMG)	Dez-14	Abr-17	Dez-14	Abr-17	
Reuniões gerais	Set-14	Abr-17	Set-14	Abr-17	
- Sessões de formação	Dez-14	Set-16	Dez-14	Set-16	
- Monitorização dos grupos de trabalho	Jun-14	Abr-17	Jun-14	Abr-17	
- Reunião *Steering Group*	Jun-15	Jun-15	Jun-15	Jun-15	
Relatórios de progresso	Jan-15	Jan-17	Jan-15	Jan-17	
Relatório final	Abr-17	Jul-17	Abr-17	Jul-17	
Reunião *Kick off*	Out-14	Out-14	Out-14	Out-14	
Seminário final	Jan-17	Abr-17	Abr-17	Abr-17	
Definição da política de partilha de dados: Princípios gerais	Out-14	Jun-15	Abr-17	Abr-14	
Definição da política de partilha de dados: Política de partilha de dados	Jan-15	Mar-17	Jan-15	Dez-16	
Custos de manutenção	Set-15	Mar-17	Jan-16	Abr-17	
Requisitos de serviços de dados	Set-15	Dez-16	Out-15	Dez-16	
Requisitos de hardware e software	Jun-14	Dez-16	Jun-14	Dez-16	
Requisitos e aquisição de software	Jun-14	Abr-17	Jun-15	Dez-16	
Definição de requisitos de comunicação	Jun-16	Mar-17	Jan-06	n.a	the procedure is waiting for external authorization to proceed
Requisitos dos dados	Jun-14	Out-14	Jun-14	Out-14	
Requisitos de metadados: Perfil SNIMar	Jun-14	Jan-15	Out-14	Abr-17	It had been updated until the end of the project
Requisitos de metadados: Vocábulos SNIMar	Abr-15	Abr-17	Abr-15	Abr-17	
Requisitos de metadados: Collaborative keywords	Jan-15	Jun-15	Jan-15	Jun-15	
Requisitos de metadados: Editor de metadados	Mai-15	Set-15	Mai-15	Dez-16	It had been updated until the end of the project
Requisitos de metadados: Elaboração de metadados	Out-15	Abr-17	Out-15	Abr-17	
Informação complementar (ex: documentos)	Dez-15	Abr-17	Dez-17	Abr-17	
Definição de requesitos do geoportal	Out-14	Dez-15	Out-14	Abr-16	
Serviços de pesquisa	Out-15	Fev-17	Out-15	Fev-17	
Serviços de visualização	Out-15	Fev-17	Out-15	Fev-17	
Serviços de *download*	Out-15	Fev-17	Out-15	Fev-17	
Serviços de apoio - produtos SNIMar	Ago-16	Mar-17	Jan-17	Mar-17	
Website: Desenvolvimento do website	Jun-14	Jan-15	Out-14	Jan-15	
Website: Manutenção do website	Fev-15	Abr-17	Fev-15	Abr-17	
Website: Acompanhamento do geoportal	Jan-15	Mar-17	Jan-15	Mar-17	
Produção de materiais de comunicação (ex. Flyers, Roll-ups, templates, quiosque, stand,...)	Out-14	Abr-17	Out-14	Abr-17	
Plano de comunicação do SNIMar	Nov-14	Out-16	Out-14	Jul-16	
Recursos educativos: Filmes temáticos	Mar-15	Dez-16	Mar-16	Fev-17	
Recursos educativos: Quizz do mar	Mar-15	Fev-17	Abr-15	Abr-17	
Divulgação do geoportal (ex. Sessões de esclarecimento, workshops, ...)	Out-14	Abr-17	Out-14	Abr-17	
Participação em eventos	Jan-15	Nov-16	Jan-15	Nov-16	

PT02 – Gestão Integrada das Águas Marinhas e Costeiras

RELATÓRIO FINAL

3.5 Descrição dos trabalhos realizados

Please see annex

4 - RESULTADOS DO PROJETO

4.1 Contributo do projeto para os resultados do Programa

4.1.1 Contributo do Projeto para os indicadores de Output do Programa (outcome do Projeto)

Indicadores	Unidade de Medida	Meta Previsto (1)	Meta Executado (2)	Taxa de Execução (3)= (2)/(1)
Number of synchronized metadata sets	number	5	9	180,00%
Number of web based products to be downloaded from the Marine Information System (including web map services and web feature services) per month	number	500	2.997	599,40%
Number of international marine data sets or geo-bases where input has been provided	number	2	2	100,00%

4.1.2 Indicadores de realização do Projeto (output do Projeto)

Indicadores	Unidade de Medida	Meta Previsto (1)	Meta Executado (2)	Taxa de Execução (3)= (2)/(1)
Number of institutions connected to the geo-portal	number	5	9	180,00%
Number of historical marine registers recoverd	number	5.000	6.358	127,16%
Reduce significantly the time to data access		time to acess information	At least the time to access information is reduced one half	goal accomplished

4.1.3 Grupos alvo que beneficiaram com os resultados do Projeto

The main goal of this project was to develop a marine geoportal for public access. The general target groups identified were: public administration, local government administration, academic and research institutions, business, including domestic and foreign investors and citizens.
The communication plan of the SNIMar project identified two types of target audiences, according to their use of the SNIMar geoportal: those that provide information to feed the geoportal (information producers) and those that search for this information in the geoportal (information users).
To publicize the project to those who produce and use marine information, the project was present at various events and various presentations were made to the entities.
At present, the central administration entities related to sea affairs are all partners of the geoportal. Promotional tasks are being developed to engage more stakeholders that are marine information producers.
For the information users the project developed three educational resources that highlight the importance of marine information that feeds the SNIMar geoportal.

4.2 Contributo do Projeto para o Emprego

	Nº de postos de trabalho criados na fase de realização do projeto (unidade de medida: equivalente Homem/Ano)			
	Permanentes		Temporários	
	Mulher	Homem	Mulher	Homem
Previstos	0	0	7	8
Efetivos	0	0	6,26	8,16

	Nº de postos de trabalho criados na fase de exploração do projeto (unidade de medida: equivalente Homem/Ano)			
	Permanentes		Temporários	
	Mulher	Homem	Mulher	Homem
Previstos	0	0	0	0
Efetivos	0	0	0	0

Justificação para os desvios

There sligth difference between the expected values and the efective values is not sgnificative.

4.3 Contributo do Projeto para a Igualdade de Género (descrição das atividades desenvolvidas)

The profile of the human resources was described ina study that was carried in February 2015. This sudy was update in December 2016 (please see 3.5 - Annex 7).This work was based on the indicators: age, gender and grade and academic field and it was applied to different functional groups: fellows, WP coordinators, focal points, HR managers and donor partners. As stated in the previous Progress Reports, all the procedures related to grants recruitment were undertaken attending to the gender equality rules. Since the beginning of the project, 21 Science and Technology Management Fellowships were opened; at the end of the project, 16 fellowships were active. In April, the project has the participation of a total of 45 people, and there is a balance in terms of gender, 53,3% are female and 46,7% male.

4.4 Contributo do Projeto para a Anti-corrupção (descrição das atividades desenvolvidas)

The financial management of the SNIMar project is centralized at EMEPC, which is responsible for all the acquisition procedures. However, another entity - the Planning, Policy and General Administration Office (GPP) – is responsible for the expenses procedures. Therefore, a Risk Management Plan of Corruption and Related Offences was developed to identify stakeholders and also characterize the risk areas that could occur during the implementation of the SNIMar project (please see 3.5- Annex 8).
This Risk Management Plan includes the following sections: scope, flowchart, financial characterization, and identification of areas of risk.
The susceptible areas of risk and infractions in the project are: Human Resources, Public Procurement and Financial, IT, Quality Control and Project.
At the period covered by the implementation of the project, it was verified that there was no need to modify the initial plan for the prevention of risks and infractions.

5 - CONDIÇÕES DE EXECUÇÃO

5.1 Análise e Justificação de Desvios

5.1.1 Calendários

	Início do projeto	Fim do projeto
Data Prevista (na decisão de financiamento em vigor)	06 / 06 / 2014	30 / 04 / 2017
Data Efetiva	06 / 06 / 2014	30 / 04 / 2017

Justificação para os desvios

Not applicable

5.1.2 Custos

	De acordo com a última Decisão em vigor	Realizado	Desvios
Custo Total do Investimento	2.352.941,00 €	2.068.538 €	284.403,27 €
Despesa Total Elegível	2.352.941,00 €	1.996.945 €	355.996,06 €
Taxa de Comparticipação	85%	85%	85%
Comparticipação do Fundo	2.000.000,00 €	1.758.257 €	241.742,93 €

Justificação para os desvios

All the performed tasks were achieved excepted the one related to the network assets. The technical specifications for acquisition of the network assets were completed since July 2016. Since then the procedure is waiting for external authorization to proceed.

5.2 Cumprimento dos requisitos para cumprimento da legislação ambiental

Not applicable

5.3 Cumprimento de condicionantes de execução referidas nas Decisões Favoráveis de Financiamento

Not applicable

6 - MEDIDAS DE INFORMAÇÃO E PUBLICIDADE

6.1 Medidas de Informação e Publicidade Adotadas (de acordo com o Plano de Publicidade)

In accordance with the communication plan (please see 3.5 – Annex 25) all the publicity measures during the implementation of the project were developed (please see 3.5 – WP#5- Outreach).

Tipo de publicidade (descrição sucinta)	Período de Realização		Custo da Ação	Público Alvo
	Data Início	Data Fim		
Project Website	July 2014	January 2015 (website	885,60 €	GeneraL public
Promotional films- series 1	June 2015	June 2016	21.845,00 €	School comunity and general public
Promotional films – series 2	May 2015	February 2017	52.813,40 €	School comunity and general public
Technological development of the mobile and web application " QuizSNIMar "	June 2016	April 2017	11.455,25 €	general public
SNIMar presentations	June 2014	July 2017		Donnor partners; marine information producers and users

PT02 – Gestão Integrada das Águas Marinhas e Costeiras

RELATÓRIO FINAL

7 - AÇÕES DE CONTROLO

Two external audits were undertaken during the implementation time of the project:
- Monitoring action by the Program Operator (Direção Geral da Política do Mar) in December 2015:
  - 12.04.2016 - Preliminary report
  - 27.04.2016 - Contradictory procedure
  - 11.07.2016- Final report
  - 19.07.2016 – The project promoter sent complementary notes
  - Main conclusions: It was not identified non-eligible expenditure.

- Audit by the Agência para o Desenvolvimento e Coesão, I.P, June 2016 :
  - 03.11.2016 – Preliminary report
  - 14.11.2016 - Contradictory procedure
  - 12.01.2017 – Final report
  - The main conclusions were: It was identified a total amount of 48, 98 € of non-elegible expenditure concerning the corrections regarding the indirect costs.

8 - PROCESSOS DE CONTRATAÇÃO

Ver anexo

ANEXOS

- Fotografias e outros elementos informativos, de natureza qualitativa e quantitativa, que permitam: i) uma adequada avaliação do investimento realizado e dos resultados alcançados, e sua comparação com os que foram fixados na decisão de favorável de financiamento, ii) evidenciar a correta publicitação dos apoios atribuídos, respeitando as normas definidas no Regulamento MFEEE 2009-2014 relativas à publicidade;
- Documentos que comprovem a conclusão dos serviços e/ou aquisições contratados;
- Extratos contabilísticos que evidenciem o registo individualizado das despesas totais realizadas e das receitas obtidas no âmbito do projeto, nos termos do plano de contabilidade em vigor;
- Declarações das autoridades ambientais sobre cumprimento de diretivas, quando aplicável.

Assinatura

Nuno Paixão
Adjunto da Responsável

Data 31 / 07 / 2017

3.5 Description of the work carried out

The SNIMar project “Preparation of integrated geographic information for marine and coastal water management” aims to develop a marine spatial data infrastructure to increase the capacity for assessing and predicting the environmental status.

This project was formally approved on the 6th of June, 2014 and the contract signature was performed on the 17th of October, 2014. The present document provides the final report of the actions undertaken between June 2014 and April 2017 within each work package.

WP#0 - Project management

1. Description and Objectives

The general management of the project, including financial management, falls under WP#0.

2. Performed tasks

In accordance with the work plan for this WP produced in February 2015, updated in May 2016, the following actions were undertaken:

a. Project implementation format (in view of coordinating all of the project's tasks)

- Meetings: 18 coordination meetings were held during the implementation time of the project. Bilateral meetings with each WP coordinator were held during January and February 2016. 7 general meetings with all partners and associated entities were held; between July and December 2015 the general meetings with partners and associated entities were replaced by bilateral meetings with each entity. Between September and December 2016 bilateral meetings with WP #4 coordinator were undertaken every 15 days. The Steering Group meeting was held one time on 5th June 2015.
- Project management platforms: the online platform *openproject.snimar.pt* was used to share the work plans defined for every WP, assign tasks and deadlines, report tasks and internal communication; the restricted area of the project's website (www.snimar.pt) was used to share the final documents produced by the different WP.
- Training:
    - A *Geonode training* session was held in IPMA between 28th and 30th june 2015. The goals of this training session were to give technical skills on geonode technology to the SNIMar development team.
    - SNIMar project collaborators participated in the "*Geonode Code Sprint",* from 17th to 20th November, 2015 in ITHACA, Turin, Italy

- One SNIMar project collaborator participate in the *Advanced training Websig with OpenSource tools course*, between 23rd to 27th November 2015.
- SNIMar project collaborators participated in the INSPIRE Validation Workshop organized by EuroGeographics INSPIRE KEN, Joint Research Centre (JRC) and EuroSDR, in Marne-la-Vallée, France, on 2nd and 3rd June 2016. This workshop had the purpose to foster the sharing of knowledge and the acquisition of skills needed to develop geographic products comply with the INSPIRE specifications.
- SNIMar project collaborators participated in specific training in "Specialized development of applications for iphone/ipad", between 6th June and 29th July 2016; "Phone Gap" between 13th Ocotober and 25th October 2016 and "Specialized development of applications for Android" between 12th October and 30th November 2016.
- SNIMar project collaborators participated in a training "How to make na aplication to the European Funds - PORTUGAL 2020" on 22nd and 23rd October 2017.

- Other deliverables: to support the project management some documents were produced.

b. Partnership agreement with Norway & Iceland

- A close relationship with the donor partners was maintained during all the implementation time. Four training sessions were held:
  - The 1st training session was held in Lisbon, from 2 to 4 December 2014, with the parterns and the participaiting entities: Portuguese Sea and Atmosphere Institute (IPMA), Directorate-General for Natural Resources, Marine Safety and Services (DGRM), Hydrographic institute (IH), Forestry and Nature Conservation Institute (ICNF), Directorate-General for Territorial Development (DGT), Regional Government of Madeira (GRM), Regional Government of Azores (GRA), Portuguese Environmental Agency (APA), Dom Luiz Institute (IDL), Norwegian Mapping Authority (NMA) and the Portuguese Task Group for the

Extension of the Continental Shelf (EMEPC). This was a session provided an introduction to spatial data infrastructures (Annex 1).

- The 2nd training session was held in Lisbon, from 17th to 19th June 2015; representatives from the following entities participated in this session: Portuguese Sea and Atmosphere Institute (IPMA), Directorate-General for Natural Resources, Marine Safety and Services (DGRM), Hydrographic institute (IH), Forestry and Nature Conservation Institute (ICNF), Directorate-General for Territorial Development (DGT), Regional Government of Madeira (GRM), Regional Government of Azores (GRA), Portuguese Environmental Agency (APA), Dom Luiz Institute (IDL), Norwegian Mapping Authority (NMA) and the Portuguese Task Group for the Extension of the Continental Shelf (EMEPC) (Annex 2).
- The 3rd SNIMar training session was held during this semester, on 26th and 27th April 2016 at the Electronics Military Center in Paço de Arcos, where the EMEPC facilities are located. This session aimed to provide the opportunity to discuss experiences and best practices relevant to the development of SNIMar geoportal, and also to present the developments of this project to date. (Annex 3).
- The 4th SNIMar training session was held during this semester, on 24th of November at the Electronics Military Center in Paço de Arcos, where the EMEPC facilities are located. This session aimed to provide the opportunity to discuss experiences and best practices relevant to the development of SNIMar geoportal, the avaluation and also to present the developments of this project to date. (Annex 4).

- The Project Management Group meetings were held five times:
  - The 1st Project Management Group (PMG) meeting took place in Sesimbra on the 1st of October 2014. The agenda included the training planification and an introduction for each WP was done to the donor partners from Norway.
  - The 2nd Project Management Group (PMG) meeting took place in Lisbon on the 3rd of December2014. In this meeting, each WP

presented a progress report to the donor partners from Norway and Iceland

- The 3rd Project Management Group (PMG) meeting took place in Lisbon on the 26th of May 2015. In this meeting, each WP presented a progress report to the donor partners from Norway and Iceland;
- The 4th Project Management Group (PMG) meeting took place in Paço de Arcos on 26th April 2016 to brainstorm and discuss the follow up project and planning the visit to Iceland.
- The 5th Project Management Group (PMG) meeting took place in Paço de Arcos on 18th April 2017. In this meeting, each WP presented the final report to the donor partners from Norway and Iceland and discussed the future of SNIMar project.

c. Partnership agreement with IPMA:

- IT equipment acquisition: the procedures to acquire all of the required IT equipment were conducted in collaboration with IPMA (please see WP#2). All the procedures are finished except the one related with network and switching assets.

d. Grant recruitment: IPMA had coordinated all the procedures to recruit the grants required for the project and all of the daily basis HR procedures.

e. Financial management:

- The increasing complexity in the procedures for the procurement of goods and services and the delay in the payments led to a shift in the temporal, physical and financial implementation of the project, according to the approved schedule in the beginning of the project.
- A new schedule and programming was validated by the Program Operator in May 2016, according to the decision to extend the deadline for project completion until December 2016. The first amendment to the partnership agreements and to the project contract was signed in 9th September 2016.

- The second amendment to the partnership agreement and the project contract was signed on 10th May 2017 according to the decision to extend the deadline for project completion until 30th April 2017.
- The third amendment to the partnership agreement and the project contract was signed on 28th April 2017 according to the new financial plan in the partnership agreement with Norway and Iceland.
- According to the project schedule all the tasks were finished except the acquisition related with network and switching assets.

3. Results Achieved

a. Deliverables: several documents were produced during the project in order to have a common understanding about some issues. The final support documents are:

1. SWOT analysis, January 2015 (Annex 5);
2. The framework of the SNIMar project, June 2015 (Annex 6);
3. Human resources characterization, December 2016 (Annex 7);
4. Plan for Prevention of Risks of Corruption and Related Infractions, February 2015(Annex 8);
5. Outcomes and outputs of SNIMar project, December 2015 (Annex 9);
6. Analysis of spatial data infrastructures, April 2015(Annex 10);
7. Output "Increasing availability of services provided on-line by public administration in the field of spatial databases on natural environment" among the participating entities, December 2016 (Annex 11);
8. Output "Recovering and structuring the historical information related to the sea" among the participating entities, December 2016 (Annex 12);
9. Reports from the tasks developed by the participating entities: Directorate-General for Territorial Development (DGT), Hydrographic Institute (IH), Regional Government of Açores (GRA), Regional Government of Madeira (GRM), Dom Luís Institute (IDL) and Portuguese Environmental Agency (APA) (Annex 13).

b. Grant recruitment: by the 3oth of April 2017, 16 Grants for Science and Technology Management were active.

c. Financial management: The status report of financial management is presented in this report (please see 3.3). The final implementation rate is 85%.

4. & 5. Contribution to Outcomes and Outputs

All the actions described above contributed to achieve, at the end of the project, the expected outcomes and outputs, e.g. the number of web based products to be downloaded from the SNIMar geoportal (including web map services and web feature services) per month and the number of institutions connected to the geoportal.

WP #1 – Policies

1. Description and Objectives

WP1 aimed to study the institutional arrangements and the data and services sharing policies to be adopted between the SNIMar entities.

2. Performed tasks

a. Characterization of the data policies of SNIMar entities based on the analysis of the results obtained through the questionnaire on data sharing policies provided by DGT to SNIMar entities in the first quarter of 2016.

b. Analysis of the situation in terms of constraints related to access and use of spatial datasets and services made available by the participants through the geoportal. The analysis of the situation was one of the necessary components to define the SNIMar data sharing policy and to ensure the articulation with SNIG.

c. SNIMar data policy document where each chapter is the result of one or more of the tasks developed since the beginning of the project: policies; good practices on data and service sharing; characterization of SNIMar datasets in terms of access and use; data sharing policies from SNIMar entities; SNIMar data policy;

d. Definition of (1) SNIMar-SNIG articulation and (2) SNIMar maintenance and updating procedures to be undertaken within SNIMar project;

3. Results Achieved

a. Final version of the characterization of the data policies of SNIMar entities (Annex 14).

b. Final version of analysis of the situation in terms of constraints related to access and use of spatial datasets and services made available by the participants through the geoportal (Annex 15).

c. Final document of the SNIMar data policy (Annex 16) that includes:

- SNIMar guiding principles for data sharing;
- SNIMar entities' data policy characterization;

- Main aspects for the future management and maintenance of SNIMar.

In order to engage all the participating entities in the project two join declarations were signed: one in the kick off meeting (Annex17) and other in the final event (Annex18) .

4. Contribution to the Programme Outcomes

Dealing with the data policies issues, WP1 contributed to the increase of data available that can be accessible through international marine geo-databases in articulation with the national spatial data infrastructure (SNIG). The definition of data sharing policies will facilitate the future articulation with international marine data sets or geo-bases.

5. Contribution to the Project Outputs

The increasing availability of services provided on-line by public administration in the field of spatial databases on natural environment may benefit also from developments dealing with the data policies issues. These developments contribute indirectly to this output as they may generate an increase in the number of datasets and services available.

WP #2 – Technical Framework

1. Description and Objectives

The main goals of WP#2 were to meet the hardware, software and network requirements of project SNIMar and to provide all the specialized IT support to the different partners involved in the project so that they can contribute with their information to the SNIMar geoportal.

2. Performed tasks & 3. Results Achieved

This WP was able to develop the following activities:

a. IT architecture conception –The goal of this activity was to attain a generic solution that may support the different IT infrastructures of the associated information-producing entities and to determine how these entities will securely integrate their data into the SNIMar geoportal. This step was completed: the associated entities DGRM, ICNF, GRM and GRA adopted the "Kit SNIMar" server specifications, whereas IH and APA decided to increase their storage capacity instead. The technological infrastructure of the central node, which will be managed by IPMA, was reinforced with a storage, security and networking upgrade in order to ensure the performance of the geoportal. WP2 team configured an environment that simulate the central node and local node configuration with a SNIMar Local Catalog prototype and performed some testes of connectivity and Geoportal application functionalities. These tests were 100% successful. The local node prototype that were already configured by WP2 team at last June, permitted to make some configuration tests to find the most adequate environment and also, concerning on the continuity of project, to assure the remote assistance of local nodes and real-time monitoring platform.

b. Hardware Acquisition - the purchase of IT equipment was a long and complex procedure and it is the main cause for the observed deviations in the temporal, physical and financial implementation of the project. By 30th of April, all the purchasing procedures were completed: 1) desktops and laptops for SNIMar team; 2) processing servers system upgrade for the central node, 3) storage system upgrade for

the central node and 4) processing and storage local nodes upgrade for APA and IH hardware including APA and IH's infrastructures upgrade; From July until December 2017, the purchasing procedures were finhished to: 5) SNIMar Geoportal infrastructure and 6) firewall assets, including hardware for central node and appliances for local node and 7) the non-didigital data recovery system. The Technical Specifications for acquisition of the network assets were completed since July 2016. Since then the procedure is waiting for external authorization to proceed.

c. Software Acquisition - Software Acquisition – An ESRI Enterprise License Agreement (ELA) was acquired. The software licenses were installed according to the SNIMar needs in order to organize the marine information that will be upload to the geoportal. A SQL server licence was acquired.

d. IT controlled environment design – throughout the project, as the team became more familiar with the range of SNIMar products and the chain steps that are necessary for their production, it became evident that there is a need to better control some products, particularly those that are more complex and/or frequently updated, so as to ensure that they remain available in the SNIMar geoportal. In this way, the IT management departments, or others with similar responsibilities, in each entity, must be assisted in the task of mapping the SNIMar products with the Information Systems that they depend on. In view of this concern, WP#2 designed an IT metadata structure in a Configuration Management Data Base (CMDB). This application was configured under the opensource OTRS platform, with ITSM module, that allowed the creation of a CMDB with IT metadata per SNIMar product. This means that each operational product that has been considered in the geoportal can be tracked by production step, input data and hardware assets.

4. Contribution to the outcomes

The correct conception of IT architecture will allow SNIMar data input to major international marine data sets or geodatabases.

All the desktops and laptops were prepared according to each institution's preferences in what regards Operating Systems (Windows and/or Linux). Meanwhile, IPMA was providing all the required IT resources (legacy resources only available for the development phase) for the development of the different assignments of each WP. This was important to give all the people involved the means to collect the organization data that will be available through the geoportal in order to achieved the outcome "Harmonization and synchronization of the hydrographical database system into one completed database" measured by the indicator "Number of synchronized metadata sets".

With the Central Node upgrade and configuration it was possible to set up a development environment to create the Metadata Editor and Geoportal. This equipment is intended to also support the website www.snimar.pt and the Collaborative Keywords application.

All participants that do not have IT resources will have the possibility to create new SNIMar products in the Central Node. This configuration will contribute to the outcome "Harmonization and synchronization of the hydrographical database system into one completed database" measured by the indicator "Number of synchronized metadata sets" and indicator "Number of web based products to be downloaded from the Marine Information System (including web map services and web feature services) per month".

With the implementation of an IT controlled environment for SNIMar products all entities that will use it could be more effective in the incidents treatment and could answer more easily to the questions: (1) If a product does not become available, which problem occurred / which information system failed?; (2) If an information system is not available, which products may this situation impact?. This application will contribute to the outcome "Harmonization and synchronization of the hydrographical database system into one completed database" measure by the indicator "Number of web based products to be downloaded from the Marine Information System (including web map services and web feature services) per month".

The correct conception of IT architecture will allow SNIMar data input to major international marine data sets or geodatabases. A target of the project is to link the SNIMar geoportal to other international geoportals. It was decided that one will be the Co-SNIG, the Portuguese platform that has to report data to INSPIRE Directive. Some tests were done to perform the integration. No problems were identified in external network connections. The second is

Iceland geoportal. All the testes to harvest from SNIMar geoportal with GeoNetwork software to connected worked well.

5. Contribution to the outputs

The correct conception of IT architecture contributed to increase the number of institutions connected to the geoportal. At this moment, there are nine associated institutions connected to the geoportal.

WP2 team and IT Division of IPMA are developing all efforts to guarantee that after the end of project, all SNIMar platform (central and local nodes, hardware and software) will be totally configured and operational. By this way it will be possible to monitor the IT infrastructure and to give support to the actual and potential new participating entities. This measures will increase the geoportal visibility and data utility.

IPMA will take advance from is monitoring team (COTI) that works on 24x7 to monitor the operability of all solution and demand solutions for incidents. Besides that and as IPMA datacenter is classify as tier III, the project will take advance of infrastructures and services.

WP #3 Geographic & Metadata Framework

1. Description and Objectives

This work package is responsible for the INSPIRE metadata and data harmonization within the scope of the SNIMar project.

2. Performed tasks & 3.Results Achieved

This WP is responsible for INSPIRE metadata harmonization, the contents of metadata through the definition of a metadata profile for SNIMar and also to develop an application to be included in the EMEPC's local node. The main activities developed by WP#3 were (please see Annex 13):

a. Data survey to all institutes: The main purpose of this task was to collect information about data and geographic information related with maritime space in all SNIMAR partners and associated entities (Annex 19)
b. Development of an application to be included in the EMEPC's local node: This application, named SAG (SNIMar AutoGenerator), will allow the automatic generation of systematic geospatial resources and their publishing into the EMEPC´s local catalog and a simple way to automatically generate metadata and export data sets (Annex 20).

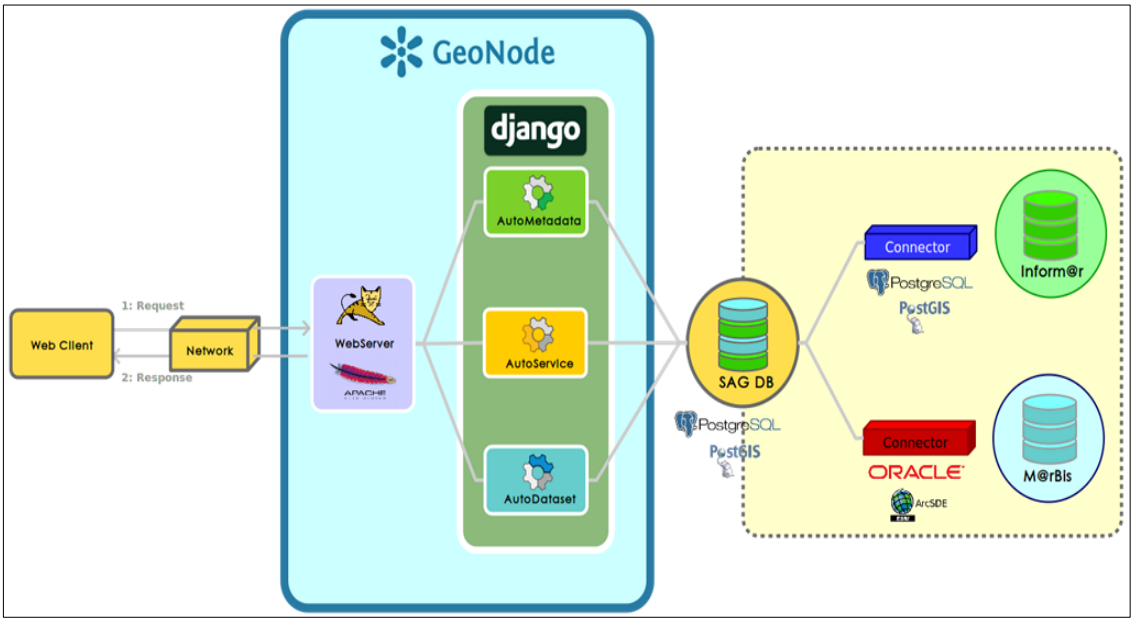

Figure 1. Architecture of SAG application.

c. Development of the SNIMar metadata profile. Along the project five releases of the SNIMar metadata profile were produced: (version v 0.9.0): first version of the SNIMar profile which includes modified or aditional elements to the MIG profile; (version v 0.9.1): includes development of SNIMar metadata validation processes. In this sense, the SNIMar Metadata Profile version 0.9.1 aims to rectify some rules for the construction of metadata, such as XML structural aspects or multiplicity of metadata elements, and to facilitate the filling of those elements through comments and more clear examples. In this new version of the profile, the Portuguese Language Orthographic Agreement of 1990 was applied and English versions of some codelists were added; (version v 0.9.2) this version was released on 19th September 2016. Includes the addition of some more explanatory comments and the correction of some XML structural errors. Besides, in section D.2. Informação de Histórico (Lineage) of the SNIMar profile, a recommendation was added in order to enable the identification of historical marine data. Therefore, in the metadata element Declaração (Statement) the following text must be added, in Portuguese and English, for all the historical datasets until the deadline of the SNIMar project: "dado histórico marinho recuperado" and "historical marine register recovered", respectively; 2); (version v 0.9.3) this version was released on 5th December 2016. Includes new elements in the section Contact (acronym and name of the responsible entities, according to the SIOE; acronym of the entity as a free keyword, according to the SIOE; free keyword “INSPIRECORE”) and the final version (version v.1- Annex 21) (Table 1.).

Table1. SNIMar profile versions and corresponding release dates.

VERSION	DATE	DESCRIPTION
v.0.9	2015.02.11	First version of the SNImar profile. Modified or aditional elements to the MIG profile (DH»GT) highlighted in red.
v.09.1	2015.12.01	Portuguese Language Orthographic. Agreement of 1990 applied. More explanatory comments added. XML structural errors corrected.
v.0.9.2	2016.09.19	A recomendation was added to section D.2. Lineage (Informaçõ histórico), in order to enable the identification of historical marine data."dado histórico marinho recuperado" and "historical marine register recovered"
v.0.9.3	2016.12.05	This version includes new elements in the section Contact (acronym and name of the responsible entities, according to the SIOE; acronym of the entity as a free keyword, according to the SIOE; free keyword “INSPIRECORE
v.1	2017.04.19	

d. Number of datasets, metadata files and web services by institution: The number of datasets related to the marine environment identified so far by all entities of the SNIMar project, the number of metadata files created in compliance with the SNIMar profile and the number of web services (WMS, WFS or WCS) available at the end of the project are listed in Table 2.

Table 2. Number of marine datasets, metadata files and web services created by institution.

INSTITUTION	Nº OF DATASETS	Nº OF METADATA (UPDATED TO THE LAST VERSION OF THE SNIMAR PROFILE)	Nº OF WEB SERVICES		
			WMS	WFS	WCS
APA (Portuguese Environment Agency)	30	30	30	30	-
DGT (Directorate-General of Territorial Development)	3	2	3	3	-
DGRM (Directorate-General for Natural Resources, Maritime Resources and Safety Services)	35	45	28		
EMEPC (Task Group for the Extension of the Continental Shelf)	1 611	7 (*)	1 597	1 611	1
GRA (Azores Regional Government)	333	333	-	-	-
GRM (Madeira Regional Government)	39	55	22	15	-
ICNF (Portuguese Institute for Nature Conservation and Forests)	352	352	352	352	-
IH (Portuguese Hydrographic Office)	316	316	1	-	-
IPMA (Portuguese Sea and Atmosphere Institute)	115	167	30	-	-
TOTAL	**2 834**				

e. Number of historical information related to the sea: as mentioned in the specifications of the SNIMar project, at least 5 000 historical marine registers have to be recovered (Table 3). This was the reason why a recommendation had to be added to the SNIMar metadata profile (version v.0.9.2) in order to enable the identification of historical marine data.

Table 3. Nº of registers of historical marine datasets identified by institution and the corresponding metadata files already created.

INSTITUTION	Nº OF REGISTERS	Nº OF METADATA	DIGITAL	TIME PERIOD
APA	78 719	-	78 719	1941-2016
DGT	NA	-	-	-
DGRM	TBD	-	-	up to 2012
EMEPC	NA	-	-	-
GRA	30	2	1	2012-2014
GRM	636	15	636	1984-2007
ICNF	55	55	55	1975-2013
IH	125	-	125	1889-2005
IPMA	> 25 150	264	TBD	1900-2010
TOTAL	**> 104 715**	Higher than the 5 000 historical marine registers requested		

f. Definition of controlled keyword lists (Thesaurus SNImar) and development of the Collaborative keywords (CK) web application. CK enables the dynamic creation and maintenance of the SNIMar thesaurus through participation in the generation and edition of terms fulfilling the rules set out in the application. The number of keywords identified so far in the scope of the SNIMar are listed, by keyword group type, in Table 4. A user manual for the web application Collaborative Keywords (CK) was produced (Annex 22).

Table 4. Number of keywords by keyword group type.

KEYWORD TYPE	Nº
Discipline	19
Parameter	237
Instrument	38
Stratum	6
Platform	7
Project	24
Place	90
Temporal	0
Taxon	1 144
TOTAL	1 565

4. Contribution to the outcomes

WP#3 is the key to achieve the expected outcome “a harmonized marine database” through the use of a dedicated profile (SNIMar profile) and the use of a dedicated thesaurus (with consensual marine-related keywords). The target (5 synchronized metadata sets) was already achieved. There are 9 synchronized metadata sets developed according to the SNIMar profile.

5. Contribution to the outputs

The identification of the number of historical information related to the sea will contribute to ensure that the geoportal will display 5000 recovered historical marine registers. At the end of the project more than 5000 registers are displayed in the geoportal.

A well-characterized data (harmonised metadata file) will contribute to ensure the good quality of the search in the SNIMar geoportal and to reduce the time required to access marine information.

WP #4 –Services & Geoportal

1. Description and objectives

WP4 aimed to develop and implement a Spatial Data Infrastructure that will allow partners of the SNIMar project to manage and interact with their own metadata, data catalogue and share the information with SNIMar's geoportal.

WP4's major goals were:

a. Establish a system for the spatial datasets and services for which metadata will be created: discovery service (catalogue), view service (web mapping) and download service (web feature service and file based).
b. Services oriented to support some thematic areas, like safety & security, sustainable fisheries, aquaculture and marine & coastal environment.
c. Integration with Transnational Marine Geo Portals.

2. Performed tasks

WP4's work plan was defined based on the following strategy - a SDI should:

a. be built bottom-up, using the best web service and project practices;
b. start with data and allow users to interact with it and generate metadata as needed.
c. be open, provide reasons for users participation, promoting recognition, and transparent information.
d. align incentives for contribution and use, providing Institutions with the infrastructure to publish and manage their geospatial data.

The WP4 team assumed the following guidelines for the development task that will take course in the following months. The adopted solutions must be based on:

a. OGC standards;
b. Scalability, performance and security;
c. Based on open source technology;
d. Creation, sharing and collaborative use of geospatial data;

e. Simple web-based tools and responsive website;
f. Privacy controls to restrict access;
g. Creation of maps and data export in a variety of formats.

The system architecture is based on a **metadata editor**, an **institutional** local-catalogue and a **SNIMar geoportal**.

Metadata-editor

A metadata editor developed as a plug-in on QGIS open source technology, which ensures the editing of metadata and geographic data manipulation in the same environment. With the real use and users feedback of the SNIMar's metadata editor some adjustments and maintenance has been required.

Activities:

- Requirements definition: Aligned with the SNIMar metadata profile, a requirements specification document was generated regarding the best practice for applications development.

- Implementation strategy in terms of design, usability and functionality: Based on the requirements specification document, the metadata-editor solution should: follow SNIMAR's profile approach; use SNIMAR XML Schema Definition for metadata file validation; use open-source technology; be a GIS integrated solution; be based on fast implementation; reflect a user friendly interface.

  According to the defined strategy and requirements for this application, the solution found by the team was to develop the metadata-editor as a QGIS® software plugin. This solution meets the following basic requirements for metadata edition: based on an open-source technology with an active community of users and developers; safeguarding interoperability and integrate metadata generation along with data generation and data manipulation.

- Development and implementation - phase 1: After analyzing SNIMar's metadata profile, along with the requirements definition document, the team began the development work. At the end of this task a mandatory-version (MV) - release I was launched.

- Testing Release I: A small group of contributors was invited to collaborate in beta testing the prototype. The result of this step was a compilation of suggestions and errors detection.

- Development and implementation - phase 2: Regarding the reports generated in the previous step (beta testing phase) a new development stage took place. At the end of this phase the non-mandatory-version (NMV) – release II was launched.

- Testing Release II: In this second testing period all SNIMar project collaborators were invited to install and use the version and to generate a set of metadata files, based on their institution's data, for testing procedures. As a result of this stage a new set of suggestions and errors was compiled.

- Development and implementation - phase 3: The list compiled in the previous step promoted a new phase of developed improvements of the application. At the end of this phase a new non-mandatory-version – release III was launched.

- Integrating CK (Collaborative Keywords) code-lists: After the development stage the integration of the CK code-lists was planned and implemented.

- Launch – release IV: After including some final improvements and CK integration, the metadata-editor was formally published and made accessible.

- Maintenance: After de IV release the develop team analysed the behaviour of the editor against the QGIS version releases. Based in the SNIMar project collaborators feedback from their usage experience, a set of suggestions were implemented in the users interface. Regular application maintenance has been performed (Figure 2);

Figure 2 - SNIMar metadata editor webpage

Local-catalogues

Regarding the requirement document defined for the local-catalogues the development team started to implement the application that will support the metadata, data, services management.

The application to be developed, will provide to collaborators from each partner Institution, a way to manage their information/data; publish and share information/data, according with their data strategy and policies.

This web applications will allow the discovery, view and download metadata, datasets and services, regarding the best-practices compliances (IETF, W3C, ISO, OGC) (Figure 3).

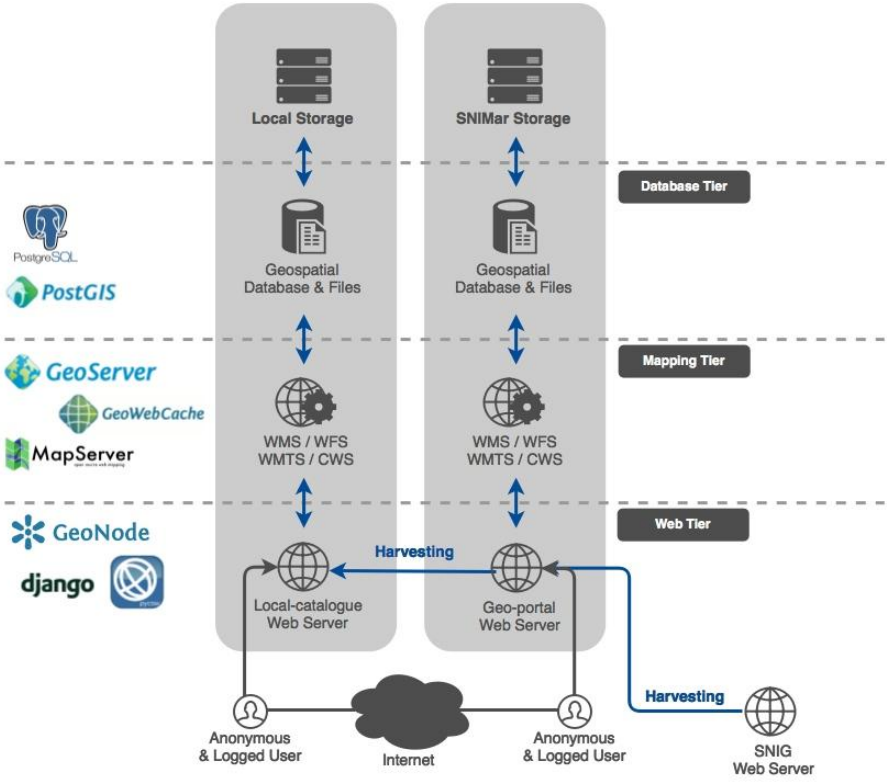

Figure 3 - Schematic architecture from the SDI solution

Activities:

- Local-catalogue requirements definition, in terms of design, usability and functionality: The first task in this activity involved the planning of a series of meetings with collaborators from all associated institutions, in order to compile the different expectations regarding the local-catalogue and geo-portal solution. From these meetings a requirement document was elaborated according to the contribution from each entity. The produced document was the basis of the development team work in terms of design, usability and functionality of SNIMar SDI.
- Analysis of technological solutions: Other important step was the analysis of the different open source solutions available, in that moment, to be used in the SNIMar project. From this comparative analysis GeoNode's solution seems to, natively, gather a larger set of features closer to the intended "Data Infrastructure Geospatial SDI" solution for the project.

  In a simplified view of the system, GeoNode is a collaborative SDI, very aligned with relational strategy among data users and metadata. This platform can integrate several

technological components that meet most of the requirements of the project. At the same time, this same characteristic (modular solution) enables the extension of GeoNode's platform through specific development, to comply with additional requirements with some ease.

The view component information/data on maps is one of the most relevant items of SNIMar project. For this purpose there are now multiple server systems solutions for publishing web-based maps, these systems that let you do the rendering of data and symbology defined, thus creating images of dynamic maps, accessible via browser. From the solutions that are available on the market MapServer and GeoServer fits the requirements from project.

Database management systems are the most effective geographical data storage, mainly because most of the existing systems already integrate the spatial component that allows the storage of such information. This solution allows the user to use tools to perform queries, editing, analysis, alphanumeric and space, no other system allows.

From the different database management systems that exist, the solution based on the relational objects PostgreSQL database with the free spatial extent and PostGIS fill the requirements from SNIMar project.

- Development and implementation of the local-catalogue: Regarding the document that identify GeoNode as the most appropriated SDI to develop the local-catalogue environment, the development team started the development phase. Before start the development tasks the WP4 team put some effort to know better Geonode technology, installation process, parameterization, interoperability with other application, map services and operations were tested.

  This activity was divided in several phases:

  - phase 1 and 2:

    With the implementation of phase 1 we decided to join phase 2 activity (simple free text search) into the same release. The phase one included:

    - Metadata management: The first task of the development and

implementation of the local-catalogue included: metadata upload, metadata validation and metadata manipulation.

- Metadata catalogue: The second task included the development of metadata search functionalities and results presentation. At this stage a simple filter action will be implemented.

These activities ended in February 2016 with the first release of local-catalogue prototype (Figure 4).

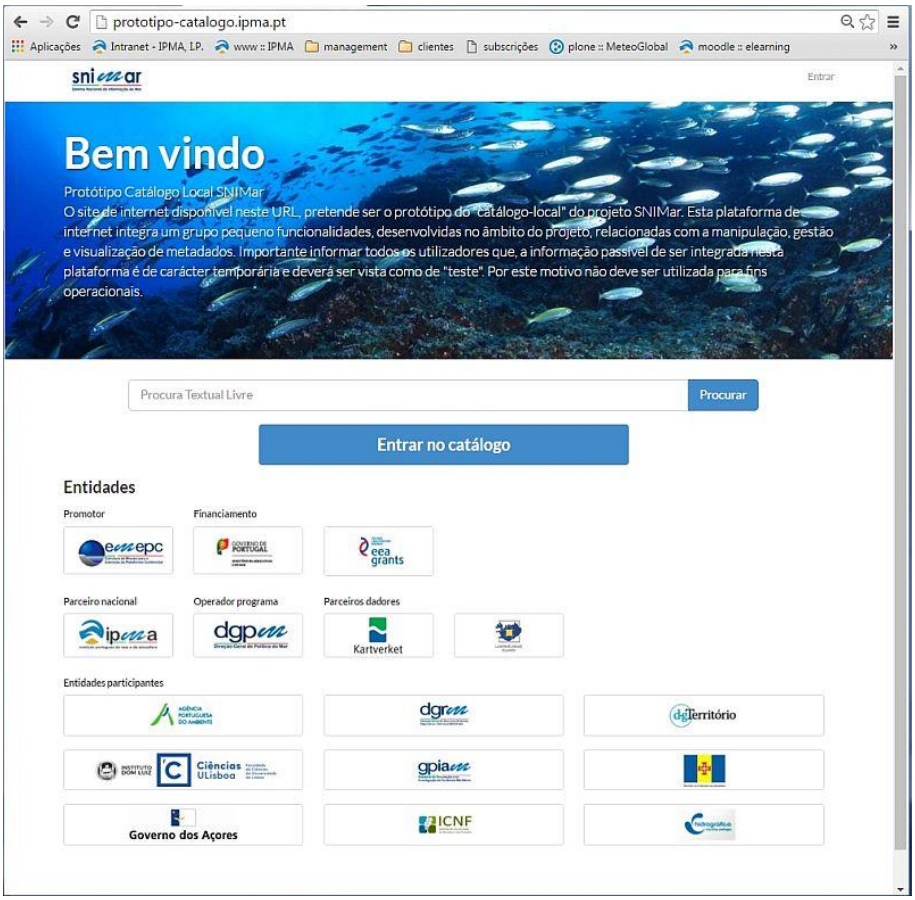

Figure 4 - Homepage from local-catalogue prototype web application.

- phase 3:

In this phase the development effort was aligned with implementation of tools to manage metadata, data and services on the local-catalogue. Also in this phase the services visualization functionality were implemented.

Dataset metadata management functionality: the defined interaction for this phase

was implemented allowing more interaction with metadata in the local-catalogue environment, such as: add metadata; remove metadata; edit metadata; associate resources to dataset metadata; remove resources associated with dataset metadata. Some usability requirements were implemented, tooltips with "descriptions" in edit fields, pre-filled fields, sample quality, icons and colours indicate metadata compliance, use of SNIMar keywords without leaving the application.

Services metadata management functionality: the following actions to manage service metadata were implemented: add service metadata of already published services (WMS, WFS, ..) ; remove service metadata; edit service metadata.

Metadata validation: this process was included in the edit interface, and the result of the validation process is presented to the user in the web application environment.

Data visualization and download: a solution for data visualization and download was integrated in the local-catalogue application.

Harvesting: the development and parameterization of the harvesting process in the local-catalogue prototype started in this phase. Some tests were performed and some positive results were achieved. It was decided to continue the development of this activity in the next phase.

These activities ended in September 2016 with the third release of the local-catalogue prototype (Figure 5).

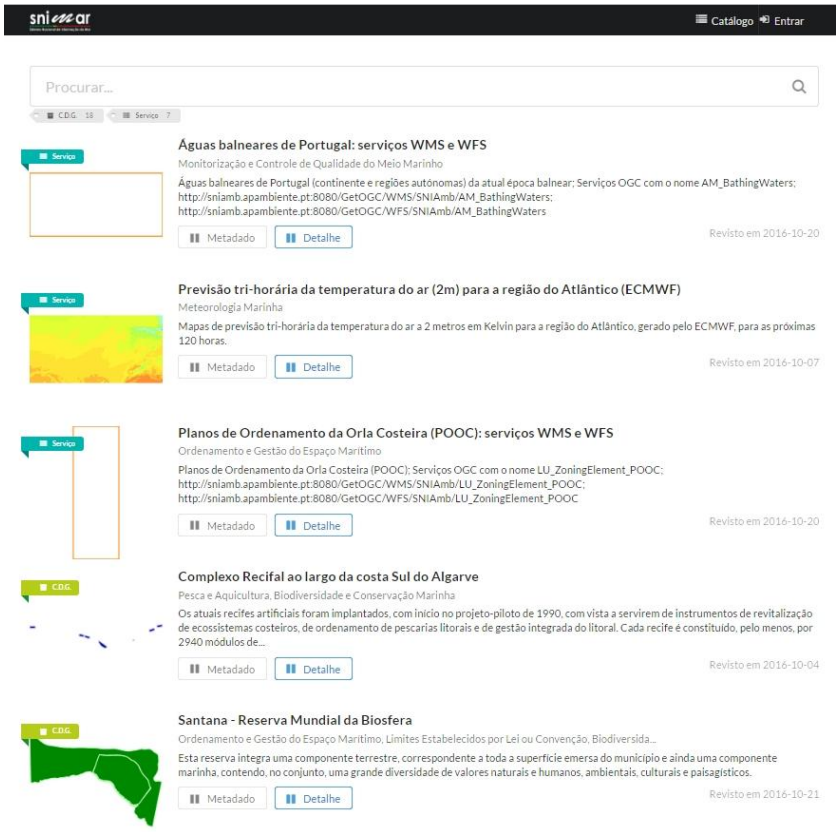

Figura 5 - View of the result list from the local-catalogue prototype

- phase 4:

  SNIMar DNS: in this stage the development team implemented and installed the servers solution in the snimar.pt DNS.

  Harvesting: with the development of the geoportal, at the same time, the harvesting process was adjusted, in terms of parameterization.

  Backoffice metadata and services management: some activities relating metadata and services management were developed and implemented during this phase 4: metadata status; publish and unpublish functionalities.

  Also in this phase, regarding user feedback, the metadata management flux was reviewed, services management interface will also were adjusted (Figure 5)

  User profile: the implementation of users profile according with requirements were developed in the local-catalogue.

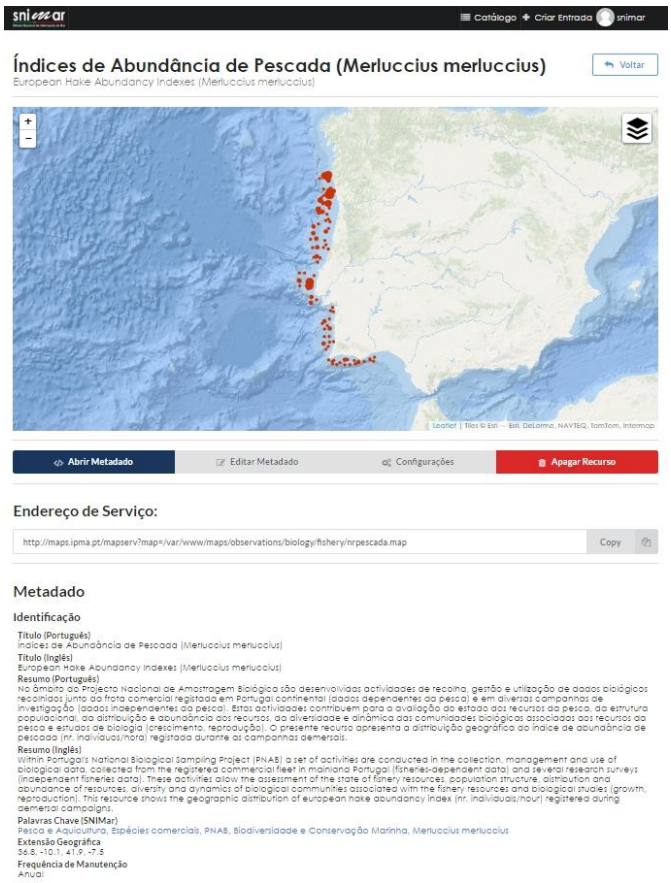

Figura 5 - manage metadata interface, local-catalogue

The local-catalogue included four profile types: anonymous, editor, manager and administrator.

Geoportal

The geoportal intends to be a web map catalogue application, that will list published metadata and services, provided by the institutions local-catalogues and other already implemented metadata catalogues from project partners.

This web application must use standard procedures and protocol to connect to the local-catalogues and harvesting the metadata. It was required that this web catalogue will implement the CSW version 2.0.2 protocol, guaranteeing interoperability with the local-catalogues. Also and based on that standard CSW, external catalogues will be connected with geoportal, ensuring interoperability conditions with external catalogues.

To ensure these requirements an ESRI open source solution was chosen. This solution will guarantee that the system will be maintained after the project's conclusion.

Activities:

- geoportal requirements definition, in terms of design, usability and functionality: The geoportal requirements for implementation were based in the requirements document, activity that involved collaborators from all partner Institutions, in order to compile the different expectations regarding the geoportal solution. Several meetings occurred in order to elaborate the reference document that was the basis of the development for the SNIMar geoportal (Annex 23);
- geoportal development: The development stage began based on the revised requirements document, respecting elements of design, usability and functionality ;
- harvesting: integration and parameterization of the harvesting process that included the developed local-catalogue and the existing catalogues in APA and IH (ESRI solution based);
- layout: the implemented solution was based in modern design elements, a metadata catalogue base solution and geographic data representation with focus in map data exploration that includes project partners suggestions regarding the geoportal interface.
- search (simple and advanced): implementation of the search engine based on the SNIMar metadata profile and with focus on search and discovery adjusted to SNIMar keywords;
    - Some final adjustments were implemented with the aim of giving users a list of results adjusted to his search.
- map discovery: the data explore based on a map solution was required allowing user to view several layers in the same map.

- Geoportal Launch: the official launch of the SNIMar geoportal was on 19th April (Figure 6).

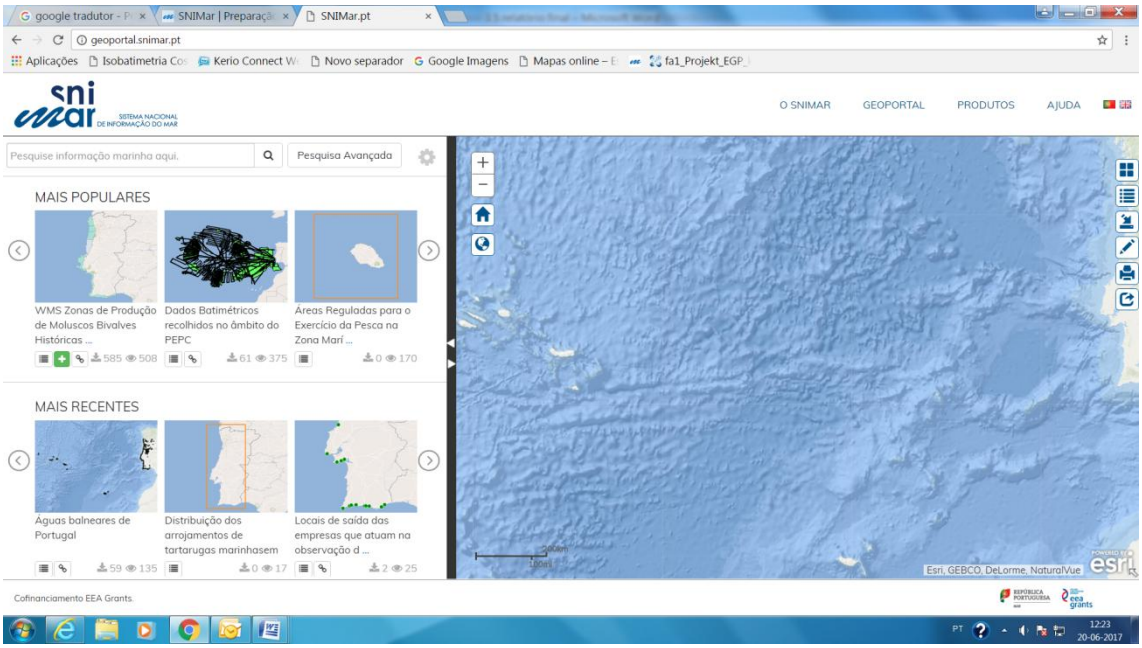

Figura 6 - SNIMar geoportal homepage

3. Results achieved

Metadata editor

The deliverable from this activity was:

- SNIMar Metadata-editor application. (http://editor.snimar.pt/)

Local catalogue

Regarding the plan defined in this activity of the project the local-catalogue prototype releases can be classified has direct results of the development phases.

- Phase 1 and phase 2 were deployed to a single release of the local-catalogue prototype. This release was available in the url: http://prototipo-catalogo.ipma.pt/

The prototype of the local-catalogue allow users from partners institutions to upload and publish metadata build with SNIMar metadata editor, associate to each metadata the related data (geotiff and shapefile format) (Figure 7)

It was also implemented in this release a simple free text search solution, based on the title, alternative title, abstract, keywords, purpose, and thematic categories.

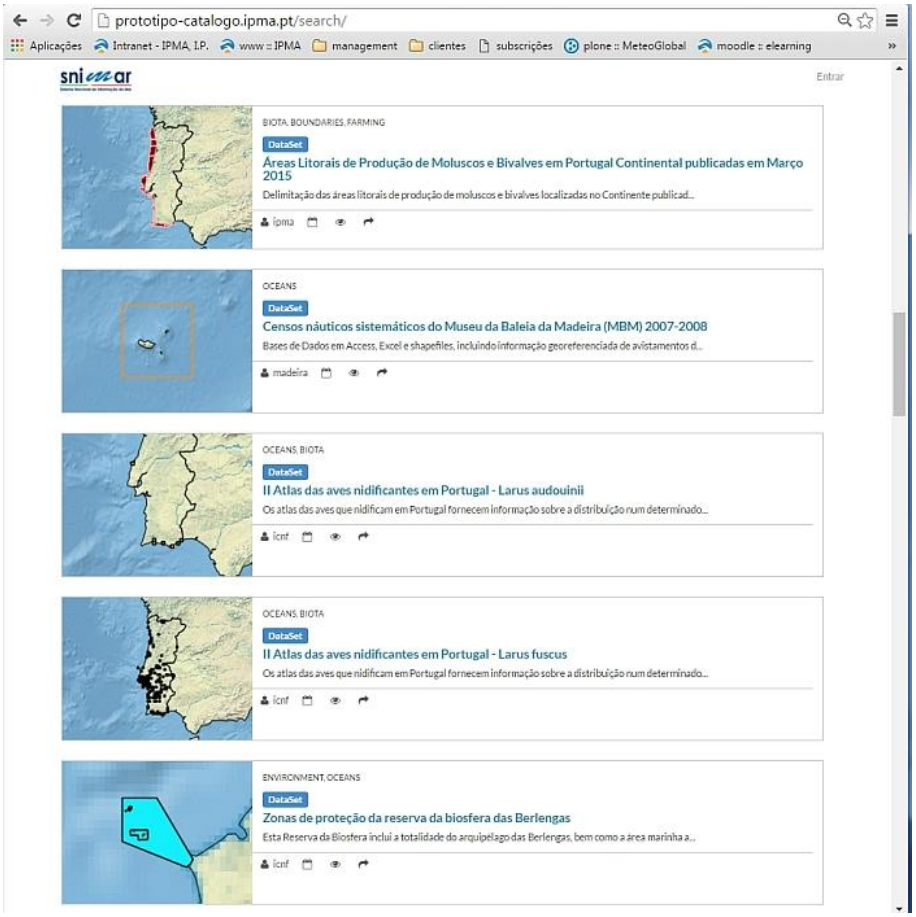

Figure 7 - Local-catalogue prototype metadata results list (phase 1 and 2)

- During the phase 3 a single release of the local-catalogue prototype was made. This third release was available in the url: http://prototipo-catalogo1.snimar.pt/

This prototype of the local-catalogue allowed users from partner institutions to upload and publish metadata (dataset and services) built with SNIMar metadata editor and to associate to each metadata the related data (GeoTIFF or shapefile format). Also the search engine was included in this release.

- In phase 4 the development team made a release of the prototype with new functionalities included. This fourth release was available in the url: http://prototipo-catalogo2.snimar.pt/

On this prototype the final harvesting adjustments, tested against the SNIMar geoportal, were implemented; the thumbnail solution based on the data (shapefile ou GeoTIFF) associated to the metadata; quick share of the service's url; data preview based on the WMS service; improvements on the editor interface, simple free text search solution based on the title, alternative title, abstract, keywords, purpose, thematic categories; preview of metadata detail

including contact information.

On this local-catalogue users from partner institutions were invited to upload some of their metadata of types dataset and service to use on and test the harvesting process.

Also in this phase 4 the two first releases of the local-catalogue solution for IPMA and ICNF institutions were deployed (Figure 8).

http://snimar.ipma.pt/

http://snimar.icnf.pt/

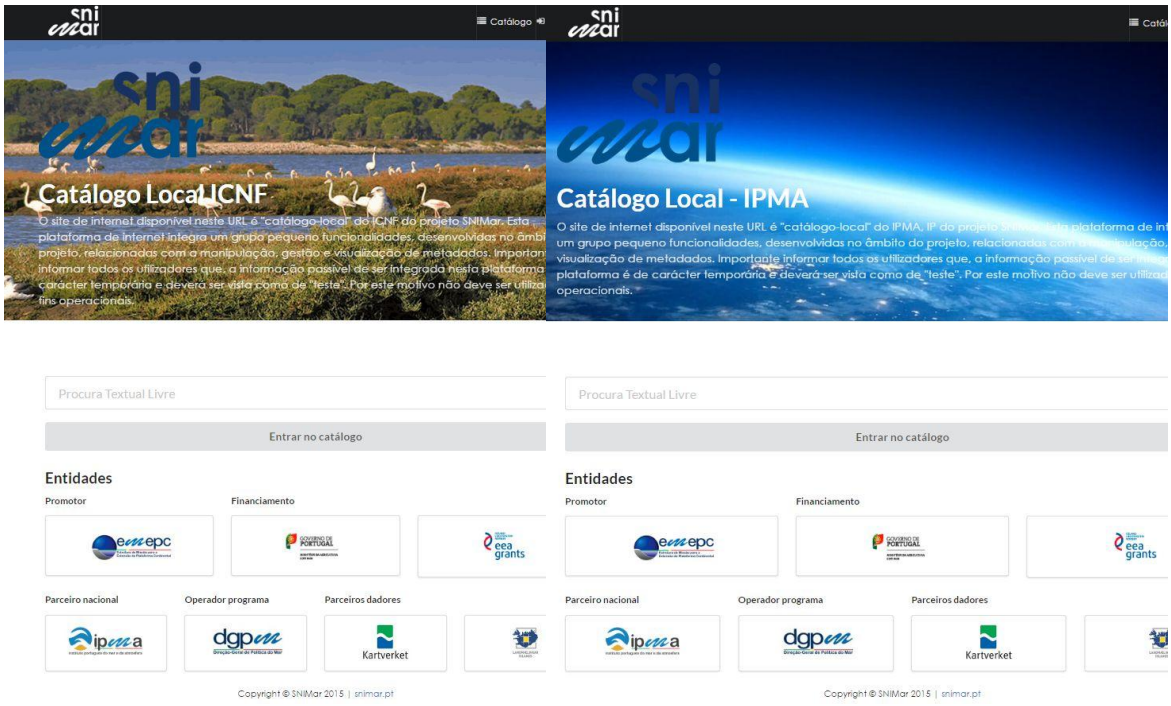

Figure 8 - Local -catalogue from IPMA and ICNF

These releases included new features related with usability. Filters based on the type and number of metadata (dataset, series or service); ordering the result list by relevance and reviewed data; pagination associated with the number of results (Figure 9).

In the backoffice environment a metadata management page became available that allows users to access the metadata list and to verify their corresponding state, if valid or publish, and take action over it.

These two catalogues were harvested by the SNIMar geoportal.

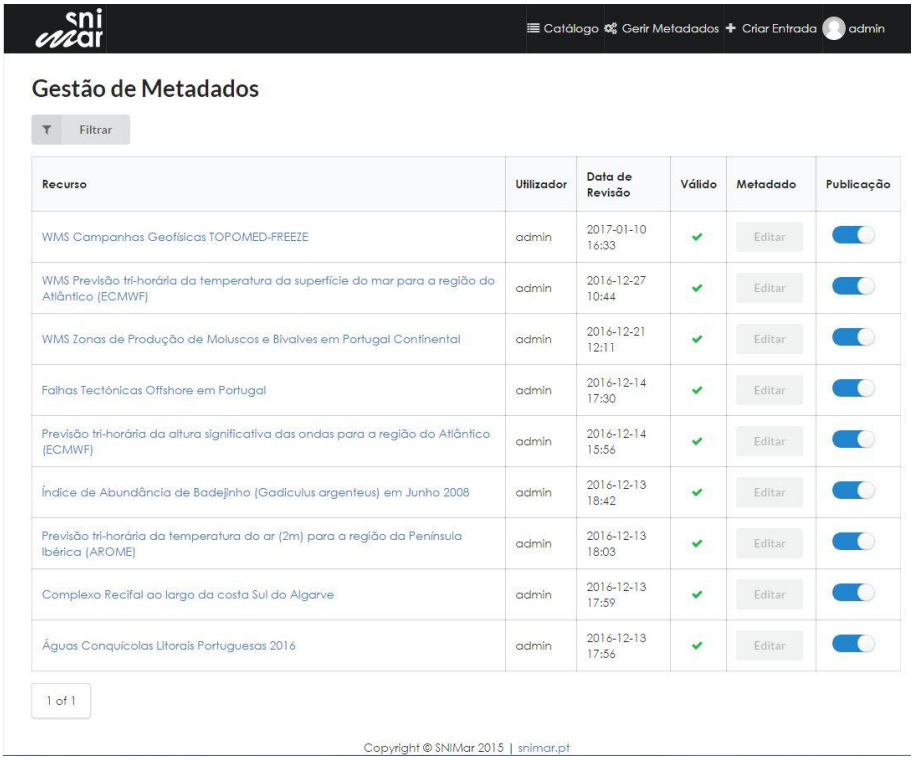

Figure 9 - Local-catalogue metadata results list.

Geoportal

The SNIMar geoportal is a web catalogue that combines all the metadata from project partners.

The first release from the SNIMar geoportal prototype became available in a temporary url:

http://aicepdev1150288.esriptprojectos.pt/snimar/

This prototype included the defined design requirements and the first approach to usability and functionality; the usage of SNIMar metadata (SNIMar profile compliance) harvested from the local-catalogue prototype; simple and advanced search using most of the requirements described in the support document (Figure 10).

The first SNIMar geoportal release was made available in the pre-production environment:

http://geoportal.snimar.pt/preprod/

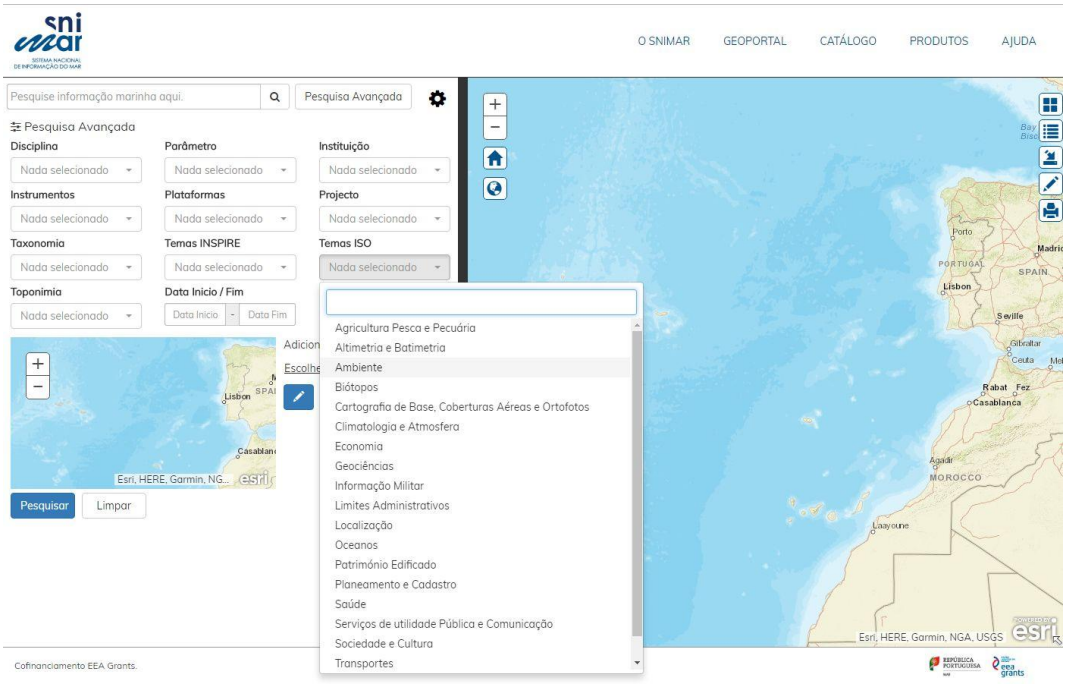

Figure 10 - SNIMar advanced search page

This release used metadata resulting from the harvesting process between the geoportal and IPMA, ICNF local-catalogues, APA catalogue and from the fourth local-catalogue prototype release. This release included the following functionalities: map discovery serving WMS services built with geoserver, mapserver and arcgis software; access metadata statistics (view and download actions); a complete metadata, attributes and resources details preview; filters results list; advanced search including all the defined requirements; implementation of categories filters; map tools; layers capture; adding external layers to the map; export metadata files (pdf and ascii format) (Figure 11).

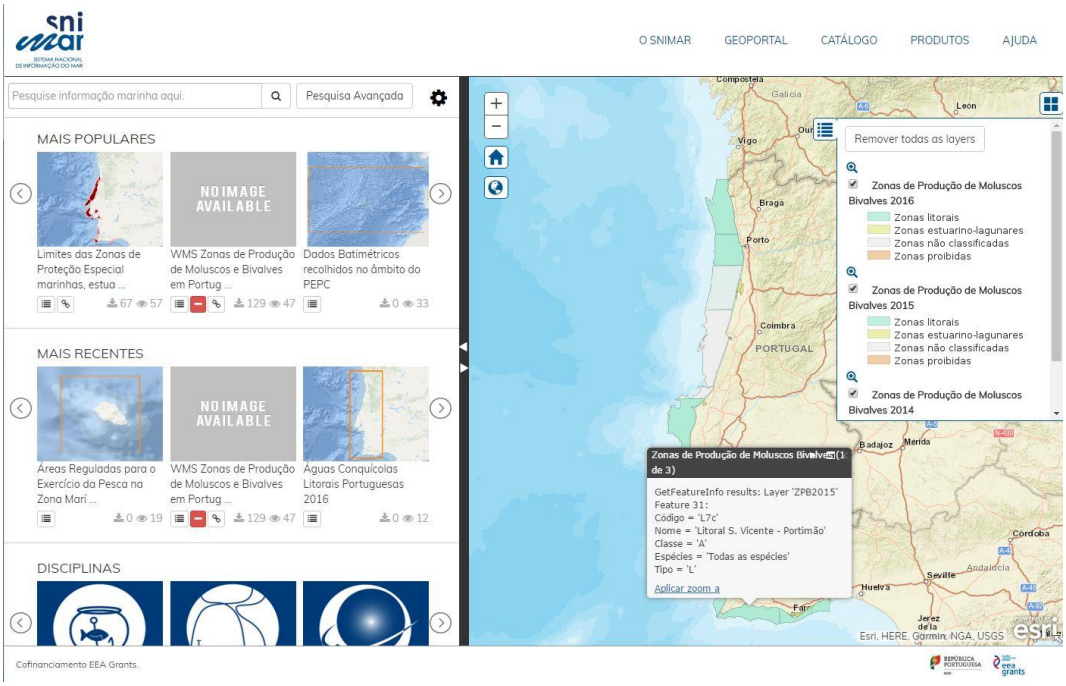

Figure 11 - SNIMar map discovery, legend and get map info

In April 2016 the final release of the geoportal was done. In these release information from the developed local-catalogues and the existing catalogue solution were integrated in the geoportal SNIMar catalogue.

The developed web applications from the local-catalogues are implemented over a VPN solution regarding the policies from each institution. At the production stage, from SNIMar geoportal, only the IPMA, Madeira and Others Local-catalogue have open access, through the internet, to their metadata and services.

The developed local-catalogues are:

IPMA, http://snimar.ipma.pt

ICNF, http://snimar.icnf.pt

DGRM, http://snimar.dgrm.mm.gov.pt/

EMEPC, http://snimar-vm.defesa.pt/

Madeira Government, http://snimar.madeira.gov.pt

Azores Government, http://snimar.madeira.gov.pt

Others, http://outros.snimar.pt

The existing ESRI catalogues are:

IH, http://geoportal.hidrografico.pt/geoportal

APA, http://sniamb.apambiente.pt/geoportal

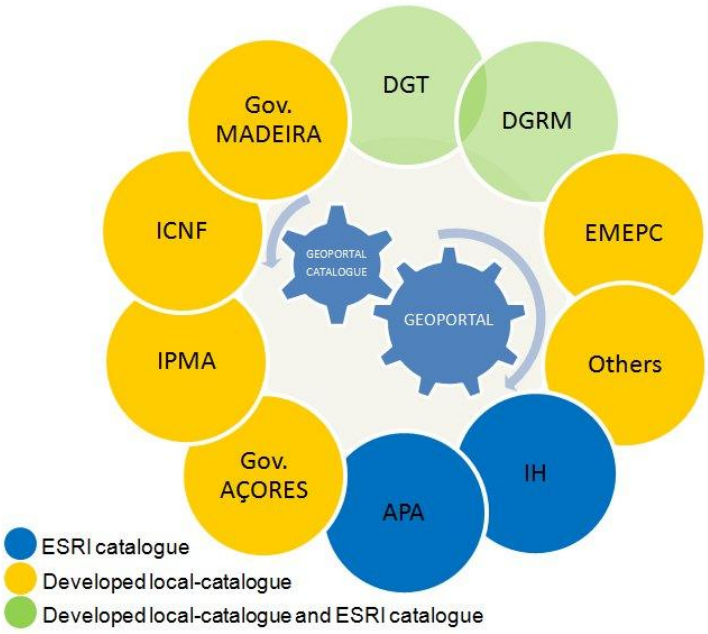

Figura 12- Infra-structure SNIMar map overview

The deliverables from this activity were:

- harvesting process implemented – SNIMar catalogue has been connected by harvesting to the SNIG catalogue and National Land Survey of Iceland catalogue;
- pre-production SNIMar geoportal - http://geoportal.snimar.pt/preprod/
- SNIMar geoportal - http://geoportal.snimar.pt/
- Support documentation for geoportal sustainability (Annex24)

4. Contribution to the outcomes

This WP is key to achieving both expected outcomes: “harmonization and synchronization of the hydrographical database system into one database completed” and to “data input to major international marine data sets or geodatabases provided”.

5. Contribution to the outputs

The correct conception of the geoportal will contribute to “create a Marine Spatial Data Infrastructure (MSDI) based on a Common Data Sharing Environment”, to “recover the historical marine information related to the sea” and to “increase availability of services provided on-line by public administration in the field of spatial databases on natural environment”.

WP #5 Outreach

1. Description and objectives

This WP aimed to disseminate project SNIMar and to achieve the specific communication goals that have been identified in the Communication Plan for the different target audiences (public administration – partner entities; public administration – other entities; universities and research centers; non-governmental organizations; business and industry; school community; general public). A Communication Plan was developed in February, 2015. An update of this plan was done in July, 2016. (Annex 25).

2. Performed tasks

During the implementation of the project the following communication tasks were developed:

a. Flyers
b. Roll-ups
c. Project briefcases
d. Promotional video - https://www.youtube.com/watch?v=0bALLTQ1loY
e. Website - www.snimar.pt)
f. Kickoff event organization
g. An interactive multimedia kiosk was acquired. The kiosk consists of a computer terminal for public usage which can perform multi-functional services with multiple media applications. It displays the SNIMar geoportal and the SNIMar interactive quiz in the contexts of communication events (seminars, forums, congresses, etc.).
h. A multimedia support was acquired. This equipment consists of a TV to display the promotion film of the SNIMar project and the promotional films for the school community in the contexts of communication events (seminars, forums, congresses, etc.).
i. A promotion bench for the stand to distribute institutional information about the project was acquired.

j. Promotional interactive game “Quizz SNIMar” was developed in a mobile and web version ; For this task, three human resources received specific training in “Specialized development of applications for iphone/ipad and android” .

a. “Specialized development of applications for android”; about 600 sets of questions/answers have been produced to feed the SNIMar Quiz app, of which 194 have been validated and inserted into the app. The IOS mobile version of the SNIMar Quiz was developed so as to cover the maximum of possible device ranges, both on iPhones and iPads. Once this application in installed in a device, the user will first enter a profile section where he/she may define a player name and avatar, and then returns to the home page. In this home page, the user is free to move between the Honor Roll, Settings and Information pages. When starting a game in Quick Mode, 10 questions are randomly selected to which the user must respond as fast as he can to accumulate more points. At each implementation of the application, whenever new questions are available, the user is asked about his intention to download them. In addition, in the Settings section the user is given the opportunity to download new questions if they exist. The technological development of an IOS mobile version of the “SNIMar quiz” app was already displayed.

k. Development of promotional films for the school community, as described in the Communication Plan:
    a. Series 1 – five films on the professionals that collect and process marine information. Five professionals were identified and contacted. All images have been captured and the films are currently at the editing stage)
    b. Series 2 - five animation films on marine processes and issues (upwelling; marine energy; marine productivity; hydrothermal fonts; wave generation) for which the collection of marine information has contributed to significantly advance current knowledge. For each film, the scientific contents, scripts and were developed. The team accompanied the development of the films (scenarios, 3D-graphics, scientific schemes, voices, sound) and fine-tuned the scripts and storyboards whenever necessary
    c. These educational resources have been developed in order to widely disseminate the geoportal to various audiences. They are free and easily accessible through general communication channels (YouTube). The SNIMar educational resources can also be used by teachers in their classrooms, with the support of the User manual (Annex 26)
l. The WP5 team has participated in the development of the web interface of the SNIMar geoportal, in collaboration with WP4.

During the implementation of the project, SNIMar was presented in several events that focus on marine, science and/or geographical information issues:

a. The SNIMar project was presented in the AFCEA Seminar on 11th March 2014, Paço de Arcos;
b. The SNIMar project was presented on 12th May 2015 in the Tenth Round of Sessions on Land Management/Third Round of Technical Sessions on Geographic Information entitled "Land Management and Geographic Information Systems: new challenges";
c. The SNIMar project was presented in Project presentations targeting the“information producers” of the following associated entities: Agência Portuguesa do Ambiente (APA), Direção Geral dos Recursos Marinhos (DGRM), Estrutura de Missão para a Extensão da Plataforma Continental (EMEPC), Governo Regional da Madeira

(GRM),Instituto de Conservação da Natureza e Florestas (ICNF), Instituto Hidrográfico (IH) and Instituto Português do Mar e da Atmosfera (IPMA);

d. Project presentation at the SciCom PT 2015 (http://www.snimar.pt/index.php?page=2&menu=4&sub=27&id=18);
e. Three project presentations at the INSPIRE Conference, Lisbon, 2015 (http://www.snimar.pt/index.php?page=2&menu=4&sub=27&id=20);
f. Presence at the Blue Business Forum, an event upheld by the Portuguese Government during the Blue Week Lisbon 2015 to promote the Blue Economy through research, technology and innovation (http://www.snimar.pt/index.php?page=2&menu=4&sub=27&id=19). SNIMar's participation in this event included:

    a. A project display that included the promotional video and the interactive game;
    b. A project presentation at the conference cycle held by the Calouste Gulbenkian Foundation;
    c. A project presentation at the 6th group meeting of European Union experts on Marine Spatial Planning;

g. The SNIMar project was presented to the committee of the Icelandic Ministry of Foreign Affairs, which was on an official visit to Portugal. The presentation took place at the *Calouste Gulbenkian Foundation*, 13th November 2015 in Lisbon, where several projects financed by the EEA Grants that included Icelandic partners were presented.
h. The SNIMar project was present at the 3rd edition of the Portugal Atlantic Conference, an event that focused on the potential for growth and internationalization of the marine economy. The SNIMar project was pesented in a panel dedicated to the projects included in the EEA Grants Programme "Integrated Management of Marine and Coastal Waters".
i. Several tools developed by the SNIMar project were presented to the project promoters and partners of the EEA Grants Program "PT02 - Integrated Marine and Coastal Waters Management", February 24th 2016 in the IPMA auditorium, in Algés. The presented tools were the SNIMar Profile, Collaborative Keywords app and SNIMar Metadata Editor . With the use of these three tools, the information shared by

entities and institution will be clearly organized. Consequently, users will be able to perform detailed and targeted searches on the SNIMar geoportal.

j. The SNIMar project was present at the Oceans Meeting in Lisbon on 2nd, 3rd and 4th of June, 2016. This event was included in Oceans Business Week.

k. SNIMar was present in the following events:

   a. "Por Novos Mares – Jornadas da Economia do Mar", which took place between the 8th and 10th of July in Sines;

   b. "Ao Leme com a Ciência Viva", Lisbon Science Festival that celebrated the 20th anniversary of "Ciência Viva no Verão", which took place on August 4 next to the Torre de Belém, Lisbon.

l. Two oral communications were presented in the Inspire Conference, Barcelona, 2016.

m. Two oral communications were presented to the VII Jornadas Ibéricas de Infraestructuras de Datos Espaciales, Barcelona, 2016.

n. Project presentation to the deputies of the Joint Research Center and the European Academies' Science Advisory Council on the 15th of November, 2016 in Paço de Arcos, Portugal.

o. Project presentation on the 14th Meeting of ESRI Users in Portugal, which took place on the 16th and 17th of November 2016 at Culturgest, Lisbon;

p. Final event organization, Lisbon, Centro Cultural de Belém, 19 de Abril de 2017;

q. Two communications were submitted to the VIII Jornadas Ibéricas de Infraestruturas de Dados Espaciais, Lisboa,15 - 17 novembro 2017;

3. Results achivied

The deliverables of the performed activities were:

a. Institutional communication products:

   a. Flyers (Annex 27)

   b. Roll-ups (Annex 28)

   c. Brief cases (Annex 29)

   d. Promotional gifts (Annex 30)

   e. interactive multimedia kiosk Interative

b. A website (www.snimar.pt) that has been continuously updated to include new information on project-related activities (e.g.: new contents, presentations, meetings, training sessions).
c. Educational resources:
    a. Five films on the professionals that collect and process marine information:

    http://www.snimar.pt/index.php?page=2&menu=4&sub=28

    b. Five animation on marine processes and issues (upwelling; marine energy; marine productivity; hydrothermal fonts; wave generation):

    http://www.snimar.pt/index.php?page=2&menu=4&sub=49

d. One promotional video: https://www.youtube.com/watch?v=aDemL8_Xv9Y
e. 16 communications in seminars, conferences and workshops (Annex 31)
f. 15 presences in events
g. A booklet about the project were produced (Annex32)
h. SNIMar Project won an award "Strategic Recognition" from the Journal of Sea Economy, 23rd June, 2017.

4. Contribution to the outcomes

With the development of these communication products (the two film series and the interactive quiz application), WP#5 will contribute to engage the information users with the geoportal, particularly the school community and the general public which constitute difficult target audiences. This way, WP#5 is contributing to enhance the number of consults to the geoportal, an important indicator for expected outcome of the project "Harmonization and synchronisation of the hydrographical database system into one completed database".

5. Contribution to the outputs

The communication tasks described above aim at engaging Portuguese marine information producers in the project, so that they actively share their information (data and metadata)

through the SNIMar geoportal. This way, WP#5 is contributing to the development of a comprehensive marine database, which contributes the project's outputs.