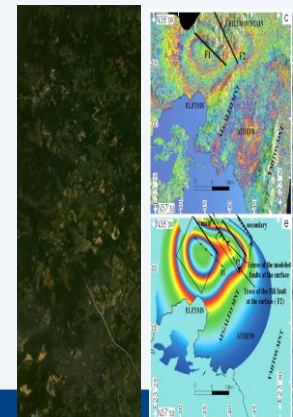


# Sentinel Collaborative Ground Segment Concept

## Overview of ESA support activities

*Meeting with Austrian Partners, 27 May 2014*



- Collaborative Ground Segment Concept
- Overview of on-going ESA support activities
- Frequency Asked Questions



The Copernicus/GMES Space Component (GSC) Operations Concept relies on a Ground Segment consisting of:

- 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 GMES Contributing Missions data
  - fulfilling the Sentinels Mission Requirement Documents
  
- a **Sentinel Collaborative Ground Segment**, with **non GSC-funded Functions and Elements**, providing:
  - a supplementary access to **Sentinel** Missions data, i.e. through specific data acquisition services, specific data products, mirror sites, etc.
  - the frame for cooperation with ESA Member States and at international level

- Access to Sentinel data through collaborative agreements allows further valorising the Sentinel missions exploitation
  
- The collaboration provides a frame for specialised solutions in 5 main areas:
  1. Sentinels data acquisition and Quasi Real Time production (Local Stations)
  2. Complementary collaborative data products and algorithms definition
  3. GSC core data product dissemination and access (e.g. mirror sites)
  4. Development of innovative tools and applications
  5. Complementary external Validation support activities

# Sentinel Collaborative Ground Segment concept



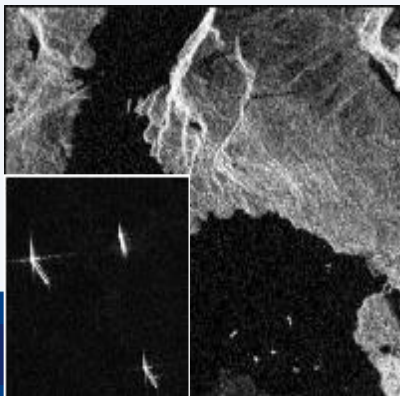
- Access to Sentinel data through collaborative agreements, valorising the Sentinel missions exploitation
- The collaboration provides a frame for specialised solutions in 5 main areas:

## 1. Sentinels data acquisition and Quasi Real Time production (Local stations)

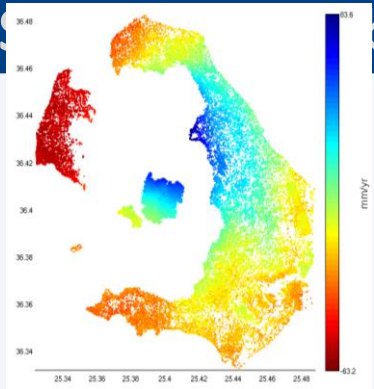
2. Complementary collaborative data products and algorithms definition
3. GSC data product dissemination and access (e.g. mirror sites)
4. Development of innovative tools and applications

Ship detection

Oil spill monitoring



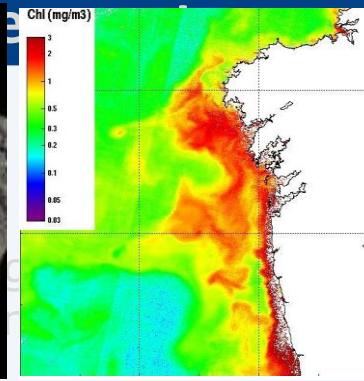
Volcano Monitoring  
(Sentinel-1)



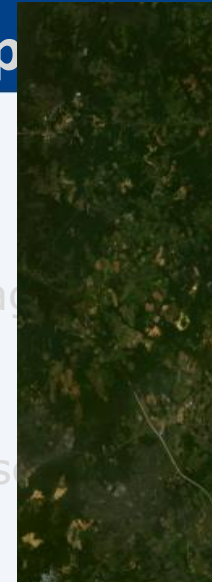
Landslides risk monitoring  
(Sentinel-1)



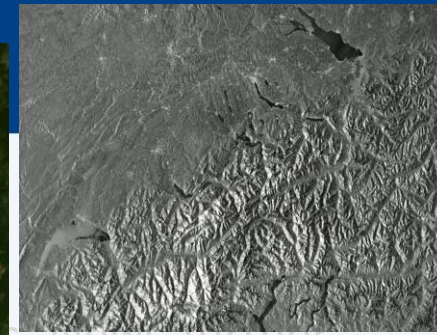
Sentinel-3  
complementary Level 2  
(alternative algorithm)



Sentinel-2  
Level 2



Sentinel-1 Orthorectified



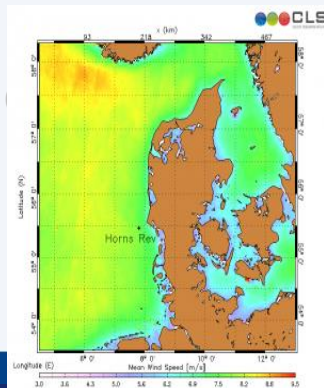
➤ The collaboration provides a frame for specialised products in 5 main areas:

1. Sentinels data acquisition and Quasi Real Time production (Local stations)
2. **Complementary collaborative data products / algorithms (to complement the core data and Copernicus services products)**
3. GSC data product dissemination and access (e.g. mirror sites)
4. Development of innovative tools and applications
5. Dissemination of products and services

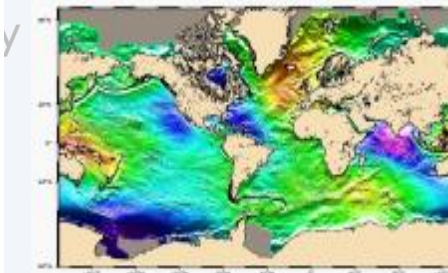
*Some examples*



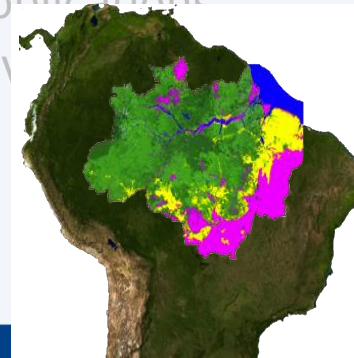
Land cover  
(Sentinel-2, -3 regional)



Wind statistics  
(Sentinel-1 regional)

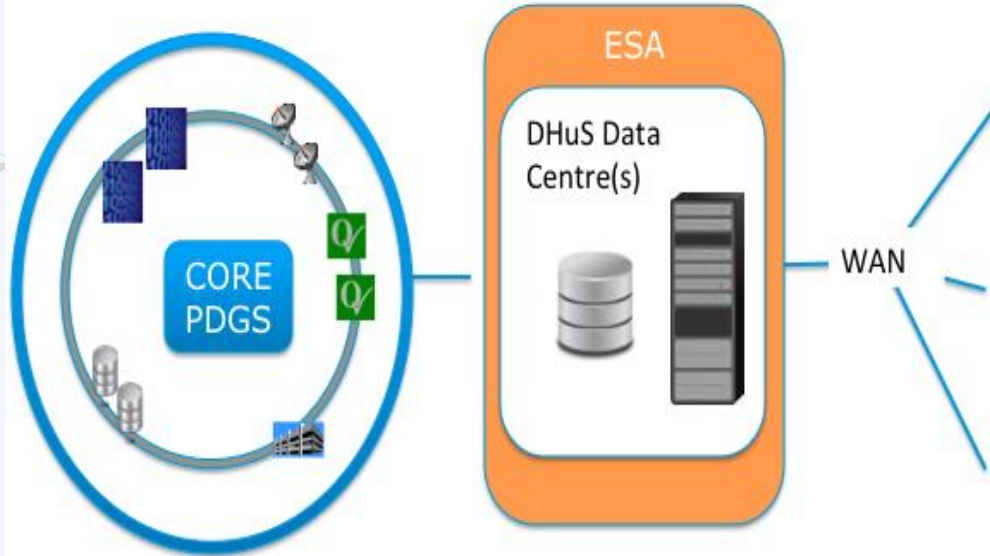


Sea surface height  
(Sentinel-3 altimetry)



Deforestation monitoring (REDD)  
(Sentinel-1, -2, -3)

*etc.*



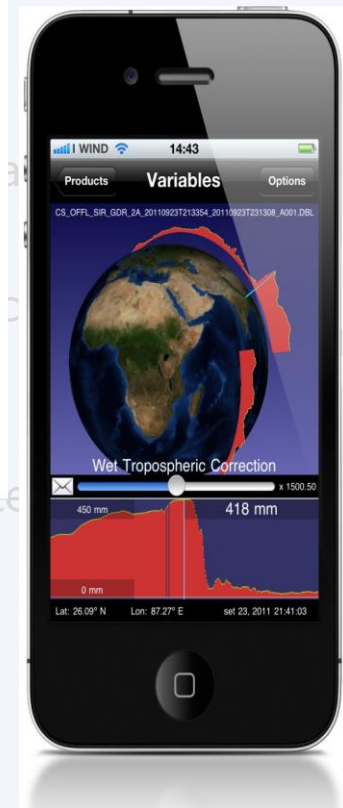
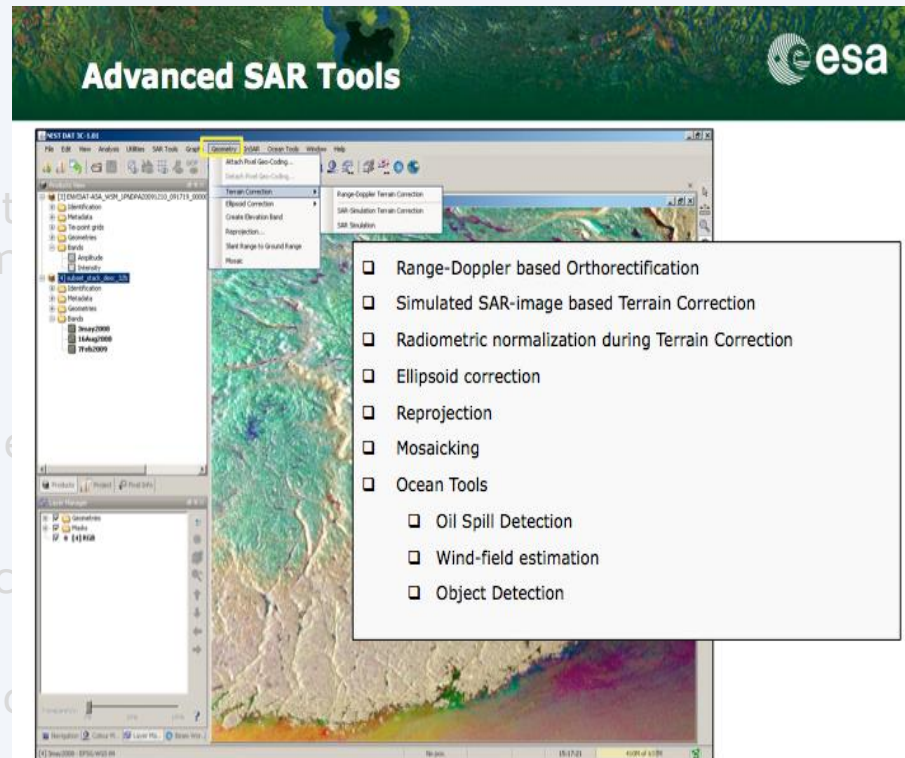
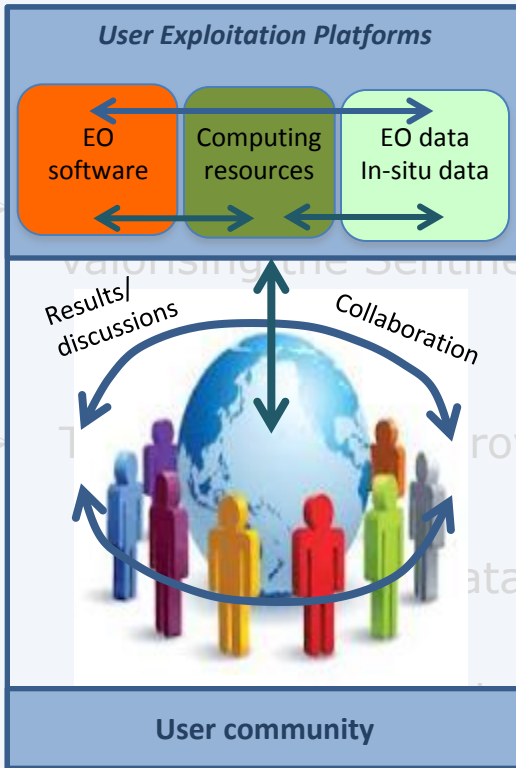
The screenshot shows the 'LAADS Web' interface for 'MERIS Registration'. The header includes the NASA logo and 'GODDARD SPACE FLIGHT CENTER'. Below the header are three satellite data images and the text 'LAADS Web Level 1 and Atmosphere Archive and Distribution System'. A navigation bar contains links for '+ HOME', '- DATA', '+ IMAGES', '+ TOOLS', and '+ HELP'. The main content area is titled 'MERIS Registration' and contains the following text: 'The MERIS data is available publicly at no cost to registered users who have agreed to the terms and conditions set by NASA and the European Space Agency (ESA) to access MERIS data. To access the MERIS data, complete the following steps.' The registration process is divided into three steps: 'Step 1: Register for an EOSDIS user account through the EOSDIS User Registration System. If you already have an EOSDIS user account, continue to the next step.' 'Step 2: Add authorization for the MERIS data to your EOSDIS user account by entering your EOSDIS login information below and filling out a short form.' This step includes input fields for 'User Name:' and 'Password:', and a button labeled 'Add MERIS Authorization'. 'Step 3: Visit <https://ladsweb.nascom.nasa.gov/MERIS/> and enter your EOSDIS login information to access the MERIS data.' The footer contains a link for '+ Privacy Policy and Important Notices', the NASA logo, and contact information: 'Webmaster: Karen Horrocks', 'NASA Official: Ed Masuoka', and '+ Send Us Your Comments'.

### 3. GSC data product dissemination (core data through mirror sites)

- 4. Development of innovative tools and
- 5. Complementary support to Calibration

Existing example: distribution of MERIS data by NASA

# Sentinel Collaborative Ground Segment concept



## 4. Development of innovative tools and applications

5. Complementary support to Calibration/Validation activities



esa Earthnet Online

Login My Earthnet

Data Access Missions Earth Topics PI Community

You are here Home > PI Community > Apply for Data > AO's

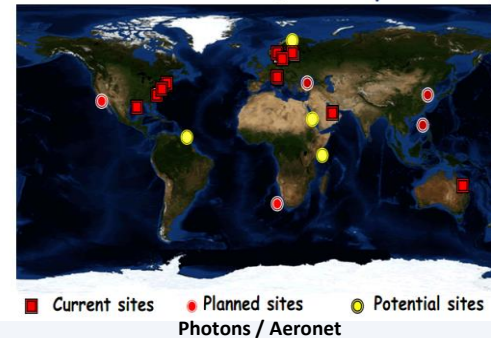
Announcements of Opportunity

Swarm SO | S3VT | G-POD | Previous AOs

**Welcome to the submission area for the Sentinel-3 Validation Team Call.**

In the framework of a GMES collaborative agreement ESA and EUMETSAT is opening call "To engage world-class validation expertise and activities to complement Sentinel-3 routine validation activities and ensure the best possible outcomes for the Sentinel-3 Mission". The call is open to relevant and interested groups and individuals worldwide; group responses are particularly welcome.

The call is implemented as a rolling call with distinct deadlines for proposal submissions on a regular basis. Next review will take place in September 2013.



4. Development of innovative tools and applications    Validation campaigns

## 5. Complementary external support Validation activities (incl. access to in situ infrastructure and data)

Implementation of the collaborative is based on 3 main steps:

## **1. Definition of process and collection of collaboration proposals**

- Started in the framework of the GMES Operations Consultation Group (GOCG)
- Requirements collection through reply to questionnaire
- Enable ESA to make a preliminary assessment of the planned initiatives
- Inputs from most MS received and under consolidation

## **2. Proposal feasibility analysis**

- Execution of simulation scenarios. Identification of potential conflicts
- Proposal refinement with collaborative partner

## **3. Formalisation of collaboration**

- Define and sign the formal agreement
- Document the technical operational interfaces
- Integrate, verify and validate the derived implementation

# Overview of on-going ESA support activities

- ESA support to Collaborative GS addresses several parallel activities, including:
  - Technical support for analysis of requirements of collaborative activities
  - Preparation of documentation for collaborative agreements
  - Engineering / technical support to collaborative partners for the set up of the interfaces to the core GS (data volumes, data types, geographical coverage, timeliness, access to data hub, etc.)
  - First level of engineering / technical support for collaborative stations partners with provision of documentation
  - Availability of Core GS developed elements for reuse: front end processor (at recurrent cost), operational processors license and associated maintenance
  - Sentinels coverage analysis and simulations related to National requirements, with potential evolution of mission analysis tools
  - Instruments and satellite tasking (to provide adequate observations and provide support to collaborative stations)

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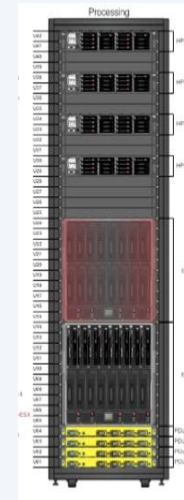
- Development, procurement and operationalization of data access/dissemination systems (including data hub tool DHuS) for access by collaborative partners
- Set up and operations of high capacity central data hub ensuring operational data flow for collaborative partners (including operations of network interface between core ground segment and collab. Data hub)
- Organization of CAL/VAL Call(s)
- Verification of user documentation related to collaborative products (planned)
- ESA hosting of collaborative processors (planned)
- Advertisement of collaborative activities (e.g. products) on the CSC Portals (planned)
- Use of ESA developed toolbox to host collaborative product processing algorithm (planned)

➤ **All of the above activities are funded via ESA GSC Programme Segment-3**  
(National Access to Sentinel data)

- Currently the allocated budget is limited to **2 M€/year** to cover these tasks

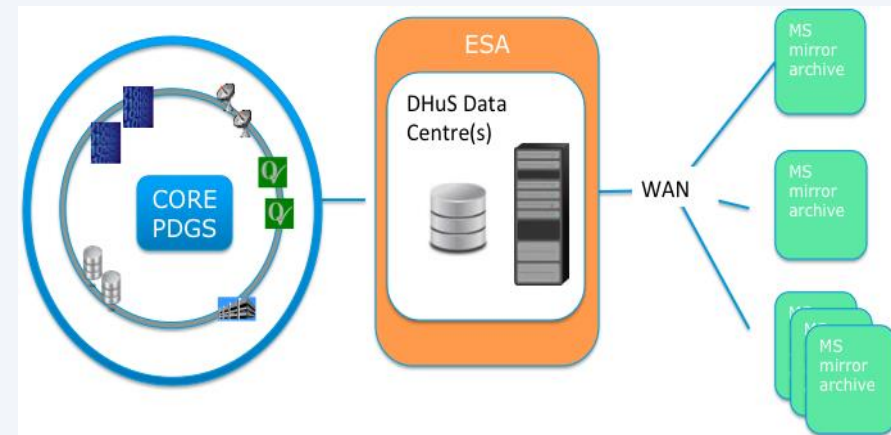
## ➤ Collaborative Ground Stations

- A first level of engineering support has been organised with the Sentinel-1 PDGS Prime Contractor
- Bilateral meetings (or videocon) can be organised with MSs interested in setting up Sentinel-1 collaborative ground station(s) for quasi-real time services.
- A first draft S1 PDGS – Collaborative station ICD has been prepared
- A high level collaborative stations architecture document, based on elements developed as part of the Sentinel-1 core GS, is under preparation



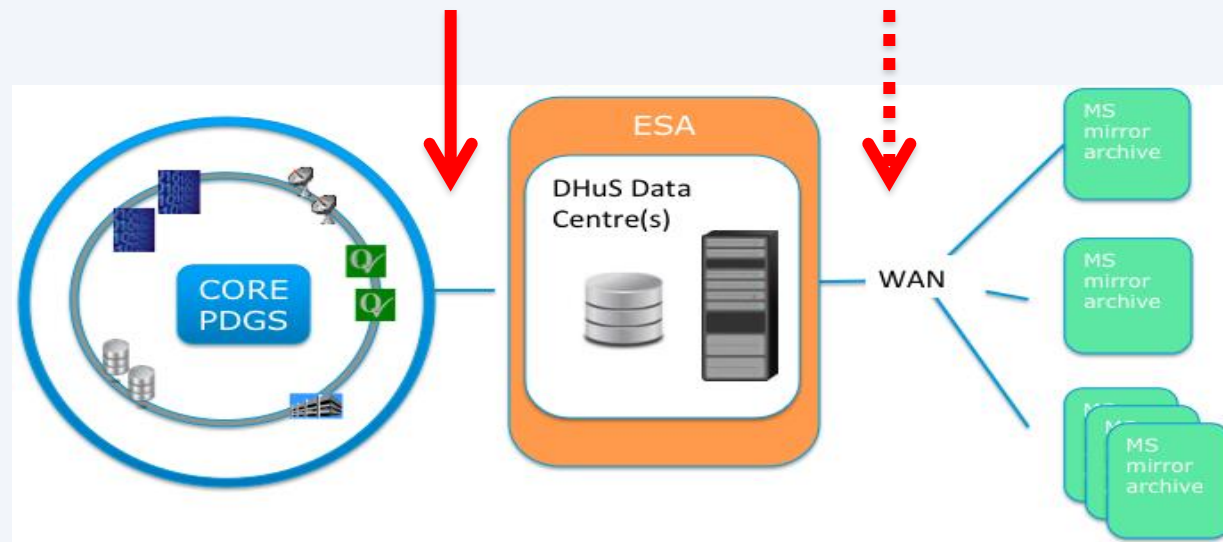
## ➤ Data Access Hub for Collaborative partners

- 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
  - allow Collaborative Partners to potentially make use of this software to manage their own mirror site
- Specific ESA support is planned with Collab. Partners for the use of this software with possible customisation (e.g. set up of scripts for systematic Sentinel data download)



## ➤ Network engineering

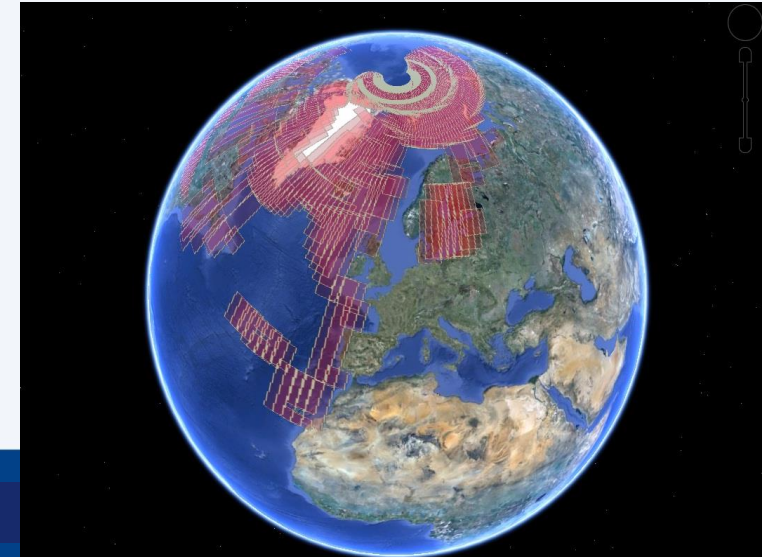
- A dedicated activity is on-going to set up the network interface between the Sentinel Ground Segment and the Collab. Data Access Hub



- This dedicated network will be complementing the GMES operational circulation / dissemination WAN, and will be funded by the ESA GSC Segment-3 programme (Sentinel data National Access line)



- Consolidation of National Sentinel observation/downlink requirements
  - The first version of the Sentinel High Level Operations Plan was approved by PB-EO in February 2013
  - Further discussions took place with Collaborative Partners representatives in particular as concerns the Sentinel-1 and -2 observation/downlink requirements
  - Additional simulations are on-going to consolidate the observation/downlink scenario



# Collaborative Partners

## Frequently Asked Questions

➤ **Stations outside Europe:**

The set up of local collab. Stations outside Europe may impact the overall system resources: additional observation needs (Sentinel-1), additional downlink requirements and constraints, etc.

It is planned to consider such requests during routine operations, assuming no or limited impact on resources, and in agreement with the EU

➤ **Reception of Sentinel-3 (and Sentinel-5P) data by collab. stations:**

Today not part of the foreseen scenario

➤ **Reception of on-board recorded data by collab. stations:**

Accepted if in overlap with the Core Stations

➤ **Reception of emergency / crisis planning tasked acquisitions by collab. stations:**

Accepted if in overlap with the Core Stations

➤ **Network interface between Collab. Partners and the dedicated centralised collaborative data hub**

ESA will set up a centralised high capacity hub dedicated to the ESA MS collaborative interface.

It is up to the collaborative partner to ensure that network connectivity / performance between this hub and their mirror site is suitable

➤ **Types of Sentinel core data available to Collab. Partners**

The available data products are the standard core products released to the users. Full details on core products are published in the Sentinel Online portal

➤ **Redistribution of CCM (Copernicus Contributing Missions) data:**

CCM data is subject of specific licence agreements. The data will be distributed via ESA CSCDA system. Further redistribution of CCM data via CollGS is not foreseen, i.e. the collaborative GS framework which concerns the Sentinels data only.

➤ **Number of national collaborative entities allowed to access the centralised Collab. Data Hub**

In principle only one National partner should access the data hub.

➤ **Can a user of country X access Sentinel data from a mirror site of country Y ?**

There are no intended rules / restrictions of the accessibility by users of a National mirror site. The access of National mirror sites is regulated by each Collaborative Partner

➤ **Coordination / duplication between different National mirror sites**

The main ESA role is to facilitate / support the Sentinel data access to collaborative partners. As a general principle, ESA does not intend to put any restriction / limitation on the collaborative GS activities, apart from the activities that have a technical impact on the CSC (e.g. deployment of collab. Stations impacting the spacecraft resources).

ESA may inform collaborative partners of similar activities in other MSs, and may consider to implement a coordination among the national partners if so requested by MSs through PB-EO.

***Thank you for your attention !***

***Sentinel Online Webportal:*** <https://sentinel.esa.int>

***Copernicus Space Component Website:*** <http://www.esa.int/Copernicus>

***Copernicus Programme Website:*** <http://copernicus.eu>