

A 3D rendering of the Earth from space, showing the Americas and parts of Europe and Africa. Several Sentinel-1 and Sentinel-2 satellites are depicted in orbit around the planet. The background is a dark blue space with faint binary code (0s and 1s) and star patterns.

**→ SENTINELS COLLABORATIVE  
GROUND SEGMENT  
WORKSHOP #14**

**26–27 June 2017 – Executive Summary**

## BACKGROUND

The Sentinel family of satellites is being developed to meet the operational needs of Europe's environment monitoring programme, Copernicus. The firsts in the fleet, Sentinel-1A, Sentinel-2A and Sentinel-3A were launched in April 2014, June 2015 and February 2016 respectively. Sentinel-1A and Sentinel-2A are already accompanied by their sister satellites Sentinel-1B, launched in April 2016 and Sentinel-2B, launched in March 2017. Sentinel-5P and the B-unit of -3 are foreseen for launch later in 2017.

Copernicus is the European Union's Earth Observation and Monitoring Programme, headed by the Commission (COM). ESA coordinates the delivery of data from upwards of 45 satellites, comprising the Copernicus dedicated missions (Sentinels) and the Copernicus Contributing Missions. The Commission is responsible for the overall initiative, setting requirements and managing the Copernicus services.

The Copernicus Space Component (CSC) – coordinated by ESA – includes the development and operations of the Sentinel satellites, as well as the distribution of the acquired Earth observation data. All Sentinel products are freely accessible online for the worldwide user community at [www.copernicus.eu](http://www.copernicus.eu) and [sentinels.copernicus.eu](http://sentinels.copernicus.eu)

In addition to that, and in close coordination with the Commission, ESA facilitates cooperation activities with Participating States to the Copernicus and the GMES Space Component Programme (including Canada) for direct and efficient access to Sentinel data. In the framework of the Sentinels Collaborative Ground Segment, potential activities of those countries are the set-up of a national mirror site, employment of own local passive receiving stations, development of innovative data processing tools and applications and complementary calibration/validation activities. In any Participating State, various initiatives and entities can be involved in the cooperation. Therefore a National Point of Contact bundles the flow of information between the national entities and ESA.

Under the lead of the Commission, ESA implements a similar cooperation scheme also with further European countries and international partners.

## WORKSHOP CONTEXT

The Sentinels Collaborative Ground Segment (CollGS) workshops provide a platform for information and discussion between ESA, the National Points of Contact, national entities involved in the cooperation and COM. The workshop succeeds the yearly meetings of the "GMES Operations Consultation Group", which started in 2010. In order to foster coordination among the CollGS initiatives, workshops are organised by ESA twice a year.

The workshop #14 objectives were to:

- Report on the latest Copernicus Space Component (CSC) developments: programmatic and technical
- Update on the latest status of the various Collaborative initiatives established by GMES Space Component (GSC) and Copernicus Participating States
- Promote the coherence between the CSC Ground Segment and Participating States collaborative initiatives
- Provide a forum for participants to harmonize their plans
- Address specific issues in the areas of:
  - Latest status and upcoming enhancements of data distribution services
  - Deployment of Collaborative GS services on DIAS
  - Offering National missions data on DIAS

The workshop took place on 26-27 June 2017 in Brugge, Belgium. 39 external participants attended the workshop, representing 20 countries. European Commission, EUMETSAT, European Maritime Safety Agency (EMSA), European Environment Agency (EEA) representatives and international partners from NASA and Geoscience Australia were also present.

Steven Bogaerts, BELSPO, welcomed the workshop participants to Brugge, a UNESCO world heritage city. ESA introduced the workshop objectives. ESA informed the participants that while the procurement process for DIAS was ongoing it would not be appropriate to make any detailed discussion on the DIAS implementation at this point and that this would be postponed to the next workshop.

The Commission reported the overall programmatic status of the Copernicus programme, from the setting up of the Copernicus IGS to the decision for the Copernicus Data and Information Access Services (DIAS) procurement.

ESA provided an overview of the latest status and prospect of the Copernicus Space Component, including the overall technical implementation status and the status of the Sentinels missions and the Sentinel data access.

The second part of the workshop was dedicated to 10 presentations from Member States and Copernicus Participating countries, addressing the progress of national CollGS initiatives, and 2 presentations from the international partners.

The final round table reported on the status of implementation of the recommendations from the previous CollGS workshops and future recommendations.

## **WORKSHOP HIGHLIGHTS**

Participants perceived the workshop as very useful to ensure coherence between the CSC development and national CollGS initiatives. Participants commented that the workshop shall also allow to increase collaboration amongst member states and not only bilateral cooperation with ESA. The main highlights of the workshop are summarized below.

Sentinel-1A and 1B nominal operations continue with an ever increasing portfolio of applications. An additional increase in pass-through observations from Sentinel-1 is planned to be gradually implemented over the coming months. Sentinel-2A operations are also nominal and

Sentinel-2B ramp-up phase is ongoing, products due to be released in early July. Sentinel-3A transitioning into routine operations with the readiness review planned in September 2017, preparations for Sentinel-3B launch are proceeding. Sentinel-5P launch is scheduled for September 2017.

The CSC ground segment operates nominally and serves the different user typologies through dedicated data access hubs. The distribution of data to the CollGS partners has seen a steady increase in the last six months, the Data Hub Relays operated in several member states are a significant contribution of this. A series of evolutions are planned in the next period including transparent access to the Sentinel data via the Long Term Archives.

CollGS agreements between ESA and twelve Participating States have been signed to date. Additionally, one country not participating to the ESA GSC programme has signed a Technical Arrangement document with ESA for the Sentinel data access cooperation. Further countries are currently assessing the establishment of cooperation agreements with ESA. As concerns international partners, ESA is implementing the cooperation based on Technical Arrangements; four of them have been signed to date (i.e. NASA, NOAA, USGS and Geoscience Australia).

Many national activities, in particular Sentinel data mirror sites, and generation of high-level products and services are operational. Provided services offer in some cases Sentinel data along with other mission data and hosted processing capacities. In particular, the following highlights were presented:

- Austria CollGS: the national mirror site, operated by ZAMG, is providing access to the global Sentinel archive. Furthermore, EODC also provides access to EO data archives accessible in a hosted processing infrastructure. Many ongoing activities around the EODC new metadata infrastructure and “Austrian Global Data Cube” with EODC acting as community facilitator.

- Belgium CollGS: The Belgium CollGS will make use of existing infrastructure related to remote sensing in Belgium and is looking to open up processing power to Belgian end users.
  - Canada CollGS: The Canadian CollGS is actively using data from Sentinel-1 and Sentinel-2 for a wide use of applications including sea ice maps, crop inventories and poaching indicators.
  - France CollGS: PEPS mirror site platform was opened in September 2015 with approx. 2000 registered users in June 2017. It is hosting a wide set of processing applications providing access to the Sentinel data.
  - Germany CollGS: DLR has been continuing to make use of Sentinel-1 products available from Direct Downlink Mode. The CODE-DE data and exploitation platform has been operational for data access since March 2017 and an announcement of opportunity for processing applications has been launched.
  - Greece CollGS: The Hellenic Sentinel data mirror is included in the BEYOND initiative for access to various EO data and services, and is operational. The service has 445 registered users in June 2017 months. Several applications are supported e.g. the monitoring of floods, smoke dispersion and fires.
  - Italy CollGS: The Italy CollGS is running as a proof of concept with an archive of Sentinel data over the Italian Region of Interest. A future extended CollGS is intended use the Copernicus DIAS.
  - Norway CollGS: Sentinel data is distributed via national mirror site at satellittdata.no. The CollGS is providing QRT access for Sentinel-1 over the Norwegian AOI via passthrough. Many new functionalities are being added to portal. Many high level product and applications are operational.
  - Sweden CollGS: The Swedish CollGS - SWEA, operated by Spacemetrics, has been operational since January 2017 and offers many features including precision data cubes.
  - UK CollGS: UK current CollGS comprises SeDAS, operated by Catapult serves commercial users while JASMIN-CEMS, operated by STFC-RAL provides academic data access. Both are operational and supported by Data Hub Relays for Sentinel data collection.
- Additional activities related to Sentinel data utilisation were presented by the international partners:
- Geoscience Australia: highlighted several application fields including the protection and monitoring inf the great barrier reef world heritage area. The current status and future plans for the regional data hub were presented.
  - NASA: provided an overview of the data distribution via their National Sentinel Gateway and the very positive feedback for the Sentinel Data usage.
- Beyond the presentations, it was noted that several plans for new CollGS by additional Participating States are being refined.
- Throughout the workshop and during the review of previous workshop recommendations a number of common topics and themes were addressed including:
- The configuration control of possible different processing of the same Sentinel data, ie. attribution, lifecycle, digital object identifiers.
  - The possibility for single-sign-on solution to all Sentinel mirror sites.
  - The interest in data cubes and the commonality / interoperability of the various approaches.
  - The usefulness of common metrics for reporting and need for a benchmarking of the data access across continents.
  - The importance for the continuation of the data hub relays in pre-DIAS era.
  - The availability of a common database for hub software maintenance issues and experience regarding ESA open source data hub software.
  - The useful progress on common licensing approach for EO data.

The workshop participants concluded that a more technical forum for discussing many common topics would be of benefit. The participants suggested to use one of the two yearly workshops for this more technical forum, with selected topics to be prepared and discussed allowing for decision and approval at subsequent workshops (with due deference to EC fora when such topics could be of relevance to the programmatic discussions).

Workshop participants also highlighted that integration of Copernicus Service products into the various platforms needs to be addressed from a technical point of view, but also on a political level, a topic that should be addressed with the respective trusted entities.

It was agreed that there would be a dedicated debrief of the DIAS procurement towards CollGS following the finalisation of the procurement process.

### WORKSHOP RECOMMENDATIONS

It was noted that implementation of many recommendations from the previous workshops are in-progress, and should thus be further tracked, namely:

- It should be possible to access Sentinel-3 Marine L2 products from the Collaborative data hub.
- The management of configuration control and versioning of core and collaborative products should be consolidated and standardized to accommodate as much as possible a “collaborative” approach.
- It is recommended to test federated user management (Single Sign On) in the context of core/collaborative GS integrated GS.
- It is recommended to assess the use in Sentinel-2 of specific DEM addressing national needs, with the objective to enter in pre-operation before end of year.
- It is recommended to assess the potential coordination/combination of meetings between CollGS workshops and the Copernicus Integrated Ground Segment Task Force in

order to maximize synergies and promote efficiencies.

- ESA, together with CollGS partners and COM should assess the possibility to continue the pre-operations of the data hub relays.
- ESA together with CollGS partners should assess the development of EO “data cubes” to be deployed on future platforms.
- ESA and COM should carry forward the current initiative to harmonise licences among EO data providers.

ESA, in close coordination with the Commission, will follow up these recommendations and report on the status of their implementation at the next Sentinel CollGS – technical - workshop, GOCG #15.

