MINUTES

OF THE

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OF THE

CEOS WORKING GROUP ON
INFORMATION SYSTEMS AND SERVICES

(WGISS)

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 Participants

CEOS-SEO Brian Killough

CEOS-CEO Kerry Sawyer\*

CNES Richard Moreno (WGISS Vice-chair), Jérôme Gasperi, Daniele Bouçon

CCRS Costas Theophilos, Patrick King\*

CSA Guy Seguin

DLR Katrin Molch

ESA Mirko Albani, Andrea Baldi, Pier Bargellini, Yves Coene, Martin Ditter, Jordi Farres

Bianca Hoersch, Henri Laur*,* Rosemarie Leone, Sveinung Loekken, Pier Giorgio Marchetti,

Philippe Mougnaud, Tommaso Parrinello

EUMETSAT Michael Schick\*

GEO Secretariat Osamu Ochiai

GSDI/HUNAGI Gábor Remetey-Fülöpp

INPE Lubia Vinhas\*

ISRO Nitant Dube\*

JAXA Satoko Miura (WGISS Chair), Yoshiyuki Kudo, Shinichi Sekioka, Michelle Piepgrass (WGISS Secretariat)

NASA Andrew (Andy) Mitchell, Pat Cappalaere\*, Yonsook Enloe, John Evans\*, Stu Frye\*, Francis (Frank) Lindsay, Dan Mandl\*, Karen Moe, Michael Morahan, Doug Newman\*

NASU-NSAU Natalia Kussul, Andrii Shelestov, Sergii Skakun\*

NOAA Martin Yapur, Ken McDonald, Glenn Rutledge\*, Ken Casey\*

NRSCC Dingsheng Liu\*

NSO Mark Loos

Russian Space Systems Tamara Ganina, Kirill Emelyanov, Valery Zaichko

UNOOSA Lorant Czaran\*

UKSA Wyn Cudlip

USGS John Faundeen\*

\* Via web conference or email

# WGISS Plenary Session, Part I

## Welcome, Introductions, Logistics

Satoko Horiyama Miura, WGISS Chair, welcomed the participants to WGISS-36, where the expectation is to promote activities and share information. She thanked ESA for graciously hosting the meeting, adding that WGISS looks forward to hearing about their activities. She asked the participants to introduce themselves.

Mirko Albani welcomed the participants to ESA ESRIN for WGISS-36. He explained a variety of logistics involving connectivity, transportation, meals, and other details.

## ESA Welcome Address

Martin Ditter welcomed the WGISS-36 participants to ESRIN (European Space Research Institute), the ESA Centre for Earth Observation. He explained that ESA currently has 20 member states, and nine countries with cooperation agreements.

ESA is one of the few space agencies in the world to combine responsibility in nearly all areas of space activity. He displayed a chart of the budget showing that EO is the largest. He listed ESA’s EO missions and explained the EO data policy. For ERS, Envisat and Earth Explorers data that is available online, the policy is free datasets, and restrained datasets (in case of technical constraints, e.g. SAR instrument tasking). He added that for Sentinels, there is full and open access to all users, and for contributing and third party missions, the data policy of the individual data provider applies.

ESA is working on federating various communities to satisfy different communities from the beginning. Federation is a key objective of ESA.

The ESA ground segment components and functions include mission management, user consultation, satellite control, payload operations and programming, planning and execution of data acquisition, processing, dissemination and archiving of satellite data products, performing quality assurance and providing user interface and support services.

The ESA ESRIN Control Centres for Distributed Facilities were listed. At ESRIN, interesting work occurs and federation is a primary mission. Everyone is called to support downstream activities, applications and services, in these activities have been demonstrated.

## Adoption of Agenda

Satoko presented the agenda. There were no significant changes.

## WGISS Infrastructure Support Project

Martin Yapur made a presentation on the WGISS Infrastructure Support Project (WISP). The team consists of himself, Anne Kennerley and Kim Keith, with server administrators Christopher Krentz and Thomas Simmons. He displayed a diagram of the current WGISS structure, described the web conferencing system used by WGISS, and the location of meeting documents on Google Drive. Recent activities include maintenance of WGISS web pages, and with the approval of the new OpenSearch project, creation of its webpage mailing list. The WGISS-ALL mailing list has been reviewed and cleaned. WISP’s future activities are to continue managing the content of the WGISS website, engaging with VCs to discuss potential support to encourage a more relevant presence in the CEOS website, supporting outreach activities, and finalizing the mailing lists review.

Satoko thanked Martin for his continuous support.

## Chair Report

Satoko gave a brief introduction on WGISS, and then presented two topics: WGISS related issues at the SIT Workshop, and preparation for the CEOS Plenary.

### SIT Workshop Report

Reports from WGISS were made at the SIT Workshop on the following:

* IDN actions in order to support recommendations: IDN registered information management tool, the automated report distribution to each agency’s contact describing registered information status, and the best practice document for easily leading users to products after data discovery.
* CEOS OpenSearch Project status
* Request for a new representative from USGS
* The CEOS Water Portal new version release
* Two best practice documents: GA.4. Disasters architecture document update, and the Browse Guideline Document
* Updates on data discovery and access statistics as of August 20th, 2013, showing no drastic increase after the SIT-28

Related topics:

* Needs of the WG Process paper: Similar to the VC Process Paper, defining the process for new VC proposal; to be discussed and decided in the future (the Plenary and beyond?)
* Data Access Initiative (by CNES, SIT vice chair)
* Improvements for CEOS data access:

Ensure complete fresh coverage of CEOS tools such as IDN (organize a yearly process such as CEOS handbook?)

Using CEOS IDN to advertising the existence of data collections

Spatial/temporal coverage

Name, description and variables

Link to granule level OpenSearch

Link to OPeNDAP access endpoint or OGC W\*S service

Extend current CEOS tools to link with information on data collections (e.g. CEOS handbook, Data Policy Portal)

* Land Surface Imaging (LSI) VC: the Land Surface Study Group (LSSG) proposed the amended TOR for the LSI, which keeps the LSI. The TOR was discussed and the following recommendations are proposed and agreed.
* LSSG should produce a document specifically addressing the objectives in the LSSG TOR, to whit the unique roles that will be played by as LSI VC given the experience and activities of related groups (e.g., SDCG/GFOI, GEOGLAM, WGISS, etc.)

The scope of the LSI coordination objectives needs not be confirmed to classical land imagery, but rather should address coordination of the suite of measurements required to generate the information products needed by ongoing and future land-focused CEOS activities.

The document should be formally approved by existing related CEOS organizations (e.g., SDCG/GFOI, GEOGLAM, WGISS, etc.) prior to presentation to the LSSG presentation to CEOS. CEOS endorsement at SIT-29? (progress report at 2013 Plenary)

CEOS agencies are requested-urged- commanded to provide active and expert representatives to the LSSG process.

Should WGISS participate to the LSSG? If yes, who?

* Precipitation Constellation (PC) Portal: PC Data Portal and links to CEOS Water Portal. Related task status:
* WA-01-C1\_3 Phase 1 – “link only” interface: Completed

WA-01-C1\_4 Phase 2 – “query/results/order based” interface: Initiated

* Disaster Study Group Recommendations: “Suppress both the CEOS Disaster SBA Team and the ad hoc Working Group on DRM and transfer all activities to a new WG on Disasters”. These recommendations will be proposed and approved at the Plenary.
* WGISS activities were mentioned in reports by the SST VC and on CEOS data access.

### CEOS Plenary Preparation

Satoko reported that the2013 CEOS Plenary Meeting will be held in Montreal November 5-6, 2013. Of the coming plenary objectives (draft), these are related to WGISS:

Objective 7: To review the conclusions of the Land Surface Study Group and determine the best way forward organizationally for CEOS.

Objective 10: To endorse the harmonized statement of contributions to the 2015 GEOSS from the CEOS VCs and WGs.

The statement of 2015 deliverables from all CEOS VCs and WGs said to use these three categories: space segment, ground segment/information systems, products and services. These same categories have been designed into the VC Process Paper update. Drafts were proposed at the SIT-Workshop, saying WGISS-36 discussion might change those.

Drafts proposed at the SIT WS:

Under “ground segment/information systems”:

Support to GCI, using CEOS OpenSearch protocol, CWIC and HMA will become accessible from GCI. IDN will be used as dataset registration system for CEOS agencies.

Portal Systems: CEOS Water Portal, LSI portal and ACC portal

Objective 15: To address any issues arising or decisions required from the CEOS Working Groups. This includes progress on the CEOS OpenSearch initiative.

Topics in the report need to be specified: for decision, for endorsement, requesting guidance, or mainly for information. What should be reported? Under which category?

CEOS OpenSearch Project Progress (Mandatory, action of the SIT-28)

Numerical information (discoverable/accessible datasets, etc.)

2013 achievements and 2014 plans

Wyn Cudlip asked about possible duplication of effort on Disasters and agreed that it might be better to have a single group, as there is with Climate. The WG process paper will declare the resources. Andy Mitchell asked if the working group process paper is required for existing working groups like WGISS. Satoko suggested that this point should be included in future discussions.

### Discussion

**WGISS participation to the LSSG**

LSSG should produce a document specifically addressing the objectives in the LSSG TOR, or the unique roles that will be played by the LSI VC given the experience and activities of related groups (e.g. SDCG/GFOI, GEOGLAM, WGISS, etc.)

Wyn commented that it would be helpful if participation was from an agency that is active in the LSI, which is co-chaired by USGS, INPE, and ISRO. Yonsook Enloe wondered if it should it be broadened to other land products, not just the imagery, and if so, they would need people with science knowledge of the land products. Martin also suggested that Lubia Vinhas and Nitant Dube be invited to have an active role or to act as liaison for WGISS. The LSSG document should be ready by the next SIT.

**Action WGISS-36-1**: Satoko Miura to ask Nitant Dube (ISRO), Lubia Vinhas (INPE), and USGS if they can represent WGISS at LSSG, or act as a liaison.

**Action WGISS-36-2**: WGISS to review the LSSG document after it is released.

**2015 Deliverables:**

Under “ground segment/information systems”: Support for data access (including VCs and GCI; this will also support some of the VCs: Using the CEOS OpenSearch protocol, CWIC and FedEO will become accessible from GCI. IDN will be used as dataset registration system for CEOS agencies and portal systems.

Wyn commented that perhaps portal systems belongs with the VCs; however, some portals are contributions of VCs, others are direct contributions of WGISS. Andy noted that the issue stems from the need for better alignment with the VC; WGISS needs to strengthen the cooperation. Ken commented that even if the constellation itself is doing the portal, WGISS could contribute, and Yonsook noted that WGISS provided active support when building the LSI with John Faundeen providing the first point of interaction.

Andy requested that the ACC portal be removed as a deliverable. Richard Moreno (WGISS Vice-chair) asked for clarification on the ACC Portal, noting that DLR hosts the hardware. The word portal is the wrong choice of word, because it is more of a system than data access. The ACC portal will be developed regardless, and Andy said that it is important to tie it to CEOS.

Wyn asked if demonstrations are deliverables; demonstrating integrated access for example.

CNES has a data access initiative: VC data access study objectives by Pedro Gonçalves. The objective is first to identify the status, then to harmonize the discovery and access between all VCs to have something more efficient. Conclusions/proposals by CNES.

**Improvements for CEOS Data Access:**

Ensure complete fresh coverage of CEOS tools such as IDN.

Using CEOS to advertise the existence of data collections.

The final agreement was:

1. Support for data access (including VC and GCI).
	1. Using CEOS OpenSearch protocol CWIC and FedEO will become accessible from the external client (including GCI).
	2. IDN will be used as dataset registration system for CEOS agencies.
	3. Demonstration/showcase based on the VC Portal data access initiative (led by CNES)
2. Portal Systems
	1. CEOS Water Portal

Wyn asked about guidelines, do we have any deliverables on this? Andy and Satoko said these documents would fall out of the activities, but do not need to be presented as deliverables.

**Report to the CEOS Plenary:**

CEOS OpenSearch Project Progress (mandatory, action of the SIT-28)

Numerical information (discoverable/accessible datasets, etc.). For this Andy suggested that it would be good to have additional metrics. It was agreed that IDN and FedEO teams to determine what would be good metrics to report (available numerical Information).

**Action WGISS-36-3a:** IDN and FedEO teams to determine good search and access metrics from the available numeric information to report to CEOS.

**Action WGISS-36-3b:** Yonsook Enloe (CWIC), Mirko Albani (FedEO), and Michael Morahan (IDN) to provide these metrics for the CEOS Plenary.

Wyn asked about GEO support; it was clarified that it will come under activities. Martin asked about reporting the initiation of engagement and exchange with WGCapD. This could come under 2013 activities.

2013 achievements and 2014 plans:

Opened communication with WGCapD, and have joint efforts with WGCV.

Interaction with Disaster Study Group, WGCapD, and WGCV.

Andy added that it would be beneficial to consider the SEO data access study, and extending a link of go-to places for data access. WGCapD is asking for that, and WGISS supplied to them the IDN and CWIC but it would be nice if it could be broadened it the WGISS website and different agencies. Mirko volunteered to do this for FedEO.

**Action WGISS-36-7:** Technology Exploration Interest Group to determine ways to advertise data access points of CEOS agencies.

## WGISS Future Meetings

Richard Moreno presented expectations for future meetings. Determination of location, timing, and hosting is still in progress.

WGISS-37: April/May 2014, maybe in North America, host TBD

WGISS-38: September 2014, maybe in Russia or Germany, Roscosmos or GFZ-Potsdam

WGISS-38: April/May 2015, maybe in Russia or Germany, Roscosmos or GFZ-Potsdam

WGISS-40: September 2015, maybe in Asia Pacific region, host TBD

Andy noted that WGISS should take into consideration the location in terms of where the most attendees can participate. Richard also noted that moving it around the world helps with new agency participation. CNES and CCMEO are potential hosts if no one else can host.

Roscosmos added that they do not have confirmation on hosting, but hope to have it in the next month. If so, perhaps September will be best.

NASA noted that they do not have confirmation on hosting, but hope to have it in the next month.

## Brief History of WGISS

Wyn Cudlip gave a brief history of WGISS for new participants. He showed the schedule of meetings since 1992, noting that originally the Working Group on Data had a number of subgroups. These then were merged, and meetings became joint.

He displayed key highlights from WGISS-22 (2006) which is the first to have minutes on the website. Many of the activities then are continuing today, or have morphed into newer generations of projects. WGISS is still working with GEO and OGC.

## WGISS Way Forward

Richard presented a synthesis of the discussion on WGISS way forward from WGISS-35.

Andy highlighted the importance of “return on investment” to take back to the agencies, and Pedro Gonçalves had suggested a white paper on this. Costas Theophilos suggested that it be categorized by agency size. Ken added that the CEOS Self Study discussed that also, as well as different levels of benefit; some groups participate in WGs that do not participate in CEOS.

Richard reported that the description of WGISS on the home page of the website was simplified and updated. He also commented on the chart showing how WGISS fits into CEOS. The structure is complicated and for the newcomer it is difficult to understand. There are so many activities within the global CEOS, and these are distributed among the same resources. Satoko commented that this is also being discussed at SIT and Plenary, and is also in the CEOS Self-Study. As a result, there will be new rules, and reporting lines that are now complex will be clarified. This is a work in progress, but the Plenary and SIT have the same concerns.

Wyn commented that there is a huge amount of information on the CEOS website. CEOS is pursuing a kind of harmonization and as a first step they are asking the VCs and WGs to provide deliverables that will be harmonized at a higher level by the CEOS SIT and Chair teams for the Plenary. WGISS should propose deliverables with the expectation of collaborating with other CEOS groups Cooperation with other groups initially is encouraged but not mandatory.

Richard continued with a discussion of the WGISS strengths: Large number of agencies, independent from industry, has strong skill/expertise of CEOS participants; and is clearly the space arm of GEOSS. Yonsook suggested specific identification that WGISS has the data access focus, and since CEOS agencies have the most data around the world and the search and access is desired globally, WGISS has the expertise to support this search and access, making the data accessible.

The agencies in WGISS have the knowledge and the inventory systems, and the agencies want to make the data more accessible. In WGISS is the knowledge and the challenges are common across the agencies. Sometimes using the OGC standards is a challenge, because it is so broad, and not having a coordination creates barriers for the users. The standard is a good starting point, but there are a number of issues that are beyond the scope of the standard.

“5 Year Plan” comments:

 The target needs to be defined

 Five years into the future is too far

 How to measure success

 Systems require to be sustained and it is not in the scope of WGISS

 Tools sharing is very interesting. But it is difficult for agencies to declare software to be open source

Karen Moe observed that from CEOS there is a real interest for providing sustained operations, but they do not see the need for interoperability because it is not well understood. WGISS should produce a high level description of interoperability for satellite data with an explanation of the difficulties and why a special body is needed for working this.

Andy noted the difficulty to take the OGC standard off the shelf without some kind of optimization. Issues that are true for satellite data may not be true for GIS data.

## CEOS Executive Officer Report

Kerry Sawyer, CEOS Executive Officer (CEO), began saying that the GEO Secretariat released Rev. 2.1 of the GEO 2012-2015 Work Plan. The request for CEOS review was sent on 30 August. The 2013 CEOS Work Plan Priority Objectives for 2013 that are relevant to WGISS are:

* CEOS Agencies will continue to enhance their cooperation to support more effective societal decision-making in the areas of climate monitoring and research, carbon observations, including observations to support the effective monitoring and management of the world’s forested regions, food security, disaster risk management, capacity building, and data availability and access.
* CEOS Working Groups and Virtual Constellations will expand their technical and scientific coordination to support these objectives, and improve the overall level of complementarity and compatibility of their Earth observation and data management systems for societal benefit.
* CEOS will continue its consideration of 2011 CEOS Self-Study recommendations, with near-term (e.g., 1-3 years) decisions anticipated on its organization, structure, decision-making processes, and stakeholder relations.

Of the eight elements of the 2013 CEOS Work Plan, four apply to WGISS:

* Disaster Risk Management
* Capacity Building and Data Availability and Access
* CEOS Support to Further Key Stakeholder Initiatives
* Adoption of Recommendations from the 2011 CEOS Self-Study

The CEOS Self-Study (CSS) will end November 2013. The Strategic Guidance (SG) document will have a 10-year life, and will contain sections on EOS Mission and Objectives, Goals, Value to Stakeholders, Approach, Definition and Measures of Success, Challenges, Opportunities, and Strategic Direction.

There is also a new Governance and Processes (GP) with a five-year life, and a new CEOS organization diagram has been developed, where the working groups report directly to the CEOS Chair, with a secondary reporting path to the SIT Chair. Elements relevant to WGISS are:

* Working Groups typically address topics such as calibration/validation, data portals, capacity building, and common data processing standards that are shared across a wide range of Earth observation domains.
* Furthermore, the activities of Working Groups are usually structured so as to respond to requirements from GEO and other internal and external organizations.

Agreement to create a new Working Group on Disasters that will capture all the CEOS disaster activities under one entity; in line with what was recommended by the Roles and Responsibilities Topical Team.

Planning for GEO Plenary in January 2014 is underway. The CEOS delegation will be led by the CEOS Chair, Alain Ratier; other members of the delegation will be from the CEOS Chair team, the SIT Chair and team, CEO, SEO (exhibition). CEOS will have a booth at the Exhibition Hall (which will be in place beginning NET 13 January 2014).

CEOS requests of WGISS:

* Assist in preparing the Working Group Process Paper
* Assist in the preparation of the new Three-year CEOS Work Plan. Begin by preparing a one-page summary of expected activities and accomplishments for the next year (due 30 September)
* Remain flexible once the CSSII is concluded and changes to CEOS guiding documents have been endorsed. May require an update to the WGISS Five-Year Work Plan and possibly will render that plan obsolete with a request to draft a Three-Year Work Plan in line with the CEOS Work Plan
* Inform the CEO of any requests for assistance from CEOS Agencies that will be made at CEOS Plenary

Wyn asked if there was any discussion about interaction with the commercial world. Kerry said that CEOS has been facilitating with commercial providers that are aligned with the space agencies, while still keeping the focus on the space agencies. Wyn pointed out that the mission statement is not clear.

Kerry said that her request for information and reports from WGISS are meant allow her to package them in such a way to optimize results.

Richard proposed that each member write out why they are here, and share at a later session.

## SEO Report

Brian Killough gave three presentations on behalf of the Systems Engineering Office.

### Data Policy Portal

As a result of a CEOS action, a data policy study was initiated: Conduct an assessment of data sharing policies for past CEOS
missions and develop an online database using current missions (2012 study) and past missions (2013 study).

A prototype online database was released on April 1, just prior to the SIT-28 meeting, and updated again prior to this meeting
(<http://www.ceos-datapolicy.org/>). This presentation summarized the content and guided everyone through the database. Feedback was requested from WGISS prior to this meeting (August 19). The study considered current (292 total) and past (293 total) mission-instrument combinations; data access policies were based on the “majority” of data products from any mission-instrument combination and may not reflect the same data policy for all data products. The study found that 73% of CEOS mission data is open and accessible. This includes all missions launched since 2000: for the 292 mission-instrument combinations from 26 CEOS member space agencies:

* Open (no registration) = 47%
* Open (simple registration) = 21%
* Open (advanced approval) = 5%
* Restricted = 22%
* Unknown = 5% (mostly China missions)

Other categories(current missions only)

* DataCORE = 33%
* IDN Portal = 45%
* CWIC = 27%
* FedEO = Unknown

Andy asked if the portal maps out to the MIM. Brian said it is a separate database, which is based on the MIM, ands a subset of those that are of interest. The keywords originated from the IDN.

Feedback to date was listed. Next steps include:

* Address any actions or feedback coming from WGISS-36
* Ask the IDN team to complete a more detailed review of the IDN connections. Review the latest “DIF Count” file.
* Ask ESA (Mirko Albani) to provide FedEO information. The current database only includes CWIC connections, but there are a large number of unknown potential FedEO connections.
* Consider links between mission-instrument combinations and the CEOS Virtual Constellations. This is consistent with the CNES plan to improve data access for VC users.
* Work with the ESA-funded MIM development team to link the Data Policy portal to missions/instruments in the MIM.
* Consider getting formal CEOS Agency approval of the Data Policy content by including it with the annual MIM update process.

Andy asked how WGISS could help. Brian replied that the related keywords that will be available in a year will allow them to relate to the mission dimension. Brian said that a tag that is clickable to jump to the IDN would be helpful, and this will be possible when the new field is available. It would be nice to leverage what is in the MIM so that agencies are not asked to do something twice.

### Data Acquisition Planning for GFOI and GEOGLAM

Brian presented the baseline global acquisition strategy for the Global Forest Observations Initiative (GFOI). The baseline strategy objective is to assure the availability of temporally and spatially consistent time-series of optical and SAR satellite data over the global forest cover. The absolute minimum requirement is the successful acquisition of at least one annual national cloud-free optical coverage over each target country. The ultimate aim is inter- and intra-annual multi-mission time-series observations. Brian displayed the mission status outlook for 2014, and the GFOI space data services currently being considered:

The GEOGLAM IP was endorsed by GEO ExCom in July. It proposes a phased approach and the scope of CEOS support being addressed now is for “foundation activities”. In response to 28-34, the CEOS Acquisition Strategy for GEOGLAM Phase 1 is being developed, and is to be completed in time for presentation for endorsement at the CEOS Plenary. The scope of the IP is 2013-2015.

Synergies between GEOGLAM and GFOI are:

* Forest and agriculture regions within any country are NOT the same.
* Wall-to-wall optical coverage is the likely synergy for acquisitions.
* There are six “producer” countries and one “at-risk” country that are common between GFOI and GEOGLAM. These include Argentina, Australia, Brazil, Paraguay, Thailand, Vietnam, and Uganda.

### COVE Tool Status

The CEOS Visualization Environment (COVE) is a browser-based tool using Google Earth to display satellite coverage swaths and calculate coincidence scene locations. The automated daily satellite position data is obtained with CelesTrak. It is a large mission database, with 127 missions, and 265 mission-instrument combinations.

Future COVE applications are oil spill disasters, volcanic ash disasters, and coverage analyzer to support SDCG, and Landsat 7 and 8 Kiosk. The SEO currently connects to the Landsat archive through EarthExplorer, and daily queries are processed to obtain metadata. Access to metadata allows COVE to generate KML files, display browse images and display cloud cover information. Metadata includes sensor name, acquisition date and time, path/row, latitude/longitude, cloud cover, sun angles, link to browse image and data ordering.

Help was requested of WGISS in the following areas:

* SDCG for GFOI and the Ad Hoc Working Group for GEOGLAM both require statistics of historical mission coverage.
* Countries want to know what data exists, where and when.
* The SEO team has been able to prototype this concept using Landsat archives, but we needs more missions.
* The big question is how to automate and simplify the archive search process for other missions. Is there a way to utilize a common approach that connects to the data archives and obtains land imaging acquisition information? Is using CEOS OpenSearch to access CWIC and FedEO the answer?
* WGISS is developing the CEOS OpenSearch approach. CWIC and FedEO are in existence. Therefore, the connection to archives exists.
* The SEO team needs the following metadata from the mission archives (at a minimum):
 - Mission, instrument, mode
 - UTC data and time of acquisition
 - Latitude/longitude boundary points
* If WGISS believes this is possible, the list of potential targets is:

ESA: ERS-1 and ERS-2, Envisat, Sentinels (future)
CSA: Radarsat-2 (meeting at MDA on Oct 7),
JAXA: ALOS-1 and ALOS-2 (future)
CNES: SPOT-5, Pleiades-1A/B
DLR: RapidEye (meeting at NASA LaRC on Oct 9), TerraSAR-X, TanDEM-X
ISRO: ResourceSat-2, RISAT-1

Satoko said that WGISS is pleased to work with the SEO to on these activities, and asked Brian to keep the group updated. Andy recommended that WGISS and SEO meet on a regular basis, via a WGISS All teleconference.

# ESA Workshop

## ESA Earth Observation Programmes

Henri Laur made a presentation of ESA’s Earth Observation Programmes. These are divided into three pillars: Meteorological missions, Copernicus/Sentinel missions, and Earth Explorer missions.

The meteorological missions are driven by weather forecasting and monitoring needs and are developed in partnership with EUMETSAT. They include the MetOp family of geostationary and polar orbiting missions with two successful launches in 2012: MSG-3 and MetOp-B.

The Copernicus/Sentinel missions are driven by users’ need to contribute to the European Global Monitoring of Environment and Security initiative. Developed in partnership with the EU, they include C-band imaging radar, high resolution optical, optical, infrared and atmospheric composition monitoring capability. Two decades of global change records resulted from the ERS and Envisat missions, meeting the need for preservation, availability and exploitation of these data. The second generation of data sources comprises Copernicus, which provides the necessary data for operational monitoring of the environment and for civil security, and the Sentinel missions. The Copernicus dedicated missions include:

Sentinel-1 (A/B) – SAR imaging for all weather, day/night applications, interferometry

Sentinel-2 (A/B) – Multi-spectral imaging for land applications: urban, forest, agriculture; continuity of Landsat, SPOT

Sentinel-3 (A/B) – Ocean and global land monitoring with wide-swath ocean color, vegetation, sea/land surface temperature, altimetry

Sentinel-4 (A/B) – Geostationary atmospheric for atmospheric composition monitoring, trans-boundary pollution

Sentinel-5 precursor/ Sentinel-5 (A/B) – Low-orbit atmospheric composition monitoring

Jason-CS (A/B) – Low inclination altimetry for sea-level, wave height and marine wind speed

Earth Explorer missions are driven by scientific needs to advance our understanding of how the ocean, atmosphere, hydrosphere, cryosphere and Earth’s interior operate and interact as part of an interconnected system. These research missions pave the way towards new development of future EO applications. The Earth Explorer missions include GOCE, SMOS, Cryosat-2, Swarm, ADM-Aeolus, and EarthCARE. BIOMASS will be the seventh Earth Explorer, designed to understand the Earth’s carbon cycle, to be launched in 2020.

The mission operations are based on a multi-functional ground segment: a unified structure, developed to meet the user requirements of ESA and third party missions, both individually and collectively by:

Integrating national capabilities and facilities into a common European decentralized framework

Providing benefits to Member States through access to ESA technology and systems

Responding to increasing data volumes and evolving user requirements for more sophisticated products

Ensuring the highest quality of Earth Observation data products

Facilitating data access to stimulate applications development, science and downstream industry

The work of ESA benefits member states with development of industrial capabilities including industrial skills in smaller, sometimes under-returned countries. It enables member states to establish a long term architecture for own missions/facilities and to cooperate in future ESA programmes, thanks to the cooperation and joint interface standardization efforts.

The feedback mechanism with the user community within mission operations follows the sequence of workshop -> recommendations -> actions -> reporting.

Access to ESA mission data is a constant ESA objective, with ease of access to Earth Observation data. To this end the ESA EO data policy was revised in 2010. This has resulted in constant upgrade of ground segment for easier access to data through Internet for Near Real Time (NRT) data and for archived data, development of alternative ways to provide data, large effort in maintaining data quality, and need to preserve “old” data for future use (LTDP).

The ESA EO data policy is free and open for data collections available on-line (i.e. most of ESA EO data), open and free of charge with user registration done electronically. For datasets not (yet) available on-line (i.e. mainly ESA SAR data) user project proposals received by ESA; data provided free of charge but with data quota limit due to processing capacities constraints.

Information on EO Data can be obtained from ESA portals (EarthOnLine, ESA Portal, and portals in support of other organizations).

Frank Lindsay commented that at NASA they have similar coordination (feedback mechanism) between users; he asked if they have internal review and how it is managed. Henri replied that they do, and maintain transparent reporting; they also carry out mission review with not only lead scientists but also Earth Science Advisory Group. Martin asked if it is known what the geographic coverage of Sentinel 4 will be. Henri replied that the mission will be mostly for atmospheric composition. Natalia Kussul asked for additional details about data policy. This will be covered in the next presentation.

## Copernicus Space Component Ground Segment and Operations Concept

Bianca Hoersch gave a presentation of the Copernicus Space Component Ground Segment and Operations Concept, giving the pre-operational status of the project. She noted that the ‘CSC Operations Concept’ refers to the period beginning mid-2014. An initial ramp-up phase is envisaged marking the transition towards the Full Operational Capability; this phase is characterised by a progressive integration of each Sentinel spacecraft in the overall system. A gradual evolution is foreseen in the performance of the availability of the overall system, the data throughput and timeliness, and the services to users. Bianca described the operations strategy, and described the ground segment, consisting of a core ground segment that provides the primary access to Sentinel Missions data, and a collaborative one for supplementary access. She listed the main facilities and data access systems, and the ground circulation and dissemination network.

The implementation of the Sentinels collaborative GS within ESA member states is based on three main steps:

Definition of process and collection of collaboration proposals

Requirements collection: questionnaire for ESA Member States released in 2011

Enables ESA to make a preliminary assessment of the planned initiatives

Sentinels core products were listed, elucidating the challenge to manage the huge amount of data. A collective vision for Sentinel data access is taking shape within and beyond Europe. The data access programmatic framework was described, and the policy is that users shall have free, full and open access to Copernicus dedicated Sentinel data and Copernicus service information. Data access is a major undertaking: a major European Earth Observation Ground Segment design challenge. Different infrastructures are adapted to different needs and typologies. There are four data access layers: Copernicus services access, ESA collaborative access, EU international agreement, and scientific/other use of Sentinel data. Sentinel-1 users’ operations preparation with test and reference data, and support tools will be available. A progressive evolution of the Data Access infrastructure is foreseen for deployment in the timeframe 2014-2016. Further information can be found at:

* Copernicus Space Component Data Access Operations Website [http://gmesdata.esa.int](http://gmesdata.esa.int/web/gsc/home)
* Sentinels Online Web portal [https://sentinel.esa.int](https://sentinel.esa.int/web/sentinel/home)
* Copernicus Space Component Website [http://www.esa.int](http://www.esa.int/Our_Activities/Observing_the_Earth/Copernicus)/[Our\_Activities](http://www.esa.int/Our_Activities/Observing_the_Earth/Copernicus)/[Observing\_the\_Earth](http://www.esa.int/Our_Activities/Observing_the_Earth/Copernicus) [/Copernicus](http://www.esa.int/Our_Activities/Observing_the_Earth/Copernicus)
* Copernicus Programme Website <http://copernicus.eu>

Natalia asked if scientific user access applies to EU only. Bianca replied that for scientists it is free and open, or through international agreement. Satoko asked how they will handle orders from users. Bianca replied that the high demand is a challenge, requiring increased infrastructure; the data will systematically be processed, and once acquired, stored. It will be moved to a mirror site, or can be accessed directly.

## Heterogeneous Missions Accessibility (HMA) and FedEO

Yves Coene gave a presentation on the Heterogeneous Missions Accessibility (HMA) and FedEO. HMA is a collaborative project started in Europe and Canada by the Ground Segment Coordination Body (GSCB) in 2005 with the objective to guarantee a seamless and harmonised access to heterogeneous EO datasets from multiple mission ground segments, including national missions and ESA missions; to standardize the ground segment interfaces of the satellite missions for easier access to EO data; and to provide interoperability for coordinated data access enabling the interactions with services or value-adders and EO Contributing Missions. It is defined through the work of 25 companies over 10 countries and with the contribution from HMA project partners (agencies and users).

Yves listed the HMA implementations, and described the HMA-S project, set up to further consolidated HMA standards according to the AWG recommendations, with the goal to pursue simplification of protocols for metadata, search, feasibility analysis and identity management; to finalize OpenSearch document with EO Product search, metadata and download options; definition of OpenSearch extension for feasibility analysis allowing seamless integration with search and download; and OpenSearch related draft deliverables already available and to be presented at OGC-TC in Frascati (Sep 2013).

The HMA-SE project was kicked-off in February 2013 to follow HMA-S protocols definition (OpenSearch); to provide a platform based on the new DAIL-SSE software baseline, enhanced with OpenSearch, CWIC capabilities available as FedEO environment; to enable the integration of the demonstrators and test-bed elements, implemented and deployed within HMA-S project, within the FedEO environment; and to further identify and integrate collection and relevant science services, developed by European partners (EUMETSAT, DLR, VITO and further relevant institutes), to be identified during the project, within the FedEO environment. All OpenSearch information is available at <http://vm3029.cloud.seeweb.it/opensearch/readme.html>. The OpenSearch Interface is accessible for external clients.

Yves’ demonstration performed the following tasks: search collection catalogue, find collection, find services with "FEDEO" in abstract, go to FedEO Clearinghouse, find optical imagery, find radar images over same area, show detailed metadata with browse image, go to home page and developers’ page, and show searches inside FeedReader, Firefox and Portal.

Next steps include Ultimate, the FedEO platform installation in ESA/ESRIN; consolidation of OpenSearch interfaces (already available for accessing FedEO) and alignment to the interfaces defined in the HMA-S project and CEOS activities; FedEO integration with GEO Portal/EOPortals; and enlargement of number of accessible data collections/catalogues/services for science users (ongoing HMA-SE project).

In conclusion, HMA provides seamless and harmonised access to heterogeneous EO datasets from multiple mission ground segments is an operational reality in Europe and Canada, and is the European model and contribution to interoperability in the Earth Observation domain. The FedEO Prototype System allows to provide brokered discovery (and access) capability for (European and Canadian) EO data through HMA standard interfaces. The FedEO evolution will aim at implementing the OpenSearch interfaces defined in the HMA-S and CEOS activities, at enlarging the number of discoverable and accessible EO data collections, and at interfacing with CEOS community catalogues.

Yonsook commented that this was a great demonstration, seeing the access points; the client is very full flavored. She was interested to see a CWIC search; it makes sense to have access from FedEO. For the same reason it would be good to make FedEO accessible through CWIC with the environments as compatible as possible. Ken McDonald followed up asking how they narrow down the collections that were available from CWIC and other providers. Yves replied that they are discussing what to do; there are catalogues that can be used, and they are also thinking about using the IDN. Yonsook noted that the strength of the IDN with controlled vocabulary is that it is maintained. The keywords have science review by international panel. Having the keyword search is very important. Andy asked how they are handling duplication of records for the same collection, and wondered what the agencies can do to resolve this; Osamu Ochiai asked WGISS for recommendations and guidance. Data exchange and interoperability should be maximized. Mirko agreed that one interface is important as the space arm of GEO. Andy noted that in GEO they have tags that say where the data came from. Yonsook concluded that this group is a great group for determining, and coming up with solutions. When keywords are similar, searches are consistent, inspiring confidence in the users. Richard remarked that Yves mentioned interesting studies and that WGISS is a good forum to try to share and standardize anthologies.

Yves commented that the analysis of what INSPIRE enforces on ESA is documented, and recommended review and discussion of this document, perhaps as a topic for the Technology Exploration Interest Group..

# Agency Reports

## Russian Federal Space Agency (Roscosmos)

Valery Zaichko gave a presentation of Roscosmos, the Russian Federal Space Agency. The Federal Space Program of Russia for 2006-2015 currently in force regulates the main lines of Earth remote sensing facilities and technologies creation and development. The key direction of Roscosmos activity is to develop Russian space systems for Earth remote sensing (ERS) that consist of enlarging and improving of Russian orbital group of satellites for ERS. Additional direction is to develop ERS ground infrastructure, to create scientific and technical background for the development of prospective ERS onboard equipment, to improve legislation and regulations in the field of ERS, coordinating with government bodies and public and commercial organizations, and to enhance international cooperation.

Roscosmos’ primary tasks include development of space systems for meteorological monitoring, radar observation, disaster monitoring, mapping, Arctic monitoring, and enlarging the orbital group of ERS satellites up to 15-20 in 2020. Valery listed and described the Russian remote sensing orbital constellation in 2013, which provides all types and modes of imagery in the optical range:

* Operation of the RESURS-DK environmental satellite equipped with the 2-5m resolution imaging instruments;
* Operation of the v-P No. 1 satellite equipped with the greater than 1 meter resolution observing instruments, wide swath multispectral instruments of high (12 meters) and medium (60 meters) resolution, and hyperspectral equipment (30 meters);
* Operation of the KANOPUS-V satellite equipped with the 2.5m resolution imaging instruments and 12m resolution multispectral camera;
* Operation of the Meteor-M No. 1 meteorological satellite with the KMSS instrument of 50-70m resolution, 1000 km swath width, and global monitoring of the Russian territory over 2-3 days;
* Operation of the Electro-L No. 1 geostationary meteorological space system with the Earth global observation equipment capable of producing images every 30 minutes

Valery also described the prospective OBZOR-O space system of 4 spacecraft equipped with the optoelectronic target equipment to provide Russian ministries and departments and territorial entities with remote sensing data for solving special-purpose tasks. He also listed the time-schedule of the development of two-layer meteorological and oceanographic space system up to 2020. Such expansion of the satellite constellation will result in an increased data volume needed to be processed and delivered in the maximum accessible to customers.

To create and deploy the orbital remote sensing facilities imply the ground infrastructure development and enhancement and remote sensing data processing technologies and services creation and upgrading. For purposes of such activities in Russia there is being established a Common Geographically Distributed Information System of Earth Remote Sensing (ETRIS DZZ) that may be integrated into the international remote sensing data acquisition, processing and dissemination systems. An essential component of ETRIS DZZ is also a General Geographically Distributed Bank of Geospatial Data wherein the Fund of Remote Sensing Data forms the basis for it. The data access and visualization are provided through the ROSCOSMOS’s GeoPortal.

The Russian Federation is ready to promote cooperation with the world community in the field of use and free distribution and access to remote sensing data from the Russian satellites.

Satoko commented that WGISS is pleased to have their participation. Yonsook added that she and Martin are very interested in talking with them, and are very interested in working with them to begin working with CWIC. Brian commented that they have many interesting missions and would like to know if the data policy restricts to Russian users, or can the data be open to a broader community. Valery replied that the GeoPortal gives access to Russian data, they are working with the government to make 10 meter and above data with open access to everyone, and with cooperation with WGISS this can happen. Brian asked if their missions can be tasked to gather data in areas of interest where there are cloud cover issues. Tamara Ganina and Valery Zaichko said it is possible from their GeoPortal. Frank thanked them for this comprehensive information on their activities, and Satoko once again welcomed them to the WGISS community.

## Global Spatial Data Infrastructure (GSDI) Association

Gábor Remetey-Fülöpp made a presentation of the GSDI.  He mentioned two publications titled “Redefining the possibility of digital Earth and geosciences with spatial cloud computing”, and “d-City: Connecting Global Futures for Environmental Planning”. He also mentioned the NASA World Wind Europa Challenge 2014 and beyond, <http://eurochallenge.como.polimi.it/>. World Wind is virtual globe technology that provides the platform for spatial data as open source, builds any functionality as needed, is freely available with open source licence (NOSA), no distribution limitation, and adheres to international data standards, OGC WMS-compliant.

Gábor listed awarded entries submitted by students and SMEs to the Europa Challenge 2013. The roadmap will be finalized in September to prepare the World Wind Europa Challenge 2014.

Gábor described the GSDI 14 World Conference, and listed some GSDI features (GSDI Global Citizen Award, IGEOS, GIKNET and SDI regional newsletters, GSDI & IGS Global News, publications). He also listed selected EUROGI and Hungarian activities.

Gábor concluded noting that GSDI’s efforts in GEO are to increase the societal benefits of EO by appropriate data sharing policies and a common technical architecture including interoperable spatial data, infrastructures and capacity building. GSDI regional and national level members from academia, governments, industry and NGOs from all continents are contributors on continuous basis. The forthcoming GSDI world conference in Addis Ababa hosted by UN is a joint event with Africa GIS in November 2013, and is a challenge for AfriGEOSS.

Frank asked how he sees the future of World Wind. Gábor replied that it /WWEC/ is a new initiative, and the open source nature of this platform makes it available locally to smaller communities and governments; the open source can be merged with proprietary for added value.

## National Oceanic and Atmospheric Administration (NOAA)

Martin Yapur presented NOAA agency highlights. The agency provides 24/7 on-orbit satellite operations and product processing for geostationary and polar-orbiting satellites. The agency is in process of acquiring next generation satellites, and providing long term data stewardship. Current NOAA initiatives are to maximize return on observing system investments, a new office to examine requirements across NOAA, develop strategies to meet multiple requirements with a single investment, determine the most effective mix of investments in observation and data management systems, and leverage domestic and international partnerships.

The NOSIA II approach is a value chain collection of activities that begins with an Earth observation. Links within the chain add value to the observation to ultimately achieve a key objective or deliver a product or service, which in turn contributes to a mission service area (MSA). The MSA can be broken down into sub-areas that represent topical/application areas encompassing the major functions within the MSA. Key Products and Services (KPS) represent the most important deliverables or science objectives to be accomplished within the MSA/Sub-Area. Data sources include direct observations, model outputs, and intermediate products that require Earth observations.

A performance scale was developed, and data collected in a variety of locations. The outcome is a value tree for PALMA application – all the inputs with the many interviews translates to scores. The goal is to determine the best combination of systems to provide specific products. PALMA incorporates system cost and benefit to determine the efficient frontier. The PALMA efficient frontier can be used to find an optimized portfolio that provides either a given performance degradation or a cost savings in comparison to the current and planned portfolio.

Brian said the difficulty with this is the subjectivity. Martin added that he is more than happy to collaborate.

## [Japan Aerospace Exploration Agency](https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&ved=0CCkQFjAA&url=http%3A%2F%2Fwww.jaxa.jp%2Findex_e.html&ei=MylIUqryOoW29QS71YGwCg&usg=AFQjCNFWpQTUzQPVNKJDPpxsYscMyj0U0g&bvm=bv.53217764,d.eWU) (JAXA)

Shinichi Sekioka gave the JAXA agency presentation. He noted that ALOS-2 (Advanced Land Observation Satellite-2) will be lunched by next April. The goal of the ALOS mission is cartography, regional observation, disaster monitoring, and resource surveys, and ALOS-2 will succeed this mission with enhanced capabilities. PALSAR-2 (Phased Array L-band Synthetic Aperture Radar2) is the successor of PALSAR and will have a spotlight mode (1 to 3m), whilst PALSAR has 10m resolution.

The Global Precipitation Measurement, GPM, is a follow-on mission to TRMM, and is a JAXA-NASA joint mission. The GPM program is composed of one core satellite, which carries a Dual-frequency Precipitation Radar (DPR), a microwave radiometer. TRMM observes tropical rainfall and GPM observes global rainfall. JAXA provides DPR for GPM. Led by JAXA and NASA, the GPM program will be conducted through international cooperation. GPM is at NASA for testing, and will be launched by next April.

To promote GPM, the JAXA GPM team has developed a game for iPhone and Android. The GPM program is designed to make more accurate and frequent observation of global rainfall.

Shinichi described the JAXA Global Rainfall Watch Service, which is produced by using TRMM and other existing satellite data.

## Centre National d'Etudes Spatiales (CNES)

Richard Moreno made a presentation of CNES, noting that the end-of-mission of Jason-1 occurred on 01 July 2013 after more than 11 years. After many unsuccessful attempts to re-establish communications with the Jason-1 spacecraft since 21 June, Jason-1 was decommissioned. For more than 53,500 orbits of the planet, Jason-1 precisely mapped sea level, wind speed and wave height for more than 95 percent of Earth's ice-free ocean every 10 days. The mission provided new insights into ocean circulation, tracked the rising seas and enabled more accurate weather, ocean and climate forecasts.

The Satellite with ARgos and ALtiKa (SARAL) is a cooperative altimetry technology mission of ISRO and CNES and is complementary to the Jason-2 mission of NASA/NOAA and CNES/EUMETSAT. It was successfully launched on 25 February 2013.

Richard announced that in April the French government appointed Jean-Yves Le Gall as the new President of CNES.

## Netherlands Space Office (NSO)

Mark Loos gave a presentation for the Netherlands Space Office (NSO), which represents the Netherlands government to space agencies (ESA) and the space industry. National programmes include TROPOMI-instrument, satellite data portal, GeoData for Agriculture and Water, and ESA Business Incubation Centre. The NSO is responsible for stimulating international cooperation with Dutch industry and investing in the future’s space pioneers (students and young entrepreneurs).

The NSO vision is a change in space, from driven by technology to driven by demand. Benefit of space technology and satellite data is the key to global solutions, scientific breakthroughs and new markets. Needs of society and opportunities on the market give direction to the development of space technology and applications; this gives opportunities for commercial markets, and asks for more synergy space and non-space, and more and broader international cooperation.

The National Satellite Data Portal provides satellite data of the Netherlands to Dutch users. During the period 2012 – 2015, level 1 satellite data includes DMC-satellites (MS), Formosat-2 (MS), Formosat-2 (PAN), and Radarsat-2 (radar). Mark described the goals, perpectives, and strategy of the data portal.

Mark described three satellite applications cases: Dike and Deformation Monitoring, Field Monitoring, and Water Monitoring. He also described the Geodata for Agriculture and Water (G4AW) project, with aim to increase the agricultural sector output by providing food producers with relevant information, advice or products through operational information chains using satellite data.

Mirko asked if the portal is open to users outside the Netherlands. Mark replied that this has not yet been accomplished.

## Canada Centre for Mapping and Earth Observation (CCMEO)

Costas gave a presentation of the Canada Centre for Mapping and Earth Observation (CCMEO), beginning with agency updates. The CCRS has a new brand resulting from a branch merger of Mapping and Information Branch and Canada Centre for Remote Sensing. The Data Acquisition Division plays a leadership role in Canada by providing access to Earth Observation data through satellite station infrastructure, long term archiving, and dissemination of satellite imagery for the Government of Canada. He gave an overview of the archiving activities, and listed satellite station facilities.

In August 2012, the Government of Canada announced funding of $38.9 million to equip Natural Resources Canada’s satellite station facilities with state-of-the-art antennas. The announcement provides funding for the installation of four antennas; funding also supports a data management system to house and safeguard satellite information. Costas presented the current status of this project.

The Earth Observation Data Management System (EODMS) has completed the requirements gathering phase. The first prototype of the software client based on conceptual design and requirements was presented to NRCan on September 10th and 11th. On August 1 enhanced accessibility was made with the release of the CCMEO Portal.

CCRS/CSA RCM collaboration is ongoing; NRCan and CSA are actively working together to integrate the RCM-specific requirements into the NRCan network of stations. The RCM project will leverage on CCRS expertise to make current and historical EO data available by interfacing the RCM order handling subsystem with CCRS future EO Data Management System.

Costas gave results of the archive environmental factors in coordination with USGS.

The Federal Geospatial Platform initiative is a 21 department horizontal initiative which enables direct sharing of geospatial and other data for faster and more integrated Government of Canada policy and decision making; cost-avoidance in the acquisition, development and management of new geospatial tools and data; embeds a value chain that derives benefits in federal geomatics investments from satellites to GIS systems; and more effective leveraging of the Shared Services Canada infrastructure, and future investments.

Andy commented on the implementation for the visually impaired. Osamu asked about the architecture for the catalog and repository slides; this is a three year project to provide a more cohesive government presence to GEO; there are several initiatives for this.

## National Aeronautics and Space Administration (NASA)

Andy Mitchell gave a presentation of the Earth Science Data and Information Systems (ESDIS) at NASA. The six major activities of the Earth Science Division are building and operating Earth observing satellite missions, making high-quality data products available to the broad science community, applied science, developing technologies to improve Earth observation capabilities, and education and public outreach. The focus areas are atmospheric composition, carbon cycle and ecosystems, climate variability and change, weather, water and energy cycle, and Earth surface and interior. He listed the ESD operating missions in 2013, airborne campaigns, and planned missions for the next 10 years.

NASA’s Earth Observing System Mission is to collect Earth remote sensing data for global change research program. NASA’s Earth Observing System Data and Information System (EOSDIS) is a petabyte-scale archive of environmental data that supports global climate change research designed to receive, process, distribute and archive several terabytes of science data per day. It provides a distributed information framework supporting EOS investigators and other users, and has an open data policy (data are openly available to all and free of charge except where governed by international agreements). By having open application layers to the EOSDIS framework, many other value-added services access to NASA’s vast Earth Science Collection are allowed. EOSDIS interoperates with data archives of other agencies and countries.

Andy listed the Earth science measurements made by various missions, the distributed areas of expertise, and displayed 2012 metrics. He also described the Global Change Master Directory (GCMD: <http://gcmd.nasa.gov/>). He graphically displayed the ECHO architecture (NASA’s middleware layer between Earth science data and users via a service-oriented architecture), the next generation client (REVERB), and access from EOSDIS Data Centers.

Andy noted that there are a lot of mechanisms for users to access data; metadata is being collected from many places, and there are different avenues to get to the user. The Metadata Architecture Study (MAS) has the goals to unify several disparate metadata formats (DIF, ECHO, and EMS), provide consistent results, performance, and access to users regardless of the mechanism through which they access EOSDIS metadata, improve the consistency and quality of EOSDIS metadata holdings, and provide a platform capable of expanding EOSDIS metadata systems to incorporate services, tools, documents, etc. Andy described the MAS Research Study and the MAS Architecture Development.

Martin asked if there is any publication regarding the MAS study research. Andy replied that he will send the website that contains it. Richard asked if ESDIS also provides high level products and do they process on demand. Andy replied that they do, and also reformatting, remapping tools.

# LTDP Workshop

Mirko Albani chaired a workshop on the topic of long-term data preservation.

## LTDP Working Group Activities

Mirko Albani gave a presentation of the Ground Segment Coordination Body (GSCB) Long Term Data Preservation (LTDP) Working Group activities. He listed the key aspects and guidelines of LTDP, and described the history and activities of the working group. One of the key aspects is the preservation of competence/knowledge on data/instruments. He also described issues 4 and 5 of the Preserved Data Set Content. The SCIDIP-ES Project (SCIence Data Infrastructure for Preservation) has the goals of development and deployment of generic data preservation services as part of the data infrastructure for e-Science, and also harmonization of data preservation policies, approaches and tools in the Earth Science domain.

Mirko displayed a diagram of the LTDP WG international context, and listed institutional and technical websites: <http://earth.esa.int/gscb/ltdp/>, <https://wiki.services.eoportal.org/>

The data preservation scenario implementation (ESA example) includes assessment of archived data and information holdings versus “PDSC” on-going for all ESA and ESA managed third party missions starting from historical ones. It also includes data migration to latest available technology and ingestion in tape libraries, consolidation of datasets and information and generation of two copies in two different locations, discovery and accessibility to users with particular focus on Climate Change Initiative requirements and needs.

Future planned LTDP WG activities were also listed. He concluded saying that cooperation in Europe in the EO LTDP domain is producing remarkable results, and closer cooperation with CEOS WGISS DSIG is needed.

## LTDP Preservation Workflow and Instantiation

Rosemarie Leone gave a presentation of LTDP preservation workflow, which gathers experience gained within the LTDP working group members by the discovery of historical mission to suggest recommendation to improve ECSS and CSDSS standards and space agencies best practices for the preservation steps to be applied to current and new missions. The Preservation Workflow defines a set of actions/steps and recommendations for the preservation of EO space datasets and associated information with the goal to ensure and optimize their (re)use in the long term. The preserved dataset content includes data records, processing software, and mission documentation.

The main input consists of European LTDP Common Guideline 2.0, PDSC 4.0, Inventory Table (V8), and Dataset Stewardship Process (Draft). The result of the workflow application consists of EO space datasets preserved, discoverable and accessible to users and for any additional curation/valorisation activity, and a set of documents describing the preservation strategy, implementation plans and activities for each individual mission dataset for historical, current and new missions.

Rosemarie listed the preservation workflow outputs, and gave definitions of designated community, curation and preservation objective, and the mission specific stewardship process. The Preserved Data Set Content (PDSC) represents what should be preserved to satisfy the Data Designated Community and Preservation Objective and it was tailored for each data category (C1 to C9). In line with the community and objectives identified, this file will be tailored taking also into account all relevant dependencies. This tailored PDSC represents the specific list of desired items to be preserved for a particular mission. Before finalization, this list should be consulted with the Designated Community.

Rosemarie described risk assessment, preservation planning and implementation, and evolution monitoring. As an example, she described the Workflow Instantiation and Lesson Learned from SEASAT data.

Satoko commented having similar problems with old archival data, and they have learned the importance of preserving software along with data and documentation. Another factor is the preservation of hardware on which the software was developed, and how to document that. Rosemarie replied to a question from Nitant that they need to try to preserve all the calibrations, but this is not normally part of the operational process. It is important to reinforce best practice and procedure for calibration.

## LTDP Persistent Identifiers

Katrin Molch gave a presentation on LTDP Persistent Identifiers. The objective is to assess if and how persistent identifiers can be introduced in Earth Sciences and to Earth observation mission data, and is there a possible application to active missions. These PIDs would be globally unique, unambiguous, and permanent identification of a digital object for locating and accessing it for a long time, and will facilitate citability, improve discoverability and accessibility and increase re-use.

Katrin listed the requirements for PID system and provider and for data holders. She also listed challenges and considerations that require long-term commitment; access to the resource must be maintained, though it may move, be renamed, or change. The granularity and processing level need to be understood, and decisions made as to which PID system to use, and whether the PIDs should be opaque or semantic. She listed examples of Persistent Identifier Systems, and PID implementation examples.

Next steps for the LTDP Working Group are to consolidate needs, requirements and use cases in EO. There is a lack of a standard and globally recognized solution; DOIs fulfill most criteria and seem to be the preferred PID system used in Earth Sciences and Earth observation

Gábor will send certain information to WGISS all regarding his question.

## Browse Guidelines Document

Yoshiyuki Kudo discussed the status of revisions to the Browse Guidelines Document. The latest revision was proposed at WGISS-33, and the reasons were listed. Work continued until April 3, 2013 when v2.0 Final draft was circulated to WGISS-ALL for review, and was approved as CEOS official document after 60 day review period.

Browse Guidelines Document v2.0 at a glance:

* Recommendations for GIS-ready Browse
* RGB True Color (green vegetation and blue water)
* Consistent stretches to allow for comparison of images
* Geolocated and map projected in one of the following formats:
* JPEG 2000 with embedded GML Geographic tags
* GeoTIFF with embedded Geographic tags
* PNG with world file
* JPEG with world file
* Packaged within KML/KMZ format
* Good examples: Use of geolocated browse in action
* USGS Earth Explorer
* NASA GIBS and NASA World View
* Online accessible browse
* URL accessible (HTTP GET, WMS)
* Embed the browse URL in CSW GetRecords response
* Updated browse survey results from CEOS agencies

The document is available on the CEOS website at <http://www.ceos.org/images/WGISS/Documents/DSIG_BGD_ver2.pdf>

To reach intended audiences, CEOS resource management and exposure policy is being discussed in terms of better discovery and access to CEOS documents. This document will be exposed to them accordingly.

## Conclusions and Recommendations

In response to a question from Yonsook, Rosemarie said that this preservation package will include ability to reprocess data since they are preserving Level 0. This is imperative to align with future missions, though intermediate products may not necessarily be preserved, depending on the mission. Making provision for preservation is much less costly during the mission than it is afterward. Coordination with the experts is essential. Wyn clarified that there are two separate activities: preserving the data, and processing it to get a product; in principle, it is not necessary to preserve the product.

Mirko made the following recommendations:

* + Preservation of EO data but also of all context, provenance and quality information (documentation, CAL/VAL databases, algorithms, etc.)
	+ Harmonized data and information accessibility; coordinated and coherent approach among stakeholders
	+ Increase focus on Data Curation, COMPETENCE/KNOWLEDGE ON DATA/INSTRUMENTS
	+ Preservation has to be addressed in all phases of an EO mission starting from its design
		- End to end Preservation Scenario and Procedures, Standardization
		- Tailored Implementation for Specific Missions/Datasets

For CEOS/WGISS DSIG and GSCB/LTDP WG coordination approach:

* + Systematic exchange and review of documents produced by each WG:
		- LTDP Guidelines
		- Preservation workflow
		- Data Consolidation Procedure
		- Preserved Data Set Content (PDSC)
		- DSIG: TBD
	+ Share and align DSIG and LTDP WG plans of activities; minimization of overlaps and identification of possible joint activities
	+ Join efforts in standardization initiatives
	+ Short term actions: Mirko Albani and USGS representative
		- Exchange plans of activities (including milestones and deliverables): November 2013
		- Identify list of documents/deliverables for review and possible cooperation topics: December 2013

If no one from USGS steps in, WGISS will need to decide on a lead.

Richard asked if the agencies present are preserving their software, and mentioned the CNES strategy. Andy said it depends on the mission. For all new and ongoing missions the software is saved. Rosemarie said it is an area where an investment has to be made, since maintaining old software has a high cost.

# WGISS Projects

## CEOS Water Portal Project

Satoko Miura chaired the CEOS Water Portal Project session.

### Project Overview and Status

Shinichi Sekioka gave a presentation of the CEOS Water Portal overview and operation status. Shinichi reported that the new user interface has been rolled out, and moved to the Amazon EC2 cloud. Two new data centers have been added: NASA ECHO and CUAHSI. OpenSearch client capability is enabled, using the “OpenSearchLight” javascript library, and 2-step search. Phrasal search support at server side is desired.

Coordination with NOAA National Climatic Data Center (NCDC) for future collaboration is being pursued. A meeting was held with NOAA NCDC in August; a standard interface will be used, CSW for catalog (TBD), OPeNDAP for data. Shinichi displayed a milestone chart for 2013-15.

### CEOS Water Portal Developments

Yoshiyuki Kudo gave a presentation on the development status and future plans of the Water Portal Project, which is in support of the AIP-6 GEOSS Water Services and is intended to provide additional operational capability, in particular for in situ water observations, to be called GEOSS Water Services as a federated resource in GEOSS. The scope of the current proposal is “a global registry of water data, map and modeling services catalogued using the standards and procedures of OGC and WMO”. Yoshiyuki explained the involvement of the
CEOS Water Portal Project in AIP-6:

* Water data and its catalog of participating organizations will be exposed through OGC based web services (CSW,W\*S,SOS), which then will be harvested to GEO DAB.
* CEOS Water Portal will be enhanced to communicate with GEO DAB (via OpenSearch) for water services participants' metadata and data.
* A set of demonstration scenarios for GEO Ministerial Summit is now being discussed within the GEOSS Water Services team.
* Aligning with the demonstration scenarios, CEOS Water Portal will offer capabilities that shows observatories on the map for user-selected variable. Once a user selects a station, search for DAB runs and the user will be able to download data seamlessly. Users will be able to choose country first, then search and access data of their interest.

The GEO Web Portal as well as any other portal can access the GEO DAB (Discovery and Access Broker) middleware framework through its catalog web service (OpenSearch, CSW, etc.) The OpenSearch endpoint OSDD supports phrase search as well as AND/OR-search for multiple free-keywords. The URL is <http://184.73.174.89/gi-cat-StP/services/opensearchgeo?getDescriptionDocument>.

One significant challenge is that the number of search results can easily become huge. When the number of results is too big, the OpenSearch response only contains the number of results per regular gridded area (4x4), conveying geographical distribution of the results and urging the client to refine the search. The “multi-box” element contains information about absolute and relative data density in each cluster (gridded spatial area), as well as the cluster spatial boundaries. From this single response a client could display aggregated results. Integrating the DAB result to the existing map interface is the challenge.

The DAB OpenSearch client enablement is ongoing, with good communication with the GEO DAB development team. Integrating DAB’s search results to the existing user interface is challenging, and currently few data can be reached from OpenSearch results; the team is working with GEO DAB to resolve and will provide feedback/lessons learned to GCI/DAB at the end the effort.

Yoshiyuki displayed a diagram of the current architecture, which is an open, distributed architecture, with the catalog outsourced, and based on two-step search (Dataset search -> Granule search). For dataset-level catalog, create and ingest DIFs is for the entire water portal dataset (except datasets of 2step-search enabled servers). Use GI-Cat (OSS) is for brokering the granule level catalog. The DIF includes “project=waterPortal” and OSDD URL applicable for granule level search for the specific dataset. The new user interface will include search and access than drill-down, category search by IDN/GCMD science keyword as well as ECV variables, and support free text search. A feasibility study will be done through prototyping the new architecture this fiscal year, and transition to the new architecture will happen the following year, if it yields satisfying results.

Yoshiyuki reported that the IDN MWS interface specification has been clarified. Retrieval of multiple DIFs in one query is possible with quick search response. They have determined DIF (datasets) granularity of over 5,000 DIFs. Some DIFs are being registered for tests. All DIFs will be created and registered by the end of this year though not visible to public.

Communication with GI-Cat DAB development team is good. Findings so far include that the temporal and geographical search works only when the source OPeNDAP server is ncISO enabled. There are also issues of database robustness. The team will provide feedback to GI-Cat, OPeNDAP, and related communities at the end of the study.

Richard Moreno asked if they have used Open Source GICat. Yoshiyuki said that they use it “as-is”. When it harvests, it makes a copy, and it is necessary to find out how many granules can be harvested without hampering performance. It would be worthwhile to look at this solution for a broker.

## CEOS OpenSearch Project

Richard Moreno and Yoshiyuki Kudo chaired the CEOS OpenSearch Project session.

### Project Status

Yoshiyuki reported the status of the CEOS OpenSearch Project. The objective of the project is to establish a common CEOS interoperability best practice of OpenSearch in order to allow for standardized and harmonized access to metadata and data of CEOS agencies, including CWIC and FedEO communities; GEO/CEOS portals should speak only one language for accessing the two. He listed the members of the team, and explained the project approach. There is no intention of making a new OpenSearch standard but CEOS needs a common Best Practice that should maintain simplicity and easy-to-implement characteristics of OpenSearch. The team is reviewing the OGC specifications and collecting comments from CEOS agencies on the OGC documents. Depending on how and to what degree OGC incorporates the CEOS comments to the specifications, the project will discuss and find out how to proceed. The options include creating a CEOS OpenSearch Best Practice Document. (Even then, interoperability/compliance with OGC specifications will still be maintained). Yoshiyuki presented a diagram of milestones for 2013-14.

### FedEO Introduction

Yves Coene gave a presentation of FedEO Open Search. He began with a brief definition of HMA, and explained that FedEO is a prototype system providing a brokered discovery and access capability to European and Canadian EO missions’ data based on HMA interfaces. Currently OpenSearch access to HMA catalogs is supporting OGC 06-131 (Atom with EOP O&M, OGC 10-157, metadata as foreign markup or atom:link), CWIC catalogs (Atom with DC or ISO metadata as foreign markup or atom:link), and Virtual Archive 4 and G-POD: Atom or RDF. The interface is aligned with OASIS searchRetrieve 1.0 conventions. FedEO will eventually implement OGC 10-032 Geotemporal Extension and OGC 13-026 Extension for Earth Observation.

Yves followed with a demonstration of FedEO, showing the interface and the client.

Future work will include complementing product/granule discovery with collection/dataset discovery using recursive or multi-step OpenSearch (Step 1: return collection metadata and OSDD, Step 2: return product metadata), supporting SRU and RDF responses, describing (using W3C DCAT) which collection is available in which MediaType/recordSchema, integrating additional back ends, and validation.

Satoko asked if FedEO is a prototype system. Yves replied that the system has just moved to ESRIN, will be maintained operationally, and is available now. Brian asked about data access. Yves replied that anyone can search, but the access to the data is restricted to GMES-registered. Some of the collections are already freely available, and any organization that wants to provide access to their data can do so. Brian noted that the data policy portal has a column for CWIC/FedEO but as yet it is not known which instrument/mission combinations are available through FedEO.

**Action WGISS-36-4:** Mirko Albani to indicate instrument/mission combinations that are available through FedEO on the Data Policy Portal.

### CNES OpenSearch Activities

Jérôme Gasperi described CNES OpenSearch activities with Theia, which facilitates the study of issues related to the impact of anthropogenic pressures on climate and ecosystems in order to understand the dynamics of biodiversity. Theia offers a thematic platform with broad range of images at different scales along with processing services. Jérôme displayed a diagram of the Theia architecture, and demonstrated the search – the user can choose project, instrument, and different metadata is displayed. The process is automatic and relies on OpenSearch endpoint. The search service is an OpenSearch description.

Brian noted that in the example demonstrated the data is commercial. What would be the next step for the user to access the data? Yves replied that the user would need a commercial catalog connection; the user would redo the search using the URL generated in the search. Brian noted that with Landsat each scene has a unique URL.

### Review of CEOS Comments

Yoshiyuki reported that it is safe to say that CEOS OpenSearch will be compliant with OGC OpenSearch. The OpenSearch Project team has collected 34 comments from CEOS members on the OGC OpenSearch Extension for Earth Observation document. Comments are mostly about clarification or the use or implementation of the OGC OpenSearch specifications, and not about changes to the core part (requirements). Important comments have already been reflected on the OGC document, and only seven comments are pending or rejected.

These seven comments are not judged suitable for the OGC specification and can be categorized as being for CEOS best practice. The proposal is to make a CEOS OpenSearch Best Practice Document. Mirko said that these comments have not been rejected, but in fact have not yet been incorporated, so it is better to call them “pending”. Yoshiyuki added that the latest spreadsheet indicated that most of these were responses from authors saying they were not in the scope of the OGC specification, and rather a best practice.

### Review of CEOS Comments

Yonsook confirmed that ESA is very open to the inputs from CEOS, and it is clear that some of the comments have not been included for lack of time. WGISS really appreciates ESA’s huge effort to incorporate the comments, and added that these comments originated from the NASA team so it would be good to have a separate teleconference that includes the authors of these comments and the HMA team. Following are the comments:

CEOS-010: Practical use of parameter extension

The meaning of this is unclear. Yonsook will investigate further.

**Action WGISS-36-5:** Yonsook Enloe to set up an email chain with the HMA team to resolve the first comment of the CEOS response to the OGC OpenSearch document; discuss these and develop recommendations

CEOS-011: Use of atom:link over eop:EarthObservation

Yves noted that this is agreed, and will be worked into the document.

CEOS-014: ESIP 2 step search

This is already a common practice. Yves agreed that it is worth mentioning in the specification document.

CEOS-015: Multiple keywords (phrase, logical operator)

The rules for the use of multiple keywords should be specified, especially notation for logical operator that connects multiple keywords. Many keywords are phrases and if specified individually without a connector. Jérôme said that we should not put it in the specification, but have a reference that it conforms to a specified standard. Rather it should be stated that CEOS conforms to the level 1 of OASIS CQL. Specifies a number of levels of complexity that the server can handle.

**Action WGISS-36-6:** Yoshiyuki Kudo to investigate/determine the CEOS Best Practice for specific conformance level of the OASIS CQL Specification.

CEOS-016: Parameter extension for mandatory query parameter

This has been accepted and incorporated in the document.

CEOS-017: Query parameter for geophysical parameter

This should go into the Best Practices document so that it can evolve over time. The list of parameters will be specified in the Best Practices.

CEOS-034: Subsetting / Narrowing query parameters

Check consistency within document “contexts” should be a free text (linked to the subject) CEOS Best Practice to set a list of keywords. There could be a multilingual thesaurus, using the actual URI from the thesaurus, at least in the collection searches. This is optional.

### Discussion on CEOS Open Search Best Practice

Yoshiyuki said that a Best Practice for CEOS is a necessity, and Yonsook agreed that going through these comments shows the need for it, adding that the Best Practice will narrow the usage to the community. This follows the OGC model. Jérôme agreed to the need of an internal (to CEOS) Best Practice. It was agreed that CEOS will implement the OGC standard, and also conform to the Best Practice. Yonsook said this model to develop such a standard and practice shows excellent cooperation.

Yoshiyuki presented the following steps to making a CEOS OpenSearch Best Practice document.

* Make “preliminary” best practice document based on the comments that did not fit in the specification (OGC documents).

Implementation based on the OGC + preliminary best practice document at CWIC and FedEO

Implementation at portal(s)

Refine the best practice document based on implementation

Propose the document as OGC Best Practice document.

Recommended creating a document containing a discussion of best practices related to the use and/or implementation of an adopted OGC standard, with release to the public. Best Practices Documents are an official position of the OGC and thus represent an endorsement of the content of the paper (e.g. WMS - Application Profile for EO Products 0.3.3)

### Discussion on WGISS-OGC Joint Meeting

Yoshiyuki displayed the agenda for the CEOS-OGC joint meeting dedicated to OpenSearch on September 23. It includes an overview of WGISS activities on data discovery and access, and on FedEO, and an overview of OGC standards on data discovery and access, proposals/ comments from CEOS OpenSearch Project, and associated discussion. The final session will be a discussion on potential areas of joint activity.

Satoko displayed the presentation that she will give, explaining the work of WGISS toward data access. This presentation includes a diagram of FedEO-CWIC interoperability and Frank commented that the diagram should explicitly say that there are other relationships in addition to those displayed. Ken added that the title indicates that the diagram is not intended to show all possible relationships, but it does suggest a specific solution. He also thought that it should be clear that WGISS did not just emerge recently, but is well established with a long history in interoperability.

Ivan Petiteville asked if there should be an explanation of the problem that CEOS is trying to solve. It was agreed to simplify the diagram and Jérôme agreed to do it. It needs to show interoperability between the two systems so that there is the need for common access to all CEOS assets. The final diagram is:



## GA.4.Disasters Project

Karen Moe chaired the GA.4.Disasters Project session.

### Project Overview

Karen Moe presented the GA.4.Disasters Project overview. She reported results from the CEOS Disasters Study Group, which identified three disasters activities as potentially overlapping: the Ad Hoc Working Group on Disasters and Risk Management (DRM), the CEOS Disasters SBA Coordinator Team, and the WGISS GA.4.Disasters Project. Steven Hosford (CNES), the lead of the Disasters Study Group, is to review scope of CEOS disasters activities and address recommendations. WGISS clarified that its role has been as a short term effort addressing technical issues and best practices for information systems and services, in coordination with CEOS Disasters SBA. The GA.4.D Project team joined DRM Ad Hoc WG in 2012 to address cross-discipline information systems architecture topics. The Study Group recommended a new working group on disasters to encompass existing activities to CEOS SIT; the proposal is to be discussed at the CEOS Plenary.

Karen discussed the motivation for the GEOSS Architecture for Disasters project. From the Enterprise Viewpoint she displayed a diagram of activities involved in satellite data support to disaster management, and explained the stages of disaster management from both the initiation perspective, and the steady-state perspective. From the Information Viewpoint she discussed information content and semantics and practitioner insights. From the Computation Viewpoint she described services and practitioner insights.

The team is preparing a GA.4.Disasters Architecture Document for final WGISS review and publication no later than January 2014. This document will provide a cross-cutting infrastructure and technology view of DRM pilots, examine the Enterprise Viewpoint of key activities to address DRM pilots’ data acquisition and data handling needs, reflect the needs of EO research community to develop DRM data products for all phases of disasters management, and identify key ‘actor’ roles for DRM.

At WGISS-34 the project team was actioned to seek clarification regarding availability of Charter data after activation and product delivery. Many organizations want to acquire disaster-related Charter data for post disaster analysis and research. The Charter identifies all data collected but does not archive the data. Anyone wanting the data must make an official data request directly to the CEOS data providers. CNES identified this need and is proposing a Recovery Observatory under the CEOS DRM proposal

The team has also requested WGCapD help to identify community standards for disasters semantics in support of capacity building (training, product improvements, and tools). Standard terminology for applications is outside the scope of WGCapD. A need has also been identified for consistent metadata based on standard terms.

Karen reported the project status as follows: The GA.4.Disasters website provides a history of project activities and findings, links to key disasters-related GEOSS, CEOS, UN and other sources, access to CEOS DRM ad hoc working group site, and GA.4.Disasters architecture and working documents. In terms of outreach, the team published a joint paper with GEOSS IN-05 task in IEEE JSTARS: “Improving Disaster Management using Earth Observations”, and presented at IGARSS July 2013 the GA.4.Disasters Architecture for integration of in situ and satellite observations, and GA.4.Disasters activities at the Earth Science Information Partners Federation meetings July 2013.

### CEOS-GEO Disaster Pilots

Stu Frye\* presented information on the CEOS-GEO Disaster Pilots. The data acquisition plan development involves developing sampling requirements, developing a list of primary and secondary missions/instruments that satisfy the requirements, performing COVE analyses to develop an observation strategy for each of the requirements, and developing a data acquisition plan with each mission that satisfies the observation strategy. There are three CEOS-GEO Regional End-to-End Systems: Caribbean/Central America (CIMH, CDEMA, CATHALAC, University of West Indies), Southern Africa (Namibia Department of Hydrology, SANSA, Kavango River Commission, RCMRD), and UNOOSA, UNESCO, World Bank involvement. Stu described the pilot definition, the acquisition strategy development using COVE, and capacity building. Capacity building is being accomplished by interacting with WGCapD. Metrics for impact/utility of products and services are being developed, and disaster server distribution and client interface is being defined. Detection/classification overlay must match the map, and must be vector-based in addition to raster products.

### Capacity Building for Disaster Risk Reduction

Dan Mandl\* gave a presentation on capacity building for Disaster Risk Reduction. He began with an overview of capacity building, with descriptions from the individual, institutional, and societal levels. He explained that the Namibia Capacity Building for Use of Satellite Data project is focused on the needs of the Namibia Hydrological Services to service flood disasters. It was established as a pilot project to identify and coalesce support from potential providers of relevant satellite data and in country user groups that can make use of data products. The team has participated in various international forums such as UN-SPIDER and CEOS to establish a disaster enterprise model to enable sharing of data from satellite data providers, and has established longer term in-country relationships to enable sustainability of pilot activities.

Dan displayed a timeline of initial activities related to the Namibia Early Warning Flood Pilot Project from 2008 to 2013. He also gave details for the four annual regional meetings held so far. The most recent one (January 2013) included a calibration exercise in the Kavango basin with more success in obtaining both EO-1 and Radarsat images while surveying the Kavango river on ground and via helicopter. It also included discussions on potentially using OpenStreetMap (OSM) as an exchange standard so that data and data and data products would be more easily shared, on various data metrics such as geolocation accuracy and possible data fusion activities, and on which data products could be put together to get some real results that could demonstrate the value of the technology.

Dan presented the agenda of the SERVIR Funded CREST and OSM Training Workshop to be held November 2013.

In conclusion, Dan noted that capacity building has been a long windy road. It is necessary to build a coalition of suppliers and users and have in-country institutional support. The key to success is building relationships that can be sustained over a longer period of time since capacity building is not the primary job of the people involved. Metrics are needed to sell results to governments using new functionality to show benefit.

Ivan asked Dan what he expects from WGISS. Dan replied that being part of the CEOS umbrella helps with funding and helps propagate the effort. Karen added that the focus on capacity building in an endeavor like this is critical. Ivan wondered if this should be discussed with WGCapD. Now may be the ideal transition time to set up an interaction with WGCapD. Dan added that this Namibia work is perceived as a pathfinder, where best practices to overcome the problems encountered are documented.

### Natural Disasters Risk Assessment at the UN-SPIDER Regional Support Office in Ukraine

Natalia Kussul and Sergii Skakun\* gave a presentation of the UN-SPIDER Regional Support Office in Ukraine. The RSO was initiated with the signing of the agreement during the UN Committee on the Peaceful Uses of Outer Space (COPUOS) Session in Vienna in 2010. The office’s scope of activities includes outreach and capacity building, technical advisory support, and horizontal cooperation. Their areas of expertise include flood mapping from optical and SAR satellite imagery, use of EO data time-series for flood and drought risk assessment, and fire monitoring. The RSO has also participated in a number of calls for flood maps production from the International Charter, and for flood mapping within the GEOSS Disasters SBA. Natalia also described the GEO Sensor Web Pilot Project, and agriculture-related international activities. She described the operational mapping of crop damage due to drought, with an analysis of drought in Crimea in May 2013, and also drought hazard mapping from EO data time-series. She listed their publications.

Ivan invited Natalia and her team to join the Flood Pilot DRM.

### Ukrainian Segment of IGMASS

Natalia Kussul gave a presentation of the International Global Monitoring Aerospace System (IGMASS), which is an initiative of the Russian scientific and public organizations to design a “system of systems” for effective early warning of international community about global risks and threats, including dangerous events of space origin. The objective is to pursue global and effective forecast of potentially dangerous natural and man-caused disasters on the Earth and in outer space provided by integrated global aerospace monitoring resources. She described the IGMASS structure, including space, aero, and ground segments, and cooperation with existing systems and initiatives.

IGMASS tasks include monitoring and forecasting of natural and technological disasters, with dozens of members and partners. The Ukrainian segment of IGMASS includes three main subsystems: seismic activity monitoring and forecasting, floods/fires/droughts monitoring and risk assessment, and control and monitoring of critical objects. They have access through the GeoPortal, and interoperability with existing systems (WGISS, GEO, and UN). She described use cases of seismic activity monitoring, flood monitoring and prediction, and fire monitoring.

Near future plans include creating a GeoPortal of the Ukrainian segment of IGMASS, interoperable with CEOS/WGISS and GEOSS activities, and to develop risk assessment products, accessible via GeoPortal.

Karen noted that these regional centers are key to success – where the biggest difference can be made.

### Open GeoSocial Enablement for GEOSS Users

Pat Cappalaere\* gave a presentation of Open GeoSocial Enablement for GEOSS Users. Pat noted that the disaster community gap is unfortunate because CEOS has the data (big data, open data) and many APIs. But the gap is enormous. In most cases, the data is not readily accessible and used as needed. He described a GEOSS [Disadvantaged] User as the hardest one to reach – not a software developer, with low bandwidth and no commercial proprietary software, but possibly belonging to an existing social community (USHAHIDI, Facebook, Twitter…) and needs actionable information to make local decisions in near real-time. Disadvantaged users can also be regional data brokers focused on capacity building, not software development efforts.

GEOSS has access to international assets, to OGC APIs, and multiple versions of them, and multiple bindings and output format encodings, developed at great cost. Conversely, the [Disadvantaged] GEOSS end-user is budget limited, with limited to no OGC skills and limited infrastructure. The GEOSS user should not need anything more than a simple web browser, with some javascript served by OGC services that can be executed and return a product that can be shared and discovered over social networks: an open GeoSocial API for GEOSS users (and brokers).

Pat issued a call to action to product publishers to provide good behaviors, publish relevant actionable products and not just data, to tag products that users could use to search, to use storytelling to distribute information, and to use a better web vector format option for users, so the client only needs to specify AOI, SBA need, or product type. Products are queried, generated and acquired from multiple sources, then shared and discovered.

### Role of Emerging Technologies in Disasters Architecture

John Evans\* gave a presentation of the role of emerging technologies in disaster architecture. He gave examples of crowdsourcing via mobile devices, location-based services, unmanned aerial vehicles, small satellites.

The “Internet of Things” involves sensor-based detection of earthquakes, forest fires, oil spills, severe weather, volcanic gas plumes, and drought. Cloud computing plays a role, for example in the Namibia Flood dashboard and image processing service hosted on Matsu cloud, as does Big Data analytics. Other potentially game-changing technologies for disaster management include satellite direct broadcast/direct readout, model webs/modeling as a service, semantic services, collaboration services, and new sensor types.

Architecture streamlines integration of new technology. It articulates the role of new technologies and relationships to existing components, it identifies information content needed vs. supplied, and clarifies what new analytical or operational capabilities become feasible. New technologies may also allow (or require) changes to the architecture.

### Discussion GA.4.D Completion, Future Needs

Karen facilitated a discussion about the completion of the GA.4.Disasters project. Satoko asked what will happen to the project’s activities when project ends; Wyn added that his concern is that with the new CEOS working group WGISS will not have access to these sorts of presentations. Frank noted that the data issues and technologies, space agency assets are key to the success of the development of the project. Ivan said these are very interesting but from the other end it is a pity that the synergies are not occurring within the diverse groups working on disasters. CEOS has been lacking the coordination between these activities and the new WG will provide this. Maybe there can be a balance – more technical aspects kept within WGISS and then reported back by Karen, and vice versa.

Andy suggested that a point of contact or liaison would be good. Ivan also suggested a joint meeting between WGISS and the new WG. Karen noted the importance of the capacity building perspective as well as the technology and data access perspective; some of the barriers to achieving the goals are resolved when reaching out to the end users. Karen noted that one of the areas that will be very significant is the search key words and semantics. There are emerging techniques for capturing that information, and efforts are underway to find vocabularies for disaster management. The disasters area has a wealth of complexity; each will have its own semantics, but maybe there can be crosscutting techniques.

Satoko pointed out that with the closing of the GA.4.Disasters Project, WGISS needs to have a place to continue the IT-related discussions. For a liaison to/from WGISS, someone from GA.4.Disasters Project team would be a good candidate. WGISS can discuss this after the new working group is created. Ivan noted the liaison does not necessarily have to travel.

**Action WGISS-36-12:** Karen Moe to produce final report of the GA.4.Disasters Project.

## CWIC Project

Martin Yapur and Yonsook Enloe chaired the CWIC Project session.

### Introduction

Martin Yapur introduced the CWIC project, showing a diagram of the evolving architecture, CWIC milestones, and listing the CWIC partners.

### CWIC Report

Yonsook Enloe gave the CWIC report. She began with a brief description of CWIC, its architecture, features, the team and partners. She noted that the initial development of the CWIC activity was funded by NOAA from May 1, 2010 to April 30, 2013. NASA and NOAA have continued to provide funding for the fiscal years of 2013-14. At the 2012 CEOS Plenary, Mike Freilich (NASA) announced that the USA government agencies - NASA, NOAA, and USGS – will provide long term funding and resources to the CWIC activity starting in May 2013. The IDN existed before the CWIC initiative and provides other services to CEOS and GEO beside collection level discovery for CWIC. For this reason, at the present time the IDN funding will remain a contribution from NASA.

CWIC provides a major source of satellite data inventory search and data access in GEO; current data partners include NOAA (CLASS), NASA, USGS (LSI), INPE, NODC/GHRSST, CCRS, AOE, and ISRO. USGS and INPE provide access to operational databases; the LSI VC team is adding more data to CWIC through the USGS CWIC connection (Cal/Val, GFOI, FCT, and GEOGLAM). NOAA will add access to most of the data in CLASS when the new API is invoked in 2014. Currently a small set of data is accessible from the NOAA CLASS NEATT API. This access is being made operational again. NASA is working to make all EO unrestricted online satellite data accessible from CWIC, including near real time data (from LANCE). GHRSST (SST VC) is working to make all their data accessible from CWIC at NOAA NODC. NODC will also add data to this CWIC connection. CCRS (CCMEO) provides search and email data ordering to access to Radarsat-1, 2 and AOE is working to add CRESDA (HJ1A, HJ1B, CBERS01, CBERS02, and CBERS2B), Beijing-1 (BJ-1), and NSMC/Feng-Yun (FY3A, FY2D, FY2E). ISRO is making progress on their CWIC access.

The CWIC Data Partners API consistency activity is tasked to making all the CWIC partners look “the same”. This involves supporting the same search criteria, pagination, sort order for returned results, online data access/order URL or email order, supporting GetRecordById to get different types of granule metadata, and support of exceptions code handling. Default criteria will be defined for providers for whom spatial criteria and temporal range is mandatory. Details of each data partner API are on the CWIC webpage in the CWIC Connector API Report.

Yonsook outlined the CWIC Data Partner responsibilities, as well as the support provided to them by the CWIC team. She also listed the three CWIC Client Partners: CWIC-Start Prototype, the LSI Portal, and the CCRS Agency Client.

Yonsook reported that all the CWIC servers (DEV, TEST, and PRODUCTION, STATIC) moved to a new hardware platform at USGS/Sioux Falls. The USGS team is providing a separate network for CWIC servers for simplified security policies for access. She expressed many thanks to John Faundeen and his USGS team.

Other recent activities include solidifying testing and processes, and developing a new dynamic metrics page. She also described activities with CCRS, IDN, and GCI integration.

Richard asked for clarification of the utility of CWIC with the development of OpenSearch. Yonsook replied that it is not necessary for anyone use CWIC or FedEO, and the team is looking forward to using OpenSearch. But it is easier if the client developers and the users if the search is developed in a consistent way. Andy added that one of the initial goals was to eventually eliminate the need for CWIC, but they have found that many agencies do not have the resources to develop their OpenSearch server, and agencies are coming together to solve problems by working together. The experience so far has shown that common agreements are valuable. The agencies participate because there is an advantage to them.

### IDN Support for CWIC

Michael Morahan presented metrics of CWIC-DIF entries for several agencies, and showed how they are broken down by science keyword. He also described the new procedure for adding an entry for CWIC in the IDN, and features in the IDN to help CWIC and CWIC users, such as the IDN CSW servers and the CWIC docBuilder. The CSW Access Document contains useful information on the IDN CSW servers, and can be obtained at <http://idn.ceos.org/docs/CSWaccess.pdf>. The CWIC docBuilder can be found at <http://gcmd.nasa.gov/DocumentBuilder/Home.do?Portal=cwic>.

### CWICStart Status and Demonstration

Doug Newman\* gave a presentation of CWICStart status and also a demonstration. He explained that the rationale for CWICStart is a proof-of-concept CWIC client that demonstrates the feasibility of rapid and simple client development using open source and free-to-obtain tools. The GCMD is an excellent source of rich dataset metadata from international providers; CWIC provides a collection of connectors to various providers using the OGC CSW specification. Current capabilities are to find datasets of interest via IDN CSW using keywords, spatial bounding box, temporal range, and concurrent, multi-dataset search. Other capabilities include visualization of datasets via provider metadata, finding granules of interest via CWIC CSW, visualizing granules via provider metadata, and downloading the granules from the provider. He gave links to access CWICStart (<http://api.echo.nasa.gov/cwic-start>, <http://api-test.echo.nasa.gov/cwic-start>, and <http://testbed.echo.nasa.gov/cwic-start>.

Next steps are authenticated access and moving beyond a prototype with continuous integration and automated testing with IDN and CWIC and production user experience, and implementing Open Search. Doug listed the tools used by CWICStart, and demonstrated the system.

### ISRO Partner Report

Nitant Dube\* gave a presentation of ISRO’s CWIC status and future plans. He noted that ISRO Earth Observation Catalogue System (IEOCS) test setup was changed from CSW 2.8 to 2.10 since it provides guest-based access, and support for ISO standard template 19139. He also reported that the Meteorological and Oceanographic Satellite Data Archival Centre (MOSDAC) satellite metadata and products will be available from the MOSDAC connector, including the newly-launched INSAT-3D.

Schedules and future plans include registration of MOSDAC data DIFS with GCMD by October 2013, testing of IEOCS with MOSDAC connector (November 2013), and operational release by December 2013. He gave special thanks to Shao, Yonsook and CWIC Team for the Support.

Yonsook commented that it will be really exciting for this data to be available through CWIC. DIF information can be sent in ISO.

### GHRSST Partner Report

Ken Casey\* gave an update on progress with the Group for High Resolution Sea Surface Temperature (GHRSST) and the SST Virtual Constellation. He provided background on GHRSST and the SST-VC and explained data status and flow. He listed metrics of the GHRSST archives and access statistics, and noted that the data centers provide access services.

Ken reported that 100% of GHRSST products are discoverable through CEOS IDN and CWIC. All 60 have granules available through NODC granule level GeoPortal at <http://www.nodc.noaa.gov/geoportal/>. There are some GHRSST data user statistics available from the CWIC server: GHRSST had 52,621 visits during 1January, 2013 through 2 September, 2013.

Yonsook said that at the SIT meeting the GHRSST activities were given a gold star. Ken said that from their perspective working with CWIC has been excellent. The team is very responsive; most other catalogs with which they have interacted are very challenging to work with, and through CWIC and IDN the partnership has been great.

### NOAA CLASS Partner Report

Ken McDonald gave the NOAA CLASS partner report. He began with an overview of the CLASS project and described CWIC access to CLASS. He reported that the server team, with hopes that it will be operational very soon as a temporary solution, is currently testing the CWIC connector. A new API is being developed as part of CLASS evolution. CLASS is intended to be an enterprise solution to meet the system requirements of the data centers providing economy of scale, a common set of services.

Ken noted that discussions of CWIC access must start with data centers, which are responsible for preservation and stewardship of NOAA data collections, have expertise on contents and proper use of data collections, and will be developing their own catalog systems with extended metadata support. CWIC will be working with the data centers to determine best way to access NOAA data and information in the future.

### CCMEO Partner Report

Patrick King\* gave the CCMEO partner report. He reported that Radarsat-1 and Radarsat-2 systematically geocorrected scenes were added as CWIC CSW development search targets in 2012 and 2013 respectively, and are now being migrated to full production mode within the CWIC server infrastructure.

An order link issue was encountered: the CSW order link for GetRecordById response was identical for each granule. An order link was needed which facilitates the ordering process by forwarding scene (granule) identification parameters (e.g. image acquisition start/stop times) automatically to MDA. The goal is to present a form to the user pre-filled with scene metadata parameters. MDA has approved this method; the form will query the user for user contact information as well. On form submit, an email pop-up will be presented whereby the email body will be pre-filled with scene parameters and user contact information; email is then sent to MDA.

Pat reported that OpenSearch was recently implemented for CCMEO Radarsat-1 and Radarsat-2 data sets (for Atom and HTML response formats only)

### LSI Portal Demonstration and Report

John Faundeen gave a presentation of the LSI Portal using CWIC. He chose a location and browsed among collections to find appropriate one. He added it to the shopping cart, logged in and ordered. He explained that they are adding specific areas of interest for GEOGLAM, and Andy and Michael are helping with loading the 50 MODIS datasets. The LSI was the first operational client to access data through CWIC.

Yonsook suggested to Brian that he take a look at this portal for his FAO project. This will serve as a model of how to build something for a specific community. She commented that she is impressed that they have been continually adding data since the portal went live a year ago. The CWIC team learned a lot from their efforts and experience. John replied that it was really a team effort.

### Conclusions

Yonsook concluded the session saying that they are actively working with CEOS OpenSearch team. They plan to hold their annual developers meeting early to assist with the OpenSearch implementation, and will provide the support and connection. The team is working on its development plans.

She gave special thanks to all the remote presenters.

# WGISS Interest Groups

## International Directory Network Interest Group

Michael Morahan gave a report for the IDN Interest Group. He announced the publication of the CEOS IDN Newsletter and reported on-time completion of action WGISS-35-4 to *provide Satoko with the number of registered datasets in the IDN (as existed before SIT-28 and before SIT Workshop); by August 19, 2013*.

Action WGISS-35-6, *IDN Interest Group to produce an automated report of DIF information for each agency, and to set up a periodic distribution to the agency contact list; by June 30, 2013*, was completed September 17, 2013; the report will be in the form of an email to the metadata author and the CEOS WGISS agency contact.

Action WGISS-35-7, *IDN Interest Group to investigate a DIF Management Tool; by WGISS-36*, is underway. The IDN is gathering requirements for an online metadata dashboard that will provide metadata status and access to each IDN provider’s contributions. Current requirements are that it be agency based, and include DIF status, insert date, last revision date.

**Action WGISS-36-16:** The IDN Interest Group to implement a DIF Management Tool.

Action WGISS-35-8, *Technology Exploration and IDN Interest Groups to create a Best Practices document for easily leading users to products after data discovery; by WGISS-36*: Michael reported that the document is drafted it and ready for posting. Satoko suggested Google Drive to allow WGISS time to review it, and that he send an email announcement of its location. Afterward it can be uploaded to WGISS and CEOS websites. WGISS has several documents and WGISS/CEOS needs to decide on a good repository.

Michael presented links for three related documents: Tips for DIF Writing (<http://gcmd.nasa.gov/add/difguide/dif_tips.html>), “Write a DIF” Guide (<http://gcmd.nasa.gov/add/difguide/WRITEADIF.pdf>), and IDN DocBuilder User Guide (<http://gcmd.nasa.gov/DocumentBuilder/Help.do?Portal=ceos>).

Action WGISS-35-18, *IDN IG and CWIC Project teams to provide to the WGCapD (for their resources web page) a summary of IDN and CWIC, and the link to the CWIC video* was completed May 28, 2013.

Michael announced that GCMD/IDN 9.9.1 was released August 2013. New features include performance improvements to RESTful APIs, Hyperlinked Data Set Digital Object Identifiers (DOIs), ISO-19115 Formatted Data Set Metadata View, ISO-19115 to DIF Metadata Translator, bulk metadata uploader, and OpenSearch tags. Michael added that performance of the KMS and MWS APIs has been improved by using caching techniques. DOIs populated in the DIF "Data Set Citation" are now hyperlinked. This was resolved using <http://dx.doi.org/>, is searchable via a “fielded” free text search. He listed instances in which a DOI is hyperlinked and resolved, and noted that DOIs without a valid DOI string will not be hyperlinked. The GCMD/IDN DIF display now offers users the option to view data set descriptions in ISO-19115 XML format. Providers may now submit metadata to the IDN in ISO-19115 metadata format, and the tool translates sets of multiple metadata records from ISO format to DIF format. The bulk uploader tool allows upload of multiple metadata records to the GCMD metadata queue, and validates records (links and syntax) and sends an email to the provider with validation results. "Open Search" tags were added to the GCMD, IDN Data, and IDN Services portal, allowing users to add a custom search site from their browser. In Firefox, a user can add "Global Change Master Directory" or "CEOS" using the "Manage Search Engine" feature.

IDN Future development (Release 9.9.2) will include tagging of metadata, DIF specific feedback via MailComments, add related keywords, and possible IDN metadata schema changes. The feature for tagging metadata records with arbitrary "flags" is envisioned to allow external partners to organize collections of metadata. This would allow partners to create collection subsets highly customized to a specialized discipline or interest outside of what is defined in the metadata. A new feature to create relationships between keywords that may not be related in the usual hierarchal (parent-child) manner will be developed. These relationships may be created between keywords belonging to the same or to different 'concept schemes' or hierarchies e.g. between science keywords and platform keywords. The creation of relationships of keywords will be handled through the GCMD/IDN Keyword Management System. New related keywords are added by providing their UUIDs. This feature will be used in the future to strengthen IDN's search and display capabilities and to be able to provide suggestions to users for related content. Proposed IDN metadata schema changes are to add a sub-field to the existing “DIF/Data\_Center” field in order to reference a Data\_Center\_Type for each unique data set. Another proposal is to add a field to the DIF that identifies the processing level of a dataset. This field will give users additional information about the dataset and allow users to search and refine their search by dataset processing level. Yonsook noted that these are to support the VCs and the suggestion is from Ken Casey, and will give credit to all the different entities that have participated in the production of the datasets.

Michael listed the latest keyword updates (v. 8.1), and listed IDN metrics for the IDN site for the period August 2012 – August 2013, with total visits of 48,815, and total page views of 94,565. He displayed graphs of IDN usage by continent, country, and search options. He also showed a graph of IDN portal usage, of user access of the CSW, and of user access of GCMD services.

Michael displayed US GEO/GEOSS metrics of current IDN/GCMD database statistics, and showed how to access the real-time reporting tool. Total ISO-19115 metadata records in CSW server is 23939, and ISO-19115 metadata records tagged as GeossDataCore is 9068.

Yonsook noted that she attends the GCI teleconferences and this maintains regular communication between WGISS and GCI.

Michael mentioned that they are also working on a new IDN design. Andy suggested sending screen-prints of these to WGISS by email.

**Action WGISS-36-13:** IDN Interest Group to distribute draft website enhancement screen prints.

## Technology Exploration Interest Group

Andy Mitchell chaired the Technology Exploration Interest Group session. The session includes cloud computing, big data, and authentication service as special topics.

**Action WGISS-36-10:** Technology Exploration Interest Group to determine possible session topics for WGISS-37 (one topic may be ISO).

**Action WGISS-36-15:** Andy Mitchell to set up an area on the Technology Exploration web page for listing open source code used by agencies, and announce to WGISS-All.

### Cloud Computing

Various agencies presented experiences in cloud computing.

#### JAXA

Satoko Miura presented several hurdles to moving a data processing system to the cloud. The first is the difference between environments, resulting in unexpected behaviors and need for modification, thus consuming additional resources. The second hurdle is product evaluation; products need to be compared with those processed on legacy systems, and accuracy may be severely affected. Thirdly, transferring level 0 data to the cloud in order to generate level 1 products may involve very large quantities of data. The last hurdle involves system replacement on the cloud side. System replacement is one of the biggest resource-consuming issues when considering data processing system operation. Any cloud service provider could not guarantee “there will be no system replacement, OS upgrade, etc.”, considering the security issues. This means resources for system replacement will be needed periodically.

Cloud computing is suitable for prototyping systems or small systems that are not critical operation. For example the CEOS Water Portal uses Amazon EC2, and JAXA’s prototype server for CWIC used Amazon.

Jordi Farres asked if JAXA encountered hurdles with software licensing. Satoko replied that they did, and cloud processing sometimes is much more expensive. Wyn commented that the problem of moving the data into the cloud is real, and that having the software close to the data is important. Andy asked if the requirements for cloud computing were originating from management, and Satoko said yes. Osamu wondered about problems with data policy; level 2 or 3 might be good to go to cloud computing, but the data policy has to be considered. Jordi asked if their service providers are using cloud computing. Satoko replied that they investigated this several years ago to see what the capabilities for transferring data were; at the time the capabilities were insufficient to satisfy the requirements. Wyn noted that some companies are proposing their own cloud facilities. Jordi commented that there is an analogy between cloud computing today and what the internet was 20 years ago; in the midterm there is a lot of competitiveness.

#### NASA

Andy Mitchell gave a presentation of cloud computing from the perspective of NASA’s Earth Science Data and Information Systems (ESDIS). He defined cloud computing, and listed five essential characteristics: on-demand self-service, broad network access, resource pooling, rapid elasticity, and measured service. He also listed the USA government regulations for cloud computing, which is mandated whenever a secure, reliable, cost-effective cloud option exists. In 2012 NASA put together a Cloud Computing Working Group to investigate this topic. The working group identified use cases involving existing cloud computing developments and future scenarios that could be addressed by using cloud computing and discovered possible EOSDIS benefits in the areas of data processing, ingesting, archiving, distributing, discovering, analyzing and visualizing.

Feasibility questions raised include ratio of compute to storage for the application, storage costs, data transfer costs and timing, and vendor lock-in. The working group will be making recommendations to ESDIS next month on possible cloud computing implementations. Andy concluded noting that they do not have anything operational at this time; he offered to send the results of the study to anyone interested. In response to a question from Martin, Andy said that NASA has not developed any guidelines yet. They are interested in a hybrid method combining commercial and in-house services. Richard added that the main issue may be security, and that a commercial cloud may be more secure than a public cloud.

#### Russian Space Systems

Tamara Ganina gave a presentation of GEO-information services from the perspective of the Russian Space Systems. She stated that there is a worldwide tendency by national space agency centers and private companies to provide consumers with remote sensing data products using public special-purpose data banks. Under modern global telecommunication technologies and remote sensing data market development, in Russia the information support to the consumers should be considered with respect to the rising level of satellite data accessibility regardless of data commercial value.

The Federal Space Agency exercises authority in organizing the use (operation) of space facilities aimed at implementing the Federal Space Program, and providing the works on creation, production, and operation (use) of space systems. Tamara listed the missions existing during the decade 2006-15, and presented a variety of diagrams related to data and products.

Regarding public access services, since 2010 the ROSCOSMOS’s GeoPortal provides consumers with internet access to the banks of Russian space data of standard processing level. In 2014 a new service – Bank of Basic Remote Sensing Data Products of Interdepartmental Use is scheduled for implementation. Thus, access to the Russian remote sensing data products of different processing levels will be possible for customers in the immediate future through the Operator’s geoinformation services.

The stringent requirements for operational efficiency of information services, an increase in primary data volume by an order of magnitude, and substantial computational resource capacity of their processing predetermine the necessity of using the cloud computing platform as a versatile environment for bank maintenance to support a dynamic distribution of computational resources when streaming processing peak loads. The basic technological requirement for the Operator’ space data banks is the availability of an integrated technical platform that supports all functions of the banks using the virtualization technologies of data processing and archiving processes. Data bank filling is performed mainly in a mode of stream processing of the acquired primary data. The cloud computing platform efficiency was confirmed in practice by developing the backup functioning technology of ROSCOSMOS’s GeoPortal in cloud environment of JSC Russian Space Systems. Creation of the GeoPortal mirror copy in a backup site provides the guaranteed availability and performance of the public access to the remote service of Earth remote sensing even in the case of more than 1000 simultaneous calls received via the internet. Equally important task in the Operator activity is the use of high-performance tools for integrating geoservices with the departmental and regional information systems that provide monitoring based on data provided by space and ground monitoring services. The integration tools have been developed to enable an automatic user servicing of information systems with EO data products using internet technologies.

Tamara listed the basic functions of the GeoPortal, and listed the bank of basic remote sensing data products for water, forest, agriculture, and fire monitoring. She noted that access via the information portal is possibleusing tools for product searching and ordering from the catalog and tools for order processing and product delivery from the bank. Subscriber (flow) servicing is in accordance with regulations defining the requirements for products and tools for the main governmental consumers (departments and regional authorities) to have access to the products.

Tamara described the areas and experience of international cooperation, and listed as conclusions that:

* To carry out validation of standard and basic products using the Russian space data in concert with the branch information analysis centers including in the form of pilot projects within the framework of departmental target programs
* To provide information integration of branch monitoring systems and a new geoservice of Russian space remote sensing systems Operator – Bank of Basic Products – to arrange a subscriber (regulated) provision of branch systems with basic products free of charge
* To implement on a commercial basis integrated geoinformation projects using the Russian and foreign EO data, ground measurements, and geospatial modeling results to the benefit of solving specialized thematic problems

Andy commented that the GeoPortal is using ISO 19115 and he would like to learn more but it is entirely in Russian. Tamara said that it will be translated to English by the beginning of next year. In response to a question she said that users do need to be authenticated, and there are different levels of authorization. Andy wondered what technology is behind the authorization as WGISS works toward using a common single sign on technology.

#### ESA

Jordi Farres gave a presentation of experiences and lessons learned on cloud computing at ESA’s Earth Observation Ground Segment. By way of introduction he presented a model for enabling convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction [NIST]. He presented three case:

Case 1 involves EO re-processing on Amazon, with the purpose of fast re-processing of large EO products collections for cal/val purposes.

Case 2 involves dissemination and processing on Hetzner, with the purpose to couple large processing capability with fast dissemination for low cost.

Case 3 involves exploitation platform with Helix Nebula with the purpose to pilot a collaborative platform for EO exploitation using multi-sourced cloud provisioning. Future activities for this case include the release platform to Supersites user community, to involve other data providers to co-locate their data on the same clouds and add additional platform components/services, and to enable users to deploy EO value added services directly on the cloud.

Jordi presented lessons learnt in the areas of ICT provisioning, service levels, application areas in EO GS, and users:

ICT Provisioning: As soon as ICT needs can be predicted and planned, IaaS is more expensive than other hosting solutions like rental, dedicated hosting. Flexibility of public IaaS is less appealing when internal resources are pooled, virtualized, and managed as an internal cloud. On the other hand, IaaS services allow to size down internal ICT resources to the “fixed” need and ensure their maximum utilization; e.g. using external provisioning for the “variable” need. The conclusion is that a hybrid ICT provisioning is desirable.

Service Levels: Terms and Conditions in public clouds express surprising low commitment. Cloud opportunities can become risks when applied to critical systems. The conclusion is to develop multi-sourcing and plan contingency scenarios for services hosted in public clouds.

Application Areas in EO GS: Dissemination and on-demand processing are very variable (depending on user demand). Secondary archive and re-processing are limited in time. Temporary resources for integration, testing and demonstration are limited in time and system-sizing needs are unknown. The conclusion is that important EO GS areas can gain from cloud computing.

Users: User expectations on cloud computing are very high. They expect that all data discoverable and accessible online with same performances as consumer service, availability of long time series of coherent data from different providers. Users expect availability of collaboration platforms and tools to exchange experiences and information. Users also expect to access, combine and exploit data from different providers. They expect to be able to perform processing directly on the cloud using virtual servers, and the cloud provides a well-accepted paradigm for pay-per-use. User communities behave like social networks. The conclusion is to be up to the users’ expectations and so as not to lose their trust.

Jordi presented as future prospects the desirability to establish mid-term relation with 2-4 cloud providers similar to current agreements with network providers, and to mandate cloud hosting for specific activities. He also suggested promoting the use of cloud computing solutions among ESA (PDGS) service providers, in benefit for their competiveness, and continuing to launch specific flagship projects based on public clouds.

Martin asked if ESA used the hybrid model – Jordi replied that they have where they deployed the cloud middleware. The data management policy is to minimize costs and maximize performance, but they had varied experience with service levels when using smaller providers. In response to a question from Yonsook, he said that he could not give numbers in terms of cost savings, since there are so many dependencies. Richard commented on the problems with differences and insufficient scope of the providers’ interfaces, which also may not be standard and open. Andy remarked that for the first use case the procurement strategy might not match what they are offering. Jordi replied that they will tend to provide a clearer framework but are still not very transparent. The intent is not developing a new relationship but reusing that which exists with current service providers. Andy commented on having a mechanism to collaborate and exploit the synergies (use case three). Karen noted that NASA has had very similar experiences.

#### CNES

Jérôme gave a presentation on the CNES data center. He stated that cost, volume, and security are the major concerns, and noted relative costs to process, store, and access, with storage as the main cost. Data is growing fast, and there is concern that data security and user privacy cannot be guaranteed in public clouds. The CNES Data Center is an in-house solution to handle the storage and processing needs of future scientific missions. Cost reduction is achieved by sharing the data center capacity between missions from different thematic areas (EO, astronomy, science, etc.) A graph of predicted maximum data volumetry by 2025 was displayed.

Richard mentioned that a major concern is to maintain a separation between the data and the knowledge base (software) to avoid giving away everything.

Jérôme also gave a presentation on WPS on the cloud, which is a joint in-kind contribution from ASTRIUM/CNES to the “Open Mobility” thread of the OC OWS-10 Testbed. He explained that what is required is a very simple client, select region of the cloud, and select raw image to orthorectify within CSW catalogue located on the cloud.

Multiple orthorectified images can re-associated to a raw image.

Click on ‘+’ to process a raw orthorectification. Process parameters are set by the user and sent to an asynchronous WPS orthorectification process located on the cloud.

Orthorectified image quality can checked through ‘Assess Quality’ WPS process located on the cloud. The result is displayed within the map as a WMS quality layer stored on the cloud.

Andy asked if the mashup was in the cloud, and Jérôme said yes. Andy commented that this is another example of not putting everything on the cloud that can be taken back to the agencies.

### Big Data

Various agencies presented experiences in Big Data.

#### NOAA

Martin gave a presentation on exploring big data perspectives at NOAA. He noted that NOAA has more than 200 research and operational observing systems, and more than 400 models and more than 4000 products are generated. Martin referred to Gilberto Camara’s presentation at WGISS-35 with the challenge to think outside the box, and that big data is coming. Sensors are now everywhere and the meaning of data is transforming. There is now crowd sourcing, open sourcing, open data, and open science.

Martin introduced the Big Earth Data Initiative (BEDI) activity, which has the goal to improve discoverability, accessibility and usability of data, with a focus on "high value" datasets and involving NOAA, NASA, USGS, USDA, and other agencies.

NOAA activity presents big challenges, big science questions. These will require new, innovative ways to solve, and will require inter, intra, trans-disciplinary science. Challenges include how to integrate non-traditional users, link data from small scales to large scales, and link models, and observational data. The solution may be with inter-agency collaboration.

Big Data Management requires creative thinking on how to solve the metadata challenge, and rethinking what the role of Data Centers is in this new environment. It also requires the examination of the trade-offs between in-depth efforts to develop comprehensive metadata standards and making data available. Agencies need to investigate how technology can facilitate addressing these challenges, and how to effectively manage the data assets in a cost-effective manner.

Sveinung Loekken remarked that the lack of interagency cooperation is a big problem. Martin replied that this interagency cooperation is just starting in 2014. Sveinung suggested that bilateral talks may be the way to approach it, and Andy added that the people in this room are the ones that need to start pushing for it. Costas said cooperation is an essential element of this activity.

#### CCMEO

Costas Theophilos gave a presentation on technical challenges with managing big data from the perspective of CCMEO. He noted that managing big volume transfer speeds, the petabyte problem, and the variety of data types are issues for WGISS. Possible discussions on which to focus are data cooperation initiatives (mirror archive?), data governance and management, data access, security, policy exchange, data networks, and big data strategy and best practices exchange.

Costas presented a transformation that is occurring among 43 Canadian government departments through April, 2015. This involves a data center consolidation from 300 down to 20, and a concept of a community cloud, a hybrid cloud with vendor provided services and a public cloud. Costas discussed challenges associated with large data volumes including time-series large data sets, and plans to handle these. To control big data, the following policy variables are considered: Maximum allowed cart size and active cart requests per user, FTP delivery commitment and expectations, bulk and email delivery.

A key transformation initiative is the Federal Geospatial Platform where all aspects are being centralized. Costas displayed diagrams of the notional data architecture and the functional view, the target state catalogue, and key requirements of data management. He commented that it will be impossible to have a single catalog, and also that there will be a requirement for common publishing.

Andy asked if there is a definition of what a data center is – Costas replied that the definition is that everything is a data center, and they all have to be consolidated.

#### ESA

Sveinung Loekken gave a presentation of ESA action on EO thematic exploration platforms. He remarked that the data community has to evolve, and the ESA will address one EOP evolution action with the implementation of Thematic Exploitation Platforms (TEP), in support of scientific exploitation of EO data. The legacy model is one in which data and software are distributed to users in a loose user network and transferred and replicated many times. The evolution is one where users access a platform work environment containing the data, tools, and required resources. The Thematic Exploitation Platform is a virtual workspacebringing together a community, relevant data, computing resources, third party tools, workflows, integrated user interface, documentation, collaborative tools, help desk, user services, and social network around a thematic domain.

Sveinung listed requirements for TEPs to reach their cardinal purposes. He also considered the opportunities for scientific and thematic domains, and for the exploitation and harmonized platforms. He listed activities and projects to date, explained a two-step approach, and listed the targets of the project, including global users, industrial and institutional partners, member states, and ESA itself. The project is seeking relevance, funding, openness, well-defined data and infrastructure provisioning strategy, and a compressed timeframe to begin operations (2015-16). He listed a number of challenges, including developing sustainable long-term operations, infrastructure as a commodity, ecosystem transition, data provisioning and open data, open source, open computing. He concluded saying that to maximize the benefits will take coordination, harmonization, and cooperation at all levels – within Europe and beyond (for example through GEO/CEOS).

Yonsook commented that this is the first she has heard of these exploitation platforms. The WGISS focus has been on portals and this looks like community portals an order of magnitude beyond. She wondered if the users would have to be authenticated, restricted. It depends on the level. Platforms can have different levels of service and accessibility. It will be a case by case basis. Sveinung said that his hope is that these platform go beyond the national objectives - to global objectives defined by the community of practice, not by the nations. Karen said there is trend in this direction coming from the thematic areas, for example a model for earthquakes and providing an environment for that community to operate. Sveinung observed that agencies facing issues on infrastructure and interoperability; he proposed writing a white paper covering the knowledge of WGISS and the agencies on this topic (Big Data, Thematic Exploitation Platforms), and to open some sort of platform for collaboration between the agencies.

#### NASA

Andy Mitchell submitted a presentation describing NASA’s efforts to manage the 8 petabytes of satellite data currently archived. He described ECHO – The Earth Observing System (EOS) Clearinghouse (ECHO) system, CMR – Central Metadata Repository, the EOS Mission Support network (EMSn), an external logical network known as the EOS Science Support network (ESSn), the NASA Earth Exchange scientific research collaboration platform, the Earth System Grid Federation (ESGF) (a public climate modeling data archive), and the Big Earth Data Initiative (BEDI).

### Authentication Service

Various agencies presented experiences with Authentication Service.

#### GEOSS

Steven Browdy\* gave a short review of authentication and single sign-on for the AIP. He presented an unofficial tentative plan of the AIP-6 access management federation architecture, adding that they are looking for partners, if any agency is interested. He also presented the current primary use cases:

1. Authenticate via OpenID to access resources at an OpenID site.

2. Authenticate via OpenID to access resources at a SAML-2 site (requires gateway); gateway accepts Google OpenID and Verisign OpenID.

3. Authenticate via SAML-2 to access resources at a SAML-2 site.

4. Authenticate via SAML-2 to access resources at an OpenID site (requires gateway).

5. Identification as "GEOSS User" During Registration.

Steven explained that for the OpenID Gateway use case the gateway verifies the OpenID, and creates SAML-2 credentials to be used and trusted in the federation. The open ID user coming in from outside would not be able to have much access. For the SAML-2 Gateway Use Case the gateway verifies the SAML-2 credentials, and receives a valid OpenID from the SAML-2 identity provider to be used in the federation. This has not been prototyped yet.

The main concerns are that data providers will have a difficult time setting things up properly, even though there are guidelines and there is help available. They are also concerned that data users will not have the seamless experience they should in accessing GEOSS resources.

Andy agreed that they will definitely face challenges; he noted that this was just implemented at NASA and building the software was the easy part – handing it over to the teams was challenging. Jérôme asked if they looked at the OAuth Protocol; Steven replied that they plan to look at it next year.

#### ESA

Andrea Baldi gave a presentation on ESA single sign-on and the OGC authentication standard. She began with the issues with legacy systems user management. These lead to Identity Management (IM) introduced in 2011 and supporting the AAI infrastructure for the creation, maintenance, and utilization of digital identities. It is based on Shibboleth 2, and consists of redundant identity providers and registries, and multiple service provider check points. IM functions are authentication and authorization, credential recovery, administration, secure storage and security enforcement, auditing, and reporting.

IM Federation today is a security token service based on SAML1, and used to federate HMA services via DAIL portal with EO web SSO users’ community. The objective of IM federating functions is to enable federation of different communities of users, allowing cross authentication, to easily share EO data. IM will use OGC web services and web SSO.

Andrea described the Secure Token Service (STS) security model and outlined the importance of federation, and the federation drivers. She also described the ESA EO Mirror Sites and several collaborative scenarios.

Andrea concluded saying that FIM is a challenge, but essential to enable EO organizations to increase data distribution via a simplified user access, and to increase data exchange and collaboration with international partners. The scenario is complex and multi-faced, and needs to cope with different technologies, organizations, and their constraints. However, the technology is mature for building a common space FIM federation, and collaboration among organizations is essential to be able to get concrete results.

Andy noted that a lot of the use cases presented are very applicable. He asked how long it takes to establish a new user account. Andrea replied that they have self-registration where the user provides some information, and receives a URL from which to confirm the registration. They have inheritance of users, so a user may have only one single entry. Yonsook agreed that it is a good model. Andrea expressed hope that this is a start of a good collaboration.

#### CNES

Jérôme made a presentation of single sign on with OAuth and OpenID. OpenID is an open standard for authentication. The model is based on conﬁdence links between service providers and authentication providers to achieve Single Sign On authentication. OAuth is an open standard for authorization. It provides a method for clients to access server resources on behalf of a resource owner.

Jérôme described an experiment of filter access to Kalideos (i.e. SPOT) data through a secured WMS server using OpenID Connect. He described the steps from the original request for authentication redirected to the identity server. An OAuth token is used to get and send the user information, as well as user rights, validation, and opening the session. OpenID Connect is planned to be used in Theia (i.e. French Land Surface Thematic Center).

Andrea asked if the authorization would be on the email address. Jérôme said that a unique and unambiguous parameter is required; each partner needs to decide the parameter that will be used.

### GEOSS Data Quality Guidelines

**Action WGISS-36-14a:** Andy Mitchell to distribute for review the GEOSS Data Quality Guidelines document.

**Action WGISS-36-14b:** All WGISS to return feedback on the GEOSS Data Quality Guidelines document.

## Virtual Constellations Interest Group

John Faundeen invited Ken Casey, representing the Sea Surface Temperature Virtual Constellation, to facilitate a discussion of what WGISS can do to help the VCs. Ken began saying that any progress WGISS can make on single sign-on would have big payoff for them, as well as progress with ISO and IDN. In response to a question, Ken said they would be interested in working with a broader set of best practices for ISO, especially from the perspective of submitting a record to the IDN. He expressed interest in collaborating with WGISS in any way.

# WGISS Plenary Session, Part II

## Follow-up on WGISS Way Forward

Richard Moreno initiated a discussion on WGISS issues and concerns, and way forward. He began with three points:

* International cooperation – agency representation at CEOS Plenary, SIT. In person meetings removes barriers to discussion.
* Give access to agency data. CEOS is space arm of GEO, so participation gives agencies responsibility to give access to data, as well as the means to discover and access.
* Not to reinvent the wheel by learning what other agencies are doing and gaining experience from others. This forum allows sharing of expertise. Information technology is going in a lot of directions and agencies cannot go everywhere, but agencies must capitalize on the innovations in IT.

Karen remarked that one of CEOS’ goals is data democracy by improving access and responding to user needs. It is helpful to clarify what is meant by interoperability goals. CEOS represents the largest repository of EO data, which is currently underutilized, but it would be good to back this up with metrics. EO data is complex and relies on the dynamic and evolving nature of IT. The complexity means that finding and accessing the data is laborious even by experts, and even more so by non-experts. Each CEOS member agency invests a lot of resources to solve these search, access, and utilization problems, and being more efficient in this is important to the agencies.

Yonsook observed that understanding the data is also important, and agreed that it would be very helpful to understand the associated metrics, and to understand the immediate and long term benefits of participating in WGISS. ISRO and RADARSAT are now visible and accessible, using the common standards; international cooperation like this shows immediate benefits, so each agency does not have to have bi-lateral agreements which are not necessary under the CEOS umbrella. These international federated projects are very important. The VCs are engaged in substantive work and providing simplified search and access is important, as they are the science and application drivers and user groups.

Costas noted that at the micro level the concept of software that can be reused immediately is something concrete that participants can take back to their agencies. WGISS also needs to provide strategic direction, and he suggested focusing on this and determining what type of processes (examples are the LTDP guidelines, and the CWIC) WGISS can immediately capitalize on. Andy wondered which immediate benefits the agencies are seeking. The best practice for OpenSearch will provide substantive direction. What kind of deliverable is the best result - a white paper? Should requirements for these be tied into the one-year plan?

Wyn remarked that improved efficiency is something that actually gives back to the agency, since everyone is expected to do more with less resources. The experiences gained at WGISS lead to better decision making. But these are not fixed deliverables; best practice guidelines provide this. There is also value in interaction with GEO, with the UN.

Satoko noted that at the CEOS level WGISS is expected to solve technical issues. An example of this is the implementation of OpenSearch which is resulting from an action from CEOS Plenary. However, at the agency level tangible deliverables are valuable. Not participating in WGISS would be a significant loss to JAXA in terms of direction and decision making. She added that a human network among agencies is important as well.

Ken added that a lot of what occurs in WGISS can support bilateral interactions – by discussing in a multilateral forum – the best practices, guidelines and tools can support those interactions.

Gábor emphasized the impact of GEO, of contributions to a common infrastructure, the dissemination of information, capacity building, and providing services for EO data. What is learned at WGISS in the way of new developments is very important when communicated to other entities. WGISS can trigger new and innovative technical solutions, and short and understandable guideline papers that are useful.

Mirko noted that this type of interaction prevents duplication of effort and solutions, and brings benefit from mutual experiences. The load and cost of the studies, with the respective expertise, can be shared.

Karen suggested that going forward the strategic process that WGISS uses can be articulated. Members represent broad and deep knowledge, can identify user and community needs and user issues. The cooperation in the international forum will result in strategies and solutions. Wyn added the need to identify the problems faced by the agencies and answer why WGISS is the solution, to develop a technical strategy, to identify the relevance of new technology, to respond to user requirements in a coordinated way, to develop efficient outreach.

Richard agreed to sum up this discussion.

**Action WGISS-36-11:** Richard Moreno to distribute to WGISS-All a summary of WGISS Way Forward session.

## GEOSS Common Infrastructure (GCI)

Osamu Ochiai, GEO Secretariat, gave a presentation of the GEOSS Common Infrastructure. He described the fundamentals of the GCI and noted that as the main enabler of the System of Systems principles and capabilities, the GCI is able to interface with external systems to facilitate end users in discovering and accessing the services and resources. He showed diagrams of the GCI architecture and of the GCI Brokering Framework. To date achievements of the GCI are about 20 brokerable capacities/systems/communities, more than 15 million potentially discoverable resources of which more than 1.2 million are GEOSS DataCORE. The GCI receives about 400,000 requests per year.

For task IN-03 GCI: *Facilitate and support the sustained operation, maintenance and enhancement of a user-friendly GCI, allowing users to search and access GEOSS resources (e.g. datasets and services),* Osamu described, listed components, and key outputs for 2013.

For the Sprint to Summit, Osamu listed the activities and milestones; these activities are of key interest to WGISS. He noted that the Implementation Boards recognize the need to pursue a set of enhancements to GEOSS and the GEOSS Common Infrastructure (GCI) in order to demonstrate operational improvements in time for the GEO Summit in January 2014. A set of actions have been presented and discussed during the GEO Work Plan Symposium, targeting particular GCI functionalities and user interfaces, linkages with existing Community Portals, and a more robust dialogue with the Communities of Practice and application/user communities.

Osamu described a working meeting for the vision and architecture of GEOSS Information System. This working meeting will consider the future of the GEOSS Information System with particular emphasis on new Earth Observation sources, processing and decision support, and GCI increased discovery and visualization of EO data in particular for GEOSS Data CORE datasets. Building on the GCI, this working meeting will give the opportunity to consider ways to increase access and use of EO data including recommendations from the recent “GEOSS Future Products” and “Big Data from Space” Workshops. GEO members and participating organizations are developing leading edge approaches to delivering EO data online for internet-savvy users, e.g., Model Web. Other companies are developing observations systems, e.g., Sensor Webs, including use of Internet of Things (IoT) for "opportunistic sensing". This working meeting will envision ways these services – while remaining autonomous – can benefit the broad and diverse GEOSS communities. The working meeting will discuss new ideas and concepts for possible use in the definition of future GEOSS Information System with development beginning in 2014 to inform the Post-2015 GEOSS strategy. The working meeting aims to better understand ("the key questions"):

How GEO/GEOSS should evolve better to serve the diversity of “real” users

Changes in the “digital landscape” relevant to GEO/GEOSS

What processes should be put in place to ensure:

Maintenance and evolution of Core GEOSS Components

Clustering and interfacing with existing or new GEOSS Resources

Engagement of user communities and new initiatives

Evaluation and inclusion of emerging technologies

Post GEO 2015 recommendations include continuation of GEO and GEOSS implementation through 2025, following strategic objectives, meeting societal challenges, following the new implementation plan for GEOSS 2015-25, following the GEO Core Functions, maintaining general governance structure while exploring options for modifications, engaging with developing countries, private and not-for-profit sectors, and maintaining resourcing mechanisms.

Martin noted the upcoming gathering of people from industry and agencies for a vision of the future and wondered how Osamu is planning to absorb the inputs from the meeting for the post-2015 perspective. Osamu replied that the meeting will have a technical perspective, and it is a challenge they will have to address. Karen said she was in the Future Products Workshop in March and saw the need for clarification of the different user roles within GEOSS. Satoko commented that WGISS is continuously trying to provide data discovery and access and WGISS is on standby for future cooperation. Barbara Ryan said that they are hoping ministers will realize there is still much more to do and task GEO to use 2014 for the next implementation plan, and get the questions addressed. She does not expect wholesale changes, but substantive changes.

Satoko confirmed as lead of the CEOS Water Portal that they will try to connect to the GCI. She requested clearly defined documents how to connect from an external portal to the GCI.

## Chair Summary

Satoko reported highlights of the WGISS-36 meeting.

* Participation to the LSSG

WGISS chair to contact Lubia/INPE and Nitant/ISRO if they can participate to the LSSG or serve as the liaison. INPE and ISRO are the co-chairs of LSI VC.

WGISS chair to contact the USGS new representative (when identified) if he or she can participate to the LSSG.

WGISS will review the LSSG document when it is ready.

* 2015 Deliverables; based on discussion, the following will be reported under “ground segment/ info systems”:

Support for data access (including VC and GCI): Using CEOS OpenSearch protocol, CWIC and FedEO will become accessible from external client (incl. GCI). IDN will be used as dataset registration system for CEOS agencies. Demonstration/Showcase based on the VC portal data access initiative (led by CNES).

Portal Systems: CEOS Water Portal

* Plenary Reports; based on discussion, the following will be reported at the CEOS Plenary meeting (November 5-6, 2013)

CEOS OpenSearch Project Progress (Mandatory, action of the SIT-28).

**Action WGISS-36-8:** CEOS OpenSearch Project team to send to Satoko Miura project updates (achievements, near term plan) for the CEOS Plenary report.

Numerical information (discoverable/accessible datasets, etc.): IDN, CWIC and FedEO.

2013 achievements and 2014 plans (Interaction with Disaster Study Group, WGCapD, Climate, and WGCV. Will work with SEO closely in the areas of historical data search to support SDCG for GFOI and GEOGLAM).

* Actions

Inputs to the CEOS Workplan, due September 27. Required input is the updated 2014 plan. The CEO requested a one-page summary of expected WGISS activities and accomplishments for the next year (due September 30). If there is any change in 2014 activity plan (due August 19), please provide the inputs by September 27; if no inputs are received, the August19 version will be used.

 Inputs towards the Plenary.

Proposals on available metrics (numeric information) => IDN and FedEO, due September 30.

Metrics (numeric information) => IDN, FedEO and CWIC project, due October 15.

CEOS OpenSearch Project updates (achievements, near-term plan) => OpenSearch project, due October 15.

Any special or urgent issues to be reported at the Plenary => due October 15.

**Action WGISS-36-9:** WGISS to send to Satoko Miura any special or urgent issues to be reported at the CEOS Plenary.

* Future

Beginning November 2013, new WGISS leadership:

 Chair: Richard Moreno/CNES

 Vice chair: Andrew Mitchell/NASA

Satoko thanked WGISS for the opportunity to serve as the chair of an international group, for helping her improve her English skills, and for the kind and warm support during and between the meetings.

Andy presented her with gifts, thanked her and added that Satoko has brought WGISS to a really good place.

## **WGISS-36 Actions**

Michelle Piepgrass reported that all actions from WGISS-35 are closed, and listed the actions resulting for WGISS-36. Consensus was achieved on the following actions:

|  |  |  |  |
| --- | --- | --- | --- |
| Action Number | Action Description | Actionee | Due Date |
| WGISS-36-1 | Satoko Miura to ask Nitant Dube (ISRO), Lubia Vinhas (INPE), and USGS if they can represent WGISS at LSSG, or act as a liaison.  | Satoko Miura | 30-Sep-2013 |
| WGISS-36-2 | WGISS to review the LSSG document after it is released. |   | 2 weeks after release of document |
| WGISS-36-3a | IDN and FedEO teams to determine good search and access metrics from the available numeric information to report to CEOS. | IDN and FedEO teams | 30-Sep-2013 |
| WGISS-36-3b | Yonsook Enloe (CWIC), Mirko Albani (FedEO), and Michael Morahan (IDN) to provide these metrics for the CEOS Plenary. | Yonsook Enloe, Mirko Albani, and Michael Morahan | 15-Oct-2013 |
| WGISS-36-4 | Mirko Albani to indicate instrument/mission combinations that are available through FedEO on the Data Policy Portal. | Mirko Albani | 1-Nov-2013 |
| WGISS-36-5 | Yonsook Enloe to set up an email chain with the HMA team to resolve the first comment of the CEOS response to the OGC OpenSearch document; discuss these and develop recommendations.  | Yonsook Enloe | 4-Oct-2013 |
| WGISS-36-6 | Yoshiyuki Kudo to investigate/determine the CEOS Best Practice for specific conformance level of the OASIS CQL Specification. | Yoshiyuki Kudo | 2-Oct-2013 |
| WGISS-36-7 | Technology Exploration Interest Group to determine ways to advertise data access points of CEOS agencies. | Technology Exploration Interest Group | 31-Dec-2013 |
| WGISS-36-8 | CEOS OpenSearch Project team to send to Satoko Miura project updates (achievements, near term plan) for the CEOS Plenary report. | OpenSearch Project Team | 15-Oct-2013 |
| WGISS-36-9 | WGISS to send to Satoko Miura any special or urgent issues to be reported at the CEOS Plenary. | All-WGISS | 16-Oct-2013 |
| WGISS-36-10 | Technology Exploration Interest Group to determine possible session topics for WGISS-37 (one topic may be ISO). | Technology Exploration Interest Group  | 31-Mar-2014 |
| WGISS-36-11 | Richard Moreno to distribute to WGISS-All a summary of WGISS Way Forward session. | Richard Moreno | 30-Sep-2013 |
| WGISS-36-12 | Karen Moe to produce final report of the GA.4.Disasters Project. | Karen Moe | 31-Dec-2013 |
| WGISS-36-13 | IDN Interest Group to distribute draft website enhancement screen prints. | Michael Morahan | 30-Sep-2013 |
| WGISS-36-14a | Andy Mitchell to distribute for review the GEOSS Data Quality Guidelines document. | Andy Mitchell | 30-Sep-2013 |
| WGISS-36-14b | All WGISS to return feedback on the GEOSS Data Quality Guidelines document. | All WGISS | WGISS-37 |
| WGISS-36-15 | Andy Mitchell to set up an area on the Technology Exploration web page for listing open source code used by agencies, and announce to WGISS-All. | Andy Mitchell | 30-Sep-2013 |
| WGISS-36-16 | The IDN Interest Group to implement a DIF Management Tool. | IDN Interest Group | 31-Dec-2013 |

## Adjourn

Satoko acknowledged this as a very productive meeting, and WGISS looks forward to the next one in North America. She noted that in-person participation is best, but remote participation is always welcome. Satoko thanked ESA for their hospitality, and added how happy WGISS is to meet and work with the ESA participants, with stimulating discussions, and excellent presentations.

# Glossary of Acronyms

AC Atmospheric Composition

API Application Programming Interface

CCSDS Consultative Committee on Space Data Systems

CEO CEOS Executive Officer

CEOP Coordinated Energy and Water Cycle Observation project

CEOS Committee on Earth Observation Satellites

Charter International Charter on Space and Major Disaster

CODATA Committee on Data

CoP Community of Practice

CSW Catalogue Service for the Web

CWIC CEOS WGISS Integrated Catalogue

DEM Digital Elevation Model

DIF Directory Interchange Format

ECV Essential Climate Variable

EO Earth Observation

ES Earth Science

GCI GEOSS Common Infrastructure

GENESI Ground European Network for Earth Science Interoperations

GEO Group on Earth Observations

GEO-GLAMGlobal Agricultural Monitoring

GEOSS Global Earth Observation System of Systems

GIS Geospatial Information System

GMU George Mason University

GPM Global Precipitation Mission

GSDI Global Spatial Data Infrastructure

GUI Graphical User Interface

HMA Heterogeneous Missions Accessibility

ICSU International Council of Scientific Unions

IDN International Directory Network

IG Interest Group

ISO International Standards Organisation

ISPRS International Society for Photogrammetry and Remote Sensing

IT Information Technology

LSI Land Surface Imaging

NRT Near real time

OGC Open Geospatial Consortium

PoC Point of Contact

QI Quality Indicator

SEO Systems Engineering Office

SBA Societal Benefit Area

SDCG Space Data Coordination Group

SG Subgroup

SIT Strategic Implementation Team

SST Sea Surface Temperature

TMSG Terrain Mapping Subgroup

ToR Terms of Reference

VC Virtual Constellation

WADC WGISS Architecture Data Contributions

WCS Web Coverage Service

WG Working Group

WGCV Working Group on Calibration and Validation

WGCapD Working Group on Capacity Building & Data Democracy