Minutes of the 60th Meeting of the CEOS Working Group on Information Systems & Services (WGISS)

Chaired by USGS, Vice-Chaired by ISRO
Oberpfaffenhofen, Germany | October, 2025

Table of Contents

Day 1: Monday 13th October, 2025

Session 1: Opening Session

1.1 - Welcome & Review of Agenda

Nitant Duve (ISRO, WGISS Vice Chair) reported:

- Tom Sohre (USGS, WGISS Chair) sends his apologies for not being able to join this week.
- Thanks to DLR for hosting WGISS-60, and providing logistics support for all participants.
- Participants were invited to introduce themselves. The full list of participants can be found in Appendix A.

1.2 - Keynote from DLR

Christian Geiß (DLR) reported [*slides*]:

- WGISS last met at DLR in 2018, for WGISS-46.
- The Earth Observation Center is part of the Research Center of DLR. It was founded in 2000, and is composed of the Remote Sensing Data Center (DFD) and the Remote Sensing Technology Institute.
- DFD includes space infrastructure, computing infrastructure as well as applied EO research for climate and environment.
- DLR receiving stations are located in the Arctic, Antarctic and across Germany.
- Terrabyte is DLR's EO exploitation and high performance data analytics platform.
- The World Settlement Footprint dataset provides a global view of human settlements with high spatial resolution and over time, from 1985 to 2015.
- Long-term air quality assessments have been done to quantify NO_2 and understand the change in concentrations over time. The decrease from 2019 to 2020 during the COVID-19 pandemic is prominent.
- Earth observation can play an important role to prepare for earthquakes, to provide information about the structures and their stability when faced with an earthquake.
- With EO data alongside street based imagery, models have been developed to simulate expected building damage when hit by different sized earthquakes.

- Trained an AI model to class building damage due to flooding, using data from a 2021 flood. This will be used to support disaster recovery for future flooding events. Pre- and post-event data was included, and used a lightweight probabilistic model.
- Have developed the 'EO Wald' platform to provide descriptive statistics on forest cover.

Discussion

- Steven Ramage (CEOS Exec Officer) noted the relevance of this work to the work of WGDisasters, in particular the flood pilot led by CONAE, and wildfire pilot led by Australia. Furthermore, WGCV addresses many topics around uncertainty, so he encourages DLR to engage with WGCV on that topic.
- Maral Bayaraa (UKSA) asked about how many of the mentioned datasets are available online, as open and free datasets. Christian noted most are available, however some datasets are more experimental and may not be online, but access can be provided on request.

1.3 - CEOS Executive Officer Report

Steven Ramage (CEOS Exec Officer) reported [*slides*]:

- WGISS often discusses the 'FAIR' principles, and should also consider the 'CARE' principles: Collective benefit, Authority to control, Responsibility, and Ethics.
- The World Economic Forum (WEF) has recently created a national space strategy toolkit. The CEOS Interoperability Handbook would be a great addition to this work, and the Executive Officer team can support WGISS in making this connection.
- The CEOS Plenary is coming up at the start of November, which will see a number of changes in leadership roles across CEOS. Australia will take on the role of CEOS Chair, while NASA will take on the SIT Chair role. Steven is stepping down from the Executive Officer position, and it will be taken up by Lefteris Mamais and his team at Evenflow.
- The CEOS Work Plan is a 3-year rolling strategy, updated annually.
- Three agencies are nominating their membership at CEOS Plenary: African Space Agency, Hellenic Space Center and Philippine Space Agency. They would all likely benefit from contributing to WGISS.
- WGCapD, supported by ESA, are developing Massive Open Online Courses (MOOC) to deliver information products to the community. Have developed one focused on food security, and another on SDGs. The Interoperability Handbook content would likely also make a good MOOC.

1.5 - Data Preservation & Stewardship Interest Group (DSIG) Work Plan

Mirko Albani (ESA) reported [*slides*]:

- DSIG has two deliverables open online: the white paper on EO data collection management and governance, which was completed earlier this year, and white paper on software preservation, which is nearing completion.
- In the 2025-2027 CEOS Work Plan, a deliverable was created on guidelines for EO data citation. This activity is in progress, and will be discussed in Session 3.
- Session 8 will cover presentation topics and archived data, and Session 9 will discuss heritage dataset recovery.

1.6 - Data Discovery & Access Interest Group (DAIG) Work Plan

Damiano Guerrucci (ESA) reported [*slides*]:

- DAIG has supported the Interoperability Handbook, particularly the Interface chapter.
- The STAC Best Practices were completed at the end of the last year. One additional comment has been received, and an update of the document will be produced shortly.
- DAIG is continuing to work on the white paper on federated authentication and authorization.
- The registration of data into the WGISS Connected Data Assets is an ongoing activity managed by DAIG.
- Working with CEOS-ARD Oversight Group to increase the discoverability of CEOS-ARD datasets in WGISS Connected Data Assets.
- Contributing to the CEOS Common Dictionary regarding data access terms.

1.7 - Technology Exploration Interest Group (TEIG) Work Plan

Yousuke Ikehata (JAXA) reported [*slides*]:

- The AI/ML White Paper is nearing completion. A final discussion will be held this week, after which virtual endorsement is planned.
- Working with DAIG on the federated authentication and authorization topic.
- Working also on the digital twins activity, with a detailed discussion planned for Friday.
- Exploring the compression topic, including on-board compression. Suggestions for what to focus on for this topic are welcomed.

1.8 - Data Interoperability & Use Interest Group (DIIG) Work Plan

Nitant Dube (ISRO, WGISS Vice-Chair) reported [*slides*]:

- The major goal for 2025 was the review and publication of the CEOS Interoperability Handbook. Following final discussion this week, the document will be delivered to CEOS Plenary for endorsement.
- In 2026, the focus will be on developing the Interoperability Maturity Matrix, as well as starting to develop interoperability demonstrators in collaboration with other CEOS groups.

1.9 - Select Action Review

Libby Rose (WGISS Secretariat) reported [*slides*]:

- A review of the open action items was provided, including a high-level summary of progress from previous meetings. All actions from WGISS-56 are closed. Three actions remain open from WGISS-57, 11 from WGISS-58, six from the Joint WGCV-WGISS 2024 meeting, and 13 from WGISS-59. In total, 36 actions are open, with 25 in progress.
- WGISS-57-07: *WGISS Chair to compile a table of POC for external and internal collaborations. Table should be regularly updated (revised at least annually) and may be included as part of a WGISS annual work plan.*
    - Libby has compiled an initial list and requested nominations for additions.
    - Matt Paget (CSIRO) agreed to serve as a POC for the ARD Oversight Group, noting that others are also actively involved and should be included.
    - Nitant Dube (ISRO, WGISS Vice Chair) suggested adding CGMS Working Group IV. He also suggested adding Dave Borges (SEO) as POC for OGC.
    - Mirko Albani (ESA) noted that ESA can provide linkage to the Data Archive Interoperability Working Group (DAI) within the Consultative Committee for Space Data Systems (CCSDS).
- WGISS-58-10: *Anyone interested in using CoMET once it becomes available to non-NOAA users should send Sarah Menassian (NOAA) an email.*
    - It was agreed that this action should remain open.
- WGISS-58-18: *DAIG to connect with the NCICS team developing the SuperSTAC prototype, and remain aware how this interacts with IDN & FedEO.*
    - The action remains open.

- WGCV-WGISS-2024-05: *SEO to develop some 'Contributor Guidelines' for the CEOS GitHub to help outsiders contribute to the Interoperability Handbook and other repositories.*
    - A draft has been prepared. A follow-up with Dave Borges (SEO) is needed to obtain the draft version.
- WGCV-WGISS-2024-13: *WGCV to provide guidance on what uncertainty information should be packaged within a dataset. WGISS should then add guidance on how this information can be provided to the user. This should be fed back to add into the CEOS-ARD specifications.*
    - WGISS is waiting on inputs from WGCV.
- WGISS-59-30: *CEOS-ARD Oversight Group to work with CEOS MIM Database team and LSI-VC to identify and develop 'CEOS-ARD' keywords to be provided to DAIG for FedEO and IDN, to support discovery of the datasets. CEOS-ARD Oversight Group should consider how to recommend the use of these keywords to support better discovery of CEOS-ARD datasets.*
    - Work has commenced, including a kickoff meeting. It was agreed the action can be closed.

1.10 - Living Planet Symposium: Key Takeaways for WGISS

Damiano Guerrucci (ESA) reported [*slides*]:

- Living Planet Symposium was held in Vienna, Austria in June 2025, organised by ESA. Both ground and space segments were well represented.
- The event included 6900 participants, with 250 sessions, 60 agoras, 4200 scientific presentations and posters, and 55 exhibitors, including CEOS.
- The ESA Earth Observation Framework booth focused on new logistics and communications, to support data access.
- The LPS user survey included responses from 732 participants, focusing on their preferences regarding data access, satisfaction from utilised EO data and services, and new, emerging needs and problems that could shape the future of EO services.
- Most respondents (55%) were interested in time series of more than 5 years, and 28% looking for 1-5 year long series.
- The filtering preferences included area of interest, mission or instrument, product characteristics and time range. Code/API integration was the most common access method, followed by GUI.
- Key aspects of data access included access to full archive and older data, data quality and reproducibility, and compatible and standardised data formats.

- Key recommendations from the survey responses include:
  - Simplify and unify access
  - Improve discoverability and metadata
  - Expand volume, coverage and continuity
  - Invest in data interoperability and harmonisation
  - Enhance user support and visibility

Session 2: Agency Reports

2.6 - CNES

Alice Andral (CNES) reported [*slides*]:

- CNES has had three successful launches in the last few months: MicroCarb, CO3D and IASI-NG (on MetOp-SG A1). Future missions include TRISHNA (with ISRO), C3IEL, REVALTO, MERLIN and GENESIS.
- MicroCarb's commissioning phase went well, and the Cal/Val Phase 1 has now commenced. First observations were conducted over Amazonia.
- CO3D's launch and early operations (LEOP) also went well, and the first images were acquired in mid-August. The DEM results are very promising.
- IASI-NG is in good shape, and satellite in orbit verification phase will continue until mid-November, before cal/val starts.
- TRISHNA will be launched in 2027, with the goal to support the creation of evapotranspiration maps.
- The CNES Data Campus promotes EO data by helping end users understand the data and what can be done for specific applications. They produce open-source algorithms, models, products and services.
- GEODES is the CNES data access and analysis platform.
- DataTerra is the French research infrastructure for the integrated observation of the Earth system, and includes satellite imagery,
- CNES initiative on digital twins includes support for industrial and academic initiatives, by delivering open-source foundation building blocks to foster new thematic digital twin initiatives. The digital twin is used by COAST-VC.

WGISS-60-01	CNES to prepare a presentation for WGISS-61 on the building blocks of Digital Twins, and how they are used by COAST-VC.	**WGISS-61**

2.3 - JAXA

Makoto Natsuisaka (JAXA) reported [*slides*]:

- A strategic update for JAXA is ongoing, with the focus transitioning from R&D to societal benefit.
- Four thematic strategic priorities have been set by JAXA: global water-related disaster risk and resource management; carbon stocks; maritime observations; and infrastructure and disaster management.
- Nine current satellites in operation, with three launched in the last 18 months: ALOS-4, EarthCARE, and GOSAT-GW.
- EarthCARE is a joint ESA-JAXA mission, with JAXA providing the Cloud Profiling Radar (CPR) sensor. The first images were released on 27 June 2024, which were the world's first measurement of vertical cloud profiles.
- The four instruments onboard EarthCARE are coordinated together by ESA and JAXA for synergetic observations. Level 1 and Level 2A/2B data has already been published. The three- and four-sensor synergistic products will be released later this year.
- ALOS-4 carries an L-band SAR sensor, carrying on the legacy of ALOS and ALOS-2. Earthquake monitoring is a key application of the data, due to the nature of Japan's location on a fault line. The swath of ALOS-4 is 400 km, four times wider than ALOS-2, while maintaining the same resolution. This reduces the revisit time for ALOS-4.
- The process of providing DOIs to research products has been started, however it doesn't comply with the recommendations of the WGISS Persistent Identifier Best Practices.
- The cloud migration of G-portal is ongoing, with the release planned for JFY2026. The data will be placed in AWS Asian Pacific (Tokyo) region. 2 PB of data are being transferred via SINET. The archive will still be kept offline at Tsukuba Space Centre, however dissemination will be via AWS. There will be no change for users accessing data.

2.5 - UKSA

Robert Fletcher (UKSA) reported [*slides*]:

- The UK Space Agency will merge with the UK Department for Science, Innovation and Technology (DSIT) from 1 April 2026. The move aims to streamline activities, however the agency will retain the name identity and brand, as well as most of the staff.
- UKSA is the current Chair of CEOS, and are preparing to host CEOS Plenary next month. Their chair activities have included the *Common Practices for Quantifying Methane Emissions from Plumes Detected by Remote Sensing*, and the CEOS in Schools programme.
- MicroCarb, collaboration with UKSA and CNES, launched on 25 July 2025. The first images were released last week.
- ESA's Biomass mission launched April 29, 2025, with UKSA playing a leading role in the mission.
- WIVERN has recently been selected as the 11th ESA Earth Explorer, with the mission proposal led by Professor Anthony Illingworth from the University of Reading.
- UKSA has recently pulled funding for the TRUTHS mission, with funding being redirected to prioritise national security projects.
- DSIT is developing an EO data architecture strategy, with the primary goal to be increasing the use of EO data in the public sector. UKSA will commission a EO Data Capability Study in Q1 2026.
- The UK EO Data Hub is the data access portal supported by government, academia and industry. Phase 2 development is ongoing, with the development of public sector use cases, and wider stakeholder engagement.

Discussion

- Alice Andral (CNES) noted that MicroCarb will primarily focus on measuring carbon dioxide, but there is also a possibility of measuring methane.

2.7 - ESA

Mirko Albani (ESA) reported [*slides*]:

- ESA has three streams of missions: Science (including Earth Explorer and Heritage missions), Copernicus and Meteorology.
- Recent launches include MTG-S1 with Sentinel-4A on July 1, 2025, and MetOp-SG A1 with Sentinel-5A on August 12, 2025.
- The Heritage Missions include data acquired by ESA from missions operated by other organisations, as well as past ESA missions. ESA ensures the discovery and access of this data remains available.

- Seven Earth Explorers are currently in operation.
- PhiSat-2 is a cubesat mission, which includes an onboard processor to provide AI processed data available to the public.
- Three ESA Scout missions are in development - HydroGNSS, NanoMagSat and TANGO. Scout missions are small missions, developed rapidly.
- Allow for advanced data access via the ASCEND platform, including the set of dedicated Multi-mission Algorithms and Analysis Platforms (MAAPs) to serve as a starting point for data analysis for Biomass, EarthCARE and FLEX.
- Sentinel-1D will launch next month, to replace Sentinel-1A which is over ten years old.
- Sentinel-2A has been working in an extended campaign since March 2025. Sentinel-2D will be placed in storage on the ground for now, until it is needed to replace Sentinel-2B.
- Sentinel-6B will launch in November 2025.
- Also developing the Next Generation Sentinel missions, and the six Sentinel Expansion missions.

Discussion

- Makoto Natsuisaka (JAXA) asked about the process for proposing mission concepts.
- Mirko noted it varies on the mission stream, but for Earth Explorers, proposals are developed by the scientific community and evaluated by a panel of scientists, who make a recommendation to the ESA Programme Board.
- Sai Kalpana (ISRO) expressed interest in PhiSat-2 and the edge computing capabilities. Will this capability be continued in future missions?
- Mirko noted that PhiSat-2 is a demonstration mission, and ESA is now looking at developing PhiSat-3. However, the capability is not operational yet.

WGISS-60-02	Mirko to provide a presentation at WGISS-61 about the outcomes of the PhiSat demonstration satellite, in particular about the onboard data processing aspects.	**WGISS-61**

2.8 - ISRO

Nitant Dube (ISRO) reported [*slides*]:

- NISAR launched successfully on 30 July 2025, with the validation of initial products in progress. Both L-band and S-band initial data has been released and looks promising.
- Together Oceansat-3 and -3A will provide a revisit time of one day.

- The G20 Satellite is being developed, with a focus on environment and climate change.
- On Bhuvan, the green cover index for all national Indian highways has recently been released and provided to the National Highways Authority of India, with the goal of creating more green highway systems.
- New satellite layers have been added to the data hub module for LISS-III, LISS-IV MX, AWiFS and Microwave.
- Experimenting with AI foundation models on VEDAS.
- Raster analysis with increasing resolution has become harder, and hence ISRO developed the Raster analytics system for Interactive Data Modelling (RiDAM) tool. Capable of handling big radar data volumes, and can support near real time visualisation and dynamic on-the-fly analysis.
- Have released new science products from EOS-6 on MOSDAC, as well as new products on Bhoonidhi.
- Collaborating with EUMETSAT to receive MSG-9 SEVIRI Nowcast data.
- A web application has been developed to calculate optimal ship routes, using sea state condition data.
- The National Database for Emergency Management (NDEM) is a unique Geo-portal to disseminate space based inputs along with services of forecasting organizations addressing all natural disasters.

14.1 - Communications Update

Libby Rose (WGISS Secretariat) reported [*slides*]:

- Two WGISS related news articles have been recently published on the CEOS website: Building a 40+ Year Global Dataset Through CEOS Agency Collaboration, WGISS Connected Data Assets: 2025 Update. An upcoming article will feature the CEOS Purge Alert Service. Further suggestions for future articles are welcome.
- The CEOS Newsletter is managed by JAXA on behalf of CEOS and has an internal focus. An article on the Interoperability Handbook will be published in CEOS Newsletter in the coming months.
- Updates to the WGISS website include the addition of a combined FedEO/IDN Data Access Page, updates to the Technology Exploration page and embedding of the WGISS Overview Presentation on the home page.

- The CEOS Communications team is working on updating the CEOS Communication Strategy to align with the priorities of the incoming 2026-2027 CEOS Chair and SIT Chair. A first draft of the updated strategy will be presented at the 2025 CEOS Plenary, with the final version to be shared at SIT-41.
- 'Interoperability' is a key topic for both incoming CEOS and SIT Chairs, and is being considered as a key campaign for CEOS over the coming year. WGISS inputs would be most welcome.

Day 2: Tuesday 14th October, 2025

Session 2: Agency Reports (cont.)

2.9 - Geoscience Australia

Michael Wellington (GA) reported [*slides*]:

- Michael works full time on Digital Earth Africa (DEAfrica).
- Efforts have been made to enhance the accessibility and interoperability of Digital Earth data products and services, including through STAC.
- Via Open Data Cube (ODC) implementation, data can be queried in a few lines of code, giving a similar user experience to the Digital Earth Sandboxes.
- Have created 'lite' version of Digital Earth Australia and Africa tools, which can be installed from pypi and includes functions for setting STAC configuration.
- The Copernicus Master of Digital Earth programme is run by a number of European universities, which uses DEAfrica as an ODC implementation.
- With support from DEAfrica, the Kenya Space Agency is implementing 'cube-in-a-box' to run on their own infrastructure with a self-managed sandbox environment.
- Ground Truth Analytics runs agriculture dashboards with the DEAfrica Sentinel-1 RTC product, mirroring the entire S3 bucket.
- Understanding the Digital Earth users has helped enhance access and interoperability, with the value of the Sandbox user experience recognised.

Discussion

- Alex Leith (SEO/Auspatious) noted the SEO is interested in using the CEOS Analytics Lab sandbox, which is built on the same infrastructure as the Digital Earth sandboxes, for

interoperability demonstrators. The sandbox is a contained, pre-prepared environment for data analytics.

Session 3: EO Data Citation Guidelines

3.1 - EO Collection Data Citation Guidelines - Introduction

Iolanda Maggio (ESA/Starion) reported [*slides*]:

- Citation is the process of adding information to a text or other material that indicates where an external resource has been used to create it. Data citation is the practice of referencing data products used in research.
- Data citation is important for scientific research, to ensure the results can be replicated. It is essential for ensuring transparency, reproducibility, and giving appropriate credit to data creators.
- To cite correctly, the citation should refer to the data (not the documentation), should be cited in-text and in the bibliography, and the full citation must include at least the core components.
- Core components of data citation include author (individual or organisational entity), title, year of publication, version, publisher, and persistent identifier.
- The proposed activity for WGISS would be to perform a data citation guidelines survey, share agency experiences and lessons learned, confirm the core components of data citation for EO purposes and select additional components of a data citation.
- The EO Collection Data Citation Guidelines would then be drafted.
- Various CEOS Agencies and groups provide recommendations on data citations, including from the Consortium of European Social Science Data Archives (CESSDA).

3.2 - EO Collection Data Citation at WGISS Agencies

- Nitant Dube (ISRO, WGISS Vice Chair) noted that persistent identifiers provided by data providers may not comply with requirements of scientific journals.
- Alex Leith (SEO/Auspatious) suggested considering citation opportunities at a more granular level, noting STAC doesn't have a concept of lineage or parent dataset. Each granule should contain a provenance relationship.
- Iolanda Maggio (ESA/Starion) noted that for the persistent identifiers best practices, a number of use cases and scenarios were described. A similar approach could be taken here.

- Nitant suggested including use cases around citation of dynamically generated data, as well as higher level products.
- Iolanda noted some examples have already been found from NASA, USGS and ESA, but encouraged other agencies to share their approaches.
- Uwe Voges (EUMETSAT/Conterra) suggested reviewing international standards such as ISO19115.

WGISS-60-03	DSIG to survey all WGISS members regarding their current practices for data citation, including what use cases should be considered for the guidelines.	**WGISS-61**

SuperSTAC

- Alex Leith (SEO/Auspatious) reached out to Chris Stoner (AWS) regarding SuperSTAC. She noted that the conversation started at ESIP in 2024, where the community were excited about SuperSTAC as 'one catalog to rule them all'. The North Carolina Institute for Climate Studies (NCICS) picked the work up, however now priorities have changed and they are no longer working on it. Chris remains interested, but no one is taking it forward at the moment.
- Unclear how the structure would work, but the idea is one central catalog. The STAC API for such a catalog would be complicated, and a sophisticated search would be required.
- Yousuke Ikehata (JAXA) noted something like this already exists, with WGISS Connected Data Assets.
- Yves Coene (ESA/Spacebel) noted one element which needs to be improved on for such a large catalog is common terminology for platform and sensor names.
- Catalogs at a higher level should also include more information about what the product includes (spatial / temporal coverage etc.).

Session 4: Data Access

4.1- Federated Authentication and Authorization (AuthN/Z) White Paper status

Filippo Marchesi (ESA/Solenix) reported [*slides*]:

- Surveyed WGISS members for WGISS-58 to investigate the landscape of federated authentication and authorisation for data discovery and access.
- The survey highlighted the need for a white paper on this topic, and the document outline has been defined, and contributions commenced.

- Discussing with the SEO to investigate possible technologies, and the possibility of a central CEOS authentication method.
- The white paper is being coordinated in GitHub, with a formatted document available here.
- Have decided to exclude data federation from the current white paper, focusing instead on user federation.
- The paper will include a number of use cases, as presented at previous WGISS meetings and other examples from the community.
- The Centralised vs Decentralised chapter will include outcomes from the ongoing work in OGC Testbed-21 regarding integrity, provenance and trust.
- Some guidelines for how to contribute to the GitHub text will be developed, and a Creative Commons license will be applied.

Discussion

- Alex Leith (SEO/Auspatious) noted the example of the eduroam wifi network. Filippo recalled this was discussed at WGISS-59 and could be considered as an additional use case. However, the team hasn't yet been able to find an expert who can provide insights into how eduroam works.
- Damiano Guerrucci (ESA) noted user federation is more critical than data federation at this time, with some resistance due to lack of understanding.

WGISS-60-04	WGISS Members are invited to suggest use cases for the federated authentication and authorisation white paper.	**Q2 2026**

4.2 - ESA-DLR Across repository data discovery, access and management

Roberto Alacevich (ESA), Ulrich Raape (DLR) and Iolanda Maggio (Starion/ESA) reported [*slides*]:

- ESA and DLR are developing a small demonstrator to discover, download, process and manage EO data across repositories.
- Six use cases have been defined to describe different types of activities users and data managers may wish to undertake in a federated data access environment.
- To allow access to free and open datasets, the catalogues would need to be federated. The ESA Multi Organisation and Multi Mission STAC Catalogues have been

implemented, as has the DLR Multi Mission STAC Catalogue. The DLR Multi Organisation STAC catalogue development is ongoing.

- Some of the products are available on both the ESA and DLR catalogues, and some only on one.
- The next step for the multi mission STAC catalogues is to restrict access to only authorised users, rather than free and open.
- Identity federation is also being covered by the demonstrator, with the main benefit being a streamlined experience for users.
- All organisations involved need to agree on the essential elements of the Identity Federations, and agree what will be shared. Some matching of attributes may also need to be done, and a solution may need to be found where attributes are missing. Requirements for reporting should be considered.
- The trust relationship is also important - are the authentication requirements on both sides at the same trust level (e.g. multi-factor authentication)?
- The demonstrator focuses only on the technical implementation, but to implement operationally additional things such as data protection and legal requirements would also need to be considered.
- The identity federation demonstrator is now working, with both local and external accounts able to be used to access datasets.
- The activity demonstrated an implementable architectural framework for ESA Space Data and DLR Long Term Archive repositories, which was applicable across agency use cases.
- Identified technical assumptions and constraints not in the scope of the OAIS-IF to be considered for any Pilot implementation, noting this was an initial prototype and further development is required.

Discussion

- Robert Fletcher (UKSA) noted the use case of a user looking for a dataset hosted by both DLR and ESA. How does the system decide which repository to access?
- Damiano Guerrucci (ESA) noted it would depend on the policy, and the requirements. The resources used by both agencies would need to be considered, with some non-technical agreement on the collaboration.

4.4 - EOEPCA Open Source EO Data Exploitation Platform

Richard Conway (Telespazio) reported [*slides*]:

- EO Exploitation Platform Common Architecture (EOEPCA) is an ESA project led by Telespazio. It is a virtual analysis environment, to support the value-adding data chain and the use of data for decision makers.
- EOEPCA is developing a common architecture built on open standards, enabling federation among EO cloud platform offerings and promoting and developing interoperability.
- Phase 1 was completed at the end of 2024 (v1.4), and the team are now working on Phase 2 with v2.0 (EOEPCA+) to be deployed in 2026. The development for EOEPCA+ is focused on working with stakeholders who operate platforms intending to adopt EOEPCA building blocks.
- The project is now an OSGeo community project, with open governance and a roadmap informed by a steering committee.
- The building blocks are software components to implement a specific platform capability, designed to be used on their own or in combination with other blocks to build a system. They are deployed with Kubernetes, with containerised implementation and a dedicated helm chart.
- Building blocks are available for data access & visualisation, discovery, open science, resource registration, data access gateway and data cube analysis.
- The processing building blocks include processing and workflow runners for both OGC API and openEO. Workspace building blocks provide a user orientated platform with storage and shared services to view outcomes.
- The project resources can be found on GitHub, alongside documentation and tutorials.
- Around 20 stakeholders have engaged with the project, including DLR's terrabyte platform which is migrating to the use of building blocks, and Digital Earth Canada who engaged with v1.4 of EOEPCA to develop their prototype.

Discussion

- Damiano Guerrucci (ESA) noted this would be a good use case to include in the Federated Authentication and Authorization White Paper.

WGISS-60-05	DAIG to connect with Richard Conway to contribute a use case to the federated authentication and authorisation regarding the EOEPCA project.	**Q2 2026**

4.5 - Discussion: Data in the cloud

Damiano Guerrucci (ESA) and Filippo Marchesi (ESA/Solenix) led a discussion on the topic of 'Data in the Cloud' [*slides*]:

- The objectives for the discussion are to exchange information on cloud solutions, processes, infrastructure, services and technologies; share challenges, issues and lessons learned; explore interoperability procedures; and monitor and assess new solutions, technologies and future trends.
- Questions and responses can be found in the slides.
- Costs, vendor lock-in, human error and only few cloud providers available were other risks identified for data in the cloud. Complex data retention policies can also be hard to navigate in the cloud archive environment.
- Alex Leith (SEO/Auspatious) noted that internal users, configuring the cloud environment, can sometimes make configuration mistakes. Recalled a 2-month delay in Landsat Collection 2 due to a single human error.
- To mitigate the risks, a hybrid cloud would mean some data on the cloud, some hard copy. Back-up hard copies would be complete copies in the cloud and hard copies.
- Federation is another key topic to mitigate risks, to ensure cross-organisation access.
- 'Egress free' cloud services could resolve vendor lock-in concerns. However, there is a real cost to egress, and 'free egress' is likely not commercially viable.
- Multi-vendor cloud archives and replication policies are other mitigation strategies for the risks associated with cloud archives.
- Wider communication with cloud vendors before procurement is really important.

WGISS-60-06	WGISS members are invited to propose topics for WGISS-61 about work and challenges with data in the cloud.	**WGISS-61**

Session 5: WGISS Connected Data Assets

5.1 - WGISS Connected Data Assets Overview

Filippo Marchesi (ESA/Solenix) reported [*slides*]:

- ISRO/NRSC data has been integrated into FedEO via the STAC interface.
- There is constant evolution of FedEO and IDN to implement emerging interfaces including STAC.
- The DAIG webpage has been updated to combine the FedEO and IDN data access tables into one table, with links to FedEO (OpenSearch / STAC) and IDN collections.
- Other topics of interest for Data Access include accessibility, discoverability, usability and interaction with standardisation bodies.

5.2 - FedEO Update

Yves Coene (ESA/Spacebel) reported [*slides*]:

- The Connected Data Assets Client Partner Guide is now available on GitHub.
- JAXA, CSDE, INPE and ESA have added new collections and granules.
- The number of granules cannot be counted with the STAC integrations, as it is not mandatory to add granule numbers in the collection metadata, however it is recommended.
- Are working to connect to the STAC backends for ISRO (Bhoonidhi), ESA MAAP, DLR, CNES and CSIRO/GA.
- The development of a STAC Validation Tool is ongoing, with a preliminary version in progress on the FedEO Validation Environment.
- Working with the CEOS-ARD team to define controlled keywords in STAC to convey CEOS-ARD compliance information.
- FedEO requires consistent platform and sensor names, and currently relies on the NASA GCMD keywords. However, not all platforms and sensors are included, and requests to NASA must be made to add new keywords. The terms exist in the CEOS MIM Database, however they aren't available in an exploitable format.

Discussion

- Sai Kalpana (ISRO) suggested that the STAC best practices mandate the granule number be included in the metadata.

WGISS-60-07	DAIG to discuss updating the *CEOS EO Collection and Granule Discovery Best Practices with STAC* to require the granule counter be included in the responses.	**WGISS-61**

- Christoph Reck (DLR) asked whether restricted datasets are included in FedEO. Yves noted that FedEO provides links to the relevant data provider pages, which may redirect to a login page if authentication is required. In a federated authentication system, the user experience would be smoothed with just one account needed to access all datasets.

5.4 - Data Assets Integration process - Use Cases

Yves Coene (Spacebel/ESA) reported [*slides*]:

- The FedEO Search API provides search API to client applications, decoupled from the original backend search API, supporting both OpenSearch and STAC.
- The harvesting interface for CEOS IDN makes available interface information for all collections (incl. OpenSearch binding) in DIF10 format, e.g. to IDN.
- Any OpenSearch or STAC clients can search both the OpenSearch and STAC catalogues.
- Once the integration process with a provider is set up, no further interaction is needed between the provider and WGISS CDA team.
- Typical issues with the integration process include:
  - Collection metadata content missing keywords
  - Encoding of assets (e.g. thumbnails/quicklooks) without “roles” property
  - Encoding of number of results / matches
  - Limited reuse of existing STAC extensions for item properties
  - Invalid JSON returned
- Future work will include an update of the client partner guide, and update of the STAC best practices.
- The preference for new collections is STAC, due to the number of STAC extensions. However, there can be issues with search parameters.

Discussion

- Christoph Reck (DLR) suggested DAIG consider developing best practices for STAC Queryables.

- Uwe Vorges (EUMETSAT/Conterra) suggested providing the metadata as html to support online search and use of large language models (LLMs).
- Yousuke Ikehata (JAXA) asked whether MCP (Model Context Protocol) can support connections between STAC and LLMs. This may be worth investigating.

WGISS-60-08	Robert Fletcher to work on getting the UKSA NovaSAR collection into FedEO, considering compatibility with the CSIRO NovaSAR product.	**WGISS-61**

5.5 - CSIRO Integration

Matt Paget (CSIRO) reported [*slides*]:

- CSIRO operates a mature Open Data Cube metadata system, used in CSIRO's EASIHub, CEOS Analytics Lab and Digital Earth platforms.
- The ODC explorer app has a STAC endpoint.
- CSIRO struggled to understand which STAC server technology to choose, noting the many available. Suggest some further guidance in the CDA Partner Guide, including what has and hasn't worked for different agencies.
- The STAC endpoint explorer has been established, which has been shared with the FedEO team for review.

WGISS-60-09	DAIG to update the CDA Partner Guide with the revised layout proposed by Matt Paget (CSIRO). Consider creating an appendix to the *CEOS EO Collection and Granule Discovery Best Practices with STAC* to explain what backends might be most appropriate.	**WGISS-61**

Discussion

- Jonas Eberle (DLR) noted DLR uses the postgres STAC version, as DLR is more comfortable with postgres databases, and doesn't have much experience with opensearch DBs.
- Nitant Dube (ISRO, WGISS Vice Chair) noted postgres is better for structured data.

Session 7: Data Management - Replicas & Big Data

7.2a - Discussion: 'Big Data'

Robert Fletcher (UKSA) reported [*slides*]:

- The term 'Big data' is often used but has a wide array of definitions.
- AI/ML technologies have increased the attention on big data, due to their need for large amounts of training data.
- Often characterised as the five 'V's of Big Data: volume, velocity, variety, veracity, value. These properties align well with big data for EO.
- Big data storage is a common problem for EO, and solutions include data lakes, data warehouses and data lakehouses.
- Big data analytics is the process used to create actionable intelligence from the vast amounts of data stored within a big data environment.
- Big data brings many benefits but comes with its own challenges, such as scalability, integration, data quality, and expertise.
- Suggest WGISS create a lessons learned paper for working with Big Data.

Discussion

- Yousuke Ikehata (JAXA) noted that AI/ML applications often use only up to TB of data, often in a data warehouse. They often also don't worry about scalability, just speed and processing power.
- Robert recalled the Big Data from Space (BiDS) 2025 conference, hosted by ESA and the European Commission two weeks ago. Most examples of 'Big Data' were using datasets between 1-10 TB in size.

WGISS-60-10	Iolanda Maggio to share a link to the BiDS proceedings with WGISS members when they are available.	**COMPLETE**

- Mirko Albani (ESA) noted many presentations at BiDS were talking about AI/ML, and platforms using AI algorithms.
- Yousuke recalled discussions at WGISS-59 on data compression, which has clear linkage with the big data topic.
- Alex Leith (SEO/Auspatious) noted foundation models are a big use case for big data.

WGISS-60-11	TEIG to consider planning a session at WGISS-61 on 'Big Data', to understand the relevant activities within space agencies.	**WGISS-61**

Session 6: Biodiversity

6.1 - Review of Biodiversity Study Team (BST) progress

Gary Geller (NASA/JPL, BST Co-lead) reported [*slides*]:

- CEOS established the Ecosystem Extent Task Team in 2022, which developed a white paper and three demonstrators using EO to map ecosystem extent. At the 2024 CEOS Plenary, the Biodiversity Study Team (BST) was created to assess CEOS options for enduring engagement with biodiversity.
- BST undertook a user assessment, and consulted with CEOS entities and Agencies to understand their activities in this area.
- BST has made the recommendation to propose a Virtual Constellation, with the initial proposal going to 2025 CEOS Plenary for approval.
- The proposed Biodiversity Virtual Constellation (B-VC) would enhance utilisation of space-based Earth observations and data products to improve biodiversity understanding, monitoring and conservation for the benefit of the environment.
- B-VC activities will include services such as data product gap analyses, data utilisation tools, as well as demonstrator development, capacity building, stakeholder engagement, and serving as the space arm of the Global Biodiversity Observing System (GBiOS).
- There are gaps in the product production pipeline to develop Essential Biodiversity Variable (EBV) products and biodiversity change indicators.
- BON in a Box has developed a product generation pipeline concept, with a GitHub algorithm and tool repository. One of the roles of Biodiversity Virtual Constellation would be to develop these algorithms and tools, building on existing work from space agencies and other organisations.
- Planning to create additional demonstrators on top of the three developed by the Ecosystem Extent Task Team.
- CEOS Analytics Lab is a great testbed for all these activities.

6.2 - Discussion: Identifying CEOS Agency resources to fill gaps identified by BST

- Nitant Dube (ISRO, WGISS Vice Chair) noted discovery and access of data is a key area WGISS can support, to help in the product development.

- Matt Paget (CSIRO) suggested bringing together a small team from WGISS to help develop the algorithms to develop these products and tools. Alex and Maral are also happy to support this activity.
- Gary noted improving the discovery and access of higher level products would be useful. The biodiversity community are also fans of data cubes, noting a lot of the data is in situ data.
- Damiano Guerrucci (ESA) recognised that considering discovery and access in the production of the higher level products can greatly improve accessibility. This includes ensuring the metadata includes the right information to allow discoverability.
- Makoto Natsuisaka (JAXA) recalled the work of the GEO Infrastructure Development Task Team (GIDTT) to federate space-based and in-situ data.
- Gary noted the team are excited about upcoming sensors which will make L-band SAR, Lidar and hyperspectral data more routinely available.
- Gary recognised it is yet clear what the gaps are in the processing workflow described by BON in a Box. The gaps tend to be in the algorithms to derive higher level products, and the community anticipated AI/ML playing a larger role in this. Compute resources will be significant.

Session 7: Data Management - Replicas & Big Data (Cont.)

7.2b - Discussion: Data Next to Compute

Robert Fletcher (UKSA) reported [*slides*]:

- There have been a number of services over the years which are attempting to bring users to the data, and process the data in the storage location to reduce the need of large data transfers.
- Some challenges include vendor lock-in, and the costs associated with operate and use at scale. There can also be issues of long term stability/funding.
- Some questions to discuss:
    - Does the approach of compute next to data work in the context of EO data access and analytics?
    - Is the approach an environmentally efficient method of data dissemination?
    - Data remains in silos per operator – would a more distributed method of data access be preferable?

- A study presented at BiDS stated that 'most users prefer to use local infrastructure for processing' – why?
- Are egress costs the biggest reason to stay within the cloud?

Discussion

- Jonas Eberle (DLR) recognised that, from an administrative perspective, it can be much easier to buy hardware, than pay on demand for virtual machines. Providers can't make their data available on all the various clouds, so data often has to be moved around.
- Alex Leith (SEO/Auspatious) noted that in a lot of applications, users can pull data from a different location without copying it.
- The Interoperability Handbook will support endeavours to bring data closer to compute. It would be good to encourage commercial providers to align with the recommendations.
- Nitant Dube (ISRO, WGISS Vice Chair) recalled the development of edge computing. WGISS should start looking at standards for this.
- Robert noted this topic would tie in with the data in the cloud discussion.

Day 3: Wednesday 15th October, 2025

7.1a - Replica Datasets: Introduction

Libby Rose (WGISS Secretariat) reported [*slides*]:

- This topic arose from the 2024 CEOS-ARD Strategy, which stated that there are often replicas of CEOS-ARD datasets mirrored in multiple locations. There needs to be a mechanism for these mirrored datasets to inherit CEOS-ARD compliance, as well as an agreed means for testing the authenticity and compliance of these copies (e.g., potentially changed formats, metadata files renamed, or content otherwise altered), and clearly identifying the original source of the CEOS-ARD compliance.
- At WGISS-59, it was suggested WGISS could provide guidance on metadata fields for source and tracing of data production.

Discussion

- Iolanda Maggio (ESA/Starion) noted this topic would fit well within the collection governance document published earlier this year. Could a recommendation be inserted into that document to cover this issue?

7.1b - Summary of WGISS-55 Data Replicas Discussion

Iolanda Maggio (ESA/Starion) reported [*slides*]:

- NASA presented at WGISS-54 on the ideal case, worst case and common case. The common case is what we are focusing on now, where some data products may be available on a cloud platform, but their provenance is unknown.
- Technical approaches to solutions to this issue explored include persistent identifiers, HASH code, cryptography, digital signature (e.g. watermark), and blockchain mechanism (e.g. KSI Blockchain).
- Persistent Identifier (PID) is usually included at the collection level, however providers could consider including the PID in the metadata file of each single product. There is a cost in reprocessing for this, so may be a recommendation for future missions.
- Inclusion of HASH code embedded in any replicated and disseminated product, was also discussed, but this also has a large cost for reprocessing.
- An action was opened at WGISS-49 to investigate how to handle replicas of data for example in the cloud. The results of this analysis are below:

Mechanisms	Data Integrity	Data Authenticity	Provenance	Traced Modifications
PIDs in metadata	✓ *	✓	✓	✓ *
HASH code in metadata	✓	✗	✗	✗
Watermark	✓	✓	✓	✗
KSI Blockchain	✓	✓	✓	✓
* = by comparing the data on the Landing Page				

- KSI Blockchain covers everything, but requires vendor lock-in.

Discussion

- Robert Fletcher (UKSA) recalled existing traceability services used by CDSE, and perhaps WGISS could learn from their approach.

WGISS-60-12	DSIG to check with CDSE regarding their approach to data traceability and invite a presentation at WGISS-61. Other agencies are invited to also present on the same topic.	**WGISS-61**

- Nitant Dube (ISRO, WGISS Vice Chair) asked whether if the format is changed, or only a subset is replicated, is the dataset still considered a 'replica'?

- Iolanda Maggio (ESA/Starion) noted that a subset of a collection is considered a new dataset and requires a new PID.
- Damiano Guerrucci (ESA) recalled different approaches across ESA in the application of DOIs for subsets of a collection. If no modifications are made to the data, a subset is just a number of products within a collection, and the PID should refer to the original collection.
- Yousuke Ikehata (JAXA) recognised that to trace provenance, new PIDs should be assigned for all subsets. However, JAXA aims to minimise PID assignment and the creation of landing pages, and don't assign a new PID for different formats of the same data.
- Damiano suggested only those who produce original data should provide a new PID, and otherwise the metadata refer to the PID of the original dataset.
- Blockchain is the only available technology which can truly identify no changes, however it is very complex. KSI is an interesting compromise to blockchain, and could perhaps be explored further.

WGISS-60-13	ESA/DSIG to organise a session at WGISS-61 with presentations on OGC Testbed-21 activities IPT part (Yves Coene) and the ESA blockchain project (Mirko & Iolanda).	**WGISS-61**

7.1c - DLR's Approach to Replica Datasets

Jonas Eberle (DLR) reported [*slides*]:

- terrabyte is DLR's EO exploitation and high performance analytics platform. Includes cloud data storage and analytics, through EOEPCA. For data storage management, it is also connected to the long-term archive, as well as external data sources (including ESA, USGS and NASA).
- The inventory database for terrabyte is based on STAC and uses the order:status extension for STAC item, as well as the deprecated flag.
- The ingestion workflow runs hourly to grab new data from the data providers. In the ingestion process, an integrity check is run on the file to ensure all data is available.
- Consistency checks include completeness, reprocessed scenes and identification of them, and deleted scenes (and the reason why they were deleted).
- The process assumes that the scenes identified are unique, and that reprocessed scenes can be identified based on the scene identified. Requirements include the list of

available scenes, as well as the list of deleted scenes. However, these are not always available.

- The terrabyte inventory is regularly compared against the bulk CSV files with the complete inventory, and the scene identifiers between data provider and inventory are synchronised.
- The terrabyte EO data checker includes a dashboard to show the completeness of the data on terrabyte compared to the catalogs of the data providers.
- Bulk metadata files are necessary for consistency checks, alongside notifications / API for deleted scenes.
- Suggest exploring the feasibility of a federated data proxy including caching, eviction, and centralised authentication.

7.1d - Replica Datasets: Discussion & Next Steps

- Alex Leith (SEO/Auspatious) asked whether terrabyte uses event-based work, such as the notifications from Element84 and USGS to hear when new Landsat scenes are available. Geoscience Australia provides notifications for added, updated, or deleted.
- Jonas Eberle (DLR) noted their approach used an hourly workflow to check for new scenes, however this is only possible with an accompanying inventory list. With thousands of new scenes available for Sentinel-2 each day, it is easier to just check every hour.
- Christoph Reck (DLR) noted work has commenced to automate the comparison of completeness of regions. It is very helpful if data providers can publish deleted products in a different catalogue than the normal one, as is done by CDSE.
- Yves Coene (ESA/Spacebel) recognised that a Digital Identifier (DID) resolves to a DID document, which can be an asset in a STAC item. DIDs can have different profiles, for example, for combination with blockchain.
- Yousuke Ikehata (JAXA) recalled the NASA *Data Product Development Guide for Data Producers*, which recommends *"the DOI resolving authority and the DOI identifier must be included as global attributes"*.

WGISS-60-14	DSIG to review the *Persistent Identifier Best Practice*, and consider refreshing the already defined use cases, noting the discussions around provenance of replica datasets. Consider developing and/or updating recommendations for each new use case.	**WGISS-61**

Session 8: Preservation Topics

8.5 - Software Preservation White Paper Concept and Status

Iolanda Maggio (ESA/Starion) reported [*slides*]:

- The white paper is intended to assist data and software managers in the Earth observation (EO) domain with the task of ensuring the long-term preservation of EO missions and data related software, thus improving data accessibility and usability for current and potential future users.
- The principals of software preservation are to collect all relevant software, preserve it in a robust way, and share it freely and openly.
- Challenges include intellectual property rights, expert knowledge, and resource availability.
- Organisations must develop a strategy to decide what software must be preserved, and ensure that the storage is secure and maintains its authenticity over time.
- The dependency graph of the software must also be considered, and all dependencies also preserved, including programming language, storage system, libraries and databases. Test data should also be preserved.
- Software preservation strategies include technical preservation, migration, virtualisation, emulation, cultivation, hibernation, procrastination and deprecation. Each has advantages and disadvantages, and a combination of techniques may be used.
- ESA has used the virtualisation technique to preserve the mission data processors for a number of heritage missions. This allows for reprocessing in-house.
- For JERS-1, the original JERS-1 processing software was improved to align with ALOS. The software was then virtualised. For SEASAT, the decision was taken to depreciate the original processing software, and a new processor was derived from the ALOS-JERS processor and virtualisation to run on the cloud. The full reprocessing was done and the processor hibernated.
- The next steps are to circulation of the draft version of the Software Preservation White Paper following WGISS-60, with feedback from WGISS members expected by the end of October.

Discussion

- Nitant Dube (ISRO, WGISS Vice Chair) suggested another strategy for preservation could focus on making the software open source.

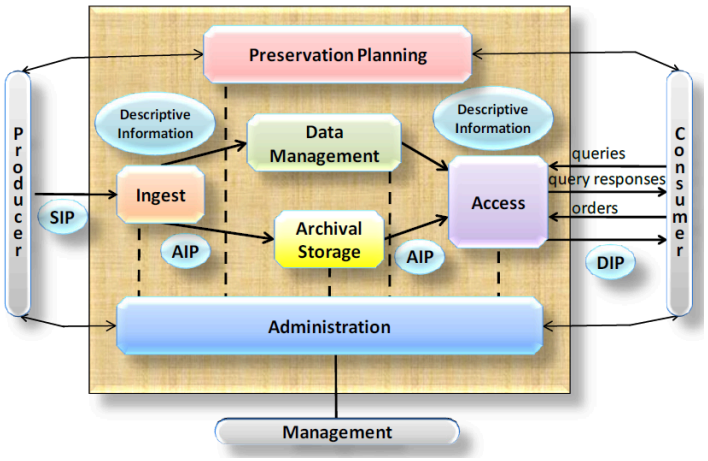
- Julian Zeidler (DLR) noted that providers may need to virtualise the whole operating system, as new versions of the kernel might not function with old docker containers.
- Mirko Albani (ESA) invited other agencies to share their approaches to software preservation.

WGISS-60-15	DSIG to organise a session on Software Preservation for WGISS-61 with contributions/lessons learned/approaches from different agencies (e.g. HESH/DAMPS for ESA, etc.)	**WGISS-61**
WGISS-60-16	WGISS Members to review the Software Preservation White Paper, ahead of virtual endorsement.	**Oct 2025**

8.6 - OAIS reference Model and Typology of Archive - Use Cases

Iolanda Maggio (ESA/Starion) reported [*slides*]:

- Open Archival Information System (OAIS) is an archive system consisting of hardware, software, information, and policy-based processes and procedures put in place and operated by an organization and its staff.
- The OAIS Reference Model is as below:



- The Submission Information Package (SIP) is delivered by the producer to the OAIS for use in the construction or update of one or more Archival Information Packages (AIPs) and/or the associated descriptive information.
- The AIP consists of the content information and the associated Preservation Description Information (PDI), which is preserved within an OAIS.

- The Dissemination Information Package (DIP) is an Information Package, derived from one or more AIPs and sent by archives to the consumer in response to a request to the OAIS.
- Archives should be constantly upgraded and evolved to facilitate the archival process by using technological innovation and best practices. However, this is often complex and costly.
- DSIG plans to review the CEOS Archive Technology Evolution White Paper, and re-share information on archives, use cases, data holdings and technology solutions currently in place. They will also share challenges, issues and lessons learned, and to present the objectives of a study on archiving technologies and trends that ESA would like to commence in 2026.
- Six use cases have been identified:
  - UC1: Online repositories (Real-Time Access)
  - UC2: Near-line repositories (Semi-Accessible)
  - UC3: Offline repositories (Long Term, Slow Access)
  - UC4: Hybrid (one organisation)
  - UC5: Federated repositories (across organisations)
  - UC6: Other

Discussion

- Robert Fletcher (UKSA) recognised UC4 is very relevant, as hybrid approaches are often used, which can include hot, warm and cold data storage data.
- Alex Leith (SEO/Auspatious) noted there is another dimension about archive completeness that could be considered, but that is separate from the technologies considered for this activity.

8.1 - Data Collection Appraisal Procedures

Iolanda Maggio (ESA/Starion) reported [*slides*]:

- A data collections appraisal procedure is recommended as input to any decision on preserving and curating EO data collections.
- The appraisal report includes a questionnaire covering the high-level mission description, sensor typology, archives holdings, mission peculiarities, designated

communities, and technical details supporting the decision process and helping the subsequent preservation and curation steps.

- The appraisal questionnaire can be used to perform an assessment of the status of the mission assets and to define an initial conception of whether the datasets under evaluation have to be preserved and kept accessible and usable for the long term.
- The procedure includes a number of questions to assess the value, relevance and usability of space mission data, as well as determining what data should be preserved, archived or shared, and establishing quality standards, metadata and long-term storage protocols.
- With the increase in data volumes, the cost to store and archive data increases and the scientific value needs to be accurately assessed. However, assessing potential future scientific value can be hard, due to unknown future uses.
- The assessment is for the organisation acquiring the data to complete.

8.2 - LSI-VC Framework to Support the Unlocking of Commercial EO Archives for the Public Good

Maggie Arnold (Geoscience Australia, LSI-VC) reported [*slides*]:

- At LSI-VC-17 in April 2025, the concept note regarding buying out of commercial EO data was presented. The idea is to curate a central record of prior acquisitions to maximise scientific and societal impact of these data sets.
- The proposal is to establish a catalogue of opportunities, including prior acquisitions, licensing terms and assessment outcomes.
- Suggestions from WGISS have included the use of the EO Data Collection Appraisal Procedure, as well as the Purge Alert framework.
- The ESA Third Party Mission framework also provides helpful guidance on this topic.
- The role for LSI-VC would be to facilitate and identify any relevant datasets, with the purchase up to individual agencies.
- It is suggested that at each LSI-VC meeting, a report is made to expose any opportunities available. Would leverage existing frameworks, and draw upon CEOS-ARD standards.
- How to incentivise the commercial sector and address their business concerns is one of the main roadbumps in this proposal.

Discussion

- Maral Bayaraa (UKSA) noted that the scene limits can often make it hard to access enough SAR data for InSAR analyses. Hence, it is suggested to treat SAR and optical data separately.
- Robert Fletcher (UKSA) suggested that using existing mechanisms like TPM or CDSA would be easiest, and agreed that finding the right incentives for the commercial providers could be difficult.
- Mirko Albani (ESA) recognised that the ESA Third Party Missions (TPM) programme doesn't have the financial means to make all the archives available. However, CEOS could make users aware of the various mechanisms available for data access.
- Robert noted that national centres, such as the UK EO Data Hub, also often provide access to commercial data.
- Mirko suggested cataloging the existence of all these mechanisms for access to scientific commercial data would be a good first step.
- Nitant Dube (ISRO, WGISS Vice Chair) suggested a test case of one potential dataset be established, to show how the procedure of identification, purchase and archival could work.

WGISS-60-17	DSIG to exchange info with LSI-VC (Maggie Arnold) on the purge alert procedure (to be renamed as data loss prevention), and data appraisal procedures and other feedback. Invite to WGISS-61 for an update on the project.	**WGISS-61**

8.3 - CEOS Purge Alert Procedure

Mirko Albani (ESA) reported [*slides*]:

- The Purge Alert Procedure has been active in WGISS for many years, with a page on the website as well as a white paper.
- The "Data Purge Alert" procedure aims at preventing, or at least minimizing, the loss of space-based EO data.
- Organisations intending for whatever reason to purge an EO dataset should apply the procedure (before purging the data) to inform other organizations with the goal to trigger a possible transfer of preservation responsibility to another interested entity.
- It hasn't been used widely, with the last alert in 2017. It is either that no one is purging data, or they are purging data without notifying WGISS.
- Ask that the organisation purging the data provide at least three months notice.

- Can we establish some annual procedures to check if agencies are or aren't purging datasets?

Discussion

- Nitant Dube (ISRO, WGISS Vice Chair) noted the target audience may be more focused on commercial organisations, as public organisations rarely delete data. WGISS could think about how the procedure can be made better known to commercial organisations.
- A mechanism could include emails to all CEOS members annually or biannually, or reporting annually at CEOS Plenary.
- It was suggested to rename the procedure the "Data Loss Prevention Procedure" to make the purpose more clear.

WGISS-60-18	DSIG and WGISS Secretariat to discuss a mechanism to refresh CEOS Agencies awareness about the Purge Alert Procedure, and ask they confirm any planned data purges.	**Nov 2025**
WGISS-60-19	DSIG and WGISS Secretariat to change the name of the *Data Purge Alert Procedure* to *Data Loss Prevention Procedure*. Reflect the change in all relevant Guidelines and CEOS/WGISS web sites (menu, news, etc.), including the Interoperability Handbook.	**Nov 2025**

Session 9: Heritage Dataset Recovery

9.1 - Status of AVHRR data recovery work

Mirko Albani (ESA) reported [*slides*]:

- Global Area Coverage (GAC) datasets are available from both NOAA and EUMETSAT from 1978.
- A complete global archive of Local Area Coverage (LAC) data, at 1km resolution, back to 1978 is not yet available, with many national and regional data archives around the world.
- The objective is to build a worldwide coverage of AVHRR LAC data series from 1978, in a common format for Level-1B and Level-1C data and available through the WGISS Connected Data Assets.
- The focus is the period 1978 - 2008, as EUMETSAT provides global coverage of LAC data from 2008.

- All data from ESA stations from 1992-1998 has been processed to Level-1B and -1C, and is available for users. The data from USGS stations has now been processed as well, and will be made available to users in Q1 2026.
- Long time series from 1981-2020 of AVHRR data from different platforms is available for Europe, via ESA and University of Bern. One of the future ESA Climate Change Initiative (CCI) products will rely on this dataset.
- The spatial and temporal coverage of the various archives available will be evaluated, to identify any gaps.
- ESA is working on the FDR4AVHRR project, which commenced in Q1 2024 at ESA, to generate a Level 1C Fundamental Climate Data Record.
- Need to better analyse the content of the American archive - which also included other areas of the world, not just America.

Discussion

- Sai Kalpana (ISRO) noted the basic outcome of the ISRO product is Level-1C, and Level-1B data is not saved in the current processing chain.

WGISS-60-20	Sai Kalpana to check the Pygac software version to ensure the Level 1B is being produced in ISRO's processing of AVHRR data.	**Dec 2025**

- Christoph Reck (DLR) asked about the assessment of duplicate datasets from the various archives. Mirko noted the uniqueness of some archives are not yet known, but the global gap analysis will reveal duplicate and unique data.

WGISS-60-21	DSIG/ESA to present results of the AVHRR LAC Data Worldwide Gap Analysis using the ESA developed tool at WGISS-61.	**WGISS-61**

- Jörg Schulz (EUMETSAT) suggested comparing the GAC and LAC data, to ensure consistency between the products. He also noted the WGClimate work to extend the Climate Data Record (CDR) Inventory to a Fundamental CDR (FCDR) Inventory, which could include these AVHRR archives.
- It will be important to demonstrate the impact of availability of LAC data compared to GAC data, especially for climate applications.

- Mirko noted that it would be valuable to understand, from a CDR Inventory perspective, if there are any datasets which are not currently accessible which WGISS can help recover.

WGISS-60-22	DSIG to present some examples of the impact derived from the availability of the 1km LAC data rather than the GAC data (e.g. snow cover, lakes temperatures, etc).	**WGISS-61**

9.2 - Updated differences between AVHRR L1b/1c satellites products

Sergio Folco (ESA/Starion) reported [*slides*]:

- ESA has done an assessment of the various product formats available in the various archives. The results are as follows:

	ESA	NOAA	EUMETSAT	CSIRO	ISRO
GAC L1b	N.A.	NOAA format	EPS or HDF 5 format	N.A.	N.A.
GAC L1c	N.A.	N.A.	netCDF format	N.A.	N.A.
LAC L1b	NOAA format	NOAA format	EPS or HDF 5 format	NOAA format	N.A.
LAC L1c	netCDF format	N.A.	N.A.	netCDF format	netCDF format (TBD)

- LAC Level 1b and 1c products are more or less aligned.
- All ESA software will be made available online in GitHub when complete.

WGISS-60-23	DSIG/Sergio to update the definitions of the levels (L1b/L1c/L2) in the slides of agenda item 8.2 and send to the involved stakeholders to confirm the contents and file format for their respective records.	**Nov 2025**
WGISS-60-24	DSIG/Sergio to inform WGISS members when the latest version of the Pygac software from the FDR4AVHRR project is uploaded on Github.	**Nov 2025**

9.3 - CSIRO & Uni Bern AVHRR Project Alignment

Matt Paget (CSIRO) reported [*slides*]:

- The Australian AVHRR archive includes Level-1B data from 1992 to the present. CSIRO is now working on recovering raw data from 1983.
- Over 60,000 scenes make up the Level 1C collection.

- The publishing of the AVHRR data is in progress, including the consolidated archive for long term storage and access.
- Coordinating with Australian Bureau of Meteorology, Australian Antarctic Division and Digital Earth Antarctica for the AVHRR scenes acquired at Casey Station in Antarctica.
- Two approaches are used for atmospheric correction, with the RTTOV-based method, and the historic CSIRO AVHRR processing system. A technical report is in preparation, as well as a poster presented at Living Planet Symposium 2025.
- In Q4 2025, the top of atmosphere footprints and metadata will be finalised, as well as the collection metadata records. A collection landing page will be published, containing reference documents, code and comparison results.

9.4 - Heritage Dataset Recovery

Sergio Folco (ESA/Starion) reported [*slides*]:

- Climate applications are asking for extension of current data records through heritage data recovery. The objective is to identify historical datasets which are of interest to climate scientists, and trigger joint recovery activities.
- At ESA, recovery projects are underway for Nimbus-7 CZCS, IRS-1C and -1D, IRS-P3 MOS, SPOT-1, -2 and -4, MOS-1 and -1b, and JERS-1.
- ESA would like to hear from WGISS members about other ongoing recovery projects.
- Datasets of interest for recovery include EURECA Ozone profiles, Spacelab 1 / ATLAS-1 Grille vertical profiles, ATLAS-1 deuterium and hydrogen atomic concentrations, Spacelab 1 / EURECA / ATLAS solar spectral irradiance, Nimbus-5 ESMR polar datasets, and SeaSat SMMR data.

Discussion

- Jörg Schulz (EUMETSAT) noted EUMETSAT is starting an activity on SMMR data from Nimbus-7, with data found at NASA. It would be good to have SeaSat and Nimbus-7 data together, as SMMR was one of the few instruments flown at that time with a C-band channel which can be used for sea surface temperature measurements.

WGISS-60-25	DSIG to organise a session at WGISS-61 on CEOS Agencies archives content with focus on heritage/historical missions and data.	**WGISS-61**

WGISS-60-26	DSIG/ESA to present Preservation and Valorisation flow at ESA using the WGISS Guidelines Assets applied to one or two heritage missions.	**WGISS-62**

9.5 - C3S Data Rescue Projects

Andrzej Klonecki (SPASCIA, FR) reported [*slides*]:

- The Copernicus Climate Change Service (C3S) commenced this work in 2018 to recover, assess and bring to a high level of preparedness a selection of early satellite data records for use in climate reanalysis (Level 1 data).
- Focusing on the historical era, from before 1979.
- Are looking at data from TIROS 2-7 Medium Resolution Scanning Radiometer (1960-1965), NIMBUS 1-7 (instruments: MRIR, HRIR, THIR, SIRS, IRIS, SCR, PMR, NEMS, SCAMS, ESMR, LRIR, LIMS, SAMS) (1964-1983) and NOAA 2-5 VTPR (1972-1979)
- The output is netCDF files with quality control flags and updated documentation.
- Detailed quality control is performed to detect errors, invalid and out of range values, duplicate values, errors in the time variable, removing unflagged calibration data, amongst other steps. This leads to quality flags with a recommendation on whether the data should be used or not.
- Scout tests performed with IFS for IRIS, SIRS A and SIRS B lead to strong improvements in regions where there are few alternative observations.
- Potential improvements are expected for the simulation of extreme events, such as sudden stratospheric warming events and storms.
- Historical data provide unique insight into model biases in otherwise observation sparse domains allowing to test e.g. data assimilation schemes
- The data will be made available for all users, together with the improved documentation.

9.6 - EUMETSAT data rescue activities and creation of F(C)DR

Jörg Schulz (EUMETSAT) reported [*slides*]:

- The main goal of the project is to extend time series as far back as possible, for global and regional reanalyses. More recently, to also support AI/ML forecasting methods.
- The climate models for 1950-1970 have a big spread due to the lack of observations to constrain the models.

- NASA has recently recovered daily surface reflectance data from historical glossy print outs. VHRR negatives were also found from NOAA-5, however the data needs to be digitised.
- Nimbus-7 data is good, however it overlaps with AVHRR availability, so the impact on the models is limited. The six months of data collected by Nimbus-4 in 1970 has been used to improve the ECMWF models.
- GEO-Ring data starts in 1980, and a bit further back in America. Working with NOAA to recuse the data from back to 1978, and include it in a large database which includes data from all geostationary instruments ever flown.
- The in situ data and historical MeteoSat data has good alignment for temperature trend estimates, and the goal is to reach that level of quality for the whole GEO-Ring.
- GEO-Ring Level-1G data will be provided as a static data set at the end of 2025 in the European Weather Cloud and EUMETSAT Data Store, as well as NOAA cloud. A user workshop for feedback on the test data set is planned for 2026 at EUMETSAT, followed by the full product released in 2027.

WGISS-60-27	DSIG to connect with WGClimate to hear more about the plans for the FCDR Inventory.	**Nov 2025**

Session 10: AI/ML

10.1 - AI/ML White Paper Report

Yousuke Ikehata (JAXA) reported [*slides*]:

- The AI/ML White Paper text is now complete. The outline has been restructured, to clarify the purpose and scope of the paper.
- The document provides an overview of AI/ML trends and usage in the Earth observation domain, as well as initiatives and activities in CEOS and related organizations.
- GEO and GISTDA provided a description of their activities, and the use cases section was enriched with contributions from WGDisasters and WGClimate.
- New sections were created for 'Hot Topics' (including foundation models and large language models (LLMs)), as well as challenges and limitations for AI for Earth observation.
- For the topic of 'AI/ML Ready Data', ESIP's checklist is included as an option, as well as CEOS-ARD.

- Some final changes are to be applied, and then the document will be circulated for review by WGISS members. After a two week review period, the document can be considered 'virtually' endorsed by WGISS.
- The paper will be updated on GitHub, and continue to invite presenters to WGISS.
- A form has been set up to collect contributions for the paper. Contributions are also welcome via GitHub.

WGISS-60-28	WGISS Exec to review the *AI/ML White Paper*, for virtual endorsement.	**Nov 2025**

Discussion

- Maral Bayaraa (UKSA) noted the value in the paper is in keeping it up to date, so it will be an ongoing activity with TEIG.

WGISS-60-29	WGISS Secretariat to work with TEIG and DAIG to ensure the GitHub repositories have the correct creative commons license. And the PDF publication procedure.	**Nov 2025**

10.2 - EO Advanced AI Assistant

Killian Perriot and Dorian Voydie (ESA/Thales) reported [*slides*]:

- There is a lot of data with documentation and information spread across platforms and sources, which non-expert users may struggle to find. ESA has developed the EO Advanced AI Assistance, to support users in finding the right support and documentation.
- The AI-Agent Orchestrator performs query management, and redirects the user to the correct tool to solve the query.
- The Technical Assistant lists relevant documents and sources. The input data was from the Earth Online and EO Portal websites.
- The Data Discovery tool finds the most suitable data collection for the user purpose. It provides direct access to MAAP catalogue data products and visualisations. The MAAP Catalogue API is used to extract information about the data collections.
- The Coding Assistant finds the most suitable standalone, executable code examples for API usage from the MAAP Catalogue. Each code cell becomes completely self-sufficient.
- The Ticketing Assistant helps users by proving the required steps, pre-filling forms, and providing relevant links to request access to the data collections they are interested in

- Two use cases were shown: Entry-level user, Advanced User
- The portal asks for specific queries, to help the user get the most appropriate answers. Understanding beginner level queries is a challenge for all large language models, and the team will work on this over the coming months.
- The tool was benchmarked against questions and answers from ESA experts.

Discussion

- Damiano Guerrucci (ESA) recognised the tool may be able to scale to respond with datasets available in other organisations, perhaps via STAC catalogs.

10.3 - CORSA AI Compression for Terrascope Products

Bart Beusen (Terrascope) reported [*slides*]:

- Terrascope includes products from SPOT-Vegetation, PROBA-V, Sentinel-1, Sentinel-2, Copernicus DEM, and Worldcover 2020 & 2021, alongside derived products.
- CORSA was developed to compress images onboard before downlink, with the aim to reduce downlink and storage volumes. Images can then be reconstructed using AI techniques.
- 27 Major Tom tiles over Antwerp, Belgium were downloaded and compressed using CORSA. The files were 32 times smaller, and contained ready-to-use feature vectors without needing to retrain a model.
- The embeddings in CORSA can be used in segmentation tasks and land cover classification.
- For hyperspectral imagers, there is large amounts of data that needs to be downlinked. There is a tradeoff to be made between loss of information and amount of data downlinked, which will depend on the application.

Discussion

- Robert Fletcher (UKSA) recalled discussions at WGISS-59 about lossy and lossless compression, and the scientific importance. How much quality is lost in the compression?
- Bart noted this is likely lossy compression, as the team are unable to get a minimum bound on the error. The amount of error that the user allows will depend on the end user application, and it would likely be best to release the data and ask for user feedback on whether it is sufficient. Analysis done showed 99% of data was retained.

- Peter Strobl (EC-JRC) suggested that the difference between the reconstructed and the original would be more insightful to analyse the quality.

10.4 - Supporting Weather and Climate Application Development with ML-Friendly Earth Observation Data

Jörg Schulz (EUMETSAT) reported [*slides*]:

- Satellite climate data records (CDRs) provide an excellent basis for ML-model training, with long, consistent, high quality datasets.
- Reliable feature detection of cloud patterns can support weather nowcasting models, and medium range forecasts, including generation of warnings.
- EUMETSAT is generating a Deep Convection System tracking database for the GEO-Ring, to provide inputs for AI/ML model training with labelled data.
- The data is made available in European Weather Cloud, DestinE and WEkEO.
- The European Weather Cloud R&D calls encourage experimentation with AI/ML, using EUMETSAT data for a variety of analyses.

Day 4: Thursday 16th October, 2025

Session 11: Interoperability Handbook and Maturity Matrix

11.1 - Session introduction

Nitant Dube (ISRO, WGISS Vice-Chair) reported [*slides*]:

- In Q4 2025, WGISS will submit the Interoperability Handbook as a completed deliverable. It will be shared with CEOS Plenary for endorsement in three weeks.
- The CEOS Interoperability Handbook v2.0 provides guidance to the organisations for development of interoperable data and services and helps them in measuring their maturity level.
- Will subsequently be working on the Interoperability Maturity Matrix, and Interoperability Demonstrators.
- The handbook has had contributions from around 30 individuals, including comments from five groups.

- The document is published and maintained on GitHub, which provides the capability for frequent changes and feedback by the larger community. It can show how many users are accessing and contributing to the documentation.
- A decision was made to exclude technologies from the handbook, as they are rapidly changing and would quickly become outdated.
- Across the five factors, there are 78 recommendations which provide guidance on how to improve interoperability for different aspects of data and services.

11.2 - Vocabulary (Semantics)

Peter Strobl (EC-JRC, LSI-VC Co-lead) reported [*slides*]:

- The work on vocabulary in CEOS began in 2021, with the CEOS Common Terminology group established.
- The group found quite a variety of dictionaries available in various communities, which were mostly alphabetical lists in PDFs. Issues found including lack of versioning, ambiguity, inconsistent definition, superficial definition, circular definitions and isolated development efforts.
- Paper published last year titled *Lost in Translation: The Need for Common Vocabularies and an Interoperable Thesaurus in Earth Observation Sciences*. Defined five pillars which are critical for a good thesaurus: consistent, integrated, understandable, educational and updateable.
- The CEOS Common Terminology group eventually led to the Vocabulary factor of the CEOS Interoperability handbook.
- The chapter provides clear rules for writing clear definitions in a common Thesaurus. The focus is not on defining terms, but rather how the EO community handles vocabulary.
- Urgently needed is a scheme for harmonised identifiers across EO assets such as sensor, instrument, platform, constellation, mission and campaign. Working with the CEOS MIM Database team to define rules for these topics, with a demo notebook available on GitHub.
- The CEOS EO Glossary has now been published online, and links to CEOS-ARD and STAC have been developed.

Discussion

- Yves Coene (ESA/Spacebel) recognised the WGISS Connected Data Assets team have had similar issues with sensor/platform names. At the moment, FedEO and IDN use GCMD keywords through NASA, however this is not very efficient and it would be great to use the CEOS MIM Database instead.
- Jörg Schulz (EUMETSAT) recalled guidance from WMO regarding product naming conventions. Alignment between WMO OSCAR Space and MIM Database terminology would be a good place to start.

WGISS-60-30	DAIG to work with the MIM Database Team to harmonise the definitions for platform and sensor identifications, building on the demonstrator work in this notebook. Consider WMO's rules regarding operational product names, and develop SKOS terminology.	**Q2 2026**

11.3 - Architecture

Alex Leith (SEO/Auspatious), Mirko Albani (ESA) reported [*slides*]:

- The Architecture Factor is broken into three key components: preservation, data and metadata, and publishing.
- Publishing is focused on what is helping users access the data.
- The recommendations were reviewed, and edits made in this pull request on the GitHub repository.

Discussion

- Jörg Schulz (EUMETSAT) noted that DATA#1 may be too prescriptive on what ARD is.
- Nitant Dube (ISRO, WGISS Vice Chair) recognised that CEOS-ARD compliance increases the interoperability of a datasets, and the Interoperability Handbook should be used as an opportunity to encourage the use of CEOS documentation.
- Peter Strobl (EC-JRC) noted there is growing demand from the commercial side to understand what is expected from products, and this needs to be a specific framework, ideally defined by CEOS.

11.4 - Interface

Damiano Guerrucci (ESA) reported:

- The Interface chapter is broken into three sections: data discovery, data access, and authentication and authorisation.

- Working on the federated authentication and authorisation white paper, which can add to the handbook once it is complete.
- No edits to the recommendations were requested.

11.5 - Policy

Nitant Dube (ISRO, WGISS Vice-Chair) reported [*slides*]:

- There are ten recommendations in the Policy chapter.
- For POL#5 (open data), it was agreed to remove the word 'freely', as open data isn't necessarily free.
- Various Open Science policies were reviewed, including those from UNESCO, NASA, EC and CERN, as well as national policies from Netherlands, Portugal, India. Ten common factors were identified.
- For data, software and infrastructure, the components identified were open data, open source software, open methodology / workflows and open infrastructure.
- For publications and their access, the Open Science policies recommended open access, open peer review and open educational resources.
- For collaborative research, review and community participation, components include citizen science and co-creation, open innovation / collaboration, and open policy and governance.

11.7 - Quality

Medhavy Thankappan (Geoscience Australia, WGCV Vice Chair) reported [*slides*]:

- The quality factor was thoroughly reviewed at the WGCV-55 meeting in July 2025.
- Nine recommendations have been agreed by WGCV. No further edits were requested by WGISS.

Discussion

- Nitant Dube (ISRO, WGISS Vice Chair) noted some comments from COAST-VC and OGC on this factor. OGC suggested including reference to ISO 19157-3, however it is still in development and also behind a paywall.
- Steven Ramage (CEOS Exec Officer) offered to help get a working copy of the document.
- Nitant suggested WGCV review the standard once published, and consider including it in a future version of the Interoperability Handbook.

WGISS-60-31	DIIG and Steven Ramage to follow up with OGC (Cassie Lee) regarding the comment about ISO 19157-3 for the Quality Factor of the Interoperability Handbook. Share with WGCV for their review against the Handbook recommendations.	**Dec 2025**

Session 12: Interoperability Demonstrators

12.1 - WGCV Demonstrator: Surface Reflectance Quality and Consistency

Medhavy Thankappan (Geoscience Australia, WGCV Vice Chair) reported [*slides*]:

- The CEOS-ARD framework provides a strong basis for interoperability, but harmonisation of surface reflectance (SR) products remains to be achieved.
- Different processing steps are used to achieve SR products, resulting in unharmonised products. ESA, USGS and Geoscience Australia products are all CEOS-ARD compliant, but are limited in their use together.
- CEOS Agencies are working to develop harmonised products, such as NASA's HLS and ESA's Sen2Like, however this demonstrates the need for better harmonisation of the original products so this work isn't necessary.
- Collection upgrades and reprocessing events are good opportunities to provide better guidance for further alignment between products.
- The aim is to achieve multi-sensor interoperability, building on CEOS-ARD achievements, by developing unambiguous characterisation of the SR measurand in the context of CEOS-ARD products.
- The expert team is meeting fortnightly, with initial discussions focussed on terminology. Work will now commence to develop a guidance document on SR quality and consistency.
- Have completed a literature review to understand the existing documentation and evidence, as well as the identification of gaps and sensitivities.

Discussion

- Nitant Dube (ISRO, WGISS Vice Chair) suggested using the CEOS Analytics Lab infrastructure to demonstrate the impact of these guidelines, in particular the impact for downstream users.
- Maral Bayaraa (UKSA) asked about the approach to harmonise methods, noting different atmospheric correction methods may be needed for different applications.

Medhavy noted the team are aware of these issues, and plan to establish groupings of use cases and end users, perhaps with metadata tags to identify different application groups.

12.2 - WGClimate Climate Data Record (CDR) Inventory Overview

Jörg Schulz (EUMETSAT) and Alexandra Nunes (EUMETSAT/Innoflair UG) reported [*slides*]:

- Ongoing discussions in WGClimate about the definition of 'Climate Data Record'. WGClimate will use the Vocabulary chapter of the Interoperability handbook to support this work.
- WGClimate is a joint working group between CEOS and CGMS, and includes the objective to provide a comprehensive and accessible view of existing and planned Climate Data Records.
- The CDR Inventory is a database of information about satellite-derived (thematic) climate data records, addressing geophysical quantities contributing to the Essential Climate Variables (ECVs) defined by the Global Climate Observing System (GCOS).
- A number of versions of the ECV Inventory have been published over the last ten years. V5.0, published in October 2024, includes 1289 records for 36 ECVs.
- The ECV Inventory is currently undergoing a transition to the CDR Inventory, with a new technical baseline to enhance discoverability and uptake. The CDR Inventory will have continuous publication, rather than the versioning of the ECV Inventory.
- The beta version of the CDR Inventory is available here, and the first full version will be released in November 2025.
- The process to populate the CDR Inventory will also be modified to reduce workload. Agency points of contact will identify access points, from which the EUMETSAT team will derive the needed information and update the inventory, followed by verification from the Agency points of contact. The inventory will be updated on a rolling basis.
- WGClimate is now working on an activity to extend the use of the CDR Inventory, to provide better linkage to the downstream community. The objective is to enhance discoverability and uptake of the CDR Inventory by external users/stakeholders of EO data.

Discussion

- Peter Strobl (EC-JRC) recalled similar discussions in LSI-VC regarding higher level products and support for applications, including the Essential Agriculture Variables (EAVs) and Essential Biodiversity Variables (EBVs).

- The WGISS Connected Data Assets (CDA) may be able to support the population of the CDR Inventory. Jörg will need to review the functionalities to assess the suitability.

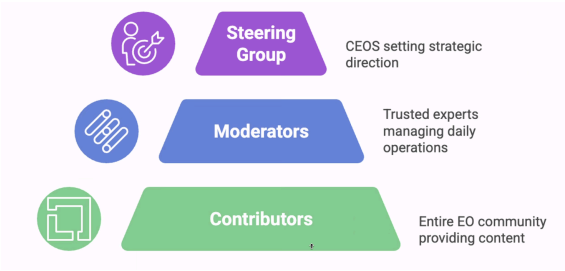
WGISS-60-32	WGISS Secretariat to share links for the WGISS Connected Data Assets with WGClimate, for their review to see if it is helpful in populating the CDR Inventory.	**Jan 2026**
WGISS-60-33	WGISS Secretariat to follow up with Wenying Su and WGClimate regarding a potential interoperability demonstrator focused on Climate Data Records.	**Dec 2025**

Session 13: CEOS Common Dictionary

13.1 - Overview of CEOS Common Dictionary

Dominik Weckmüller (EC-JRC) reported [*slides*]:

- The CEOS Common Dictionary is now online, and contributions can be made in the repository.
- No circular definitions are allowed, instead only parent-child relationships. Base terms are terms with no parents, only children.
- Multiple different definitions are allowed if needed. The first definition is the most important one.
- A tagging system is included in the glossary, with tags such as 'base', 'core', 'controversial' and 'high impact'. These can then be used to filter the glossary. Tags such as 'work in progress', or individuals' names, can be added to help with maintaining the glossary.
- The glossary is based on markdown files, which are easy to edit and review. All files are static and hosted on GitHub, with the html updated with each change to the repository. Automatic linkage between terms is also implemented and re-run with each change.
- There are questions around what happens in the case of conflict. There are two principles: agility (quick development) vs authority (trusted and stable, veto rights, with a Glossary Steering Group).
- Governance model proposed is as follows:



- The contributor base will hopefully be large, with all EO community members proposing edits.
- Moderators are trusted experts managing daily operations, such as reviewing edits and merging simple changes. They will ensure quality, clarity and adherence to principles to enable/facilitate community discussions.
- The steering group would be formed of CEOS experts, setting the strategic direction. In the case of foundational changes to terms, these must be discussed by the steering group.

Discussion

- Libby Rose (WGISS Secretariat) suggested that the Steering Group shouldn't just be one group, due to different terms relating to different entities. Each term could be 'assigned' to an existing CEOS group, who are the experts in that topic and can make decisions on that term.
- Dominik suggested that edits over a 6-12 month period can be collated to form a 'pre-release', which can be reviewed by the relevant expert group(s) before the release is approved.
- The points of contact for each group could be the Chair & Vice-Chair / Leads by default, who can nominate another individual if desired.
- Filippo Marchesi (ESA/Solenix) suggested some guidelines be developed on how to contribute to the GitHub, and how the approvals are managed. Peter Strobl (EC-JRC) noted the team is working on this, and will develop some short videos on how to submit, as well as issue templates.

WGISS-60-34	WGISS Secretariat to work with Dominik Weckmüller to document the agreed management proposal for the CEOS Common Dictionary. Once reviewed by WGISS, WGISS Chair to bring the document to CEOS Secretariat.	**Dec 2025**

13.2 - Review of tricky terms

Peter Strobl reported [*slides*]:

- 'In-situ' has many varied definitions across the community. Definition in the glossary is now focused on complementarity with remote sensing:
  - Observations performed in the same place where a phenomenon occurs, normally without isolating it from other systems (its environment) or altering its pre-observation state.
- 'Resolution; is another controversial term, which has a very distinct definition referring to how often something is sampled. However, it often refers to grid spacing instead.
- 'Data' is a particularly complex and confusing issue in EO, as there are many sub-terms which rely on the term data.

Discussion

- Maral Bayaraa (UKSA) recognised challenges may arise when trying to get the whole EO community, both public and private sectors, to adopt the dictionary.

Session 11: Interoperability Handbook and Maturity Matrix (cont.)

11.6 - Maturity Matrices: Data Management & Stewardship, Cal/Val and Interoperability

Iolanda Maggio (ESA/Starion) reported [*slides*]:

- The Data Management and Stewardship Maturity Matrix (DMSMM) defines all activities needed to preserve and improve the information content, quality, accessibility and usability of data and metadata.
- DMSMM includes inputs from GEOSS, RDA FAIR, WMO and ESA EarthNet.
- Four levels of maturity are defined: not managed (L0), partially managed (L1), managed (L2) and fully managed (L3).
- Five areas with 12 components are included in the DMSMM.
- To develop an Interoperability Maturity Matrix, individual tables for each factor in the handbook should be developed.
- Maturity levels could be visualised on a radar chart.
- The national archives of australia data interoperability maturity model is a nice example.

- Regarding WGCV-WGISS-2024-01, the intended audiences of DMSMM and the WGCV Maturity Matrix (EDAP) have been reviewed and documented. The assessment determined both are fit for purpose.
- WGCV-WGISS-2024-02, the GEO Earth Intelligence Readiness Matrix is under evaluation and can be reviewed at WGISS-61.

Discussion

- Nitant Dube (ISRO, WGISS Vice Chair) suggested two maturity matrices for Interoperability, one for Data and another for Services, dividing the recommendations into one of two categories (or both).
- Steven Ramage (CEOS Exec Officer) noted that Evenflow, who support the CEOS Executive Officer, have experience with the GEO Earth Intelligence Readiness Matrix, and could offer further support.
- Nitant noted that recommendations may also need to be weighted.
- Alex Leith (SEO/Auspatious) recalled the AWS cloud readiness assessment, which is a self-assessable checklist.

11.8 - Interoperability Handbook

Nitant Dube (ISRO, WGISS Vice-Chair) reported [*slides*]:

- The Interoperability Handbook, with some modifications as discussed today, was endorsed by WGISS.
- Thank you to all the contributors who have put in efforts.
- The version v2.0.0-pre1 will now be prepared and sent to CEOS Plenary next week, for endorsement the week of 3 November 2025. Once endorsed by Plenary, v2.0.0 can be created.
- The GitHub repository includes a script to create the PDF.
- The maturity matrix development process, as well as lessons learned from the demonstrators, will inform future updates of the Interoperability Handbook.

WGISS-60-35	WGISS endorsed the Interoperability Handbook. WGISS Chair and Vice Chair to submit the document for CEOS Plenary review and endorsement.	**COMPLETE**

Session 12: Interoperability Demonstrators (cont.)

12.3 - Decision-ready data

Nitant Dube (ISRO, WGISS Vice-Chair) reported [*slides*]:

- Decision-ready data is data that has already been cleaned, processed, and structured so it can be used directly to support decision-making, without requiring extra transformation or heavy analysis.
- Decision context should be defined before data products are defined.
- Decision-ready data provides inputs into decision support systems, including AI/ML models.
- It is used by analysts, dashboard systems, policy makers and system managers, and should be provided in a consistent format with required metadata to be optimised for decision making.
- For example, to support agriculture, the ARD product would be Surface Reflectance, while the decision-ready data product would be a Vegetation Condition Index (VCI) Map.

Discussion

- Makoto Natsuisaka (JAXA) noted JAXA is working with local districts in Japan to supply satellite data for disasters, and has found that GeoTIFF format is often too difficult for the user.
- Antonio Montuori (ASI, WGDisasters) recognised the importance of a strong connection between the scientists and decision makers, so that the products are responding to needs expressed.
- Jörg Schulz (EUMETSAT) suggested starting with one use case with a specific decision maker. While disasters may be the easiest use case, the pipeline between data, scientists and disaster warnings often also need an operational organisation in the middle.
- Alex Leith (SEO/Auspatious) noted the existence of decision-ready products such as Digital Earth Australia's coastline product. Many other examples also exist, and could be built on to support specific decision makers.
- Peter Strobl (EC-JRC) recalled the series of products provided by the Copernicus Emergency Service, which can be searched and selected by decision makers as needed.

- Maral Bayaraa (UKSA) noted emergency and 'business as usual' work should be treated differently, such as providing products for transport agencies to improve the efficiency of their systems.
- Jörg recalled analysis by EC-JRC on European legislation, and how many services depend on remote sensing data.
- Antonio recognised data policy is also incredibly important. WGDisasters is actively working to increase the amount of free and open data provided to respond to disasters.
- Peter noted the discussion is probably focused on 'information products' rather than 'data'.
- Yousuke Ikehata (JAXA) recalled the EO dashboard developed by ESA, NASA and JAXA, initially as a response to the COVID-19 pandemic. It has now expanded with other data and tools to support decision makers.

WGISS-60-36	DIIG to present on Decision-Ready Data use cases at WGISS-61.	**WGISS-61**

12.4 - Hawaii Supersite: activities, dataset, outcomes and lessons learnt from WGDisasters

Antonio Montuori (ASI) and Stefano Salvi (INGV) reported [*slides*]:

- The Geohazard Supersites and Natural Laboratories (GSNL) initiative was established in 2010 to promote advances in the understanding of seismic and volcanic processes and to improve risk mitigation.
- Supersites are single hazardous locations requiring observation support, and can be event or permanent. There are currently 13 active around the world.
- Natural laboratories cover larger regions with less dense monitoring. The only natural laboratory at this time is the San Antonio Fault.
- Across the Hawaiian archipelago, there are a variety of active faults occurring in association with the volcanoes, as well as strong, damaging earthquakes.
- Satellite data is routinely used by the USGS Hawaiian Volcano Observatory, including from ALOS, RADARSAT, TerraSAR, Sentinel-1, SAOCOM and Pleiades satellite series. WGDisasters has organised a quota from each satellite to be provided for the GNSL supersites.
- Main observed events include Kīlauea's 2018 lower East Rift Zone eruption and summit collapse and Mauna Loa's 2022 eruption.

- The wealth of SAR data has facilitated the development of new techniques and methods and has enabled the study of numerous hazardous processes, including the stability of lava deltas, the formation of pit craters as well as magma supply, storage, and transport.
- The Hawaiian Volcanoes Supersite provides a model for the importance of open data policies and demonstrates the utility of satellite data in disaster risk reduction, in agreement with the 2007 Frascati declaration, 2012 Santorini report, and 2015 Sendai framework.
- The work involves merging products from the various SAR missions, which is assisted by their common formats and processing chains. It will be interesting to explore how the Interoperability Handbook recommendations can be applied for this use case.

Discussion

- Mirko Albani (ESA) asked about the length of time series needed for these applications, and if recovery of heritage over these areas would be beneficial. C-band SAR data from ERS back to 1991 over Hawaii could be made available by ESA.
- Antonio noted that WGDisasters has experienced that the most important thing is continuity, and to continually acquire data over the target areas in the background campaign.
- Maral Bayaraa (UKSA) recognised that planning of acquisitions is very important for InSAR applications.
- Nitant Dube (ISRO, WGISS Vice Chair) noted NISAR will soon be providing high resolution data over the target sites as well.

WGISS-60-37	DIIG to set up discussion with Mike Poland (USGS, WGDisasters) and Hawaii Supersite scientists, to understand the data types and product types used in their work. Explore how it can be shown as a demonstrator for interoperability.	**Dec 2025**

12.5 - Discussion: Brainstorming other Interoperability Demonstrators

- The goal of the interoperability demonstrators is to put in practice the recommendations in the handbook and how they lighten the load for data processing.
- Alex Leith (SEO/Auspatious) recognised the publishing side of architecture would be good to explore in a demonstrator. Notebooks could be developed, and made available in the CEOS Analytics Lab to emphasise how empowering interoperability can be.

Day 5: Friday 17th October, 2025

Session 14: Closing Session

14.0 - CEOS Analytics Lab

Alex Leith (SEO/Auspatious) reported [*slides*]:

- The CEOS Analytics Lab (CAL) is a geospatial computational environment, based on CSIRO's EASIHub and powered by Open Data Cube.
- Includes a Jupyter Notebook python computing environment, with a number or example notebooks to demonstrate use of the environment.
- CAL allows for easier fetching and analysis of data, including with multiple different datasets. It provides a great platform for the proposed interoperability demonstrators.

Discussion

- Peter Strobl (EC-JRC) asked about the license and registration, and how redistributors ensure users have accepted the data license. Alex noted the requirement is to appropriately cite, however this is also not always enforced.
- Jörg Schulz (EUMETSAT) agreed proper attribution is a problem, as it can affect funding for different programmes.
- Jörg suggested CEOS consider organising a hackathon to bridge the different expert communities in the CEOS Working Groups, to explore what exists in the current data and tools, and what is missing.
- Maral Bayaraa (UKSA) noted that the UK Department for Environment, Food & Rural Affairs (DEFRA) is organising a hackathon next year, and there may be potential to link in with CEOS. Alex suggested delivery of the SEO's cloud-native geospatial workshop materials.

WGISS-60-38	Maral Bayaraa and Robert Fletcher to explore the potential for CEOS involvement in the UK Hackathon planned in 2026, including potentially the workshop materials developed by SEO.	**Dec 2025**

- Nitant Dube (ISRO, WGISS Vice Chair) noted half-day workshops with local commercial companies could be organised alongside future WGISS meetings, and could be used to explore the use of tools such as the CEOS Analytics Lab.

- Matt Paget (CSIRO) noted the Biodiversity Study Team's work in the CEOS Analytics Lab for their demonstrators. This is another activity WGISS may be able to support, or learn lessons from.

14.2 - Action Review

Libby Rose (WGISS Secretariat) reviewed the actions recorded throughout the meeting. The full list of actions can be found in Appendix B.

14.3 - Closing Remarks

Nitant Dube (ISRO, WGISS Vice-Chair) reported:

- Tom Sohre's (USGS, WGISS Chair) term as WGISS Chair will come to a close at CEOS Plenary next month. WGISS thanked Tom for his expert leadership over the past two years.
- Nitant will succeed Tom as WGISS Chair, serving from the close of CEOS Plenary 2025, until CEOS Plenary 2027.
- Damiano Guerrucci (ESA) has been nominated for the role of WGISS Vice Chair for 2026-2027, followed by WGISS Chair for 2028-2029. This will be raised for endorsement by CEOS Plenary next month.
- WGISS-61 will be held as a joint meeting between WGISS and WGDisasters, on 16-20 March 2025, in India. The city is yet to be decided.

WGISS-60-39	WGISS Secretariat to publish the dates of 16-20 March 2025 as the dates of the WGISS-61 / WGDisasters-22 joint meeting, to be hosted by ISRO in India.	**COMPLETE** https://ceos.org/meetings/wgdisasters-25-wgiss-61/

- WGISS Members are invited to propose potential hosts for WGISS-62, to be held in September or October, 2026. Proposals for workshops or other events which could be hosted alongside are also welcomed.
- WGISS thanks DLR for hosting WGISS-60, and all CEOS Agencies for their support of WGISS activities.

Session 15: Digital Twins

15.1 - Harmonization of Mutli-Resolution Geospatial Data in Geospatial Digital Twin Framework

J. Narendran (ISRO) reported [*slides*]:

- Policy changes in India (National Geospatial Policy (2022), Indian Space Policy (2023) and Drone Policy/Rules (2018, 2021)) have driven the development of geospatial digital twins. National projects have also required digital twins to support their work.
- Geospatial digital twins include data from satellites, UAVs, Aircraft, terrestrial platforms and IOT sensors. All the data is in heterogeneous formats, with a variety of temporal and spatial resolutions.
- Created a simple model for 3D city modelling, built with 2D polygons and lidar point cloud data to extrude the polygons to the relevant heights. Computer generated architecture is used to segment and texture the structures.
- UAV data, including stereo imagery with nadir and oblique cameras, as well as video footage, complements the satellite and aerial data. Vehicle-mounted lidar instruments are used to capture road features, and deep learning is used to classify and extract features.
- CCTV feeds are also used, with MJPEG frames included in the digital twin.
- All the datasets are integrated in a graphical user interface in a CesiumJS framework.
- Will be integrating satellite data from CartoSat and ResourceSat series, as well as Sentinel-1 and -2, and Landsat-8 and -9.
- The digital twin will be integrated into Bhuvan and Bhoonidhi.

Discussion

- Nitant Dube (ISRO, WGISS Vice Chair) recognised that the digital twin integrates a huge amount of data, and hence interoperability plays a key role.
- Alex Leith (SEO/Auspatious) noted CesiumJS is the biggest open source platform for these types of applications. Having the correct cloud native geospatial formats are important to enable these technologies.
- Nitant suggested TEIG develop a list of open source tools which can be used to support digital twin development.

15.2 - Irish National Framework for Digital Twins

Alastair McKinstry (ICHEC) reported [*slides*]:

- Ireland has a number of digital twin activities, including supporting those led by European organisations such as Destination Earth (DestinE).
- The Irish Centre for High-End Computing (ICHEC) includes climate simulation research run on the ICHEC super computers. Their work has included machine learning

identification of solar panel and electric vehicle identification, as well as water quality, seaweed farming and hydrology.

- Started working with digital twins with a small example to monitor lake water quality. Using space-based data with some AI/ML modelling, ICHEC created a tool for the Irish Environmental Protection Agency to monitor water quality. However, there were challenges around maintaining the product at a reasonable cost.
- CASPIr system is a platform-as-a-service, designed to manage small workflows in a consistent manner on a unified platform.
- The IRL-DataSpace and IRL-DSSC (Data Space Support Centre) is a federated ecosystem of data stakeholders, systems, and services at a national level, and providing linkage with European resources. The aim is to unify the currently fragmented national data ecosystem, facilitating data sharing and collaboration across disciplines.
- The EO Datacube includes core products and is a cornerstone service for geographic data. All data is 'AI-ready', with added metadata and gridded for training AI models.
- Work on digital twins is focused on analysing building risk in Dublin, land use modeling, flooding and hydrological applications, and greenhouse gas emission monitoring (with the Integrated Carbon Observing System).
- The challenge is in managing all these datasets and services to support academia.

15.3 - Discussion: What is the role of EO in Digital Twins?

Maral Bayaraa (UKSA) led a discussion on digital twins for WGISS [*slides*]:

- Discussions are ongoing regarding the definition of 'digital twins' for the purpose of WGISS. Online research has revealed WGISS may be actually talking about 'Digital Shadows'.
- Digital twins help a user say something about the physical world, with the physical world inputting data information to the digital twins, which helps with simulation and decision making for the real world.
- Matt Paget (CSIRO) recognised the key element of a digital twin is the predictive modelling and scenario planning, and regular updates of the data to get closer to the physical system.
- Nitant Dube (ISRO, WGISS Vice Chair) noted digital twins were originally developed by industry, when real-time data is fed into a system, and all parameters can be controlled. However, for Earth systems, all parameters cannot be controlled.
- To support decision making, data quality must also be controlled.

- Yousuke Ikehata (JAXA) recognised it is important to understand what parameters can and cannot be controlled. Space-based EO data is often best for global scale digital twins, as local scale applications require very high resolution data.
- Peter Strobl (EC-JRC) suggested digital twins would be most useful if they could space thematic fields and applications, and across a variety of scales.
- Alastair Mckinstry (ICHEC) recalled that a digital twin is a very particular model, with high fidelity for a particular purpose. They are updated live, with real data. It is unlikely to be realistically possible to try and model everything, and a digital twin should define what areas it should be accurate in.
- Nitant asked how can our WGISS activities support digital twins? Do we need to improve our dissemination services and data archives, or improve the availability of open source software?
- Matt recognised that global weather and climate modelling could be considered a global digital twin, with data assimilation plus physics and verification improving together through time.
- Jonas Eberle (DLR) suggested WGISS look at what happens in detail in digital twin ecosystems, such that everyone understands the concept in the same way.
- Peter noted that it would be interesting to understand requirements for digital twins, and their particular place amongst other existing systems.
- Alex Leith (SEO/Auspatious) recognised the importance of setting expectations around open source software, data and specifications to support interoperability of digital twins. Providers should be encouraged to make their platforms free and open.
- Makoto Natsuisaka (JAXA) highlighted issues around the large resources needed to develop and maintain a digital twin.
- Killian Perriot (Thales) recommended WGISS explore further on what the precise definition of a digital twin is, and how it can create impact.
- Dorian Voydie (Thales) recognised the great collaborative network that is the digital twin community.
- J. Narendran (ISRO) recognised the integration of digital twins, bringing together a lot of services together under one platform.
- Libby Rose (WGISS Secretariat) highlighted the value of WGISS as a place to share activities happening in this space across CEOS Agencies and the wider Earth observation community.

- Damiano Guerrucci (ESA) noted digital twins are an opportunity to demonstrate the path from data to information.
- Julian Zeidler (DLR) recognised the Interoperability Handbook provides great guidance on how to support the ingestion of a wide variety of data into digital twin projects.
- Christian Reck (DLR) suggested WGISS could help in understanding data quality and its importance in digital twins.
- Robert noted the role of EO in digital twins remains unclear, as there are many other datasets involved. The limitations of space-based EO data needs to be recognised.

WGISS-60-40	TEIG to propose a way forward for Digital Twin activities, and outputs. Topics to consider include: definition of 'Digital Twin', importance of interoperable data, available open-source tools, and the role of space-based data.	**WGISS-61**

Appendix A: List of Participants

In-person participants

Affiliation	Name
DLR	Christian Geiss
DLR	Felix Feckler
DLR	Hendrik Zwenzner
DLR	Jonas Eberle
DLR	Julian Zeidler
DLR	Patrick Aravena Pelizari
DLR	Roeder Johannes
DLR	Ulrich Raape
EC-JRC	Peter Strobl
ESA	Cristian Rossi
ESA	Damiano Guerrucci
ESA	Mirko Albani
ESA/Solenix	Filippo Marchesi
ESA/Spacebel	Yves Coene
ESA/Starion	Iolanda Maggio
EUMETSAT	Jörg Schulz
EUMETSAT/Conterra	Uwe Voges
INGV	Stefano Salvi
ISRO	Nitant Dube
JAXA	Makoto Natsuisaka
JAXA	Yousuke Ikehata
SEO/Auspatious	Alex Leith
Thales	Dorian Voydie
Thales	Killian Perriot
UKSA/Airbus	Robert Fletcher
UKSA/Satellite Applications Catapult	Maral Bayaraa
WGISS Secretariat	Libby Rose

Virtual Participants

Affiliation	Name
ASI	Antonio Montuori
CEOS Exec Officer	Steven Ramage
CNES	Alice Andral
CNES	Fournier Hugo
CONAE	Homero Fernando Lozza
CSIRO	Matt Paget
DLR	Ben Krass
DLR	Christoph Reck
DLR	Eberhard Mikusch
EC-JRC/Engineering Ingegneria Informatica	Dominik Weckmueller
ESA	Florian Widmer
ESA	Roberto Alacevich
ESA	Saskia Brose
ESA/Starion	Sergio Folco
EUMETSAT/Innoflair UG	Alexandra Nunes
Geoscience Australia	Maggie Arnold
Geoscience Australia	Medhavy Thankappan
Geoscience Australia	Michael Wellington
Irish Centre for High-End Computing	Alastair Mckinstry
ISRO/NRSC	J. Narendran
ISRO/NRSC	Sai Kalpana
KCEO	Meriam Lahsaini
NASA	Gary Geller
NASA	Yoseline Angel
SPASCIA	Andrzej Klonecki
Telespazio UK	James Hinton
Telespazio UK	Richard Conway
Vito	Bart Beusen

Appendix B: Actions

Key

For WGISS-61 Agenda

Other actions

Action ID	Action	Due Date
WGISS-60-01	CNES to prepare a presentation for WGISS-61 on the building blocks of Digital Twins, and how they are used by COAST-VC.	**WGISS-61**
WGISS-60-02	Mirko to provide a presentation at WGISS-61 about the outcomes of the PhiSat demonstration satellite, in particular about the onboard data processing aspects.	**WGISS-61**
WGISS-60-03	DSIG to survey all WGISS members regarding their current practices for data citation, including what use cases should be considered for the guidelines.	**WGISS-61**
WGISS-60-04	WGISS Members are invited to suggest use cases for the federated authentication and authorisation white paper.	**Q2 2026**
WGISS-60-05	DAIG to connect with Richard Conway to contribute a use case to the federated authentication and authorisation regarding the EOEPCA project.	**Q2 2026**
WGISS-60-06	WGISS members are invited to propose topics for WGISS-61 about work and challenges with data in the cloud.	**WGISS-61**
WGISS-60-07	DAIG to discuss updating the *CEOS EO Collection and Granule Discovery Best Practices with STAC* to require the granule counter be included in the responses.	**WGISS-61**
WGISS-60-08	Robert Fletcher to work on getting the UKSA NovaSAR collection into FedEO, considering compatibility with the CSIRO NovaSAR product.	**WGISS-61**

WGISS-60-09	DAIG to update the CDA Partner Guide with the revised layout proposed by Matt Paget (CSIRO). Consider creating an appendix to the *CEOS EO Collection and Granule Discovery Best Practices with STAC* to explain what backends might be most appropriate.	**WGISS-61**
WGISS-60-10	Iolanda Maggio to share a link to the BiDS proceedings with WGISS members when they are available.	**COMPLETE**
WGISS-60-11	TEIG to consider planning a session at WGISS-61 on 'Big Data', to understand the relevant activities within space agencies.	**WGISS-61**
WGISS-60-12	DSIG to check with CDSE regarding their approach to data traceability and invite a presentation at WGISS-61. Other agencies are invited to also present on the same topic.	**WGISS-61**
WGISS-60-13	ESA/DSIG to organise a session at WGISS-61 with presentations on OGC Testbed-21 activities IPT part (Yves Coene) and the ESA blockchain project (Mirko & Iolanda).	**WGISS-61**
WGISS-60-14	DSIG to review the *Persistent Identifier Best Practice*, and consider refreshing the already defined use cases, noting the discussions around provenance of replica datasets. Consider developing and/or updating recommendations for each new use case.	**WGISS-61**
WGISS-60-15	DSIG to organise a session on Software Preservation for WGISS-61 with contributions/lessons learned/approaches from different agencies (e.g. HESH/DAMPS for ESA, etc.)	**WGISS-61**
WGISS-60-16	WGISS Members to review the Software Preservation White Paper, ahead of virtual endorsement.	**Oct 2025**
WGISS-60-17	DSIG to exchange info with LSI-VC (Maggie Arnold) on the purge alert procedure (to be renamed as data loss prevention), and data appraisal procedures and other feedback. Invite to WGISS-61 for an update on the project.	**WGISS-61**
WGISS-60-18	DSIG and WGISS Secretariat to discuss a mechanism to refresh CEOS Agencies awareness about the Purge Alert Procedure, and ask they confirm any planned data purges.	**Nov 2025**

WGISS-60-19	DSIG and WGISS Secretariat to change the name of the *Data Purge Alert Procedure* to *Data Loss Prevention Procedure*. Reflect the change in all relevant Guidelines and CEOS/WGISS web sites (menu, news, etc.), including the Interoperability Handbook.	**Nov 2025**
WGISS-60-20	DSIG/ESA to present results of the AVHRR LAC Data Worldwide Gap Analysis using the ESA developed tool at WGISS-61.	**WGISS-61**
WGISS-60-21	Sai Kalpana to check the Pygac software version to ensure the Level 1B is being produced in ISRO's processing of AVHRR data.	**Dec 2025**
WGISS-60-22	DSIG to present some examples of the impact derived from the availability of the 1km LAC data rather than the GAC data (e.g. snow cover, lakes temperatures, etc).	**WGISS-61**
WGISS-60-23	DSIG/Sergio to update the definitions of the levels (L1b/L1c/L2) in the slides of agenda item 8.2 and send to the involved stakeholders to confirm the contents and file format for their respective records.	**Nov 2025**
WGISS-60-24	DSIG/Sergio to inform WGISS members when the latest version of the Pygac software from the FDR4AVHRR project is uploaded on Github.	**Nov 2025**
WGISS-60-25	DSIG to organise a session at WGISS-61 on CEOS Agencies archives content with focus on heritage/historical missions and data.	**WGISS-61**
WGISS-60-26	DSIG/ESA to present Preservation and Valorisation flow at ESA using the WGISS Guidelines Assets applied to one or two heritage missions.	**WGISS-62**
WGISS-60-27	DSIG to connect with WGClimate to hear more about the plans for the FCDR Inventory.	**Nov 2025**
WGISS-60-28	WGISS Exec to review the *AI/ML White Paper*, for virtual endorsement.	**Nov 2025**
WGISS-60-29	WGISS Secretariat to work with TEIG and DAIG to ensure the GitHub repositories have the correct creative commons license. And the PDF publication procedure.	**Nov 2025**

WGISS-60-30	DAIG to work with the MIM Database Team to harmonise the definitions for platform and sensor identifications, building on the demonstrator work in this notebook. Consider WMO's rules regarding operational product names, and develop SKOS terminology.	**Q2 2026**
WGISS-60-31	DIIG and Steven Ramage to follow up with OGC (Cassie Lee) regarding the comment about ISO 19157-3 for the Quality Factor of the Interoperability Handbook. Share with WGCV for their review against the Handbook recommendations.	**Dec 2025**
WGISS-60-32	WGISS Secretariat to share links for the WGISS Connected Data Assets with WGClimate, for their review to see if it is helpful in populating the CDR Inventory.	**Jan 2026**
WGISS-60-33	WGISS Secretariat to follow up with Wenying Su and WGClimate regarding a potential interoperability demonstrator focused on Climate Data Records.	**Dec 2025**
WGISS-60-34	WGISS Secretariat to work with Dominik Weckmüller to document the agreed management proposal for the CEOS Common Dictionary. Once reviewed by WGISS, WGISS Chair to bring the document to CEOS Secretariat.	**Dec 2025**
WGISS-60-35	WGISS endorsed the Interoperability Handbook. WGISS Chair and Vice Chair to submit the document for CEOS Plenary review and endorsement.	**COMPLETE**
WGISS-60-36	DIIG to present on Decision-Ready Data use cases at WGISS-61.	**WGISS-61**
WGISS-60-37	DIIG to set up discussion with Mike Poland (USGS, WGDisasters) and Hawaii Supersite scientists, to understand the data types and product types used in their work. Explore how it can be shown as a demonstrator for interoperability.	**Dec 2025**
WGISS-60-38	Maral Bayaraa and Robert Fletcher to explore the potential for CEOS involvement in the UK Hackathon planned in 2026, including potentially the workshop materials developed by SEO.	**Dec 2025**

WGISS-60-39	WGISS Secretariat to publish the dates of 16-20 March 2025 as the dates of the WGISS-61 / WGDisasters-22 joint meeting, to be hosted by ISRO in India.	**COMPLETE** https://ceos.org/meetings/wgdisasters-25-wgiss-61/
WGISS-60-40	TEIG to propose a way forward for Digital Twin activities, and outputs. Topics to consider include: definition of 'Digital Twin', importance of interoperable data, available open-source tools, and the role of space-based data.	**WGISS-61**