



CEOS



CEOS


Committee on Earth Observation Satellites

Incoming USGS Chair Themes for 2017

Greg Stensaas

CEOS WGCV-41 Plenary

Tokyo, Japan



- **Proposed 2017 CEOS Chair Initiatives**
 - Version 1.0, 17 August 2016
 - Draft Initiative Paper for SIT and Final for Plenary
- **Introduction**
- As the Chair Agency for CEOS for 2017, USGS EROS, Dr. Frank Kelly,
 - USGS will provide leadership on a number of initiatives in support of CEOS objectives.
 - Ensure continuity and coherence of CEOS activities, priorities and themes identified by the current Chair (CSIRO) and the current SIT Chair (ESA)

- Maintain and build upon current processes and accomplishments
- Ensure continuity and coherence of CEOS activities
- Ensure that the priorities and themes identified by the current Chair (CSIRO) and the current SIT Chair (ESA) are supported and further developed through 2017
- Pursue conclusions and recommendations of the two *ad hoc* teams which have been operating in 2016
 - *Future Data Access & Analysis Architectures*
 - *Non-meteorological Applications for Next Generation Geostationary Satellites*

2016 initiatives and themes established by CSIRO and ESA

1. Future data access and analysis architectures.
2. Non-meteorological applications for next generation geostationary satellites.
3. Consideration of future partnerships and priorities for CEOS, notably with GEO, the UN system, development banks, and the *big data* players.
4. Expediting existing CEOS thematic acquisition strategies – in relation to forests, agriculture, disasters, climate, carbon and water.



- **Analysis Ready Data (ARD)** definition and development of a CEOS strategy, and reducing obstacles facing users interested in EO satellite data uptake and application.
- **CEOS Data Cube** in support of existing CEOS activities and as part of a solution to the challenges.
- **Trial implementations of these activities** demonstrating utility for CEOS and its agencies building on efforts already underway.
- **Interoperability of moderate resolution optical data products** in parallel to ARD efforts, pursue progress on interoperability among key data streams for maximum benefit from the multitude of instruments now operating.



FDA-AHT Update

Prepared by Tom Cecere (USGS ; FDA-AHT co-lead)

WGCV Plenary

September 7, 2016

Tokyo, Japan



- One of two CEOS Chair Initiatives
- CSIRO (Rob Woodcock) is the co-lead
- Initial report has been submitted for review in preparation for the SIT TWS in Oxford, UK
- Monday, September 12 scheduled session (9am – 12pm UK time)
 - Discuss Report Recommendations with regards to Data Cube and Analysis Ready Data and Proposed Pilots (in the near term)
 - Discuss how to address individual agency contributions
- The USGS has proposed to build on the results of the FDA-AHT activity as one of its Chair initiatives (Implementation of the FDA report recommendations). Greg Stensaas to brief.

- Overview
- Current Trends and Developments
 - There have been discussions here related to the ties between Analysis Ready Data and Validation in the sense of dealing with multiple data sets. Assumption is that all initial data can be characterized through a robust cal/val process
- Challenges and Opportunities related to Increased EO Data Volumes, Velocities, and Variety
- The Future of EO Data Architectures
- Conclusions (still under development)
- Appendix (Current Agency EO Systems Projects)



- Finalization of the **CEOS ARD definition** by the SEO and LSI-VC.
- Systematic **availability of ARD** from multiple CEOS agencies.
- Consultation with the *big data* players to **maximize ARD uptake**.
- Advance **Data Cube 3-Year Work Plan** and implementation arrangements.
- Further development of existing **Data Cube and ARD prototypes**.
- Address opportunities and challenges raised by the **GFOI Global Data Flows study**.
- **Deployment mix** in support of CEOS and agency objectives.



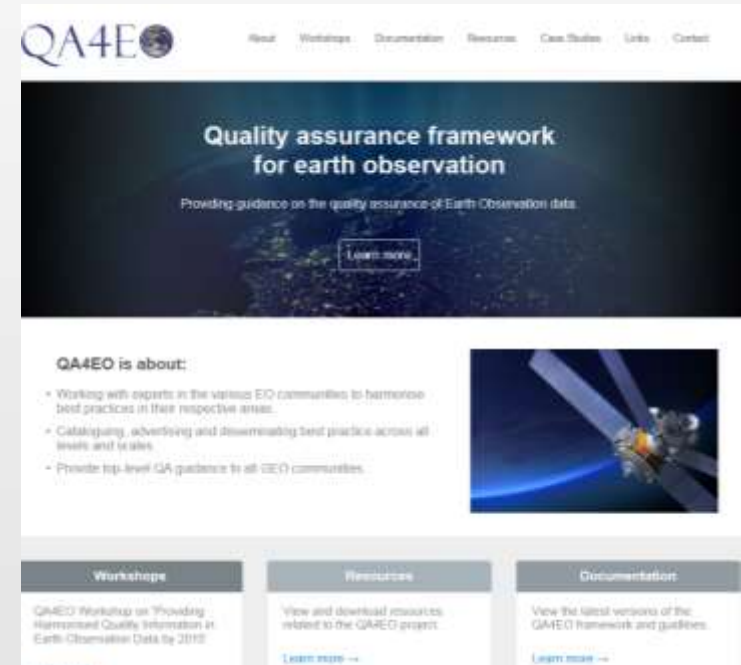
- **Generally applicable framework** for land moderate resolution interoperability.
 - Radiometry, geometry, data formats, metadata, and data access, and metrics and reporting.
- **Case study** focused on Landsat-Sentinel-2 interoperability.
 - Document, publish, and communicate clearly to the community the objectives and intended uses of the interoperable products.
- Case study to be conducted **in concert with WGCV subgroups**.
 - Land Product Validation (LPV) subgroup evaluating processors for atmospheric correction and surface reflectance retrievals.
 - Infrared and Visible Optical Sensor (IVOS) subgroup defining calibration protocols.

Moderate resolution = 10 – 100m

- In order to maintain momentum and continuity, the intention is that both initiatives will be taken forward **within existing** Ad Hoc Teams, Working Groups, and VCs
- No new CEOS organizations or structures being proposed, but coordination with existing structures is required

- Large push within CEOS WGCV for many years
- Began as GEO Task
 - Data quality assurance (GEO DA-06-02 GEOSS Quality Assurance Strategy, led by WGCV and IEEE) is a fundamental and cross cutting task for GEOSS
- “Develop a GEO data quality assurance strategy, beginning with space-based observations and evaluating expansion to in- situ observations, taking account of existing work in this area”.
- -From the GEO 2007-2009 Work Plan, page 25
- 1st QA4EO Workshop – October 2007, GEO Geneva

<http://qa4eo.org/>



QA4EO

Home Workshops Documentation Resources Case Studies Links Contact

Quality assurance framework for earth observation

Providing guidance on the quality assurance of Earth Observation data

[Learn more](#)

QA4EO is about:

- Working with experts in the various EO communities to harmonise best practices in their respective areas.
- Cataloguing, advertising and disseminating best practice across all levels and scales.
- Provide top-level QA guidance to all GEO communities.

Workshops
QA4EO Workshop on Providing Harmonised Quality Information in Earth Observation Data by 2015
[Learn more](#)

Resources
View and download resources related to the QA4EO project.
[Learn more](#)

Documentation
View the latest versions of the QA4EO framework and guidelines.
[Learn more](#)

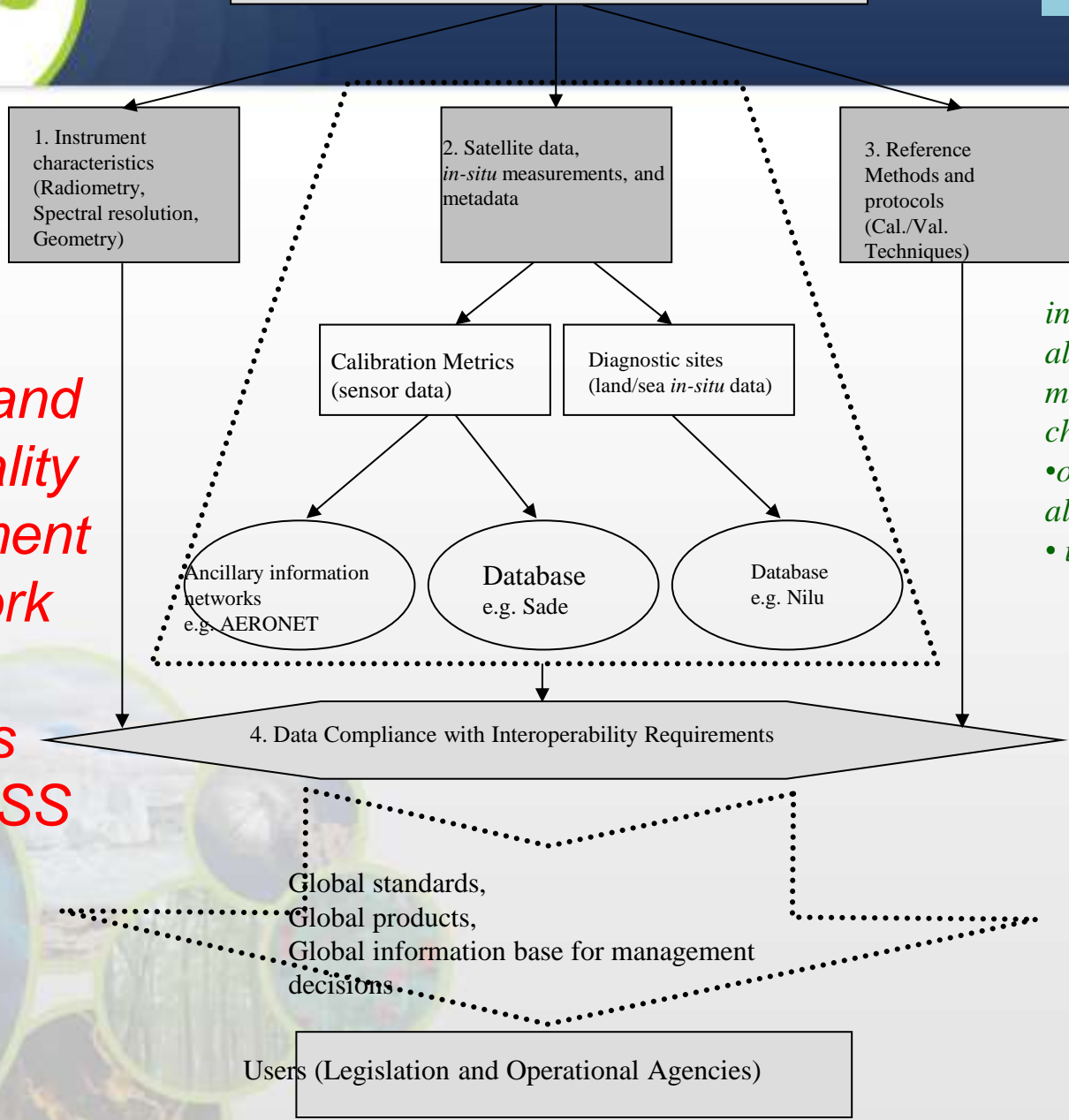


GEOSS Data Quality Framework
(accessible throughout GEOSS cal/val website)

From WGCV 27
14. June 2007
NPL, Teddington, UK

Links to different Agencies

Cal/Val and data quality assessment framework system elements for GEOSS



includes RTC procedures and all error propag. models and methods to establish QA characteristics. Use:

- operational processor (by all)*
- use common data format*

for data combination and merging

Need for Standard
Interoperable Formats to
Benefit from all Earth
Observation Systems



- Technical Specifications for Collecting, Processing, Storing, and Disseminating Data and Products
- Based on Non-proprietary Standards
- Defining What Systems Should Comply With to be Contributed to GEOSS



- **Offering Access to Data and Services**
- **Providing Calibration and Validation**
- **Providing Tools**



- WGCV and Subgroups
- Special task(s) teams: Atmospheric Composition, Cloud, DEM, others, ...
- Outreach and coordination with other groups
 - GSICS
- Tasks
 - Recommended cal/val methods and test sites – established by WGCV and each subgroup
 - SADE, LandNet, RadCalNet, field campaigns and joint test exercises
 - QA4EO Guidelines with GSICS
 - Recommended metadata and documentation requirements
 - X
 - Y
 - Z
 -



- **Quality Assurance Framework for Earth Observation (QA4EO), :**
 - <http://qa4eo.org/about/>
 - QA4EO has been endorsed by [CEOS](#) as a contribution to facilitate the [GEO](#) vision for a Global Earth Observation System of Systems ([GEOSS](#)). The aim of GEOSS is to deliver comprehensive and timely knowledge/information products worldwide to meet the needs of its nine "societal benefit areas". This can only be achieved through the synergistic use of data derived from a variety of sources (satellite, airborne and in situ) and the coordination of the resources and efforts of the GEO members.
 - To accomplish this vision, starting from a system of disparate systems that were built for a multitude of applications, requires the establishment of an internationally coordinated operational framework to facilitate interoperability and harmonisation.
 - The success of this framework, in terms of data, is dependent upon the successful implementation of two key principles:
 - Accessibility/Availability
 - Suitability/Reliability
 - Success also requires effective communication of these principles to all stakeholders.
- **QA4ECV**, <http://www.qa4ecv.eu/>
 - The [QA4ECV](#) project is developing an internationally acceptable Quality Assurance framework that provides understandable and traceable quality information for satellite data that is used in currently evolving climate and air quality services. This framework should to deliver the historically linked long-term datasets that users need, in a format that they can readily use.



- **Gap Analysis for Integrated Atmospheric ECV CLimate Monitoring (GAIA-CLIM) project**
 - GAIA-CLIM, <http://www.gaia-clim.eu/>
 - The [GAIA-CLIM](#) project is supporting Copernicus by establishing prioritised needs for further observational capacity, targeted at providing the required step-change in satellite calibration and validation capacity. The principle aim of the project is to lead a step change of availability of and ability to utilise truly reference-quality traceable measurements in support of satellite data characterisation.
- **Fidelity and uncertainty in climate data records from Earth Observations**
 - FiduCEO, <http://www.fiduCEO.eu/>
 - The FIDUCEO project will build [nine new climate datasets](#) from Earth Observation using a rigorous treatment of uncertainty, informed from the discipline of metrology. We will produce four Fundamental Climate Data Records and five Climate Data Records, each with complete and traceable estimates of stability and uncertainty.
 - FIDUCEO will also produce a suite of software tools for reading/writing the data and for performing metrologically rigorous analysis - including tools for stability analyses and ensemble creation.
 - <http://www.fiduCEO.eu/vocabulary>

- WGCV Interoperability
 - WGCV and Subgroups
 - Special task(s) teams: Atmospheric Composition, Cloud, DEM??
 - Outreach and coordination with other groups
- What is Interoperability proposed Pilot/Case Study?
 - **Interoperability of moderate resolution optical data products** in parallel to ARD efforts, pursue progress on interoperability among key data streams for maximum benefit from the multitude of instruments now operating.
 - Is this right?

- What is interoperability?
 - *Wikipedia: Interoperability* is a characteristic of a product or system, whose interfaces are completely understood, to work with other products or systems, present or future, in either implementation or access, without any restrictions.
 - Webster: ability of a system (as a weapons system) to work with or use the parts or equipment of another system
 - Medical: Interoperability describes the extent to which systems and devices can exchange data, and interpret that shared data. For two systems to be interoperable, they must be able to exchange data and subsequently present that data such that it can be understood by a user.
 - Sensor dependent?
 - Product dependent?
 - User dependent?

- What is the way forward for interoperability
 - Start with Sentinel-2 and Landsat
 - Document processes and flows
 - Look across CEOS and GEO for interoperability efforts already happening
 - Documents proposed process and flow diagrams
- Who documents guidelines or standards
 - CEOS?
 - GCOS/GSICS/SCOPECM
 - ISO
 - IEEE
 - ASPRS/ISPRS
 - Others?



- Reflectance quantities in optical remote sensing—definitions and case studies, G. Schaepman-Strub a,b,□, M.E. Schaepman c, T.H. Painter d, S. Dangel b, J.V. Martonchik, Received 9 May 2005; received in revised form 1 March 2006; accepted 4 March 2006; Remote Sensing of Environment.

