

# CEOS WGISS 31 Meeting Report

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Wyn Cudlip  
21<sup>st</sup> June 2011

## Executive Summary

CEOS WGISS held its 31st meeting from the 13<sup>th</sup> to 17<sup>th</sup> June, at the USGS EROS Data Centre in Sioux Falls, South Dakota. All the Interest Groups and Projects working within WGISS and its two Subgroups reported at the meeting; and there were Agency reports from INPE, NASA, NOAA, JAXA, and CCRS. There was also a co-located 2-day Workshop on the CEOS WGISS Integrated Catalogue (CWIC), with the first day being held jointly with WGISS.

WGISS continues to support GEO both through direct contributions to GEO Tasks and through indirect contributions to CEOS activities that support GEO, such as the development of the CEOS Virtual Constellations. GEO is in the process of transferring to its new 2012 to 2015 work plan and is re-structuring its operations, placing an emphasis on achieving its 2015 strategic targets.

Following the retirement of Ken McDonald (NOAA), who was the WGISS representative to the GEO Architecture and Data Committee (ADC), WGISS recognises that it needs to strengthen its involvement in the ADC. WGISS can make an useful contribution because the currently proposed GEOSS architecture does not fully take into account some of the difficulties encountered when trying to catalogue and access the huge volumes of satellite EO data that are now available. A small team has been created to ensure WGISS can interact with the ADC in a meaningful way. The agencies represented in the Team are CSIR, NASA, JAXA and UKSA (Wyn Cudlip).

WGISS also has involvement in some of the GEO Projects such as Forest Carbon Tracking (FCT) and the Joint Experiment for Crop and Agriculture Monitoring (JECAM); and is investigating how to contribute to the proposed GEO Water Cycle Integrator Project.

WGISS is also working with WGCV on the three QA4EO Showcase Projects, covering:

- Forest Carbon Tracking
- Atmospheric Composition (Ozone)
- Global Elevation

These data quality related activities are intended to show the benefits of having a well-structured data quality assessment process that is standard through EO and related communities. Showcase demonstrations are being planned for the GEO and CEOS Plenaries towards the end of 2012. UK delegates to WGCV and WGISS (Peter Muller and Wyn Cudlip respectively) are designated as the leads for the Global Elevation Showcase Study, but current progress is very slow due to lack of funding.

WGISS continues to respond to specific actions from CEOS SIT. Both WGISS actions from the last SIT meeting in May concern the International Directory Network (IDN), which provides a registration and search capability for over 25,000 datasets and services related to Earth observation. In summary, the Actions are to ensure:

- The IDN is accessible through the GEO Common Infrastructure (GCI),
- CEOS Agencies register their product metadata in the IDN.

WGISS continues to support the development of the CEOS Virtual Constellations, and has particular involvement in the Land Surfacing Imaging VC and the Atmospheric Composition VC. It was noted that a new (7th) Virtual Constellation is being proposed within CEOS concerning Sea Surface Temperature (SST). This is likely to be of particular interest to the UK.

Also of particular interest to the UK are developments within the Disaster Management Interest Group. NASA have received funding to carry out a study on the GEOSS Architecture for Satellite Support for Disaster Management of Risk. This will evaluate the relationship between the Disaster Charter and related GEO and CEOS initiatives. The Study should be of particular interest to the UK as the UKSA currently holds the Chair of the Disaster Charter, and Wyn Cudlip has been invited to contribute to the Study.

WGISS is therefore planning a major revision of its 5-year Plan prior to the next CEOS Plenary in November. WGISS also intends to contribute to the CEOS Self Study project, which is aiming to review the benefits of CEOS since its creation in 1984.

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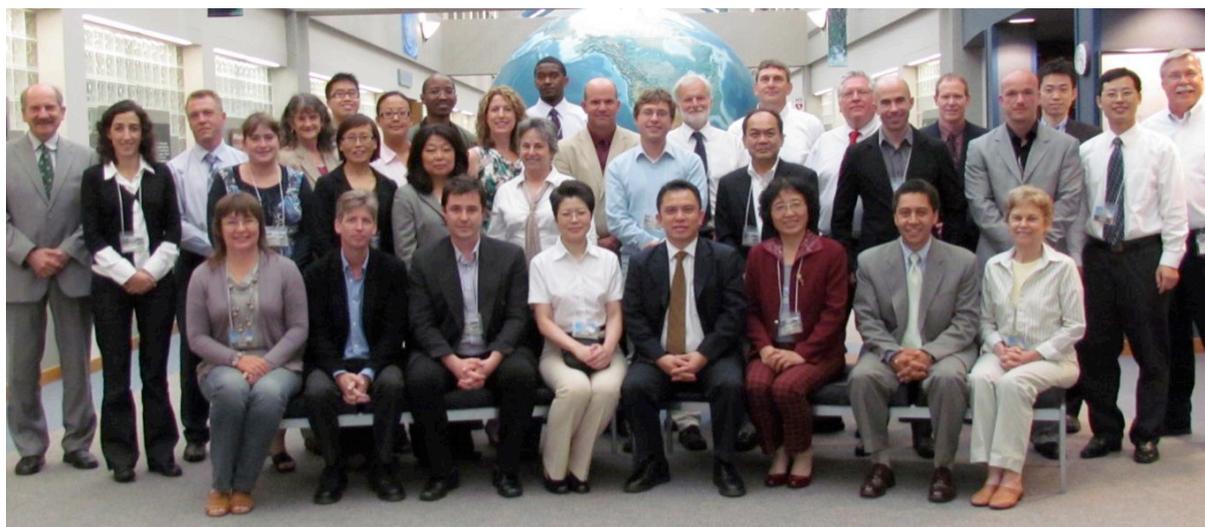
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## Contents

1	Introduction .....	4
2	WGISS Support for GEO .....	5
3	Data Quality .....	6
4	WGISS Interest Groups and Projects .....	6
5	UKSA support for WGISS .....	10
6	Conclusions.....	10

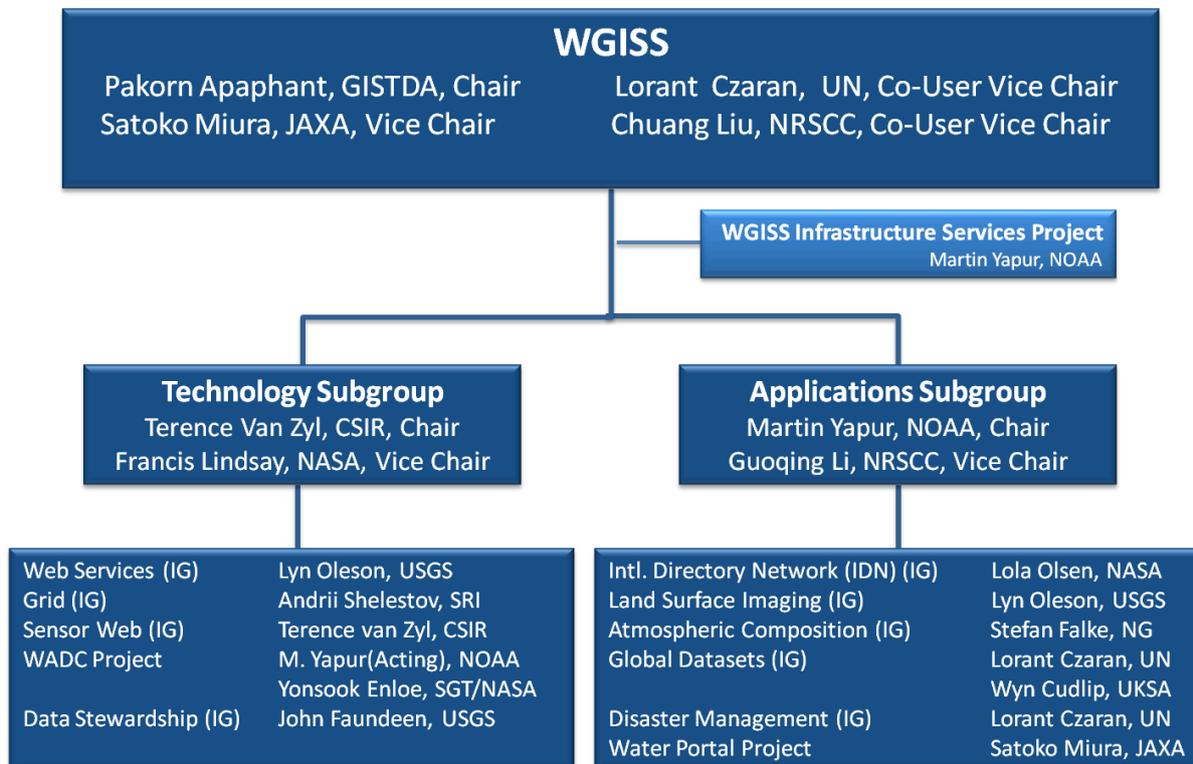


*Delegates at the WGISS 31 meeting in Sioux Falls, June 2011*

## 1 Introduction

The CEOS Working Group on Information Systems and Services (WGISS), together with its two Subgroups (Technology and Applications), held its 31st meeting from the 13<sup>th</sup> to 17<sup>th</sup> June, at the USGS EROS Data Centre in Sioux Falls, South Dakota. WGISS continues to focus its activities on support to GEO both through direct contributions to GEO Tasks and through indirect contributions to CEOS activities that support GEO, such as the development of the CEOS Virtual Constellations.

The following diagram shows the structure of WGISS prior to the meeting.



As of April 2011

This was the third meeting with Pakorn Apaphant (GISTDA<sup>1</sup>) as Chair. The next WGISS meeting (to be held in Budapest in September) will be his last as Chair. The Vice-Chair, Satoka Miura (JAXA<sup>2</sup>) will then become Chair and the CEOS members are requested to consider nominations for the position of WGISS vice-chair; taking up this role in November 2011, and becoming chair of WGISS in November 2013 for a further period of two years.

There were only minor changes to the structure discussed, mainly due to the forthcoming retirement of Lyn Oleson (USGS<sup>3</sup>). It was agreed that Andrew Mitchell (NASA<sup>4</sup>) would become the new lead for the Web Services Interest Group.

There was discussion of perhaps merging some of the Interest Groups as their activities were overlapping (e.g. Web Services, Sensor Web and GRID) but the topic was deferred for further discussion at the next WGISS meeting.

It was also agreed to create an interim Disaster Management Project in place of the Disaster Management Interest Group (more on this below).

<sup>1</sup> GISTDA - Geo-Informatics and Space Technology Development Agency, Thailand.

<sup>2</sup> JAXA – Japan Aerospace Exploration Agency

<sup>3</sup> USGS – United States Geological Survey

<sup>4</sup> NASA – National Aeronautics and Space Administration

## 2 WGISS Support for GEO

The main focus of recent WGISS activities has been support of a number of GEO Tasks defined in the GEO Work Plan for 2009 – 2011<sup>5</sup>. These include:

**Geo Task DA-09-01b:** Data Metadata and Products Harmonisation

**Geo Task AR-09-02a: Virtual Constellations** (particularly Land Surface Imaging and Atmospheric Composition)

**Geo Task DA-09-03d** on Global DEMs (led by Prof. Muller, UCL)

The main discussion at this WGISS meeting concerned the new GEO 2012-2015 Work Plan, which is currently under review. GEO activities are to be divided under three main headings with a number of sub topics. The proposed draft 3-part structure is as follows:

### Infrastructure (Architecture and Data Management)

- IN-01 GEOSS Common Infrastructure
- IN-02 Earth Observing Systems
- IN-03 Earth Data Sets
- IN-04 GEOSS Communication Networks
- IN-05 GEOSS Design & Interoperability

### Institutions and Development (Capacity Building, Science & Technology etc.)

- ID-01 Data Sharing
- ID-02 Catalyzing Resources for GEOSS
- ID-03 Institutions & Individual Capacity
- ID-04 Building Communities & Awareness/Building a User-driven GEOSS
- ID-05 Ensuring GEOSS Sustainability
- ID-06 Gap Analysis

### Information Services (covering the Societal Benefit Areas, SBAs)

- DS-01 Disaster Risk Reduction and Early Warning
- DS-02 High-Impact Weather Forecasting
- DS-03 Climate Information
- DS-04 Ocean Monitoring, Forecasting & Resources
- DS-05 Integrated Water-Cycle Information
- DS-06 Disease Early Warning
- DS-07 Energy and Geo-Resources Management
- DS-08 Human Impact Monitoring and Forecasting
- DS-09 Global Agricultural Monitoring & Early Warning
- DS-10 Global Land Cover
- DS-11 Global Forest Observation
- DS-12 Global Carbon Observation and Analysis
- DS-13 Global Ecosystem Monitoring
- DS-14 Global Biodiversity Observation (GEO BON)
- DS-15 Tracking Pollutants (Mercury, POPs)

WGISS has particular strengths relating to the Infrastructure topics and can also contribute EO information services into the various Societal Benefit Areas.

Following the retirement of Ken McDonald (NOAA), who was the WGISS representative to the GEO Architecture and Data Committee (ADC), WGISS recognises that it needs to strengthen its involvement in the ADC. WGISS can make a useful contribution because the currently proposed GEOSS architecture does not fully take into account some of the difficulties encountered when trying

<sup>5</sup> GEO Work Plan: [http://earthobservations.org/geoss\\_imp.shtml](http://earthobservations.org/geoss_imp.shtml)

to catalogue and access the huge volumes of satellite EO data that are now available. A small team has been created to ensure WGISS can interact with the ADC in a meaningful way. The agencies represented in the Team are CSIR<sup>6</sup>, NASA, JAXA and UKSA (Wyn Cudlip).

WGISS also has involvement in some of the GEO Projects such as Forest Carbon Tracking (FCT) and the Joint Experiment for Crop and Agriculture Monitoring (JECAM); and is investigating how to contribute to the proposed GEO Water Cycle Integrator Project.

This provides an opportunity for WGISS to review its operations and contributions to GEO. WGISS is therefore planning a major revision of its 5-year Plan prior to the next CEOS Plenary in November. The UK was the author of the original 5-year Plan and so UKSA (Wyn Cudlip) was asked to assist in the revision.

WGISS also intends to contribute to the CEOS Self Study project, which is aiming to review the benefits of CEOS since its creation in 1984.

### 3 Data Quality

The joint WGISS WGCV<sup>7</sup> meeting, held in Montreal in September 2010, agreed to further co-operation in support of the exploitation of the QA4EO<sup>8</sup> framework and guidelines for documenting data quality. QA4EO has been developed by WGCV in response to a request from a previous **GEO Task DA-06-02\_2** "Data QA Framework and Guidelines". In order to further promote QA4EO, it was agreed that 3 QA4EO Showcase activities should be developed over the coming year. These are to cover:

- Forest Carbon Tracking
- Atmospheric Composition (Ozone)
- Digital Elevation Models

These activities are being led by WGCV with support from WGISS.

Due to its international reputation in quality assessment and validation of DEMs (partly as a result of previous BNSC support for Prof. Muller), the UK is expected to take a leading role in the DEM Showcase. Also, due to its leading role in the development of QA4EO, the UK is also expected to make a contribution to the other showcases, mainly in terms of providing assistance on the interpretation and use of QA4EO.

Showcase demonstrations are being planned for the GEO and CEOS Plenaries towards the end of 2012. UK delegates to WGCV and WGISS (Peter Muller and Wyn Cudlip respectively) are designated as the leads for the Global Elevation Showcase, but current progress is very slow due to lack of funding.

### 4 WGISS Interest Groups and Projects

Apart from the WISP Project (see below), WGISS technical activities are structured under two Subgroups (Technology and Applications), and are carried out in Interest Groups or Projects depending on whether the activity is regarded as long or short term respectively.

**WISP: WGISS Infrastructure Project** – Martin Yapur (NOAA)

WISP manages the WGISS website and ensures the presentations at meetings are made easily available.

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<sup>6</sup> CSIR: Council for Scientific and Industrial Research, South Africa

<sup>7</sup> WGCV: Working Group on Calibration and Validation

<sup>8</sup> QA4EO – Quality Assurance for Earth Observation <http://www.qa4eo.org/>

## Technology Subgroup

### Web Services Interest Group – Lyn Olsen (USGS)

The Web Services IG provides a forum for exchange of technical information and lessons-learned experience about Web services and other WWW / Internet related software technologies. In order to facilitate construction of interoperable service infrastructures, the Interest Group closely observes and interacts with OGC<sup>9</sup> and ISO<sup>10</sup> standardization activities and OGC testbeds<sup>11</sup> (involving WCS, CSW, and WMS web services) and makes the results available to WGISS and Projects.

Recent activities have been focused on the WADC Project and the implementation of the CEOS WGISS Integrated Catalogue (CWIC) (see below).

The current Lead of the Web Services IG, Lyn Oleson, is due to retire soon and so it was agreed that this role would be taken over by Andrew Mitchell (NASA).

### GRID Interest Group – Andrii Shelestov (SRI)

The GRID IG has been experimenting with the use of GRID technologies in support of EO applications – particularly disaster management and flood monitoring using SAR and optical imagery. Wide Area Grid (WAG) investigations have included collaboration between the Ukrainian Space Research Institute (SRI) and the Center for EO and Digital Earth (CEODE) of the Chinese Academy of Science.

It is now recognised that GRID Computing is not being as widely adopted as originally expected and there is now much discussion on Cloud Computing. It was therefore agreed to organise a special session on Cloud Computing at the next WGISS-32 meeting.

### Sensor Web Interest Group – Terence van Zyl (Meraka Institute, CSIR)

The Sensor Web IG has been investigating and reporting on Sensor Web issues for several years. It maintains a close interaction with the GEO Sensor Web activity (Task AR-09-02c) and with the Sensor Web developments taking place in the OGC. It also intends to co-ordinate with GEO, and the Sensor Web Alliance<sup>12</sup>, on the hosting of a GEO/WGISS Sensor Web Workshop in the Washington area in 2012.

### WGISS Architecture and Data Contributions (WADC) Project – Martin Yapur (acting) (NOAA)

The purpose of the WADC Project is to facilitate the development, availability, harmonization, and access of data, metadata, and products commonly required across diverse societal benefit areas, and to provide inputs to improve the functioning of GEOSS through the appropriate GEO tasks. It recently produced a “Seamless Discovery and Access” discussion document; and an outline of a “Portal Paper” discussion document, which it has since passed on to the CEOS Systems Engineering Office (SEO) who have been tasked with writing a “Portal Paper” by the end of the year. These papers are available through the WADC Project Section of the WGISS website<sup>13</sup>

The WADC Project are also working on the creation of the CEOS WGISS Integrated Catalog (CWIC). This is intended to provide a standards-based access protocol for data product inventories for CEOS Agencies. Much of this work duplicates work already carried out by ESA in the development of their HMA<sup>14</sup> catalogue and data access system. Unfortunately, ESA has not had a strong presence at CEOS WGISS meetings over the last few years and is missing the opportunity to promote HMA within

<sup>9</sup> OGC – Open Geospatial Consortium: <http://www.opengeospatial.org/>

<sup>10</sup> ISO – International Standards Organisation: <http://www.iso.org/iso/home.html>

<sup>11</sup> OGC Web Services Demonstrations: <http://www.opengeospatial.org/resource/demos>

<sup>12</sup> Sensor Web Alliance: <http://www.sensorweb-alliance.org/>

<sup>13</sup> WGISS website: <http://www.ceos.org/wgiss/>

<sup>14</sup> HMA – Heterogeneous Missions Accessibility: <http://earth.esa.int/hma/>

the CEOS community. Recognizing the need to co-ordinate catalogue access to the NASA, USGS and NOAA, these three agencies have begun the development of the CWIC system and are encouraging other agencies to join and to promote the system to GEO.

Further discussion on co-operation between the USA and Europe on this matter is required to encourage future co-ordination and to prevent a proliferation of catalogue/data access systems.

### **Data Stewardship Interest Group - John Faundeen (USGS<sup>15</sup>)**

The data Stewardship IG aims to provide a forum for the discussion of data management issues including the long-term preservation of data. Prior to the meeting John Faundeen presented three information documents on:

- DSIG Data Long-term Strategies.docx
- DSIG Data Preservation Techniques.docx
- Data Lifecycle Models and Concepts v4.docx

## **Applications Subgroup**

### **IDN: International Directory Network**

NASA's Global Change Master Directory (GCMD) continues to provide the basis for the CEOS International Directory Network (IDN). This provides directory-level information on over 22,000 datasets and over 3000 Services related to Earth Observation. The IDN is continuing to improve its integration with GEO. To this end, it has developed support for the OGC catalogue standard CSW 2.0.2, which will allow the IDN to be a part of a distributed search capability.

Wyn Cudlip gave a presentation on the GCMD/IDN response to the recent GCMD User Working Group (UWG) meeting. The UWG meets every 2 to 3 years and reviews the progress of the GCMD and makes recommendations for future developments. Wyn Cudlip is a member of the UWG and represents the interests of CEOS WGISS.

The GCMD/IDN continues to develop its data holding by working closely with data providers to assist them in the creation of metadata (using for example the DocBuilder Tool). It also helps create tailored Data Portals for specific communities, such as the Antarctic Master Directory (AMD) Portal or the Integrated Marine Biogeochemistry and Ecosystem Research Portal. A full list of IDN Portals can be found via the IDN website<sup>16</sup>.

Both WGISS actions from the last CEOS SIT meeting in May concern the IDN. These were to ensure:

- The IDN is accessible through the GEO Common Infrastructure (GCI),
- CEOS Agencies register their product metadata in the IDN.

### **Land Surface Imaging Interest Group – Lyn Oleson (USGS)**

The purpose of the Land Surface Imaging (LSI) Interest Group is to support and assist the LSI Constellation and the Constellation Study Team wherever possible as it relates to information systems and services technologies and developments. The LSI Constellation activity supports the GEO Forest Carbon Tracking Project. The LSI IG helped with the creation of the current LSI Portal<sup>17</sup>.

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<sup>15</sup> USGS – United States Geological Survey

<sup>16</sup> IDN Portals:

[http://www.ceos.org/index.php?option=com\\_content&view=category&layout=blog&id=148&Itemid=213](http://www.ceos.org/index.php?option=com_content&view=category&layout=blog&id=148&Itemid=213)

<sup>17</sup> LSI Constellation Portal: <http://wgiss.ceos.org/lisip/>

### **Atmospheric Composition Interest Group – Stefan Faulke (NG)**

The Atmospheric Composition IG provides a forum for atmospheric composition activities across WGISS in support of the CEOS Atmospheric Composition Constellation (ACC) and other atmospheric composition related efforts.

The main current activity is support for the development of the *Atmospheric Composition Portal*<sup>18</sup> (GEO Task AR-09-02b). This Portal is a good example of the incorporation of European GMES activities into a global CEOS/GEO initiative.

### **Global Datasets Interest Group – Lorant Czarán (UN) & Wyn Cudlip (UKSA)**

The Global Datasets IG aims to encourage the development of EO Global Datasets; and support the exploitation of such datasets.

Its main current activity is support of the development of the DEM Quality Information System (DEMqis) proposed by Prof. Peter Muller of University College London. In the first instance, this aims to make validation, and other data-quality information, available relating to the recently released 30m ASTER Global DEM<sup>19</sup>. Other Agencies have agreed to provide validation data once the DEMqis is established.

### **Disaster Management Interest Group – Lorant Czarán (UN)**

The Disaster Management IG has been searching to find its niche in the complex web of global EO disaster management initiatives. At this meeting, NASA announced that it now has funding to carry out a Study on the “GEOSS Architecture for Satellite Support for Disaster Management of Risk”. This will evaluate the relationship between the Disaster Charter and related GEO and CEOS initiatives. The Study should be of particular interest to the UK as the UKSA currently holds the Chair of the Disaster Charter, and Wyn Cudlip has been invited to contribute to the Study.

### **Water Portal Project – Satoka Miura (JAXA)**

Following the successful conclusion of the previous WGISS CEOP activity (Co-ordinated Extended Observing Period for the water cycle), JAXA has proposed to continue the activity with a new initiative to continue to improve the integration of in-situ data with satellite observations. This is to be called the CEOS Water Portal Project. The 35 reference sites established for the old CEOP will be extended to 52 around the world. The associated Water Portal<sup>20</sup> provides access to a whole variety of hydrological data and water relevant data scattered over the world. It retrieves data from distributed data centers on-the-fly (using OPeNDAP etc.) and lets users download and view rendered images or graphs. The Portal is not just a system for data distribution, but is aimed to become a system that enables data integration.

JAXA is seeking data provider partners, and plans to link the Project to the GEO Water Cycle Integrator Project.

### **Other WGISS Interests – the CEOS Virtual Constellations**

In support of GEO objectives and as a space component of GEOSS, CEOS has developed the concept of virtual, space-based Constellations. A CEOS Virtual Constellation is a set of space and ground segment capabilities operating together in a coordinated manner, in effect a virtual system that overlaps in coverage in order to meet a combined and common set of Earth Observation requirements. The individual satellites and ground segments can belong to a single or to multiple owners. There are currently 6 defined constellations<sup>21</sup>:

<sup>18</sup> Atmospheric Composition Portal: <http://wdc.dlr.de/acp/about.php>

<sup>19</sup> ASTER GDEM: <http://www.gdem.aster.ersdac.or.jp/>

<sup>20</sup> CEOS Water Portal: <http://waterportal.restec.or.jp/>

<sup>21</sup> CEOS Virtual Constellations:  
[http://www.ceos.org/index.php?option=com\\_content&view=article&id=122:virtual-constellations-for-geo&catid=31:initiatives&Itemid=46](http://www.ceos.org/index.php?option=com_content&view=article&id=122:virtual-constellations-for-geo&catid=31:initiatives&Itemid=46)

- Atmospheric Composition Constellation
- Land Surface Constellation
- Precipitation Constellation
- Ocean Color Radiometer Constellation
- Ocean Surface Topography Constellation
- Ocean Surface Vector Wind Constellation

WGISS continues to support the development of the CEOS Virtual Constellations when required, and has particular involvement in the Land Surfacing Imaging VC and the Atmospheric Composition VC. It was noted that a new (7th) Virtual Constellation is being proposed within CEOS concerning Sea Surface Temperature (SST). This is likely to be of particular interest to the UK.

## 5 UKSA support for WGISS

The UKSA delegate (Wyn Cudlip) gave 2 presentations at the meeting covering:

- GCMD/IDN Response to the User Working Group Report
- Global Datasets Interest Group Report

(Copies available through the WGISS website<sup>22</sup>)

Wyn Cudlip continues to be the Point of Contact (PoC) for DEM discussions within WGISS; and the liaison PoC for the CCSDS<sup>23</sup> activities on data packaging and long-term archiving.

Delegates at the meeting expressed appreciation for the UKSA support for WGISS activities and hoped that continuing support will be available for the UK related tasks identified earlier in this report.

## 6 Conclusions

WGISS meeting attendance remains an efficient way of gathering information on global activities in Earth Observation, and maintaining international contacts at a working technical level. The leverage provided by working with other Space Agencies in an international context provides opportunities to make significant international contributions with relatively modest investment. The knowledge gained also helps ensure UK investments in related topics are co-ordinated and relevant in an international context.

There are a number of other technical areas that the UK has expertise to offer including data quality, disaster response, land surface imaging, metadata harmonisation, sensor web enablement etc. The UK has world-class expertise to offer in these areas and involvement would provide an international showcase for UK capability and provide a valuable contribution to important international activities.

CEOS is now well established as the provider of the satellite arm for GEO. It is therefore appropriate that any UK expenditure on space activities in support of GEO be routed through CEOS. This will provide maximum synergy with other Space Agency activities and ensure that space expenditure is effective and well targeted on space-related issues.

Further information is available from Wyn Cudlip ([wcudlip@geoseren.com](mailto:wcudlip@geoseren.com)) and the presentations given at the meeting will be available from July 2011, from the meeting section of the WGISS website <http://wgiss.ceos.org/>.

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<sup>22</sup> WGISS website: <http://www.ceos.org/wgiss/>

<sup>23</sup> CCSDS – Consultative Committee for Space Data Systems