

EO Exploitation Platforms

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DEIMOS Group
Head of Data Systems

The logo for deimos, featuring a stylized orange wave above the word "deimos" in a bold, white, lowercase sans-serif font. Below "deimos" is the text "elecnor group" in a smaller, white, lowercase sans-serif font.
deimos
elecnor group

25th January 2018



SPACE

Expertise across the entire value chain in satellite systems
Deimos technology is present in more than 60 satellites



Capabilities to lead a complete space mission



PHASE 0



PHASE A



PHASE B



PHASE C/D



PHASE E



USER

DEFINITION

DESIGN

DEVELOPMENT

LAUNCH

APPLICATIONS





2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
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SARGO

Sensors, ...

FP7 EO, 220k€



Systems, Services

FP7 EO, 2.5M€

E-GEM

Sensors, Satellites, UAVs

FP7, 2.8M€

S1-CPAF

Systems

Sys

ESA, 1.3M€



Sensors, UAVs

H2020, 900k€



Systems, Services

H2020, 2.8M€



Systems, Services

ESA, 2M€



SAGA

Systs, Serv

Systs, Serv

EEA+Mar2020, 220k€



Satellites

H2020, 2.5M€



Systems, Services

H2020, 10M€

RPAS-MAR

Sensors, UAVs

EMSA, TBD



Systems, Services

H2020, 3M€



System, Challenges

H2020, 3€



Marine-EO

Sys, Serv

Sys, Serv

PCP, 700k€



Sys, Serv.



EO Exploitation Platforms

EO Exploitation Platforms:

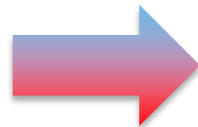
Interoperable set of system services supporting EO developers

Co-design:

Work on design of system in close connection with users

Users:

Developers of EO applications and tools



PILOT EO SERVICES



 Research and Scientific Communities

 Governmental Organisations

 Commercial Entities

 General public, Media, NGO, Education

EXPLOITATION TIER

Exploitation Layer

Scientific Data Exploitation

Public Sector Benefits

Industry Growth

Copernicus Services

Platform Services Layer

 Identity Management

 **tep**
thematic exploitation platform

 Open Earth Engine

 Data Cubes

 Proba-V MEP


National/Commercial Platform Services including Coll. G/S

Resources Tier Layer

Data
ICT

 Copernicus DIAS Back-Office

 National/Commercial Mission Platforms


National/Commercial Platform Services including Coll. G/S

Data Generation Layer

Ground Segment
Infra-structure

 **esa**
ESA
Heritage, Earth Explorer,
Third party Operations

 Copernicus Sentinels Operations

 **EUMETSAT**


National/commercial Operations



Research and Scientific Communities



Governmental Organisations



Commercial Entities



General public, Media, NGO, Education

EXPLOITATION TIER

Exploitation Layer

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Public Sector Benefits

Industry Growth

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Platform Services Layer



Identity Management



thematic exploitation platform



Open Earth Engine



Data Cubes



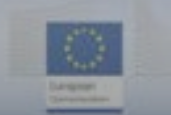
Proba-V MEP



National/Commercial Platform Services including Coll. G/S

Resources Tier Layer

Data ICT



Copernicus DIAS Back-Office



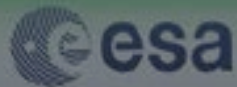
National/Commercial Mission Platforms



National/Commercial Platform Services including Coll. G/S

Data Generation Layer

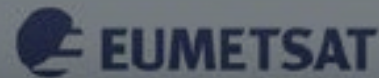
Ground Segment Infra-structure



ESA Heritage, Earth Explorer, Third party Operations



Copernicus Sentinels Operations



National/commercial Operations



EO EXPLOITATION PLATFORMS

Several coordinations in H2020 activities

Participation in ESA Hydrology TEP

EEA Grants

Participation in OGC Testbed 14 (security and user management)

Pre-Commercial Procurement

Co-chairing the EO Exploitation Platforms OPGC DWG (+ESA, +NASA, +TBD)

More than **20M€** funding in Exploitation Platform technologies

Collaborative approach with other system developers

Working with more than 30 service and application developers

Universities, Research centres SMEs

in Exploitation platforms technology development -> **co-design**

Across many domain areas



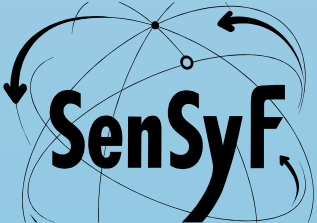




Services for Sustainable Fishery: Attract funding and ensure sustainability



Main targets:

- Engage users in co-designing applications
- Work with application developers to improve impact on users' operational pipelines and responsibilities
- Scale to other geographical and thematic
- Operationalise services for public institutions (<5 years)
- Develop commercial marine services for the Atlantic (<5 years)



Initiative	# Services	Pilots Thematic Areas	Targets
	7	<p>Generic (water, polar, vegetation, spectro-temporal integration, land use / land cover, agriculture support)</p>	Ingestion of Copernicus data, tools - SenSyF SDK, integration of pilot services in cloud platform
	3	<p>Maritime Monitoring (port entry, fishing, interactive analysis)</p>	Data preparation, data hub & catalogue, geo-portal
	6+8	<p>Coastal Research (water quality, bathymetry, storm surge, vessel detection, oil spills + 8 masters thesis)</p>	Tools - Co-ReSyF SDK, integration of pilot services in cloud platform
	11+	<p>Monitoring of SDGs (agriculture, biodiversity, security, artic, megacities, geohazards, territory, food security, smart cities, energy, +marine)</p>	Data ingestion & hub – catalogue, QoS and community feedback, user management, cloud + DIAS (ongoing), operations & monitoring
	3x6	<p>Challenges (food security, intelligence, geohazards, ...)</p>	Data ingestion and transfer, data analytics including ARD / data cubes, data visualisation



VIRTUAL RESEARCH, DEVELOPMENT AND OPERATIONS ENVIRONMENT



Research Environment

Target users: researchers

coresyf.eu
geportal.coresyf.eu

 Oil spill detection	 Vessel detection	 Coastal Altimetry
 Hyper-temporal Time Series	 Water quality & benthic habitat mapping	 Optical & SAR Bathymetry



R&D Environment

Target users: service developers
national authorities

simocean.pt
geoportal.simocean.pt/

	FISHING AREAS CHARACTERIZATION Prediction of fish distributions and potential areas of catch for the main species along the Portuguese coast
	SEA STATE INDEX FOR HARBOUR APPROACHES To provide access to real-time sea state information based on high-resolution forecast models for the port authorities.
	COMPARISON OF METEO-OCEANOGRAPHIC PARAMETERS Integrated web visualization environment of different meteo-oceanographic fields



R&D & Operations Environ.

Target users: service developers

nextgeoss.eu/





Services for Sustainable Fishery: EASY ACCESS TO EO AND NON-EO DATASETS



Sentinel 1A/B

Sentinel 2A

Sentinel 3A

Jason-1/2/3

ENVISAT

ERS-1/2

SARAL/AltiKa

Landsat 8

Specific scenes from

VHR SAR and Optical

HYCOM sea state data

AROME meteo parameters

SMARTWAVE

wave, sea floor depth

SWAN

wave, sea floor depth data

ECMWF wave data

CMEMS Ocean Colour, SST

Coastal radar currents data

Fish Capture Data

GDACS

PLAN4Aall

JRC

Proba-V

CMEMS

GOME-2

MODIS

Sentinel-1

Sentinel-2

Sentinel-3

... and growing



MELOA



MARINE-EO



NEXTGEOSS USER EXPERIENCE

European Data Hub and Platform

“Need to bridge the gap between research and operational services”
Marco Weydert (EC)



NEXTGEOSS

Contributing to the Vision of GEO



NEXTGEOSS

European Data Hub and Platform

FIRST PUBLIC RELEASE

Feb 2019

Nextgeoss.eu



NEXTGEOSS

Contributing to the Vision of GEO



NEXTGEOSS PARTNERS

European Data Hub and Platform



Schweizerische Eidgenossensch
Confédération suisse
Confederazione Svizzera
Confederaziun svizra



WORLD METEOROLOGICAL ORGANIZATION



VIDERUM



University of Reading



BLB



WAGENINGEN UNIVERSITY & RESEARCH



HS-RS

UNIVERSITY OF TWENTE.



Norsk institutt for luftforskning
Norwegian Institute for Air Research

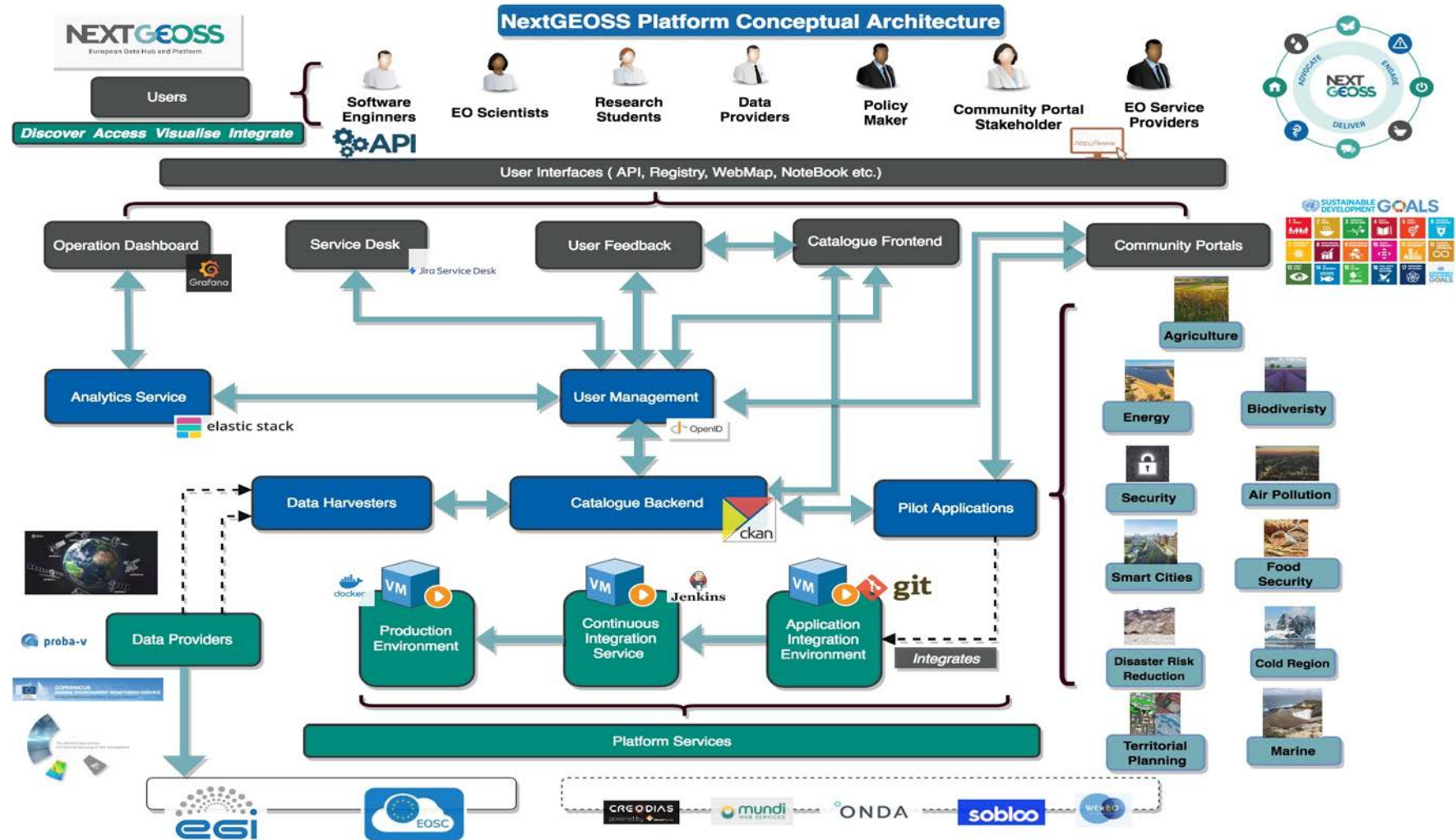


Consiglio Nazionale delle Ricerche



NEXTGEOSS ARCHITECTURE

European Data Hub and Platform





NEXTGEOSS PILOT SERVICES

European Data Hub and Platform

Innovative
Pilot Services

IP1
Agricultural
Monitoring



IP2
Biodiversity



IP3
Space &
Security



IP4
Cold Regions



IP5
Air Pollution
in Mega Cities



IP6
Disaster Risk
Reduction



NOA

Business
Pilot Services

BP1
Territorial
Planning



BP2
Food Security



BP3
Smart Cities



BP4.1/2
Energy*



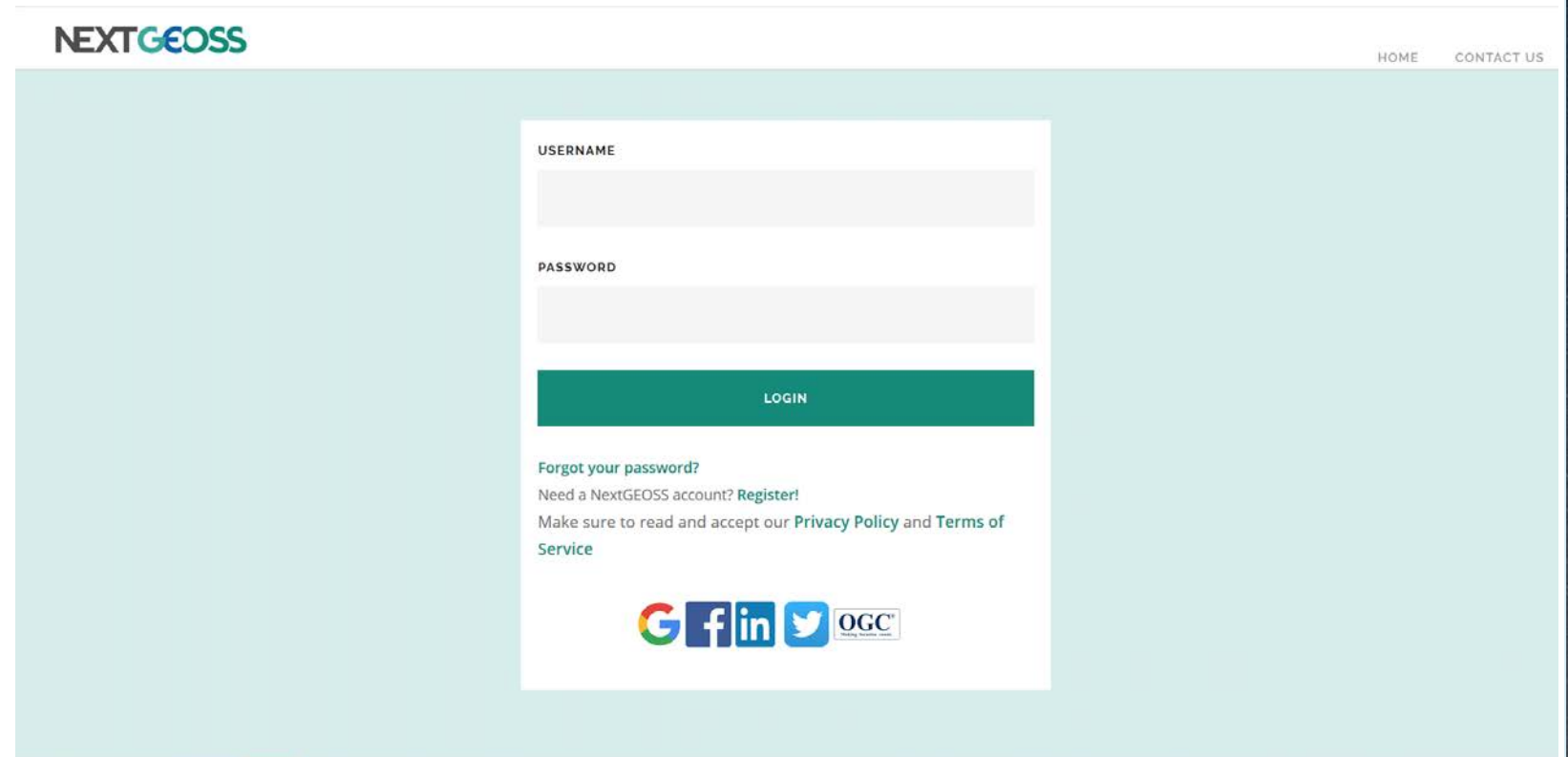
BP5 Marine
Drift





USER MANAGEMENT

- Integrated User Management
- Using OGC Standards
- Integrated SSO



NEXTGEOSS


HOME CONTACT US

USERNAME

PASSWORD

LOGIN

[Forgot your password?](#)
Need a NextGEOSS account? [Register!](#)
Make sure to read and accept our [Privacy Policy](#) and [Terms of Service](#)





DATA HARVESTERS AND CATALOGUE BACKEND

- Data Harvested, in Catalogue:
 - Joint Research Centre (2 collections)
 - GDACS Average Flood Data (2 collections)
 - Plan4All (1 collection)
 - Proba-V (18 collections)
 - CMEMS (7 collections)
 - GOME-2 (5 collections)
 - MODIS (12 collections)
 - Sentinel-1 (3 collections)
 - Sentinel-2 (2 collections)
 - Sentinel-3 (10 collections)
- Data Harvested, in Catalogue



- Open Catalogue
- Integrated QoS

FIRST PUBLIC RELEASE

Feb 2019

Nextgeoss.eu



VIDERUM



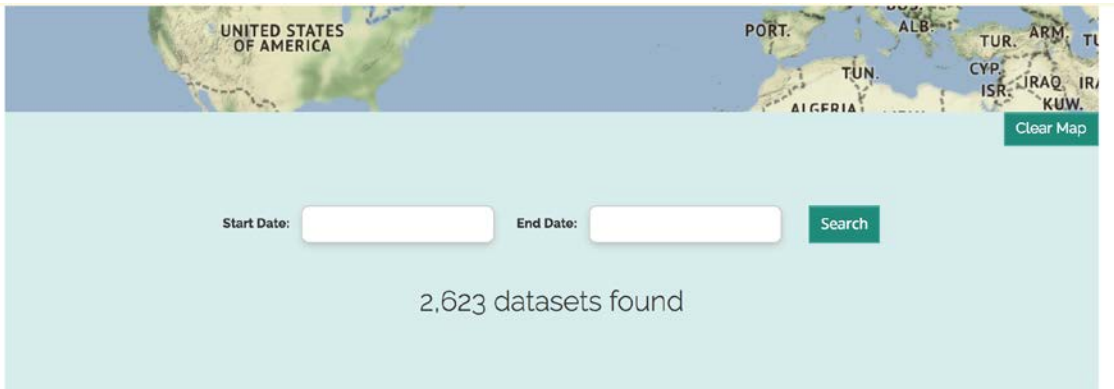
ckan



OPEN KNOWLEDGE

CATALOGUE FRONT END AND API

- Online User Interface for Search and Discovery
- OpenSearch and API for integration in application
- Developed on OpenSource CKAN OKF and Viderum



me / OpenSearch

Home Collections Datasets Providers Topics

Opensearch

The NextGEOSS data hub provides an OpenSearch interface supporting two-step search. Below you will find information about accessing the OpenSearch description documents and the search endpoints, as well as a description of the available parameters. You will need a client to use OpenSearch. If you do not have an OpenSearch client or you are not a developer using the OpenSearch interface as the backend of your client or project, the OpenSearch interface is not for you. Please use the Web interface.

Accessing the Description Documents

The description documents are available at the following endpoint: <https://catalogue.nextgeoss.eu/opensearch/description.xml?osidd={OpenSearch Description Document ID}>. The osidd parameter is required. There is one description document for step one of two-step search (or 'collection search') and each individual collection has its own description document. The search results of collection search include a link to the description document for each collection, so you only need the description document for collection search in order to begin using the OpenSearch interface. Your client will discover the relevant collection-level description documents for you as you search.

Access the collection search description document here:
<https://catalogue.nextgeoss.eu/opensearch/description.xml?osidd-collection>

Accessing the Search Endpoints

The search endpoints are located at https://catalogue.nextgeoss.eu/opensearch/collection_search.atom? (for step one or collection search) and <https://catalogue.nextgeoss.eu/opensearch/search.atom?> (for step two or product search/search within a given collection).

The description documents instruct your client how to query each endpoint.

Search Parameters

Consult a description document and the related standards for details about the supported search parameters. The data hub supports the OpenSearch Geo and Time extensions.

By default, the following parameters are supported



USER FEEDBACK

- User Feedback to be integrated by Pilots in Community Portals
- Simple Feedback on Data
- Developed by CREAM and UAB



Universitat Autònoma
de Barcelona

Additional Info

Metadata Updated on NextGEOSS Catalogue	January 17, 2019, 6:37 PM (UTC+00:00)
Metadata Created on NextGEOSS Catalogue	January 17, 2019, 6:37 PM (UTC+00:00)
Identifier	PROBAV_LEFT_L2A_20180802_230105_1KM_V101
Start Time	2018-08-02T23:01:05Z
Stop Time	2018-08-02T23:05:49Z
description	PROBA-V Level2A - 1KM segments contain the Level 1C (P product) data projected on a uniform 1Km grid.
UUID	d57e62e1-a876-4d6d-afe1-87a23e3b084e

Community Feedback

No comments yet. Be the first to leave feedback about this dataset.

Add feedback



ANALYTICS SERVICE AND OPERATION DASHBOARDS

- Extract analytics on system execution state and performance
- Display data to operator for diagnostics in real time and past
- Warn operator on critical occurrences



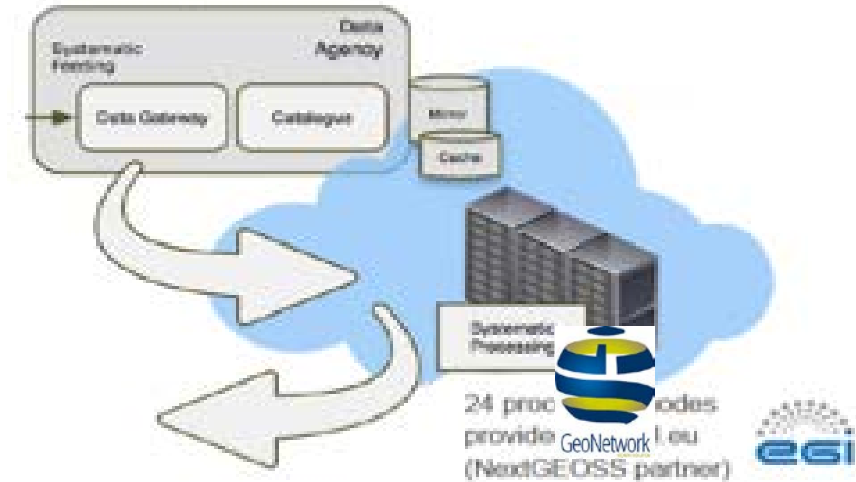
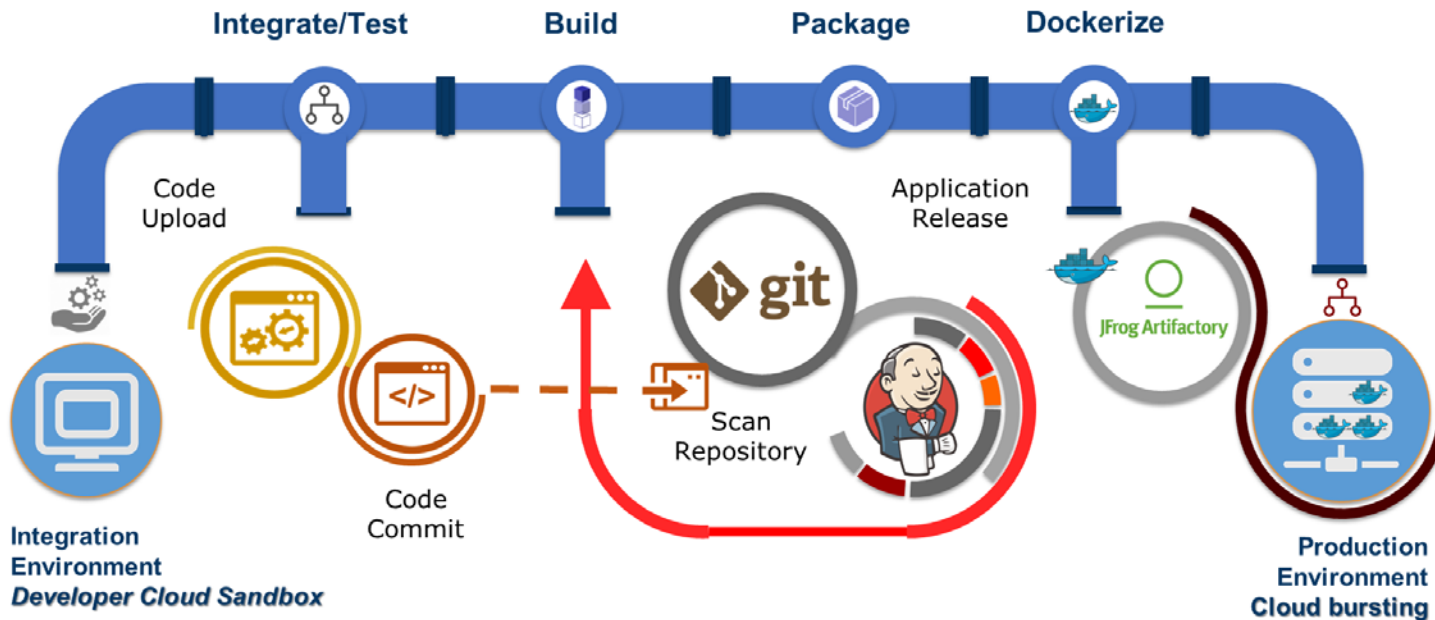


APPLICATION INTEGRATION AND PRODUCTION SETUP

- Setup environment
- Integrate pilot and tools
- Test and Validate
- Transfer for Operations

Integrate ➤ *Build* ➤ *Package* ➤ *Deploy*

→ Continuous Integration/Deployment →



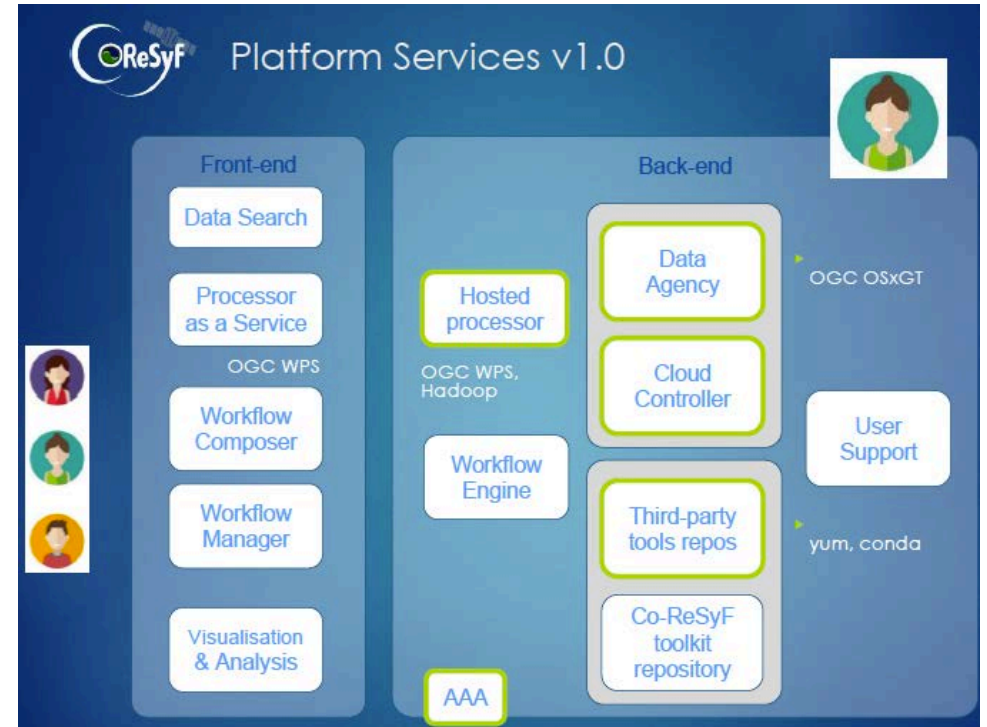


Coastal Research Synergy Framework

- Open source
- Data + tools + processing
- Target:
coastal researchers & developers
non EO communities

Aim: easy and fast

data access
processing
tools
expert support



for

developing
building
deploying
operating



Platform Services v1.0



Front-end

Data Search

Processor
as a Service

OGC WPS

Workflow
Composer

Workflow
Manager

Visualisation
& Analysis



Back-end

Data
Catalogue

OGC OSxGT

Cloud
Controller

User
Support

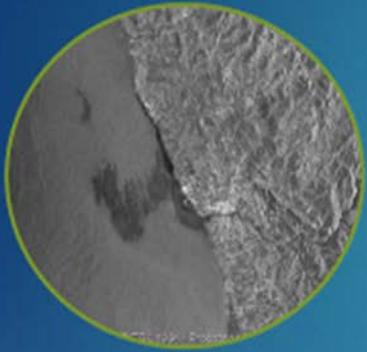
Third-party
tools repos

yum, conda

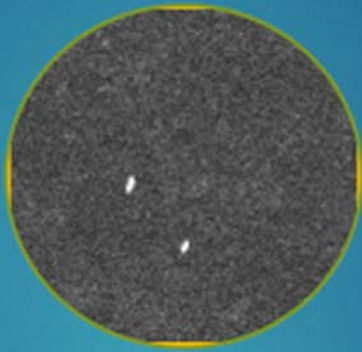
Co-ReSyF
toolkit
repository

AAA

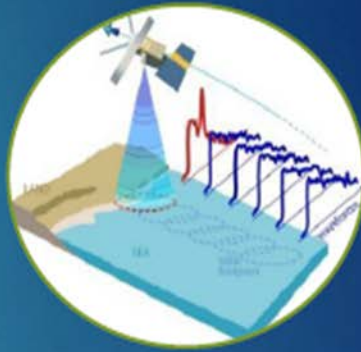
Oil spill detection



Vessel detection



Coastal Altimetry



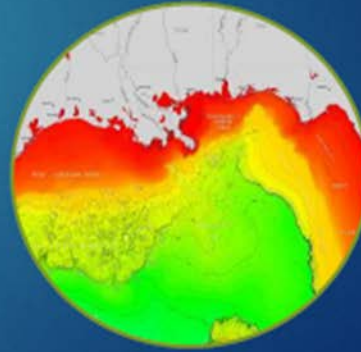
Hyper-temporal Time Series



Water quality & benthic habitat mapping



Optical & SAR Bathymetry



Back-end

Data catalogue

OGC OSxGT

Cloud controller

User Support

Third-party tools/repos

yum, conda

Co-ReSyF toolkit repository

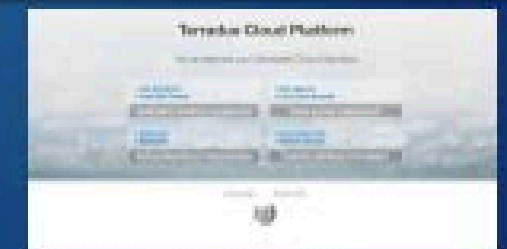
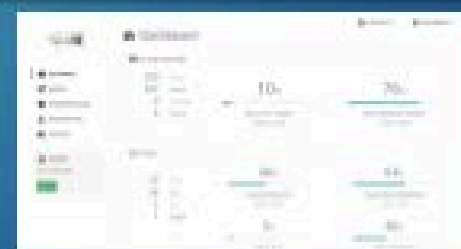
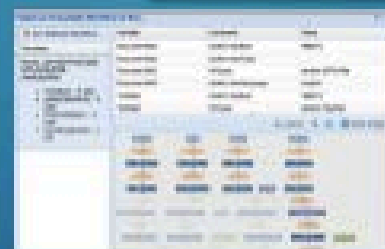
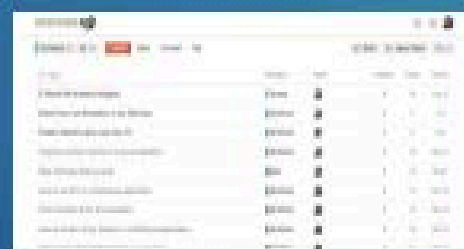
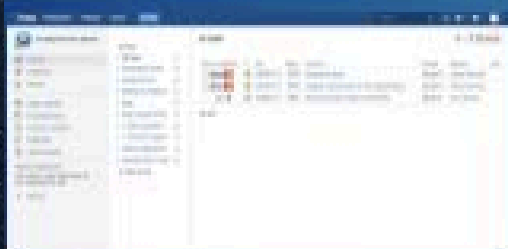
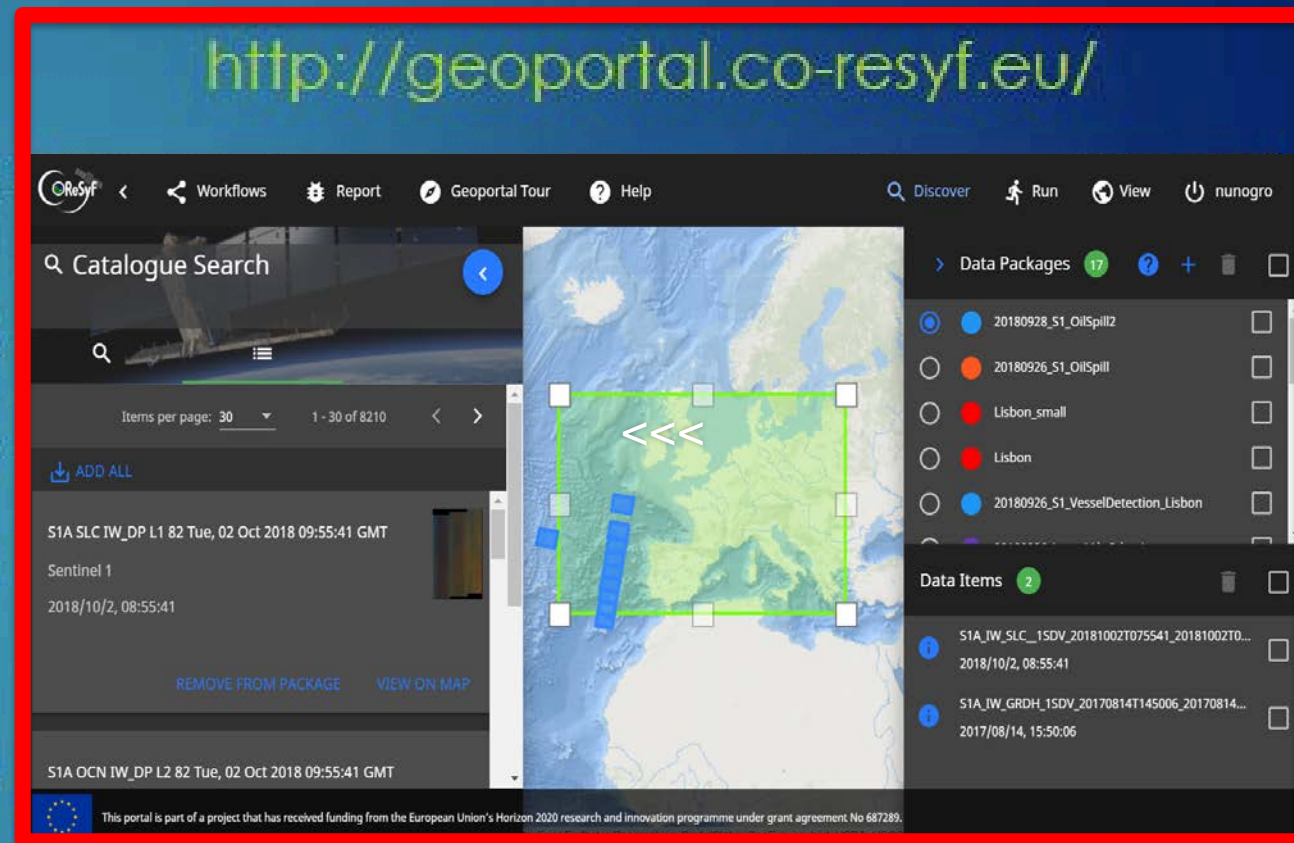
Manager

Visualisation & Analysis

AAA

Geoportal:

Search for data, create data packages, run applications and visualise results



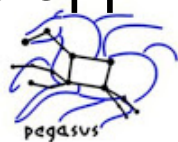


WORKFLOW MANAGER

- Re-use existing modules/services
- Compose applications in Graphical interface



WINGS



pegasus



camunda



OGC[®]
Making location count.

WPS



kubernetes



docker

Variable	Constant	Value
Positionations	workflowParameterValue	WV
u_gfs	workflowParameterValue	4326
method_inversion	workflowParameterValue	direct

The screenshot shows a graphical workflow editor with a list of components on the left and a main workspace on the right. The components list includes: CoReSyF_Oil_Spill_Detection, CoReSyF_Oil_Spill_Detection_2, CoresyFilling, ImageCrop, Image_Reclassification, Image_mask, Land_Sea_Mask, OHMA_Separability_Workflow, Polygonize, SAR_Calibration_with_EC0G_SpeckleFilter, SAR_Calibration_with_EC0D_SpeckleFilter, SAR_bathymetry, SAR_bathymetry_noPar, Test_Subset, UCC_Vessel_Detection, VectorCreator, VectorEditor, Vessel_Detection_v2, cp_test, and create_dummy_raster. The main workspace shows a complex flowchart with nodes and arrows representing the workflow logic.



NEXTGEOSS OPEN CALLS

European Data Hub and Platform



1. Integration of new **pilot services** in operational environment:

- *Fully scalable resources*
- *Cloud vendor independent environment*
- *Easy access to data sources*
- *Dedicated operation dashboards*

2. Cataloguing **data** from projects and services

- Providing single access point to (mainly) European data sources

3. Cataloguing **services** and **projects**

- Increase visibility for distributed activities and services

<https://nextgeoss.eu/engage-with-nextgeoss/>



RECOMMENDATIONS

- Establish clear targets to address:
 - E.g. link to SDG indicators, Marine Strategy Framework Directive, etc.
- Create an interoperable ecosystem of Atlantic-focused services
 - Collaborative, i.e. based on interoperable micro-services
 - Standardised interfaces: REST / WPS / WMS, etc.
- Focus in bridging the gap from R&D to operational services
- Engage of Marine/Maritime service users for the requirement & validation
- Engage National and International Authorities for testing & validation data
- **Regional Coordination XXX**
- Regional Clusters -> AtlanticGEOSS Thematic Working Groups
 - ESA Should lead role in the AtlanticGEOSS Governance -> Connect to GEO & SDGs
- Have also a clear R&D, longer term scientific agenda
 - E.g. Use of AI, EO satellite data assimilation, coastal VHR, etc.



Thank you!

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