



→ 6th ESA ADVANCED TRAINING COURSE ON LAND REMOTE SENSING

Sentinel-1A Data Dissemination and Users Data Uptake

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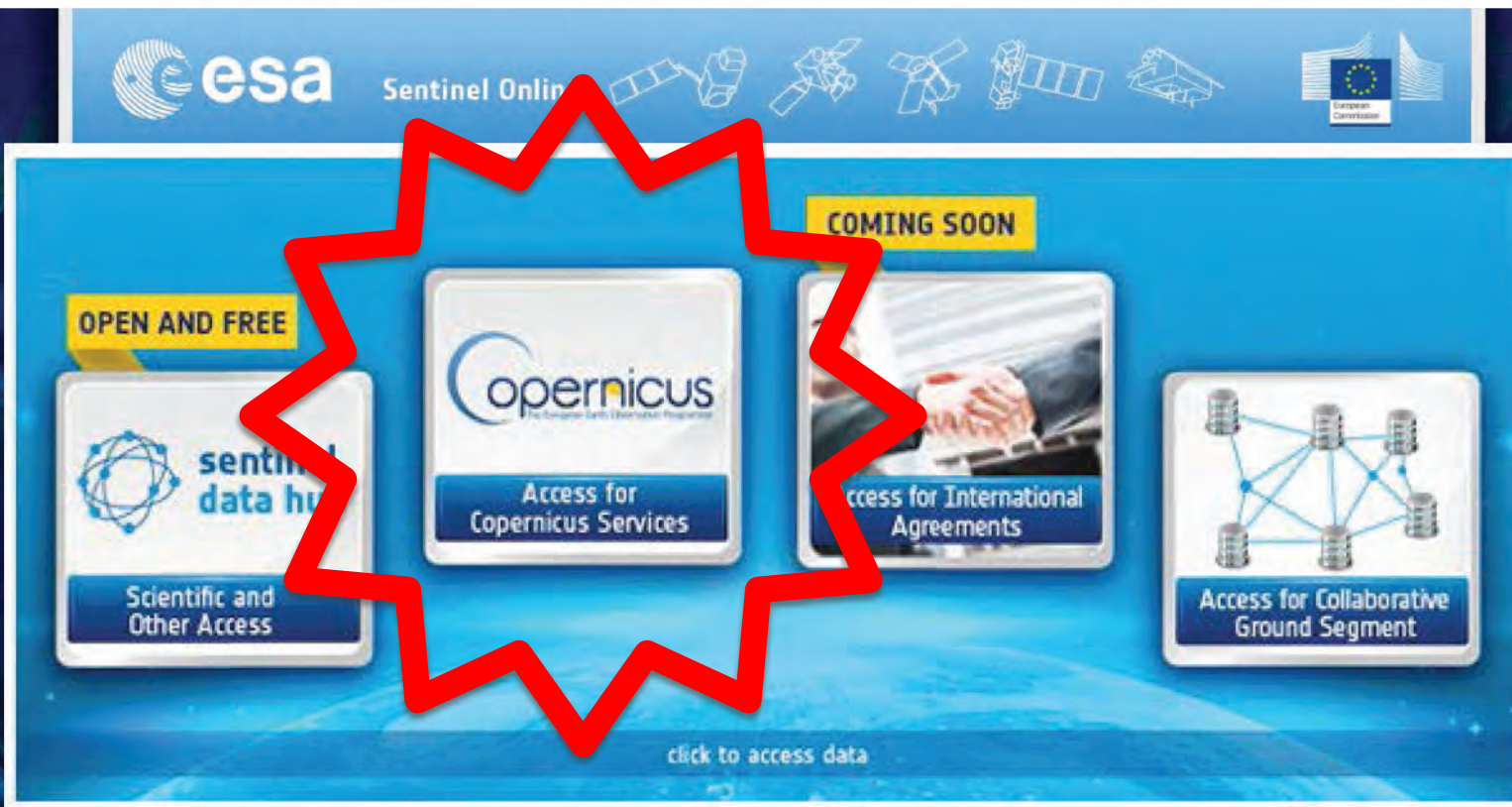
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14–18 September 2015 | University of Agronomic Science and Veterinary Medicine Bucharest | Bucharest, Romania

Copernicus Space Component: Data Access Overview

- The Copernicus Space Component Ground Segment data access implements an Open and Free data policy ensuring that all Sentinel products are accessible to all users online
- Access to Sentinel latest products is made available via dedicated data hubs
 - User can self-register to the data hubs
 - Intended for up to 12 months of data via rolling archives
 - Data download via terrestrial network (connectivity to internet 10 Gbps)
- In addition, access to full Sentinels long-term archive is being made available to all users online



esa Sentinel Online

COMING SOON

OPEN AND FREE

sentinel data hub

Scientific and Other Access

Copernicus

Access for Copernicus Services

Access for International Agreements

Access for Collaborative Ground Segment

click to access data

Sentinel Missions

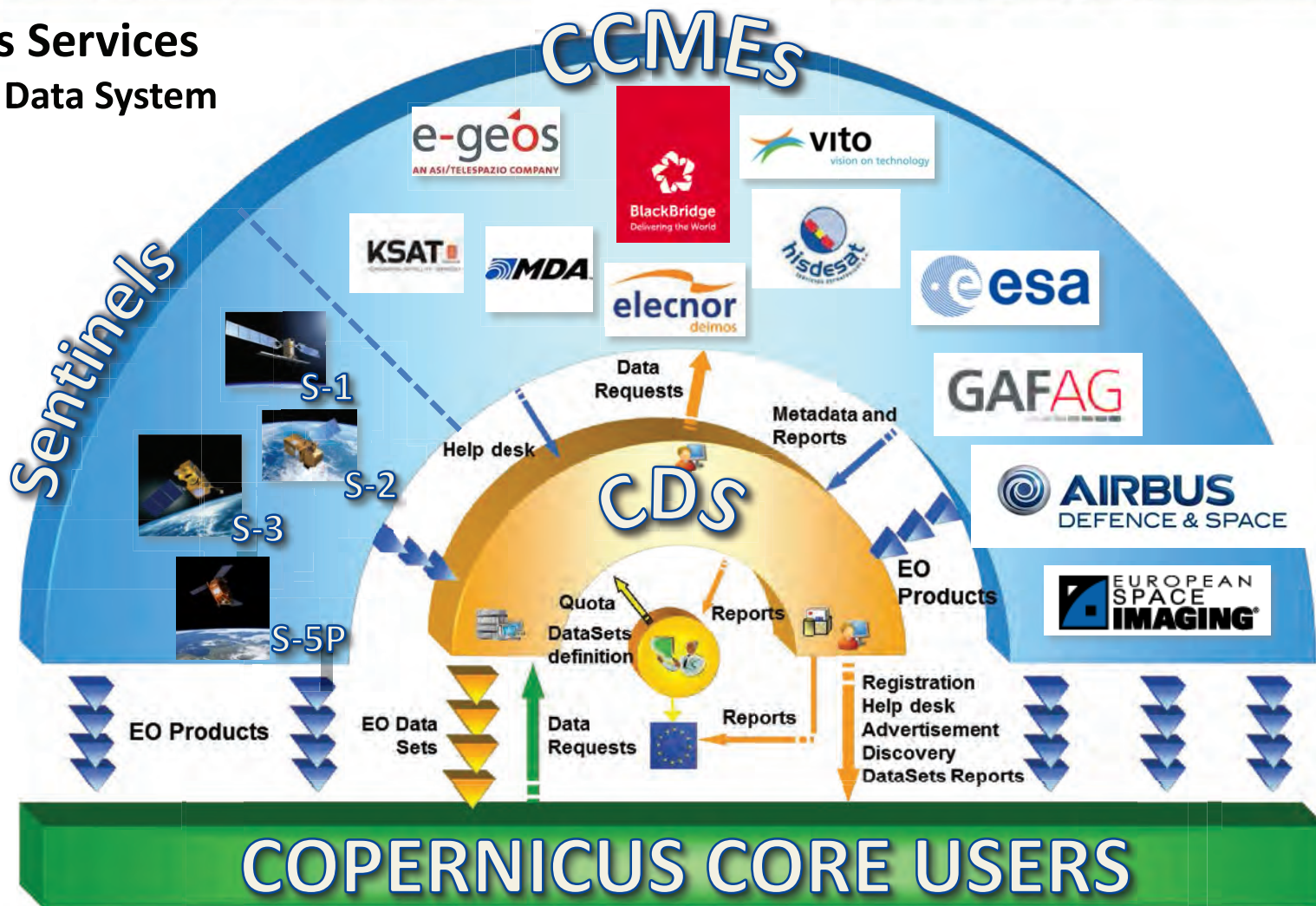


Thematic Areas



- ESA Copernicus
- ESA Copernicus
- Observing the Earth
- Earth Online
- CSCDA
- Disasters Charter
- ESA Climate Change Initiative
- Ground Segment Coordination Body (GSCB)

Copernicus Services Coordinated Data System





Sentinel Online



OPEN AND FREE



sentinel
data hub

Scientific and
Other Access



COMING SOON



Access for International
Agreements



Access for Collaborative
Ground Segment

click to access data

→ Sentinel Missions



→ Thematic Areas



- EU Copernicus
- ESA Copernicus
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Open Access – The Scientific Data Hub

esa Sentinel-1 Scientific Data Hub

Welcome to the Sentinel-1 Scientific/Other use Data Hub

The Sentinel-1 Scientific Data Hub provides free and open access to a Rolling Archive of Sentinel-1 Level-0 and Level-1 user products. Products are available for the following Sentinel-1 [acquisition modes](#):

- Strip Map (SM)
- Interferometric Wide Swath (IW)
- Extra Wide Swath (EW)

Level-0 products and Level-1 Ground Range Detected (GRD) products are available for all performed acquisitions. Level-1 Single Look Complex (SLC) products are available for acquisitions performed over specific regions of interest.

The S-1 Scientific Data Hub Rolling Archive maintains the latest 2 months of products for download via HTTP. During the initial operations period the complete data production, commencing from the in-orbit commissioning review (3rd of October 2014) is available online. A maximum of 2 concurrent downloads per user is allowed in order to ensure a download capacity for all users.

The Sentinel-1 Level-1 products are preliminary qualified. Operational product qualification, including absolute radiometric calibration, will continue during the next period.

Enter the HUB **User Guide** **Roadmap**

esa Sentinel-1 Scientific Data Hub

Overview Search Upload Profile Cart Management Statistics About

Welcome [dsapen](#) | [Logout](#)

View product 'S1A_EW_GRDM_1SSH_20141203T173228_20141203T173331_003558_00431B_5054'

Quicklook Summary Product Platform Instrument

Download the product

- S1A_EW_GRDM_1SSH_20141203T173228_...
- annotation
- calibration
- s1a-ew-grd-hh-20141203T173228-201...
- measurement
- s1a-ew-grd-hh-20141203T173228-201...
- preview
- icons
- map-overlay.html
- product-preview.html
- quick-look.png
- support
- S1A_EW_GRDM_1SSH_20141203T17322...
- manifest.safe
- XFDU

ESR 2013 2014

Created by GeoSystems 2013 Prototype V0.1.0.13

Simple Web Interface – Powerful Programming Interface

Open Access Web Interface

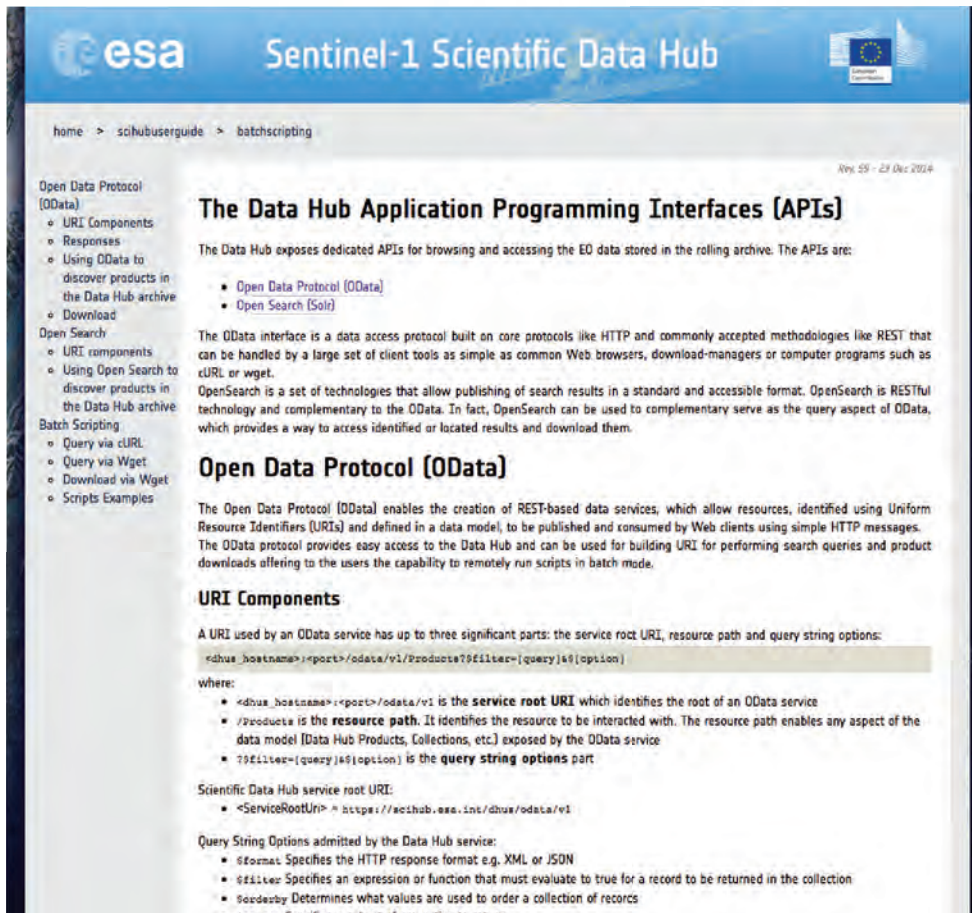
The screenshot displays the Sentinel-1 Scientific Data Hub web interface. At the top, there is a registration form with fields for Username, Password, E-mail, Firstname, Lastname, Domain (Atmosphere), and Usage (Research). Below the form is a search bar and a map of Europe. The main content area shows the 'Sentinel-1 Scientific Data Hub' header with navigation tabs: Overview, Search, Upload, Profile, Cart, Management, Statistics, and About. A 'View product' section displays a map and a list of products. A 'Download the product' section shows a list of files for download. A 'Cart' section displays a list of products in the cart with details like Date, Instrument, Mode, Satellite, and Size. The interface is clean and user-friendly, with a blue and white color scheme.

Straightforward
Registration

Flexible
Search

Product
Inspection

Individual &
Batch Download



esa Sentinel-1 Scientific Data Hub

home > schubuserguide > batchscripting

Nov 29 - 23 Dec 2014

The Data Hub Application Programming Interfaces (APIs)

The Data Hub exposes dedicated APIs for browsing and accessing the EO data stored in the rolling archive. The APIs are:

- Open Data Protocol (OData)
- Open Search (Solr)

The OData interface is a data access protocol built on core protocols like HTTP and commonly accepted methodologies like REST that can be handled by a large set of client tools as simple as common Web browsers, download-managers or computer programs such as curl or wget.

OpenSearch is a set of technologies that allow publishing of search results in a standard and accessible format. OpenSearch is RESTful technology and complementary to the OData. In fact, OpenSearch can be used to complementarily serve as the query aspect of OData, which provides a way to access identified or located results and download them.

Open Data Protocol (OData)

The Open Data Protocol (OData) enables the creation of REST-based data services, which allow resources, identified using Uniform Resource Identifiers (URIs) and defined in a data model, to be published and consumed by Web clients using simple HTTP messages. The OData protocol provides easy access to the Data Hub and can be used for building URI for performing search queries and product downloads offering to the users the capability to remotely run scripts in batch mode.

URI Components

A URI used by an OData service has up to three significant parts: the service root URI, resource path and query string options:

```
<dhue_hostname>:<port>/odata/v1/Products?<filter>=<query>[<option>]
```

where:

- <dhue_hostname>:<port>/odata/v1 is the **service root URI** which identifies the root of an OData service
- /Products is the **resource path**. It identifies the resource to be interacted with. The resource path enables any aspect of the data model (Data Hub Products, Collections, etc.) exposed by the OData service
- ?<filter>=<query>[<option>] is the **query string options** part

Scientific Data Hub service root URI:

- <ServiceRootUri> = https://schub.esa.int/dhue/odata/v1

Query String Options admitted by the Data Hub service:

- <format> Specifies the HTTP response format e.g. XML or JSON
- <filter> Specifies an expression or function that must evaluate to true for a record to be returned in the collection
- <orderby> Determines what values are used to order a collection of records
- <select> Specifies a subset of properties to return

Open Access Programming Interface

Cross Platform Application
Programming Interface
compatible with many
programming style (Script,
Java, App, ...)

HTTP / RESTful

Simple Authentication

OpenSearch

OpenData

Example scripts available for
download



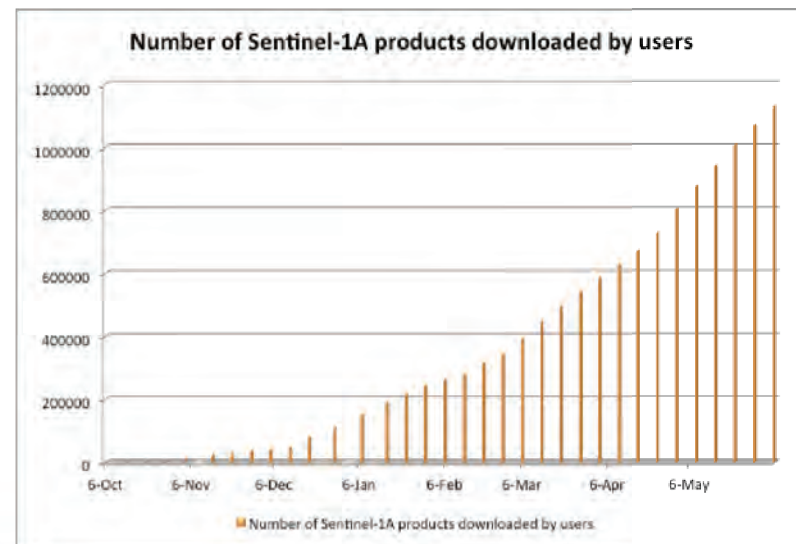
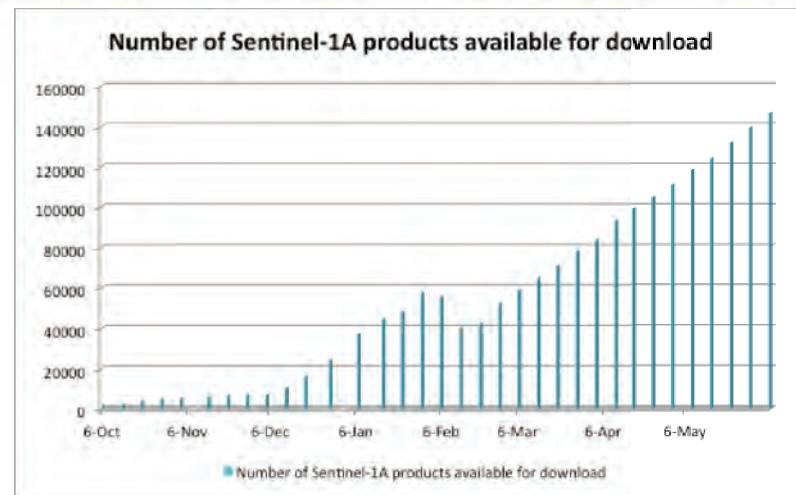
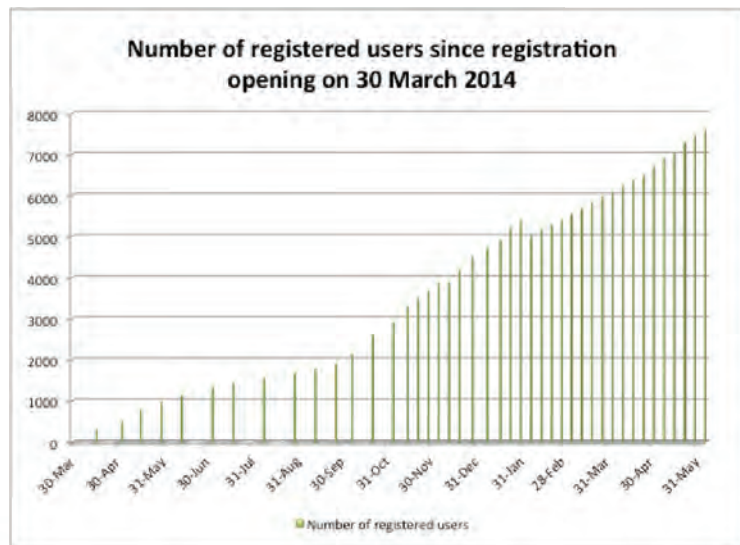
Open Access – Initial Operations

- Self Registration and Sample Products open since S-1A launch 04-2014
- Routine Data flow opened following S-1A IOCR 10-2014
- Rolling Archive
 - target of latest 12 months data
 - no strict timeliness guarantee
- Quota restriction of 2 concurrent downloads to ensure bandwidth availability for all users
- Massive parallel usage has lead to considerable effort in infrastructure and performance optimizations

Sentinel-1 User and Data Statistics [1/4]

(By 4 June 2015)

- ✓ 7,586 registered users
- ✓ 1,030,000 products downloaded by users, representing about 1.37 PB of data
- ✓ More than 150,000 products available for download



Sentinel-1 User and Data Statistics [2/4]

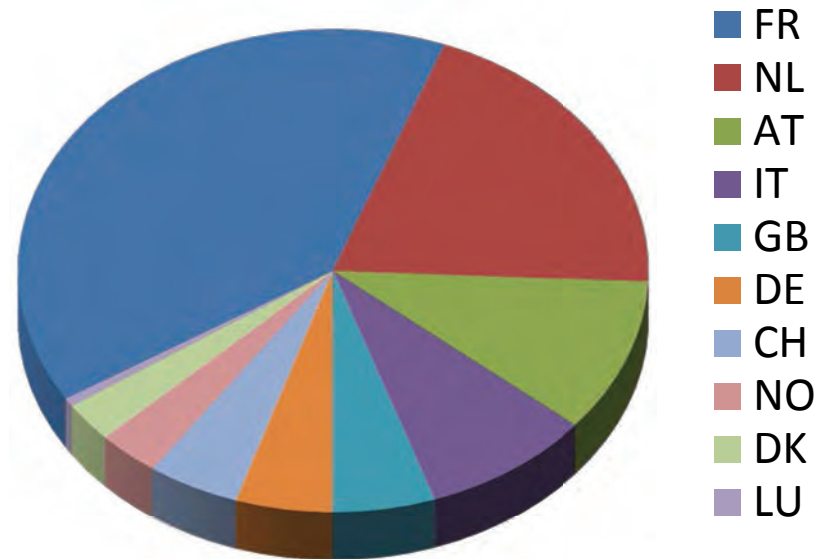
Continent	Registrations: Jan to May 2015 (vs. Q1)	Number of Downloads: Jan to May 2015 (vs. Q1)
Africa	250 (180)	390 (274)
Asia	1513 (1255)	42738 (29172)
Europe	4585 (3568)	457320 (207029)
North America	911 (737)	404857 (193205)
South America	302 (187)	37181 (12941)
Australia	117 (98)	30121 (10898)
Antarctica	3 (3)	63 (40)



- Statistics are based on users self registration provided information
- Europe and North America are hosting the most active user communities
- Dedicated tests on-going with African users to benchmark download capacities

Sentinel-1 User and Data Statistics [3/4]

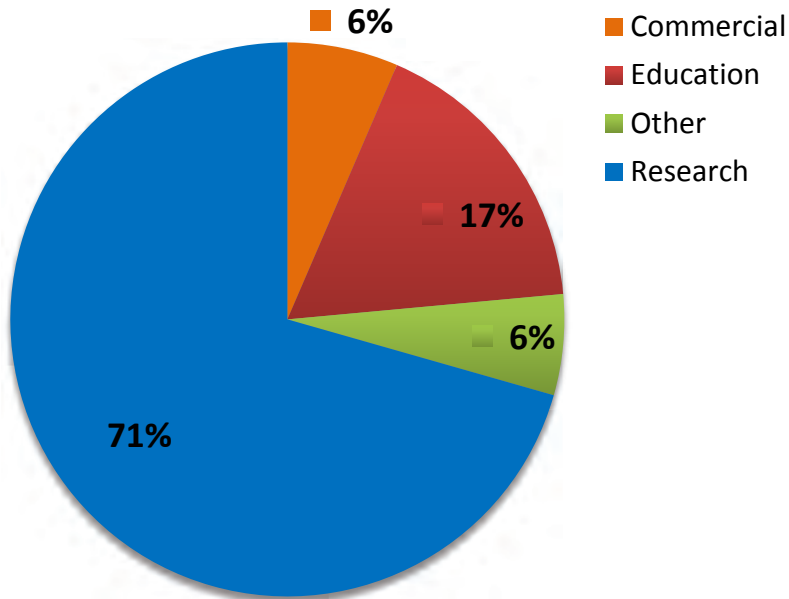
EU/ESA Top Ten	Number of Downloads: Jan to May 2015
FR	164665
NL	82843
AT	42848
IT	36265
GB	21816
DE	20521
CH	19506
NO	13214
DK	11101
LU	2457



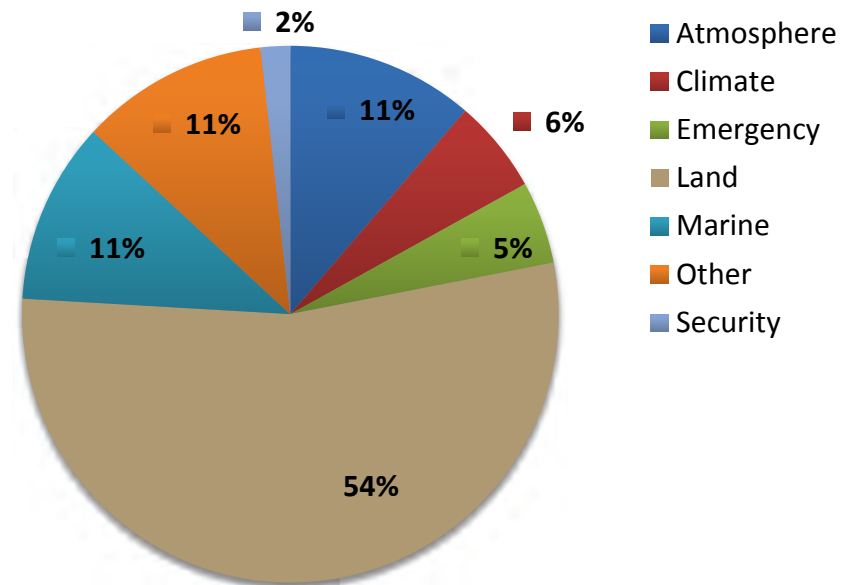
Downloads per country

Sentinel-1 User and Data Statistics [4/4]

Percentage of users for each use type



Percentage of users for each use domain



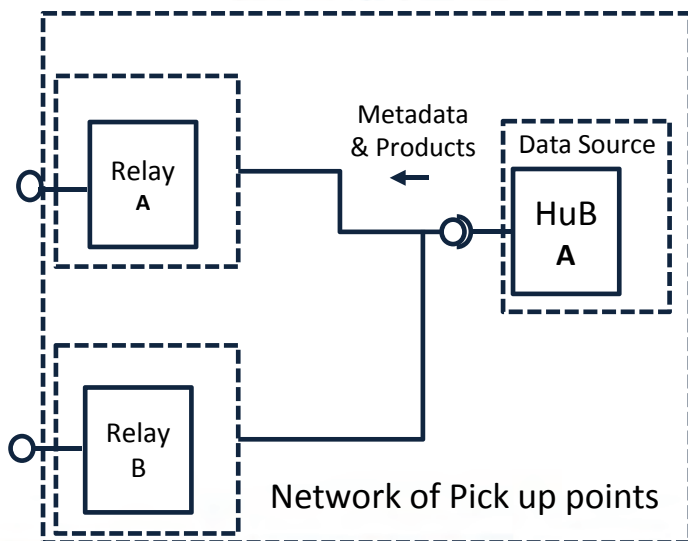


Sentinels Collaborative Ground Segment Access

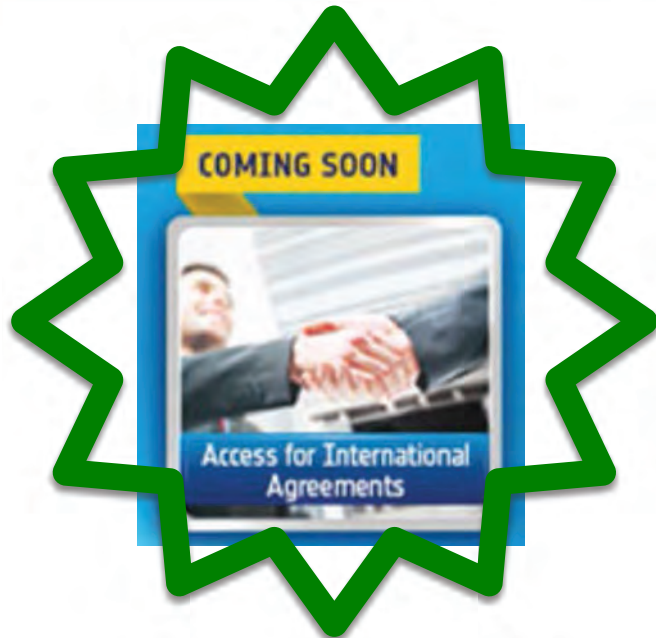
Collaborative GS access established since 01-2015

- Collaborative agreements being set up with almost all Member States
- Access currently enabled to 7 MS
- Routine downloading data towards mirror archives
- Additional 50,000 downloads / 100TB data disseminated
- GR and FR mirrors sites already open to public

Additional data relays are being established to enhance overall data access using ESA Data Hub Open Source Software (DHuS)



International Agreements Data Access



- Data downloads currently performed via open access data hub
- New infrastructure to be established after summer 2015 for international partners dedicated access
- Similar technical solution as for Collaborative GS data hub

- Data Hub opening pending formalization of data access agreements between EU and International partners
- Technical Arrangements are established between ESA and each international partner (e.g. NOAA, NASA, USGS, etc.) to document the operational interfaces

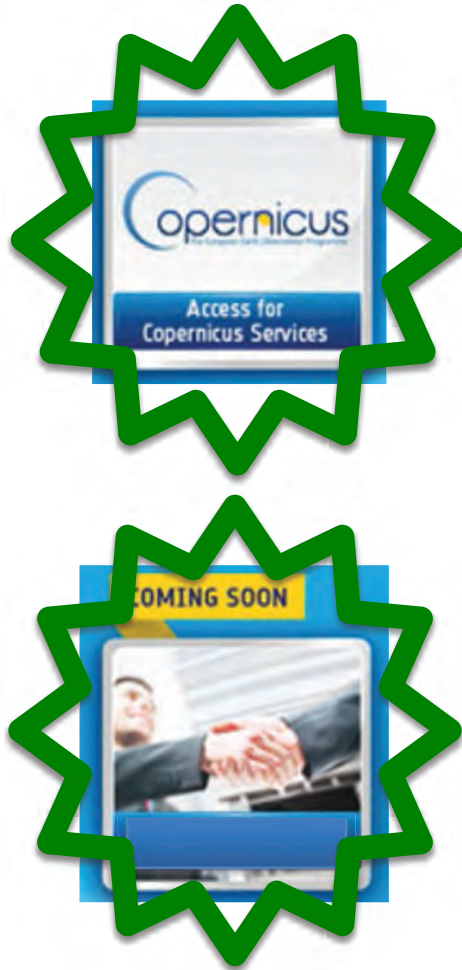
Other Data Hubs Access

Copernicus Services

- Dedicated FTP in operations for MyOcean since 10-2014
- Over 35,000 product disseminated so far
- Additional data hub is being established for other Copernicus Service access without quota restrictions

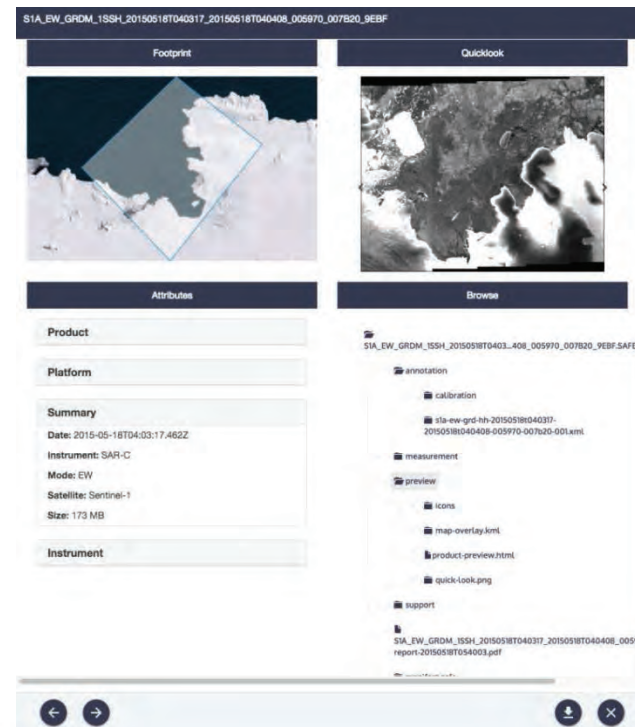
Commercial Access

- Deployment of a dedicated hub for commercial companies has been requested
- User eligibility criteria and liability provisions to be defined with Commission



Sentinels Dissemination – Upcoming release

A new UI has been released to account for user feedback and managing multi-Sentinel collections
New Sentinels missions will be added according to commissioning and ramp-up schedules



Main Sentinel-1 Operational Features

Open and Free On-Line data access (1/3)

- Data Access Navigator

OPEN AND FREE

sentinel data hub

Scientific and Other Access

COMING SOON

Open & Free on-line data access to S1 operational user products to “scientific/other-use users” since 3rd October 2014 on <https://scihub.esa.int>.

click to access data

- Access through self-registration
- Automated download scripting published
- Restriction on concurrent downloads
- **All data published since 3rd October 2014 still available on line**
- **Data access will be enabled for archive data when roll-out will be activated (After Oct. 2015)**

Sentinel-1 Scientific Data Hub

Overview Search Profile Cart About

Welcome [username] Logout

Search

Request done: *

Display 1 to 100 of 71,606 products

	S1A_IW_SLC__1SDV_20150319T160734_20150319T160801_005103_006680_4C49 https://scihub.esa.int/dhus/odata/v1/Products(7ad720eb-b9e4-4ca2-9252-c816d808c8a8)/\$value Date : 2015-03-19T16:07:34.941Z, Instrument : SAR-C, Mode : IW, Satellite : Sentinel-1, Size : 7 GB	
	S1A_IW_SLC__1SDV_20150319T160710_20150319T160737_005103_006680_5685 https://scihub.esa.int/dhus/odata/v1/Products(b9bf364a-f75b-43d9-8818-f0eda7db75e9)/\$value Date : 2015-03-19T16:07:10.116Z, Instrument : SAR-C, Mode : IW, Satellite : Sentinel-1, Size : 7 GB	
	S1A_IW_SLC__1SDV_20150319T160644_20150319T160712_005103_006680_89E6 https://scihub.esa.int/dhus/odata/v1/Products(3fa347ce-0fe1-4279-8865-73401872b70a)/\$value Date : 2015-03-19T16:06:44.335Z, Instrument : SAR-C, Mode : IW, Satellite : Sentinel-1, Size : 7 GB	

Currently on-line available products:

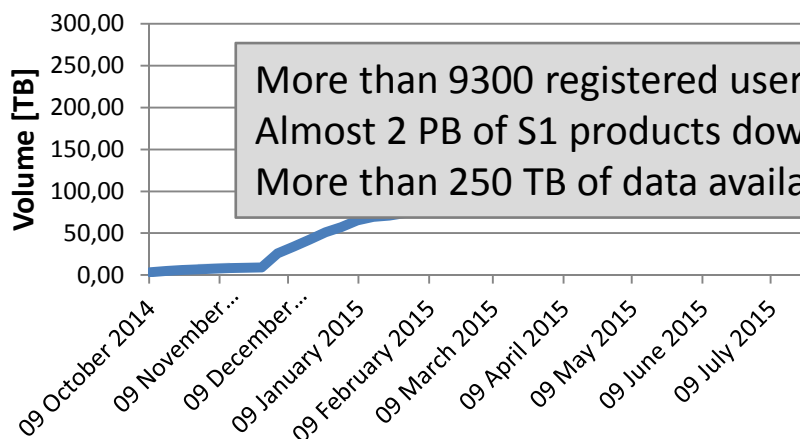
- IW, EW, SM L0 & L1 systematic products
- WV L2 OCN products
- IW/EW L2 OCN products

Main Sentinel-1 Operational Features

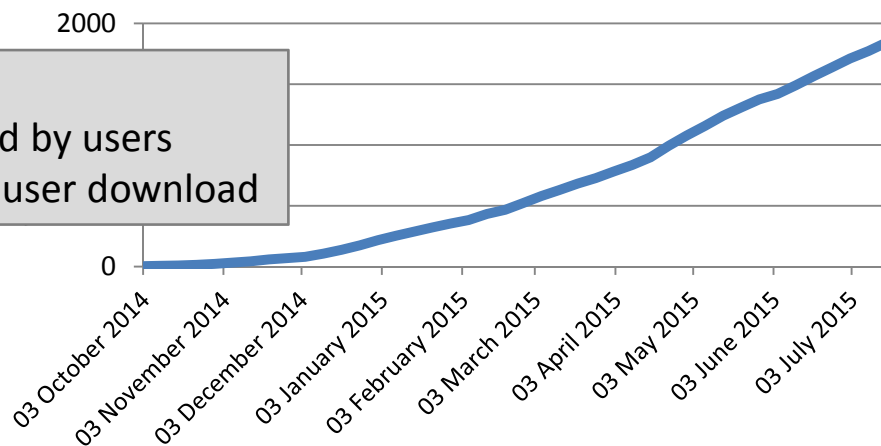
Open and Free On-Line data access (2/3)

- Regular open data access to any user previous self-registration since 3-Oct-14 for S1 systematically generated L0 & L1 user products (L0 SM/IW/EW, L1 SM/IW/EW).
- Open access to systematically generated S1 L2 products since July 2015

Volume of Sentinel-1 products published on line
(cumulative values)



Volume of user-downloaded Sentinel-1 products
(cumulative values)



More than 9300 registered users
Almost 2 PB of S1 products downloaded by users
More than 250 TB of data available for user download

Space Segment Commissioning phase

Sentinel-1A Operational qualification (S1A)

S1A Routine Ops.

S1A-L

IOCR

ROR#1

Main Sentinel-1 Operational Features

Open and Free On-Line data access (3/3)

Statistics are based **on users self registration**

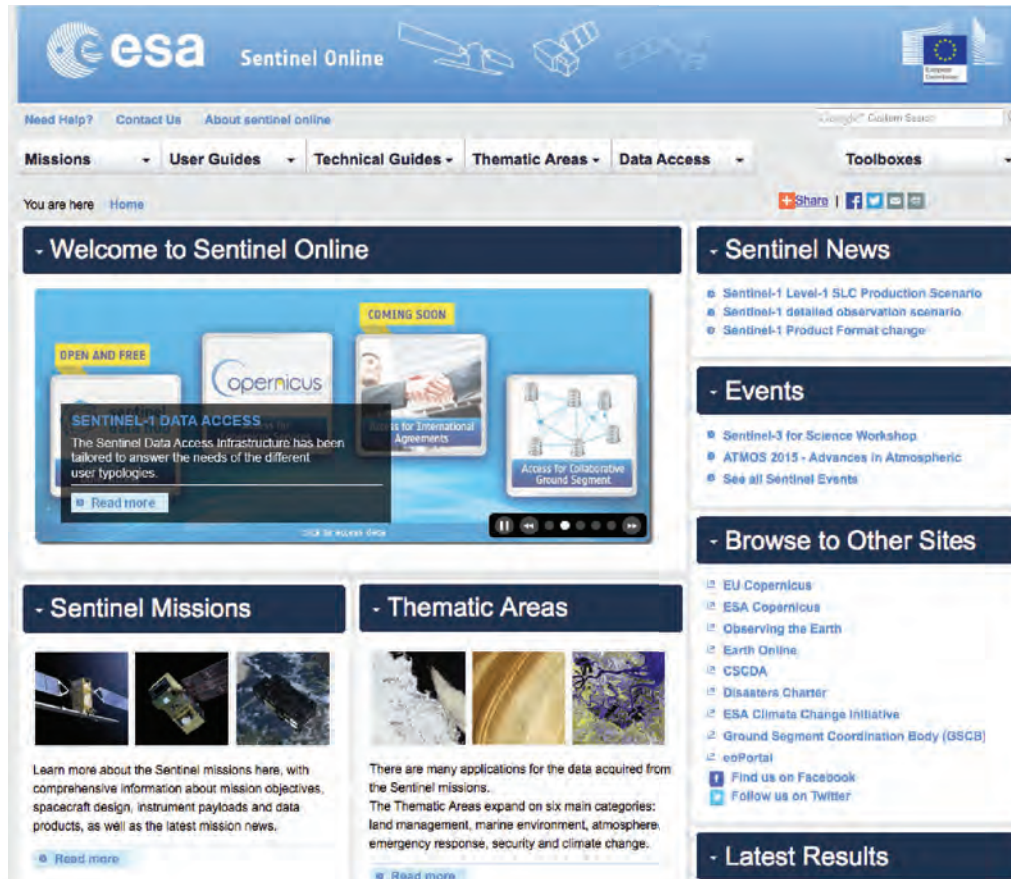
Continent	Registrations: Since start of operations	Number of Downloads: Quarter 2
Africa	233	119
Asia	1852	52904
Europe	5064	320293
North America	983	313657
South America	344	41655
Australia	128	26288
Antarctica	3	23



Europe and North America are hosting the most active user communities

Dedicated tests on-going with African users to benchmark download capacities

Sentinel Online Web Portal



The screenshot shows the Sentinel Online web portal. The header features the ESA logo, the text 'Sentinel Online', and a search bar. Below the header is a navigation menu with links: Missions, User Guides, Technical Guides, Thematic Areas, Data Access, and Toolboxes. The main content area is divided into several sections: 'Welcome to Sentinel Online' with a 'Sentinel-1 Data Access' banner; 'Sentinel News' with a list of news items; 'Events' with a list of events; 'Browse to Other Sites' with a list of links; 'Sentinel Missions' with a list of missions; 'Thematic Areas' with a list of thematic areas; and 'Latest Results'.

SENTINEL-1 DATA ACCESS
The Sentinel Data Access Infrastructure has been tailored to answer the needs of the different user typologies.
[Read more](#)

Sentinel News

- Sentinel-1 Level-1 SLC Production Scenario
- Sentinel-1 detailed observation scenario
- Sentinel-1 Product Format change

Events

- Sentinel-3 for Science Workshop
- ATMOS 2015 - Advances in Atmospheric
- See all Sentinel Events

Browse to Other Sites

- EU Copernicus
- ESA Copernicus
- Observing the Earth
- Earth Online
- CSCDA
- Disasters Charter
- ESA Climate Change Initiative
- Ground Segment Coordination Body (GSCB)
- eoPortal
- Find us on Facebook
- Follow us on Twitter

Sentinel Missions

Learn more about the Sentinel missions here, with comprehensive information about mission objectives, spacecraft design, instrument payloads and data products, as well as the latest mission news.
[Read more](#)

Thematic Areas

There are many applications for the data acquired from the Sentinel missions.
The Thematic Areas expand on six main categories: land management, marine environment, atmosphere, emergency response, security and climate change.
[Read more](#)

<http://sentinels.copernicus.eu>



Thank you