

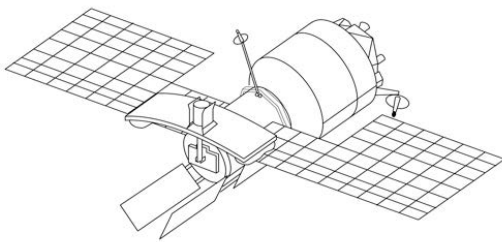


BEYOND

Building a Centre of Excellence
for EO-based monitoring of Natural Disasters



BEYOND Ground Segment Facility The Hellenic Sentinel Data Hub (Mirror Site)



BEYOND

- www.beyond-eocenter.eu



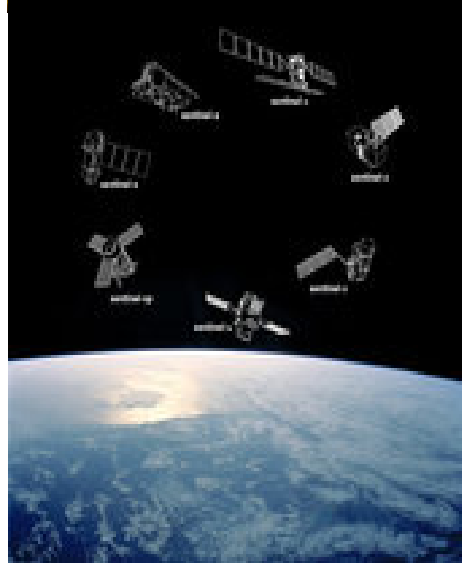


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Building a Centre of Excellence for EO-based monitoring of Natural Disasters



The 1st Collaborative Ground Segment (Mirror Site) for Sentinel satellite missions was signed between ESA and NOAA on 12 May 2014



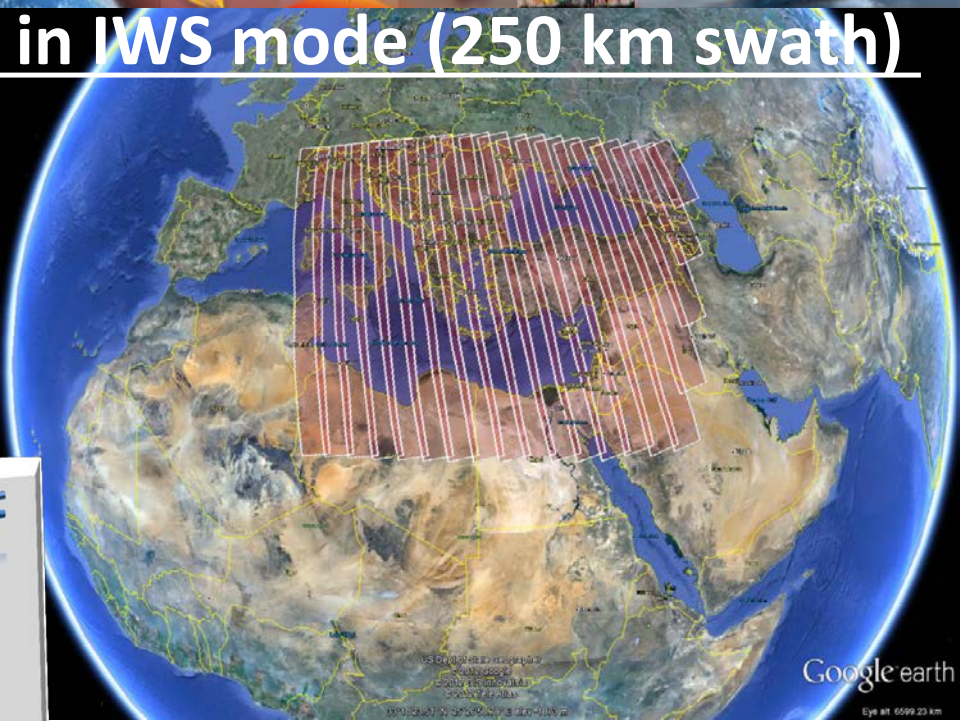


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Sentinel-1A/2A passes in IWS mode (250 km swath)



**OFFICIAL ANNOUNCEMENT OF
HELLENIC MIRROR SITE
ATHENS SPACE EXPO:
28 MARCH – 5 APRIL 2015**



[HTTP://SENTINELS.SPACE.NOA.GR](http://sentinels.space.noa.gr)



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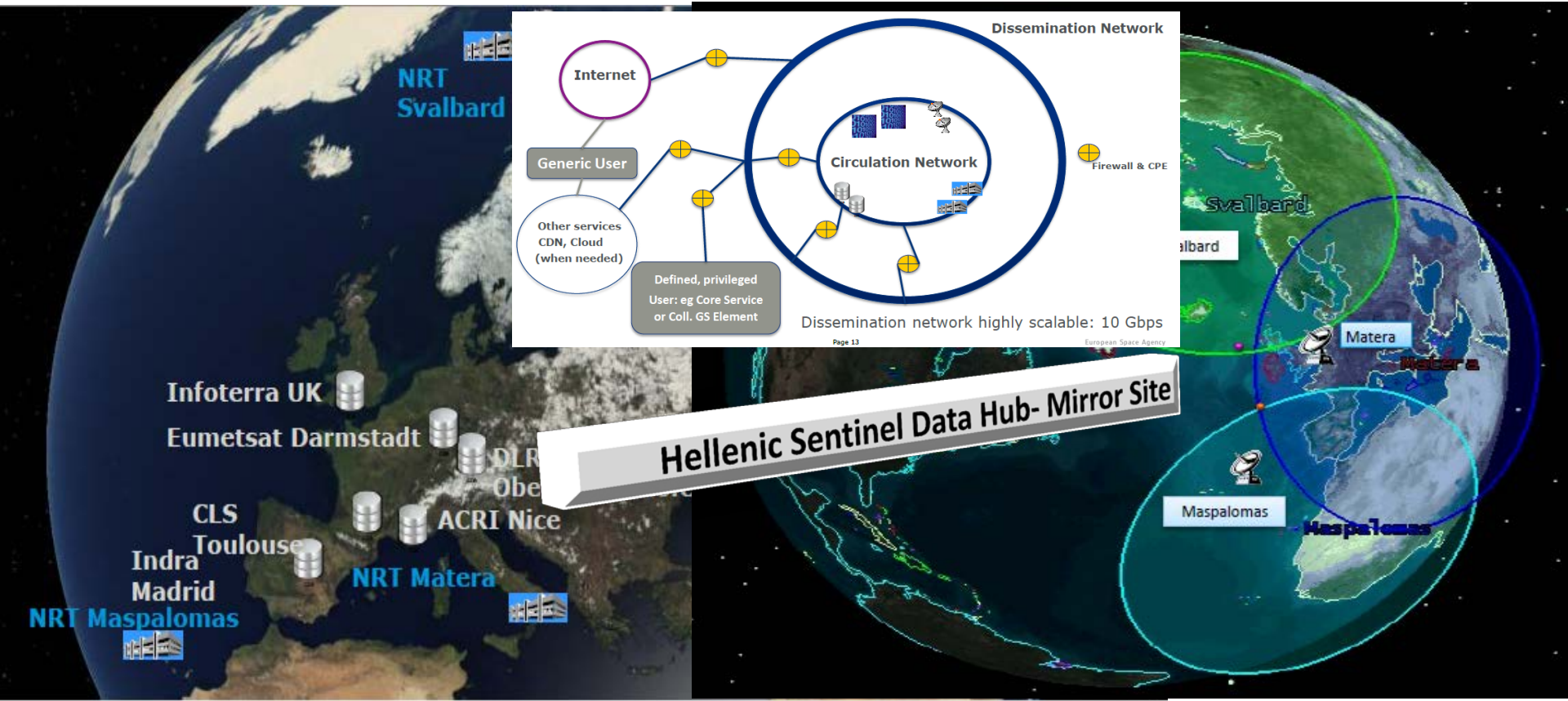


MASSIVE: Mapping Seismic Vulnerability and Risk of Cities
European Commission - DG ENV A.3 - Civil Protection

- Built up an additional pick up point (**Mirror Site**) of Sentinel data at the premises of the **National Observatory of Athens (NOA)** in collaboration with the **Greek Research and Technology Network GRNET S.A.** the Greek Partner of the GEANT network.
- **Disseminate Sentinel data and higher level Copernicus products** to the End User & Scientific communities mainly at national level, but also to neighboring South Eastern Mediterranean and Balkan countries on the basis of the existing and/or future transnational needs and cooperations.
- The whole project is in line with the ongoing initiatives and strategic objectives for building at NOA a Center of Excellence for EO based monitoring of the Environment and Natural Disasters and processing of Space Data.

➤ a **GSC Core Ground Segment**, with **GSC-funded Functions and Elements**, providing :

- the primary access to Sentinel Missions data as well as
- the coordinating access functions to Contributing Missions data



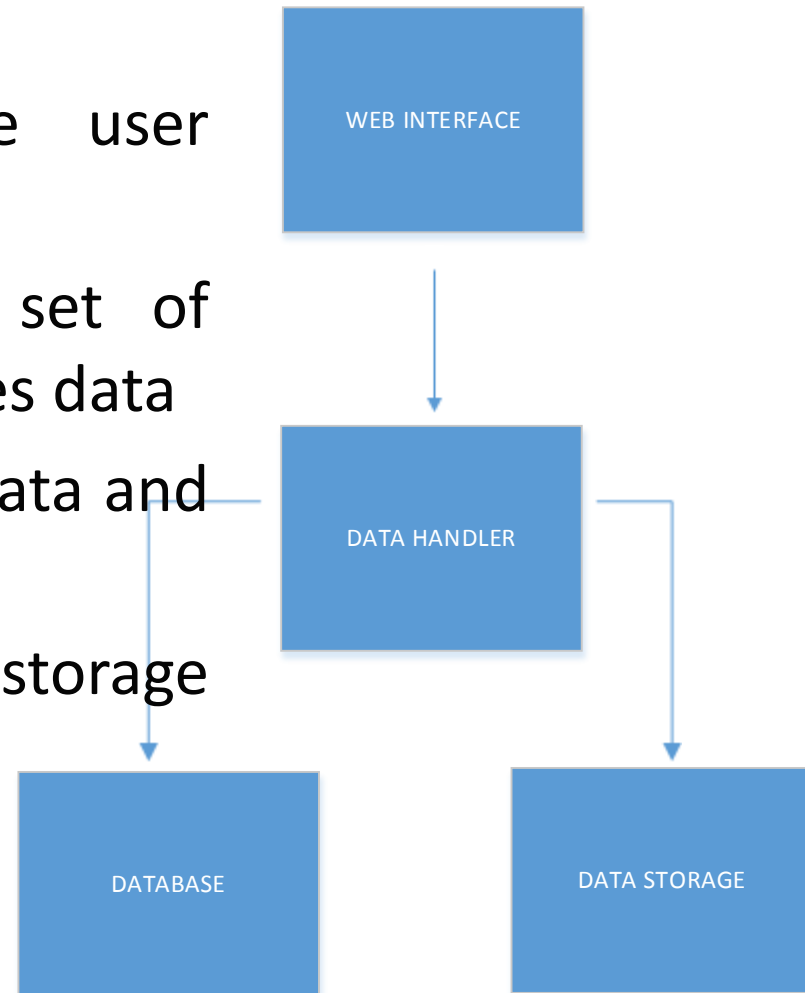
3Level Architecture

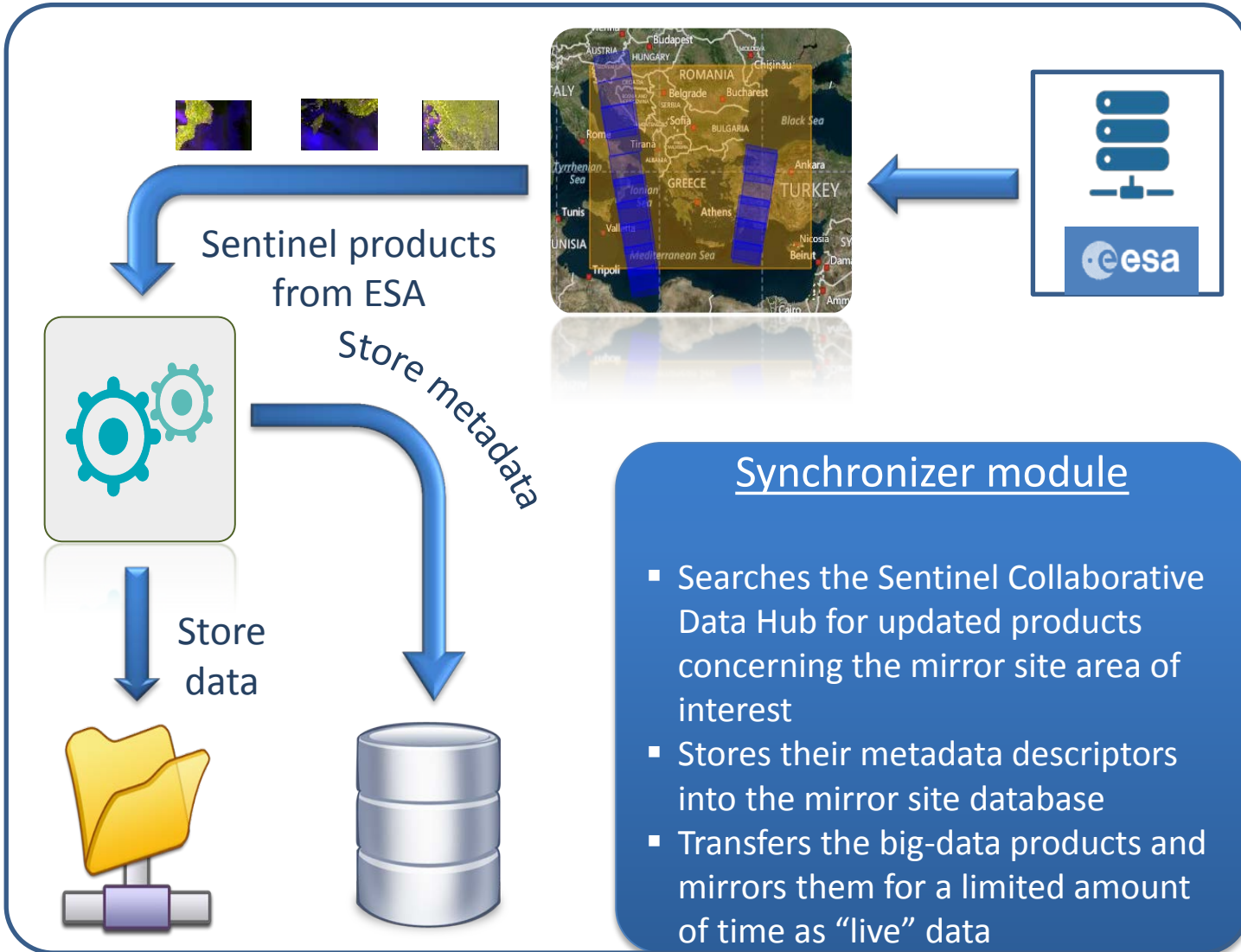
➤ **Web Interface Level 1st:** the user interaction level

➤ **Data Handling Level 2nd:** The set of scripts that downloads and organizes data

➤ **Database Level 3rd:** storing metadata and systemwide events

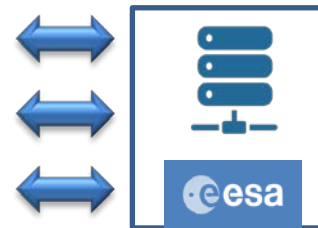
➤ **Data Storage Level 3rd:** physical storage of data



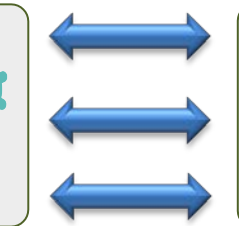
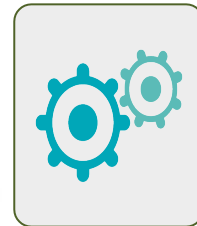
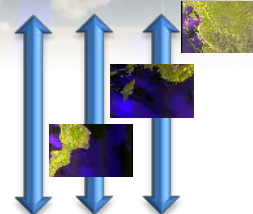


Downloader module

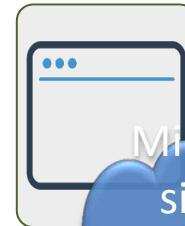
- Gathers the Mirror Site user requests posed through the GUI in the form of orders (i.e. collections of products).
- Concurrently downloads products that are not lying in the local storage.
- Informs users for the availability of the big data products in order to download them via the Mirror Site facilities and its Web GUI.



Concurrent download of Sentinel products from ESA



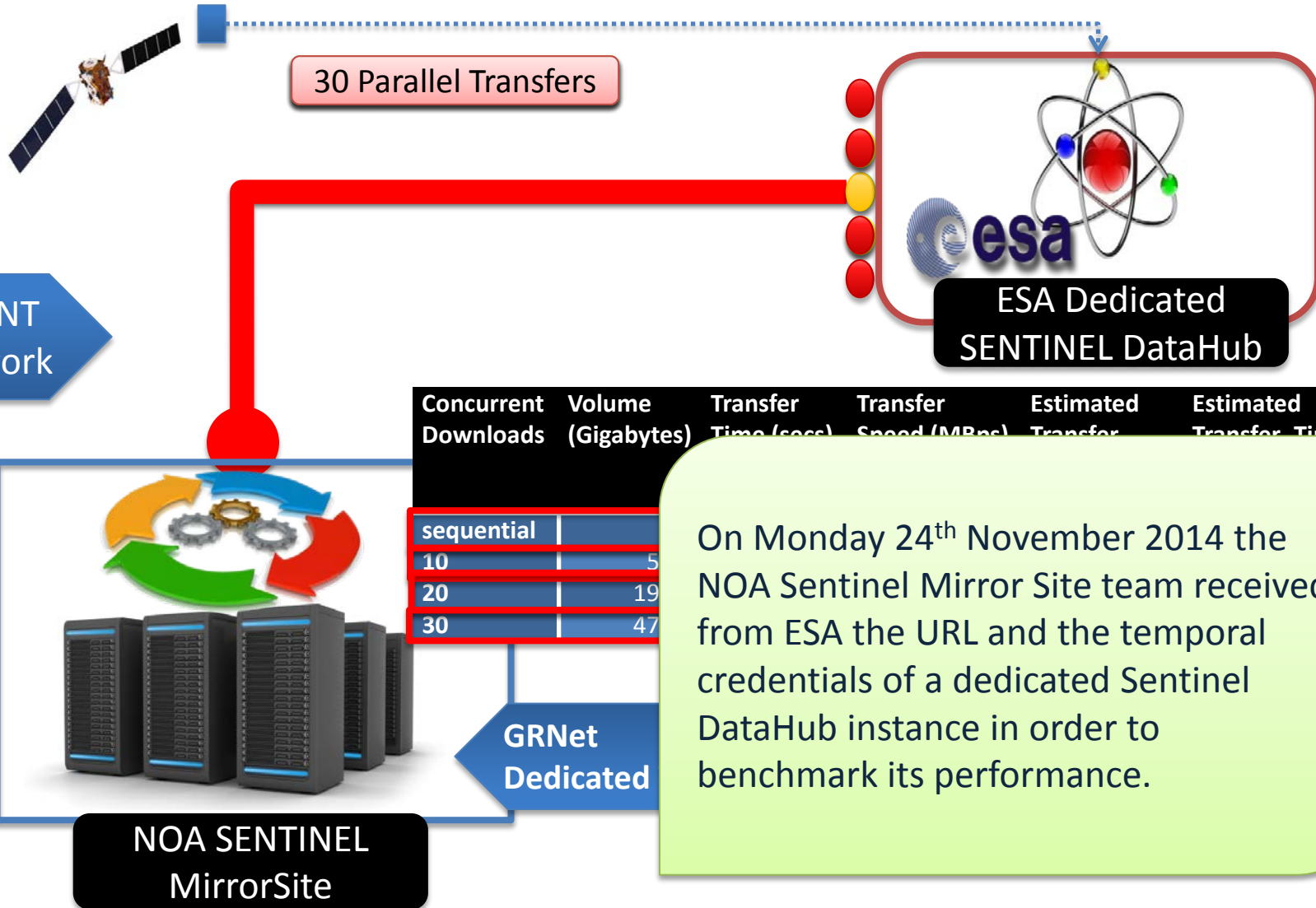
Requests of users for Sentinel products



Concurrently store data



Concurrently update metadata



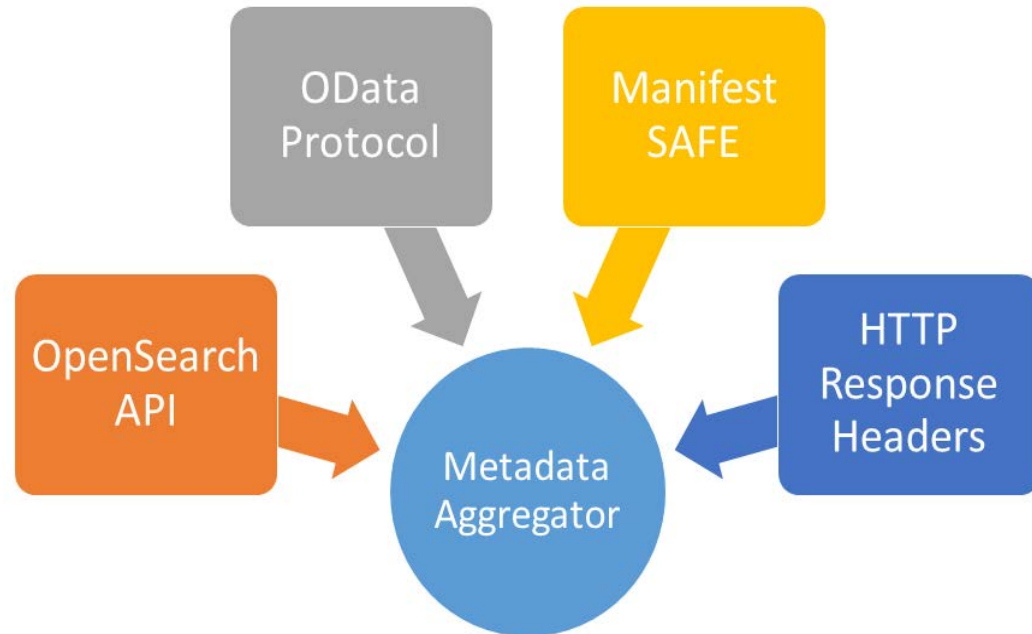
On Monday 24th November 2014 the NOA Sentinel Mirror Site team received from ESA the URL and the temporal credentials of a dedicated Sentinel DataHub instance in order to benchmark its performance.

➤ Four steps in order to aggregate all the metadata for a Sentinel product:

1. Get metadata through the ESA's OpenSearch API.
2. Get metadata through the ESA's OData protocol.
3. Get metadata from the Product's manifest file in SAFE format.
4. Use HTTP Response headers.

- Parse metadata.
- Rename metadata.
- Catalogue metadata.

Hellenic Sentinel Data Hub The BackEnd architecture Metadata Aggregation/Cataloguing



Statistics on Users & Data Traffic

other (17)

United States

China

In a few months of operations

- Number of registered Users : 160
- Size of downloaded files: ~440 GB

The Greek Mirror Site is advertised through the ESA portal to be known in larger audiences

- Italy
- Greece
- Romania
- Canada
- France
- Belgium
- Germany

- The distribution of IP addresses accessing the Mirror Site indicates that most visits come from the Greek domain, while there is a considerable number of international visitors

Greece

- Most registered users are from Greece but also a number of European and non European countries (France, Belgium, Italy, Romania, Germany, Canada, etc).



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Hellenic National Sentinel Data Mirror Site

Provided by the: National Observatory of Athens
 Powered by the: Greek Research & Technology Network

OVERVIEW ABOUT User Name Password Login

OVERVIEW

The Hellenic National Sentinel Data Mirror Site is a web based system designed to provide EO data users with Search and Dissemination capabilities for the Sentinel products.

This current version is the first operational prototype developed under the current EU-ESA GMES / NOA agreement.

Detailed information on Sentinel products and Data Access mechanisms is available at <https://sentinel.esa.int/web>

References

- ▶ <http://www.copernicus.eu/>
- ▶ <https://sentinel.esa.int/>

NOA Sentinel Mirror Site

GUI

Provides a registration mechanism so that new users can obtain access to Catalogue Search and

Order facilities

Register at the Hellenic National Sentinel Data Mirror Site. [REGISTRATION](#)

[View the Hellenic National Sentinel Data Mirror Site User Manual.](#)

NOA Hellenic National Sentinel Data Mirror Site Team
NOA Official: Prof. Kanaris C. Tsinganos, President of NOA
Scientific Coordinator: Dr. Haris Kontoes, Research Director
WebMaster: MSc. Themistocles Herekakis, Research Associate
Development: MSc. Vassilis Tsironis, Research Associate
Curator: Mr. Vaggelis Papakirikou, Research Associate

National Observatory of Athens

Last Updated: 12 February 2015
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 NOA Web Site: www.noa.gr
 IAASARS Web Site: www.astro.noa.gr
[Contact Us](#)

Web Template created with Artisteer



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Hellenic National Sentinel Data Mirror Site

Provided by the: National Observatory of Athens
Powered by the: Greek Research & Technology Network

OVERVIEW ABOUT

thekek | | Login

OVERVIEW

The Hellenic National Sentinel Data Mirror Site is a web based system designed to provide EO data users with Search - Cataloguing - Order and Dissemination capabilities for the Sentinel products.

This current version is the first operational prototype developed under the current EU-ESA GMES / NOA agreement.

Detailed information on Sentinel products and Data Access mechanisms is available at <https://sentinel.esa.int/web/sentinel/sentinel-data-access>

References

- ▶ <http://www.copernicus.eu/>
- ▶ <https://sentinel.esa.int/>

Register
View the

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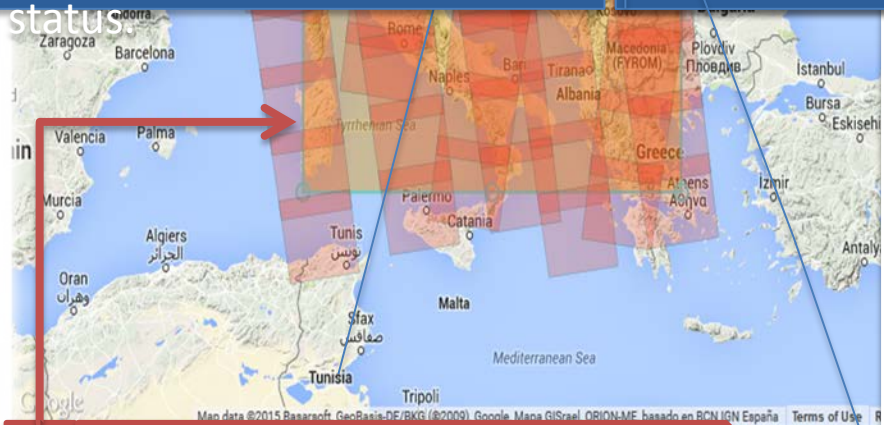
Web Template created with Artisteer.

...with the applied credentials users may login to access the Search – Order and Data access facilities

Information activated via

...the catalogue of queried products provides more information regarding the spatial coverage, the attributes and their order status.

.. and then by querying the desired date range and product attributes...



- 
- 
- 

In order

Remove from order

Add to order

Show 10 entries

QLook	Platform	Level	Instrument	Prod.Type	Mode	Swath	Direction	Polarization	Start Date	Stop Date	Preview	Order
	SENTINEL-1	SAR Slice	SAR	RAW	IW		ASCENDING	VV	2015-01-27 17:22:33.294807	2015-01-27 17:23:05.094094		
	SENTINEL-1	SAR Slice	SAR	RAW	IW		ASCENDING	VV	2015-01-28 16:23:31.023508	2015-01-28 16:24:03.4235		
	SENTINEL-1	SAR Slice	SAR	RAW	IW		ASCENDING	VV	2015-01-27 17:20:53.293342	2015-01-27 17:21:25.093338		

Add to Order

The Cart preview page offers cart management facilities. Users can submit the present session's selected products thus creating a new order cart...



OID	Date Submitted	Date Expired	Status
Order with ID: 52	2015-02-20 17:40:19.823876	-	In Queue
Order with ID: 53	2015-02-20 17:49:25.721513	-	In Queue

QLook	Platform	Level	Instrument	Prod.Type	Mode	Swath	Direction	Polarization	Start Date	Stop Date	Preview	Order
	SENTINEL-1	SAR Standard L1 Product	SAR	GRD	IW	IW	ASCENDING	VH	2015-01-26 18:40:40.810257	2015-01-26 18:41:05.809273		
	SENTINEL-1	SAR Standard L1 Product	SAR	SLC	IW	IW3	DESCENDING	VH	2015-01-26 05:35:55.487505	2015-01-26 05:36:12.801456		
	SENTINEL-1	SAR Standard L1 Product	SAR	SLC	IW	IW3	DESCENDING	VH	2015-01-30 05:03:02.825174	2015-01-30 05:03:31.134295		

3 entries

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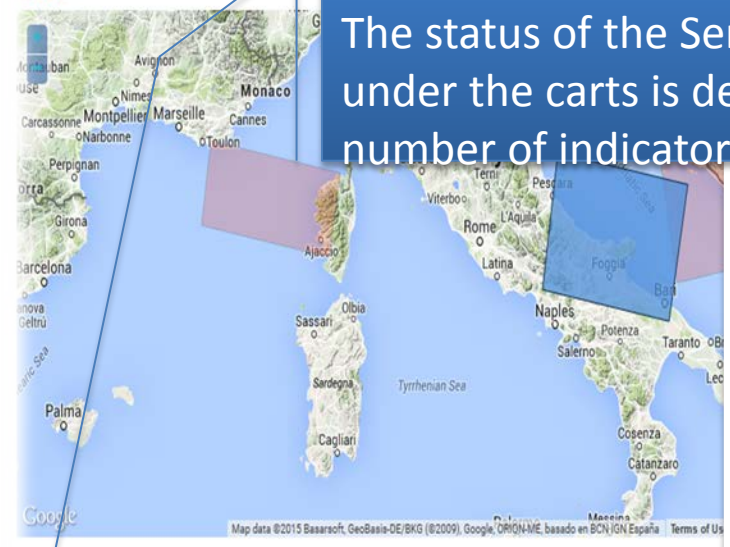


National Observatory of Athens

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 IAASARS Web Site: www.astro.noa.gr
[Contact Us](#)

...and view the status of the previously submitted order cart. The status of the Sentinel products under the carts is depicted by a number of indicators.

CART



The product is located at ESA DataHub

The product is being downloaded

The product is corrupted

The product is ready to download

OID	Date Submitted	Date Expired
Order with ID: 54	2015-02-20 17:53:44.048772	

QLook	Platform	Level	Instrument	Prod_Type	Mode	Swath	Direction	Polarization	Start Date	Stop Date	Preview	Order
	SENTINEL-1	SAR	SAR	GRD	IW	IW	ASCENDING	VH	2015-01-26 16:40:40.810267	2015-01-26 16:41:06.809273		
	SENTINEL-1	SAR	SAR	SLC	IW	IW3	DESCENDING	VH	2015-01-26 06:38:55.487506	2015-01-26 06:38:12.801466		
	SENTINEL-1	SAR	SAR	SLC	IW	IW3	DESCENDING	VH	2015-01-30 06:03:02.829174	2015-01-30 06:03:31.134296		



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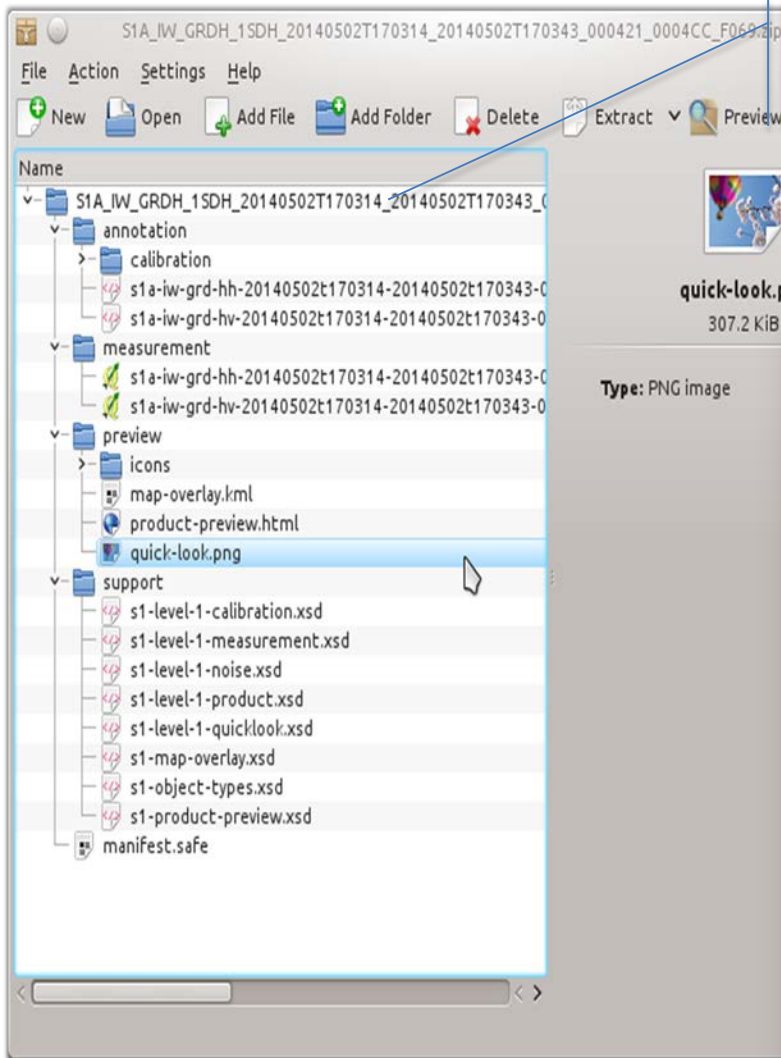


CART

...the Hellenic Sentinel Data Hub user is free to download locally the available Sentinel products

QLook	Platform	Level	Instrument	Prod.Type	Mode	Swath	Direction	Polarization	Start Date	Stop Date	Preview	Order
	SENTINEL-1	SAR Standard L1 Product	SAR	GRD	IW	IW	ASCENDING	VH	2015-01-26 16:40:40.810257	2015-01-26 16:41:05.809273		
	SENTINEL-1	SAR Standard L1 Product	SAR	SLC	IW	IW3	DESCENDING	VH	2015-01-26 05:35:55.487505	2015-01-26 05:36:12.801456		
	SENTINEL-1	SAR Standard L1 Product	SAR	SLC	IW	IW3	DESCENDING	VH	2015-01-30 05:03:02.825174	2015-01-30 05:03:31.134295		

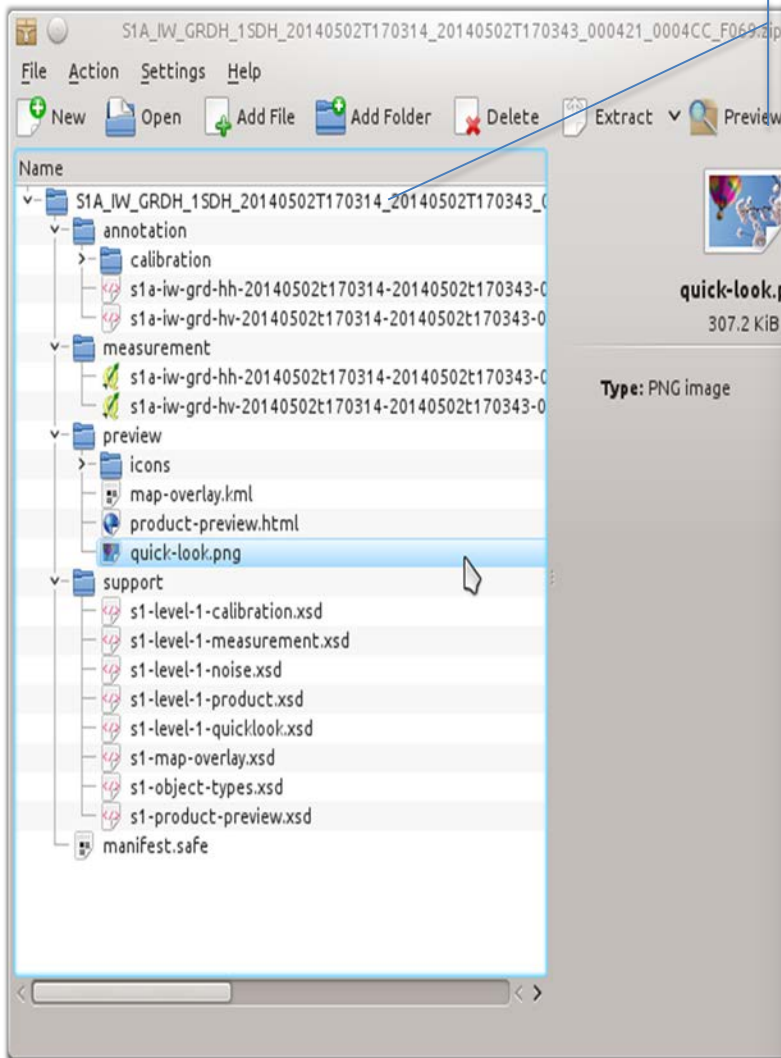
Product Ready to Download



...and inspect their content



...and inspect their content





Hellenic Sentinel Data Hub Shibboleth

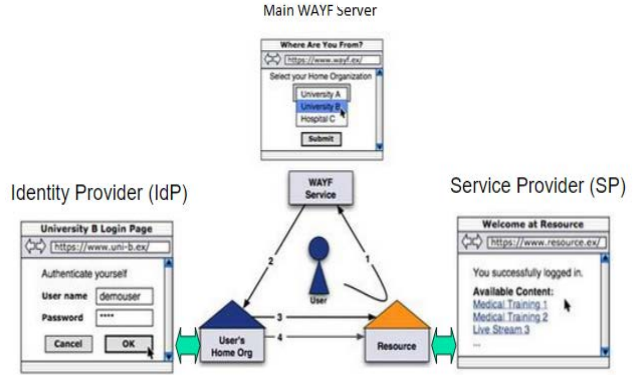
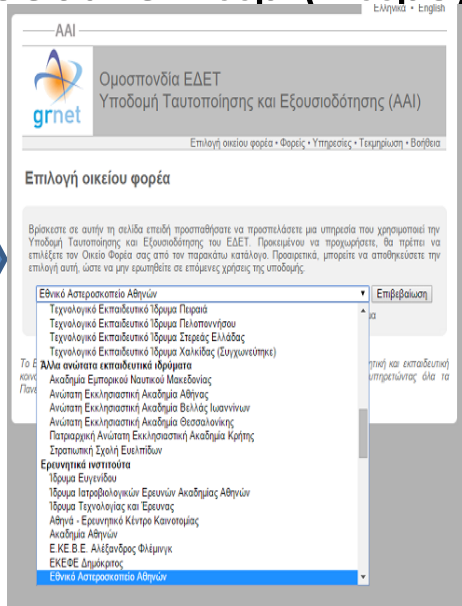
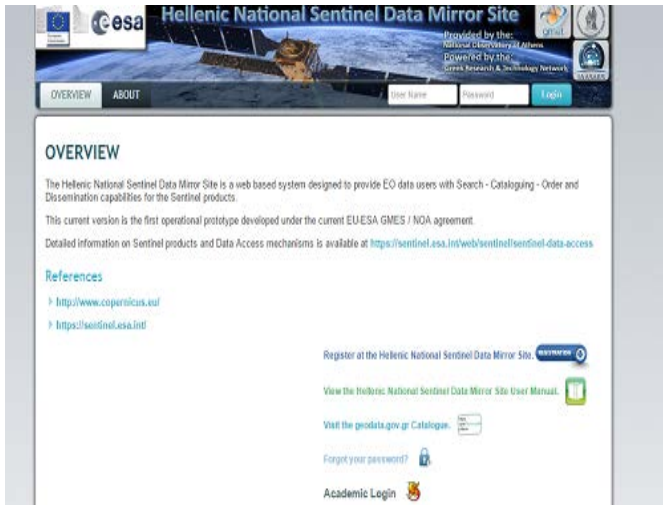
Building a Centre of Excellence for EO-based monitoring of Natural Disasters



- The Hellenic Sentinel Data Hub boosts it's popularity by allowing all members of the Greek Academic community (professors, students, researchers) to securely login via their academic credentials.
- The Hellenic Sentinel Data Hub has joined the GRNET's SSO Federation, which is based on **Shibboleth**.
- Enhanced security using secure http (https) connections



Shibboleth.





BEYOND Hellenic Sentinel Data Hub Shibboleth

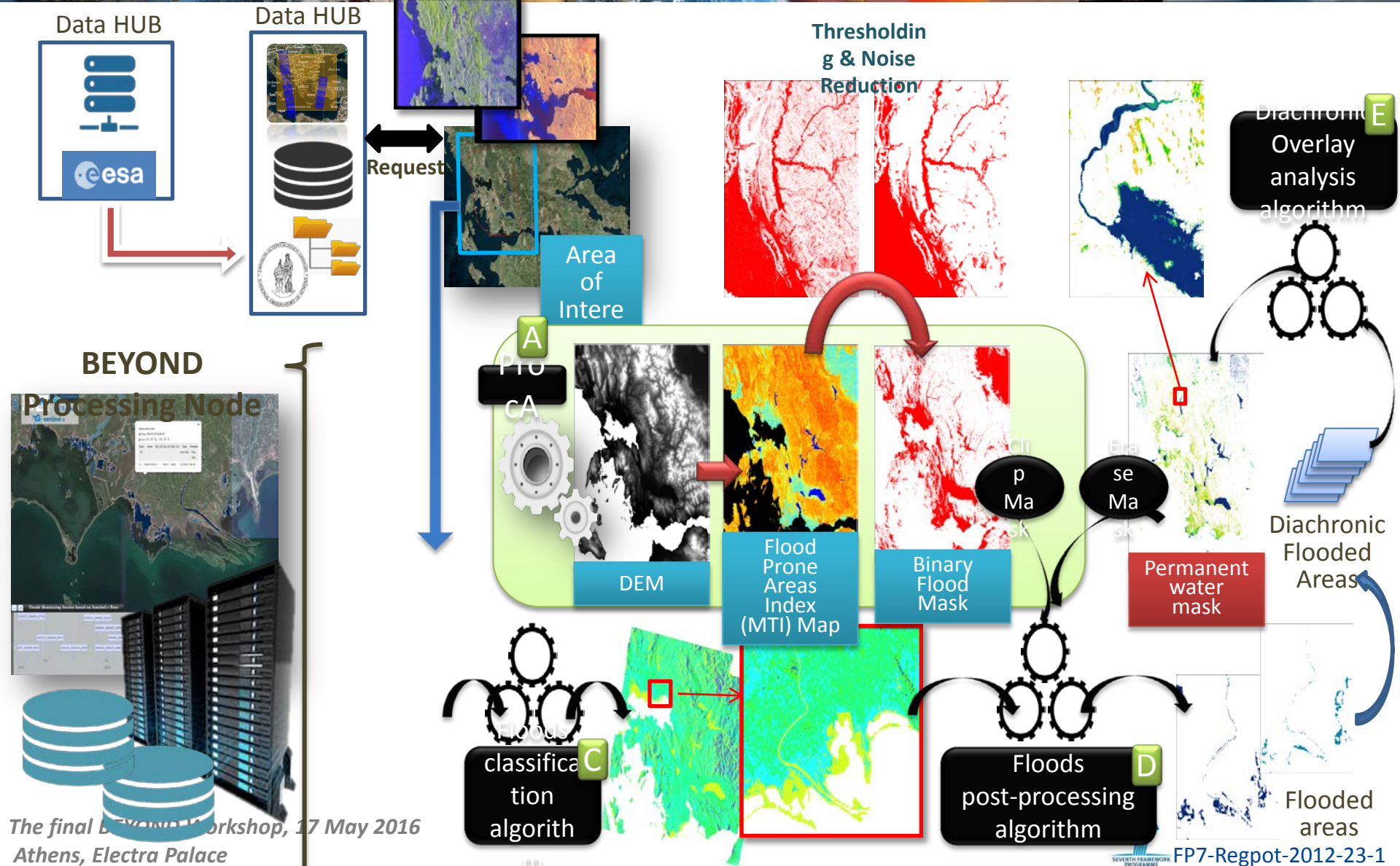
Building a Centre of Excellence for EO-based monitoring of Natural Disasters



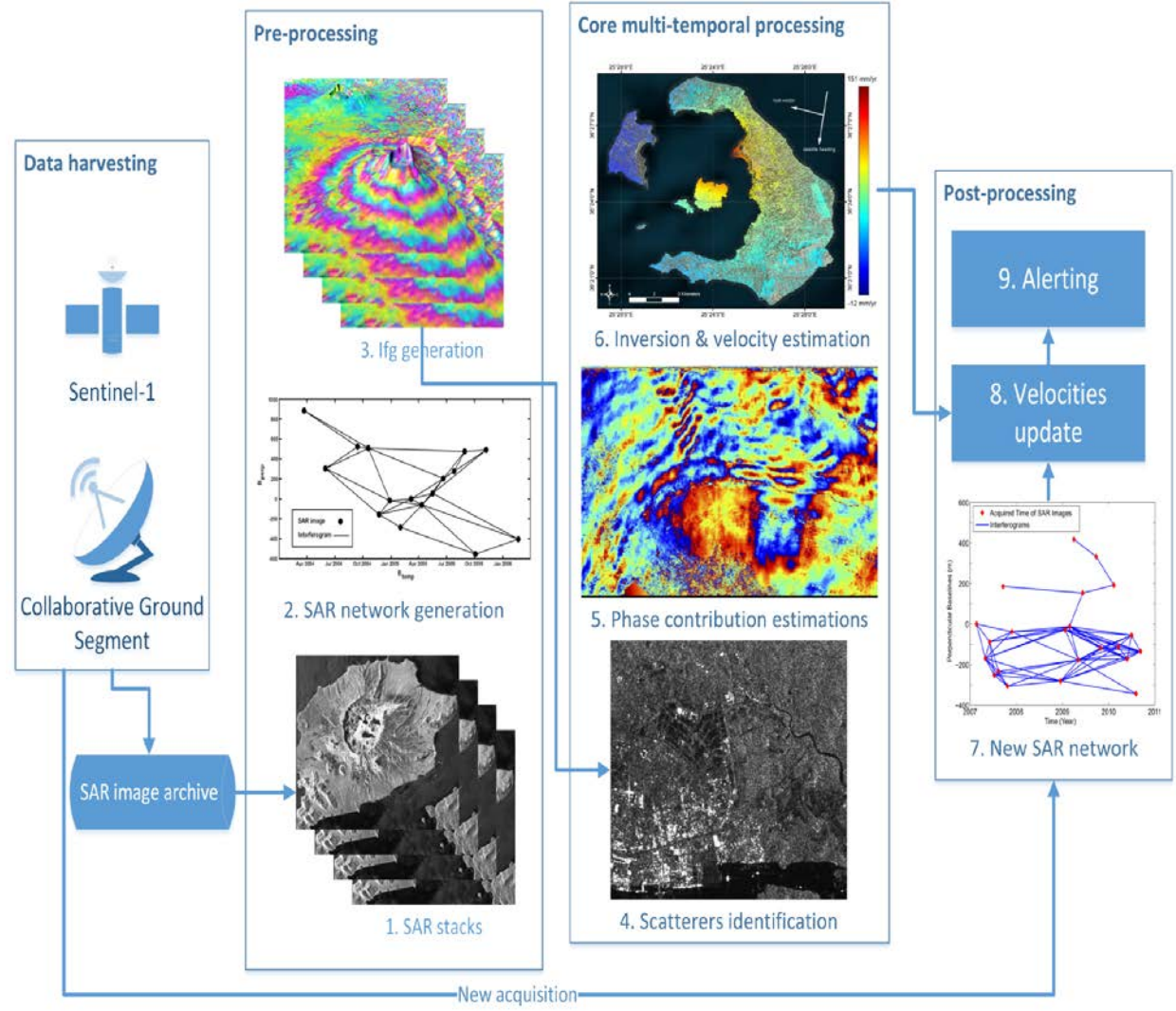
The SENTINEL Image Processing Toolbox application on ~Oceanos

The SENTINEL Image Processing Toolbox application is accessible via the Hellenic Mirror Site and the "TOOLBOX" menu item.

The screenshot shows the website interface for the Hellenic National Sentinel Data Mirror Site. At the top, there are logos for the European Commission, ESA, and the National Observatory of Athens. The main header features the text "Hellenic National Sentinel Data Mirror Site" and "Provided by the: National Observatory of Athens" and "Powered by the: Greek Research & Technology Network". A navigation menu includes "OVERVIEW", "SEARCH", "CART", "TOOLBOX", "USER PROFILE", and "ABOUT". A user login status shows "User: therekak, is logged-in." and a "Logout" button. The main content area is titled "SENTINEL IMAGE PROCESSING TOOLBOX" and includes a link to "View the Sentinel Processing Toolbox User Manual." Below this, there is a section for the "NOA Hellenic National Sentinel Data Mirror Site Team" with details on the NOA Official, Scientific Coordinator, WebMaster, Development, and Curator. The National Observatory of Athens logo and name are also present, along with the "BEYOND" logo. Footer information includes "Last Updated: 03 March 2015", "Copyright © 2015 | All Rights Reserved", and website addresses for NOA and IAASARS. A "Contact Us" link is also provided.

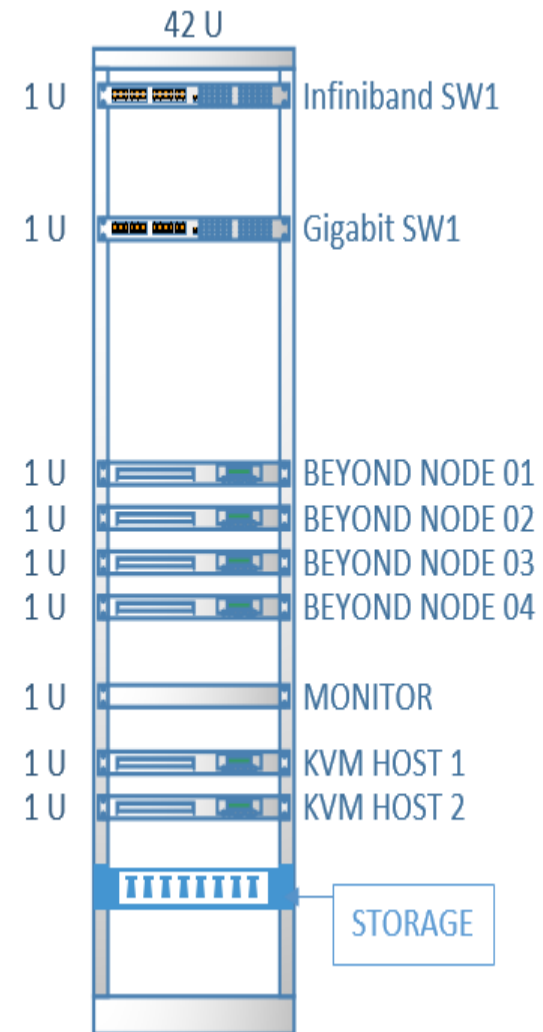


PS InSAR Architecture - Deformation velocity fields



- IAASARS has empowered its computational infrastructure with high-performance server hardware.

- BEYOND NODE 01-04:
 - Model: Dell PowerEdge R620
 - CPU: 2x Xeon 8 Core
 - RAM: 64GB
 - OS: Centos 6.6 Minimal
- PowerVault MD3400, 12G SAS, 2U-12 drive
- 2 KVM Virtualization Servers
 - Model: Dell PowerEdge R815
 - CPU: 2x AMD Opteron 6128
 - RAM: 512GB
 - OS: RHEL 6.0 64-bit (Dell pre-installed image)



- ▶ The ground segment architecture is based on the N-tier paradigm.
- ▶ The 1st tier comprises the ground station and the servers used for acquisition and processing.
- ▶ The 2nd tier comprises the datacenter and the backend processes used to extract and store metadata in the catalogues (e.g. Synchronizer process).
- ▶ The 3rd tier constitutes the frontend that is used to allow the users to search, view and download products. Ground Segment on the cloud!

Satellites



SATELLITES:
AQUA, TERRA,
SUOMI NPP,
NOAA AVHRR,
METOP,
MSG,
FY

Ground Station



Servers



Synchronizer process



http://...ent.s
P...



Web users



Datacenter



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for EO-based monitoring of Natural Disasters



SEVENTH FRAMEWORK
PROGRAMME

Thank you for your attention!

For more information

<http://beyond-eocenter.eu>

<http://sentinels.space.noa.gr>