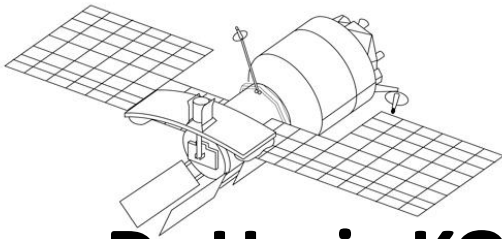




Greece's Collaborative Ground Segment Initiatives



Dr Haris KONTOES, Prof Kanaris Tsinganos

National Observatory of Athens

Dr Xenofon Tsilimparis, GRNET (GEANT)

The oldest Greek/SE European Research Institution: 170 years of continuous contribution to research and services to the society

3 Research Institutes: Astronomy and Astrophysics, Space Applications and Remote Sensing
Geodynamics, Environment and Sustainable Development

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

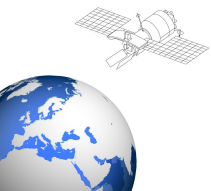


Scope of the Collaborative Ground Segment – Greek Mirror Site

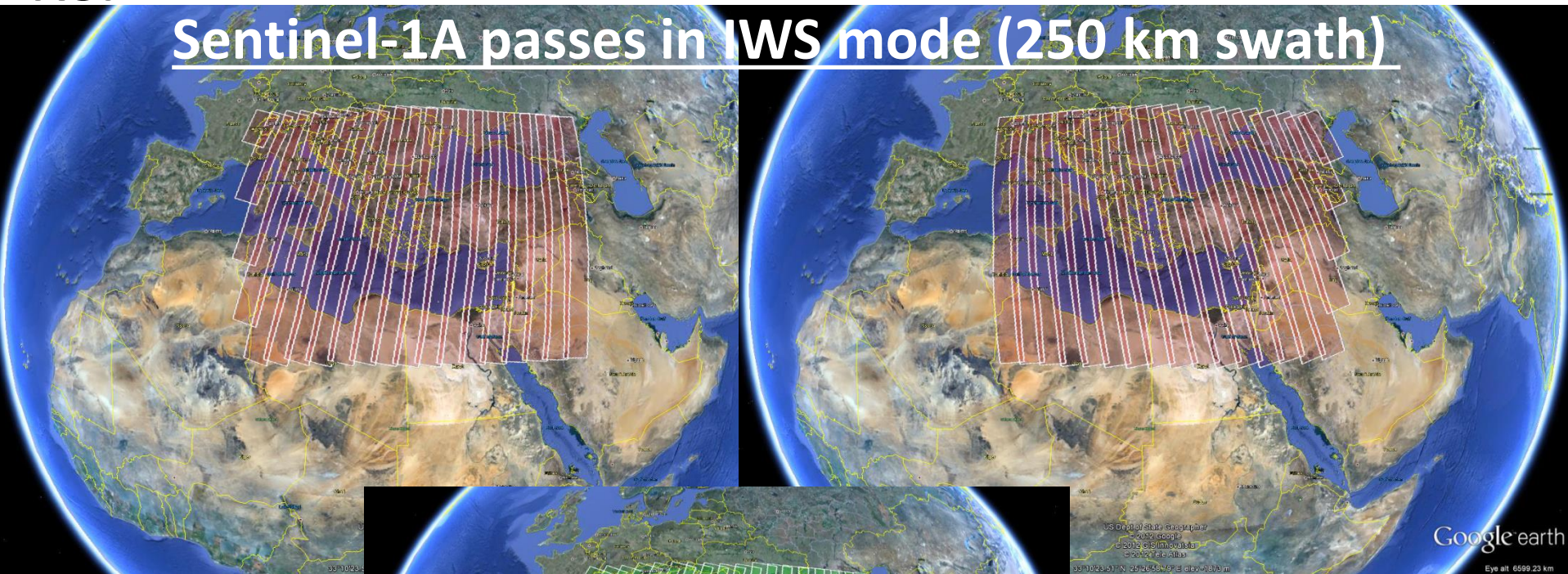
Built up an additional pick up point (**Mirror Site**) of Sentinel data at the premises of the **National Observatory of Athens (NOA)** in collaboration with the **Greek Research and Technology Network - GRNET S.A.** the Greek Partner of the GEANT network.

Disseminate Sentinel data and higher level Copernicus products to the End User & Scientific communities mainly at national level, but also to neighbouring South Eastern Mediterranean and Balkan countries on the basis of the existing and/or future transnational needs and co-operations.

The whole project is in line with the on-going 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.



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



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



NOA Sentinel Mirror Site - Overview

ESA has developed a prototype software, the Data Hub System (DHuS), with the scope to:

- Allow Collaborative Partners to centrally access Sentinel data through a dedicated Hub

NOA → ESA's Collaborative Partner for the use of DHuS software

At NOA/GRNET:

- Computational Infrastructure facilities for downloading and storing Sentinel Data are under installation, configuration, and testing
- A complete set of software tools for the systematic data download and organized storage, as well as distribution of data via a Web interface is ready for testing, and operation by the users



NOA Sentinel Mirror Site - Computational Infrastructure

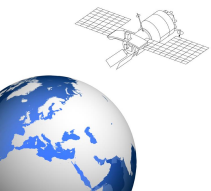
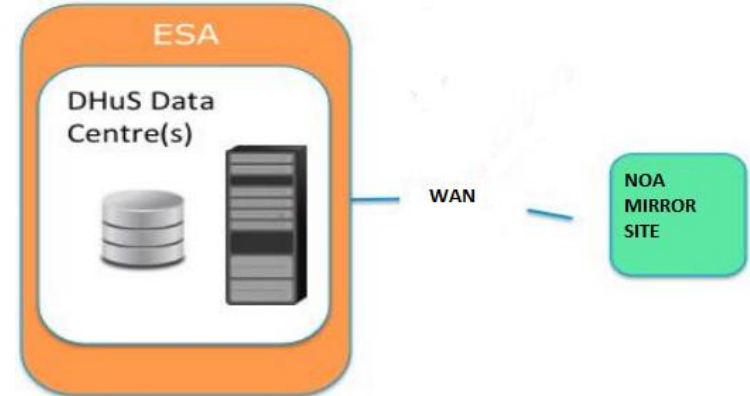
- High-Speed optical links owned by GRNET/GEANT, are used to connect ESA's Data center(s), with NOA's Mirror Site computational infrastructure
- A set of Virtual Machines (VMs), hosted by the Greek Research & Technology Network (GRNET), are configured and ready for use

OS: Ubuntu Linux 14.04 LTS, 64 Bit.

CPU: 1-2 CPU's per VM.

RAM: 2-4 GB per VM.

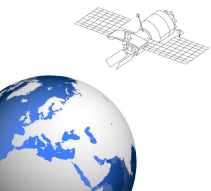
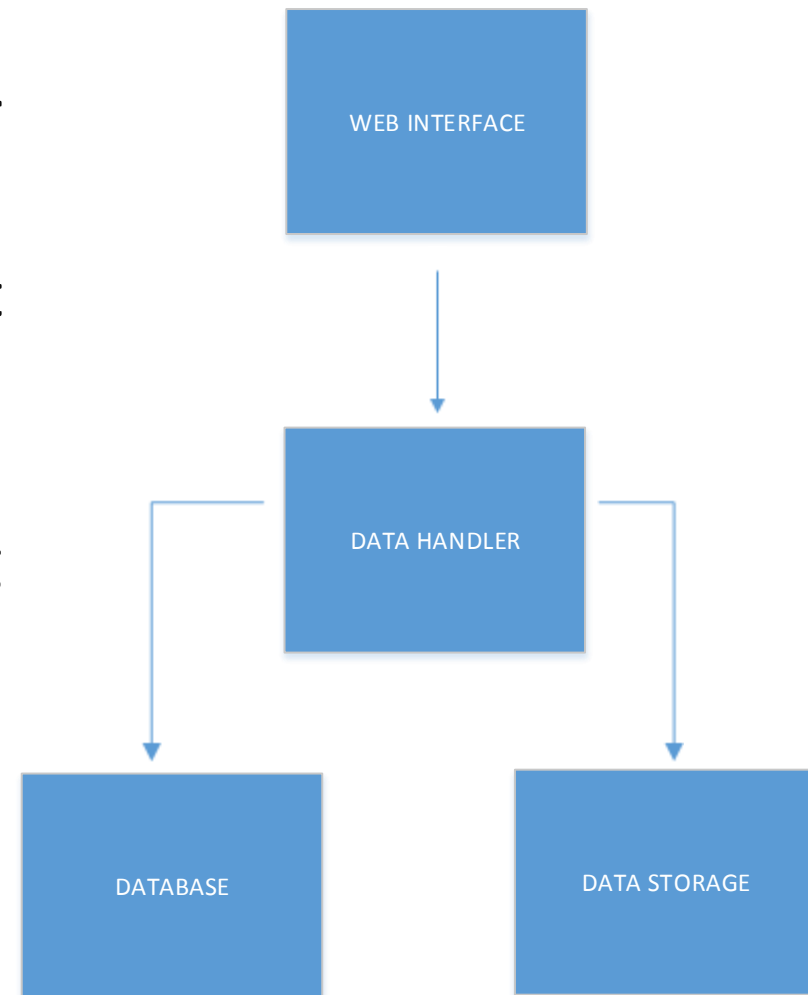
Static, dedicated IPv4 and IPv6 addresses



NOA Sentinel Mirror Site - Architecture

3-Level 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 system-wide events
- **Data Storage Level 3rd:** physical storage of data



NOA Sentinel Mirror Site - Database Level

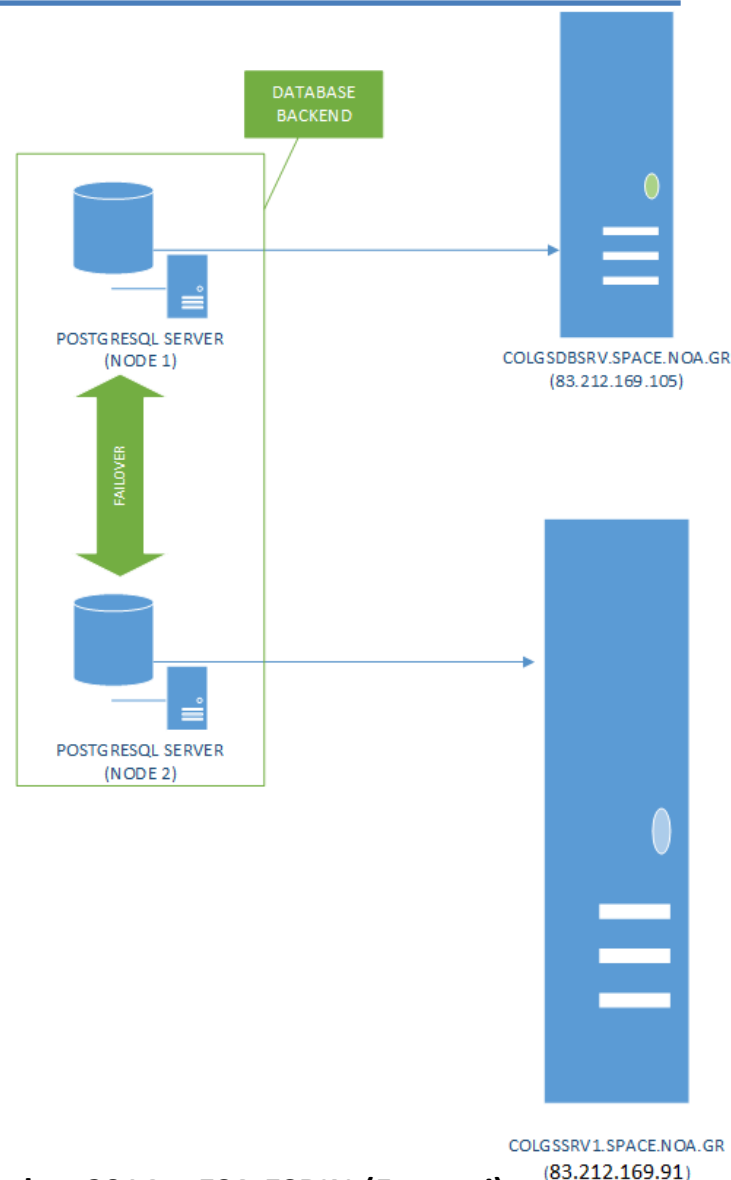
➤ Utilization of 2 Database Servers

- ✓ Main DB
- ✓ Backup DB

➤ PostgreSQL 9.3

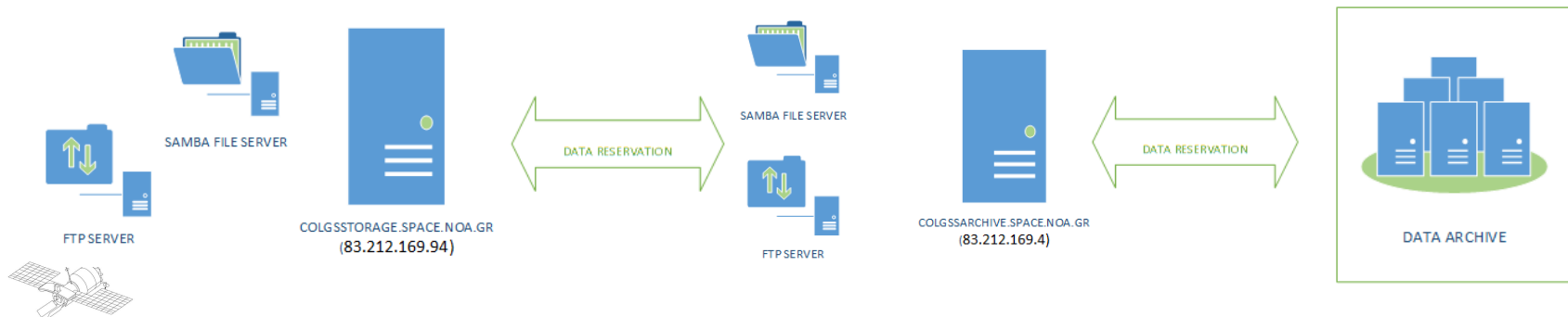
➤ Easily expandable

➤ Organized in cluster for achieving automatic fail-over, load-balancing etc

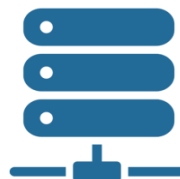


NOA Sentinel Mirror Site – Data Storage Level

- **“Live”** data are kept in a high-performance, small storage capacity virtual machine (VM)
- **“Non-live”** data are transferred and kept in a second-level storage, in a dedicated VM
- Finally, older (than one month) data will be stored in a tape library/Hard Disk archiving solution **(currently under specification)**



NOA Sentinel Mirror Site Back-end Architecture



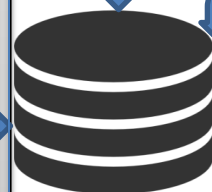
The data synchronizer module:

- Searches the DataHub for updated products concerning the mirror site area of interest
- Stores their metadata descriptors into the mirror site database
- Transfers the big-data products and mirrors them for a limited amount of time as “live” data

The data downloader module:

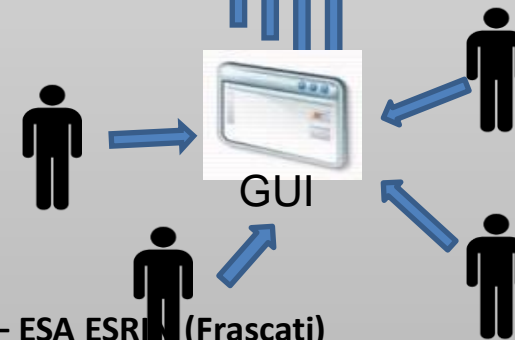
- Gathers and manages data orders applied via the NOA Mirror Site GUI
- Concurrently retrieves locally older “non-live” Sentinel products
- Informs Users when an order (collection of requested products) is ready, and its component big-data products are available via the NOA Mirror Site facilities and the Mirror Site GUI

Concurrent me

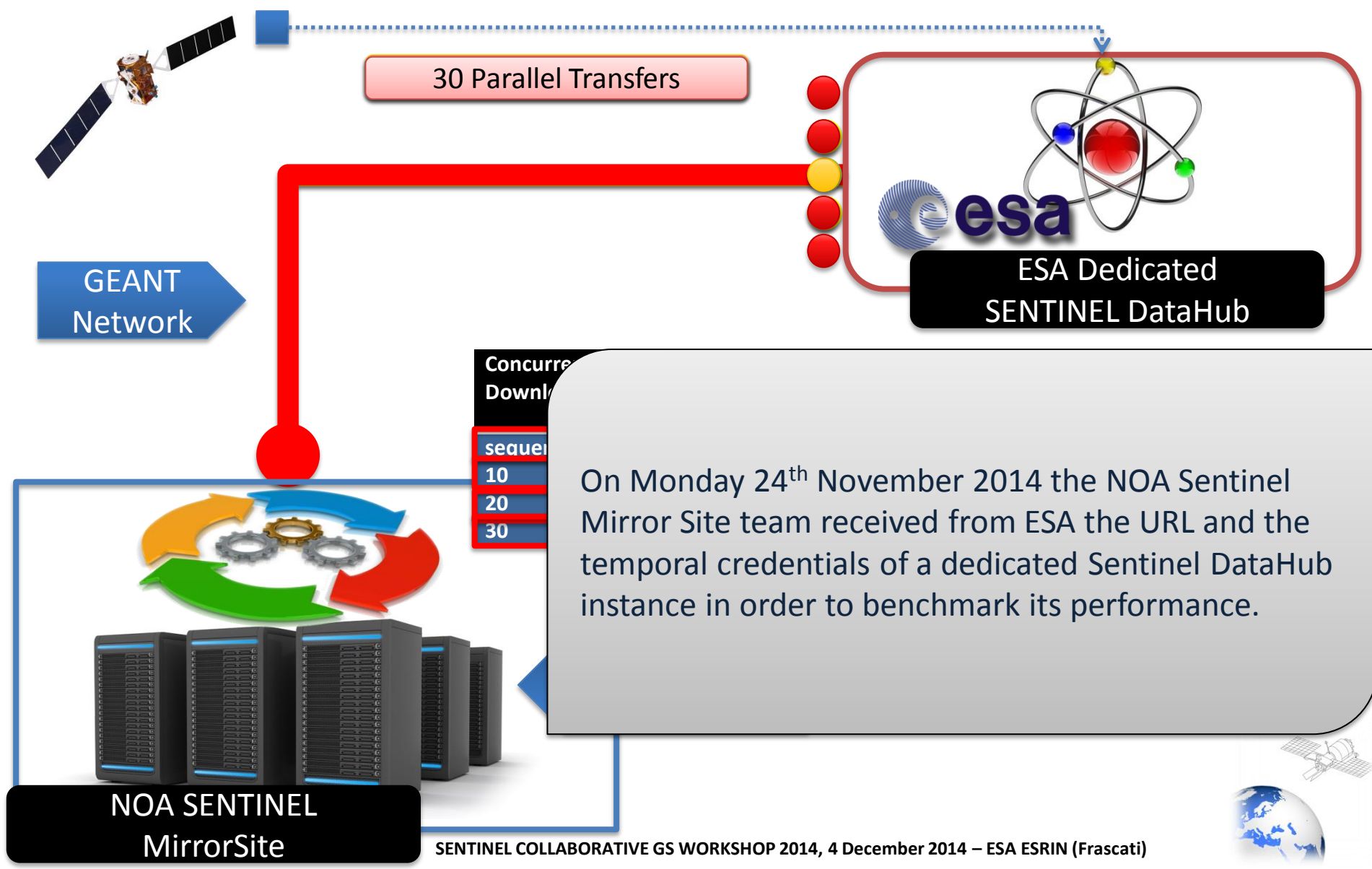


Concurrent
data store
...



Gather
orders



Benchmark Exercise for testing the Dedicated DataHub → NOA Mirror Site Architecture




NOA Sentinel MirrorSite GUI

National Observatory of Athens

Sentinel Data Hub



OVERVIEW

ABOUT

Username

Password

User Name

Password

Login

OVERVIEW

The Sentinel Data Hub is a web based system designed to provide EO data users with distributed mirror archives and b for the Sentinel-1 products.

This current version is the pre-operational prototype developed under the current EU-ESA GMES agreement.

Detailed information on Sentinel-1 products and Data Access mechanisms is available at <https://sentinel.esa.int/web/sentinel/>

Contact

Lofos Nymphon - Thissio, PO Box 20048 - 11810, Athens
Tel. +30 2103490000, Fax +302103490120

W: <http://www.noa.gr>
E: therekak@noa.gr

Are you interested entering Sentinel Data Hub system?

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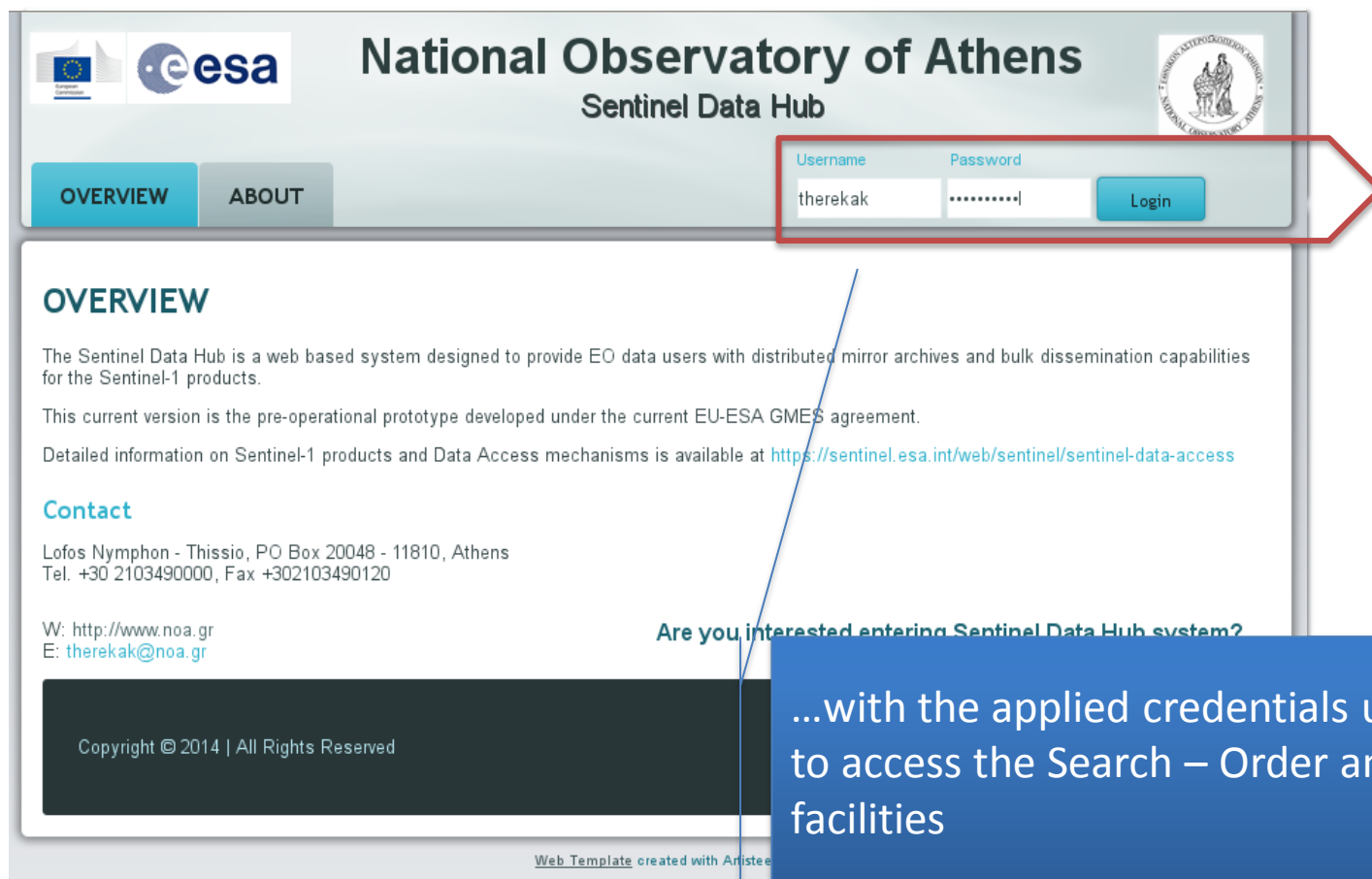
IAASARS - NOA www.astro.noa.gr

NOA Sentinel Mirror Site GUI
Provides a registration mechanism
so that new users can obtain access
to Search Catalogue and Order
facilities

Web Template created with Artisteer.



NOA Sentinel MirrorSite GUI



National Observatory of Athens
Sentinel Data Hub

OVERVIEW **ABOUT**

Username Password

therekak

Login

OVERVIEW

The Sentinel Data Hub is a web based system designed to provide EO data users with distributed mirror archives and bulk dissemination capabilities for the Sentinel-1 products.

This current version is the pre-operational prototype developed under the current EU-ESA GMES agreement.

Detailed information on Sentinel-1 products and Data Access mechanisms is available at <https://sentinel.esa.int/web/sentinel/sentinel-data-access>

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Web Template created with Artistee

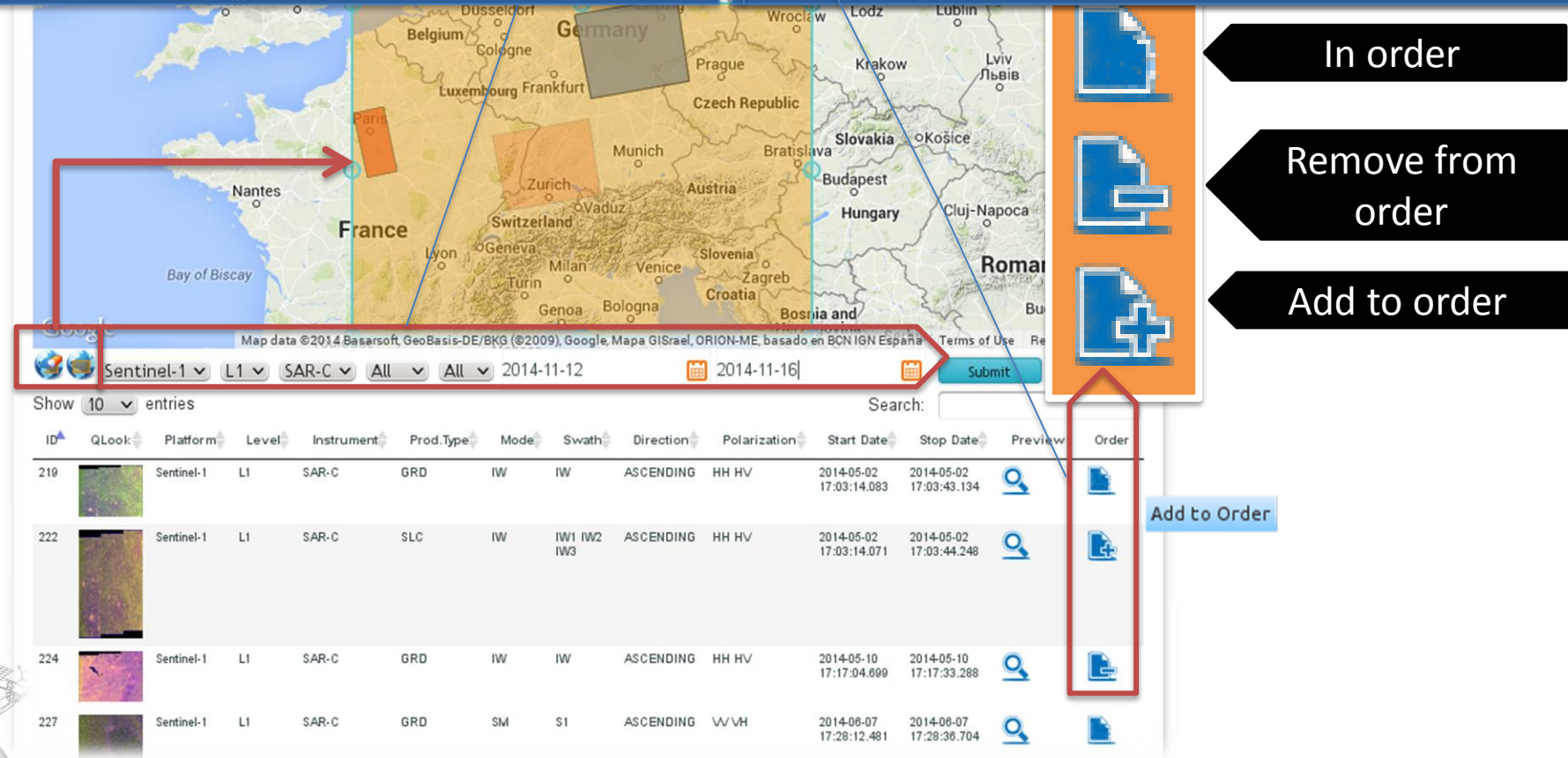
...with the applied credentials users may login to access the Search – Order and Data access facilities



NOA Sentinel MirrorSite GUI

...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...



Map Data: ©2014 Basarsoft, GeoBasis-DE/BKG (©2009), Google, Mapa GISrael, ORION-ME, basado en BCN IGN España

Search Filters: Sentinel-1, L1, SAR-C, All, All, 2014-11-12, 2014-11-16, Submit

Table of Queried Products:

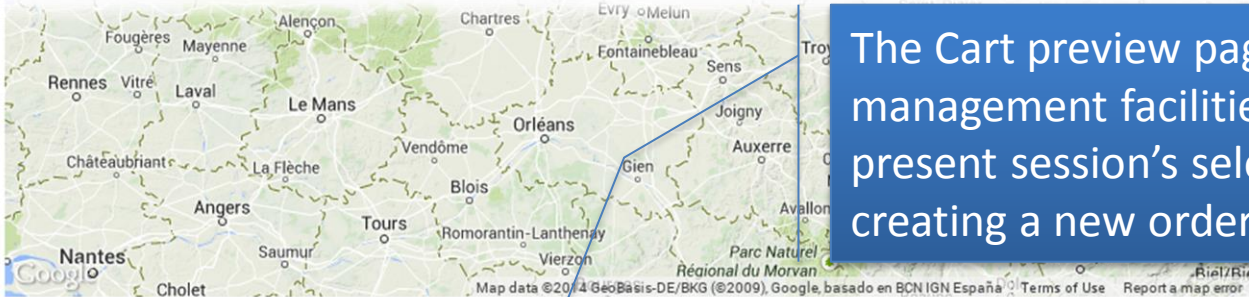
ID	QLook	Platform	Level	Instrument	Prod.Type	Mode	Swath	Direction	Polarization	Start Date	Stop Date	Preview	Order
219		Sentinel-1	L1	SAR-C	GRD	IW	IW	ASCENDING	HH HV	2014-05-02 17:03:14.083	2014-05-02 17:03:43.134		
222		Sentinel-1	L1	SAR-C	SLC	IW	IW1 IW2 IW3	ASCENDING	HH HV	2014-05-02 17:03:14.071	2014-05-02 17:03:44.248		
224		Sentinel-1	L1	SAR-C	GRD	IW	IW	ASCENDING	HH HV	2014-05-10 17:17:04.699	2014-05-10 17:17:33.288		
227		Sentinel-1	L1	SAR-C	GRD	SM	S1	ASCENDING	VV VH	2014-06-07 17:28:12.481	2014-06-07 17:28:36.704		

Order Status Legend:

- In order
- Remove from order
- Add to order

Add to Order

NOA Sentinel MirrorSite GUI



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	Status
	30	2014-10-07 17:44:31.549993	submitted
	31	2014-10-07 17:44:52.238887	submitted
	32	2014-11-20 16:44:02.898634	submitted
	33	2014-11-21 10:06:58.130848	submitted
	34	2014-11-25 13:18:47.704777	submitted
	35	2014-11-26 17:11:58.29132	submitted
	0		

Submit

Search:

ID	QLook	Platform	Level	Instrument	Prod.Type	Mode	Swath	Direction	Polarization	Start Date	Stop Date	Preview	Order
236		Sentinel-1	L1	SAR-C	GRD	IW	IW	DESCENDING	HH HV	2014-06-20 08:39:50.141	2014-06-20 08:40:14.731		

1 entries


7 entries

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IAASARS - NOA www.astro.noa.gr

NOA Sentinel MirrorSite GUI

CART



	OID	Date	Status
	30	2014-10-07 17:44:31.549993	submitted
	31	2014-10-07 17:44:52.236887	submitted
	32	2014-11-20 16:44:02.898634	submitted

ID	QLook	Platform	Level	Instrument	Prod.Type	Mode	Swath	Direction	Polarization	Start Date	Stop Date	Preview	Order
225		Sentinel-1	L1	SAR-C	GRD	IW	IW	ASCENDING	HH HV	2014-06-07 20:51:25.297	2014-06-07 20:51:50.296		
227		Sentinel-1	L1	SAR-C	GRD	SM	S1	ASCENDING	VV/VH	2014-06-07 17:28:12.481	2014-06-07 17:28:36.704		

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



The product is located at
ESA DataHub



The product is being
downloaded



The product is corrupted



The product is ready to
download

NOA Sentinel MirrorSite GUI

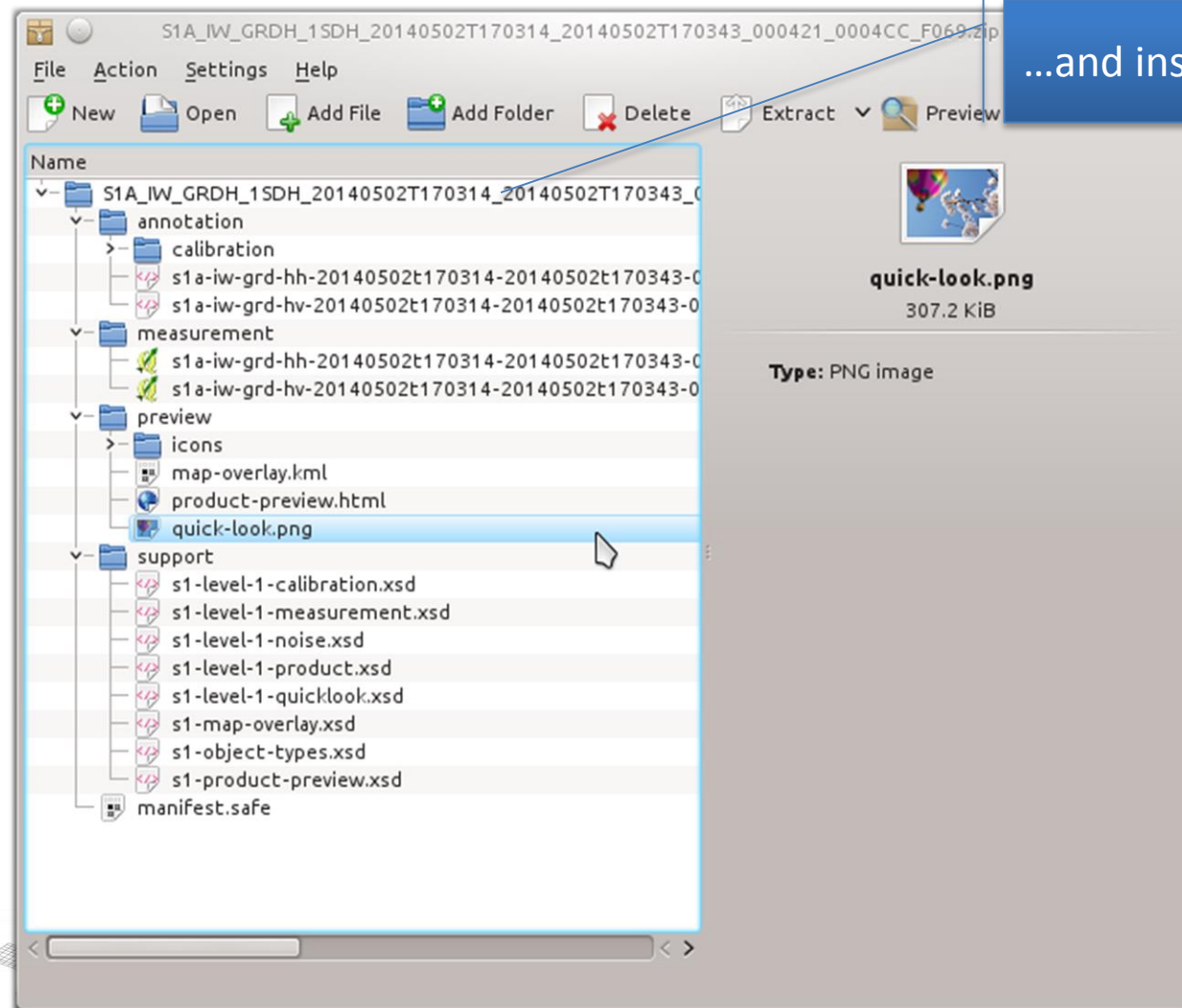
CART



...the NOA Mirror Site user is free to download locally the available Sentinel products

ID	QLook	Platform	Level	Instrument	Prod.Type	Mode	Swath	Direction	Polarization	Start Date	Stop Date	Preview	Order
219		Sentinel-1	L1	SAR-C	GRD	IW	IW	ASCENDING	HH HV	2014-05-02 17:03:14.083	2014-05-02 17:03:43.134		
220		Sentinel-1	L1	SAR-C	GRD	IW	IW	DESCENDING	HH HV	2014-04-13 03:49:43.156	2014-04-13 03:50:12.328		
221		Sentinel-1	L1	SAR-C	GRD	IW	IW	ASCENDING	HH HV	2014-05-01 16:22:32.127	2014-05-01 16:23:07.785		

NOA Sentinel MirrorSite GUI



...and inspect their content

**Thank you for your
attention!**