



GEOSS ADC Architecture Workshop

Hosted by the European Commission
At the Joint Research Centre
February 4-5, 2008



Architecture Workshop, February 2008

A GEOSS Architecture Workshop was conducted in Ispra, Italy on February 4th and 5th, 2008. The workshop was hosted by JRC and organized by GEO Task AR-07-02 "[GEOSS Architecture Implementation Pilot](#) (AIP)." The Architecture Workshop preceded the 6th Architecture and Data Committee meeting (ADC-6) also hosted at JRC.

The Architecture Workshop was aimed to be an interactive event to develop requirements for GEOSS Architecture developments. The workshop covered topics relating to the outcomes of the ADC core architecture tasks in 2007 and to develop plans for 2008. Participants participated in the refinement of topics that will become part of a Call for Participation in 2008. Scenarios in the workshop emphasized the needs of Societal Benefit Areas (SBA) to the service architecture in support of daily decision-support. The scenarios topics were identified through collaboration of the GEO User Interface Committee (UIC) and ADC.

The Architecture Workshop is part of an overall process of the ADC. The AIP is a forum in which GEO ADC tasks can utilize the core architecture in developing task-specific portion of GEOSS. Development as part of AR-07-02, e.g., registration and testing of services, is then "delivered" to the AR-07-01 as an operational capability. Coordination between tasks is therefore of high importance to GEOSS development. The Architecture workshop emphasizes [coordination with GEO Tasks](#)

Monday, February 4th



Start (Duration)	Activity		
1300 (90)	Opening Plenary		
1430 (20)	Refreshment Break		
1450 (90)	Parallel Session 1a: Air Quality & Health Scenario Leader: John White	Parallel Session 1b: Inter-calibration Scenario Leader: Stephen Ungar	Parallel Session 1c: Initial Operating Capability Leader: Doug Nebert
1700	Adjourn		

Tuesday, February 5th



Start (Duration)	Activity		
0900 (90)	Parallel Session 2a: Biodiversity Scenario Leader: Doug Muchoney and IP3 group	Parallel Session 2b: Energy - Solar Scenario Leader: Lionel Menard	Parallel Session 2c: Clearinghouse, Catalogues, Registries Leader: Doug Nebert
1030 (20)	Refreshment Break		
1050 (90)	Parallel Session 3a: Disaster Response Scenario Leader: Guy Séguin	Parallel Session 3b: Sensors Interoperability Leader: Ingo Simonis	Parallel Session 3c: Test Facility for GEOSS Registration Leader: Paul Smits
1220 (70)	Lunch		
1330 (60)	Parallel Session 4a: Water/Drought Scenario Leader: David Arctur	Parallel Session 4b: Workflow Leader: Pier Giorgio Marchetti	Parallel Session 4c: User Portals and Applications Leader: Ingo Simonis
1430 (20)	Refreshment Break		
1450 (90)	Closing Plenary		
1700	Adjourn		

Coordination of Workshop with GEO Tasks

This table is under development.



Session	Task #	Task Short Title	Task Point of Contact
Disasters	DI-06-09	Use of Satellites for Risk Management	Canada (Guy Seguin)
Biodiversity	BI-06-02	Biodiversity Requirements in Earth Observation	DIVERSITAS International (Norbert Juergens)
Biodiversity	EC-07-01	Global Ecosystem Observation and Monitoring Network	N/A
Biodiversity	BI-06-03	Capturing Historical Biodiversity Data	GBIF (Jim Edward)
Energy	EN-06-04	Using New Observation Systems for Energy	IEEE (Ellsworth LeDrew)
Air Quality	HE-07-02	TBD Environment and Health Monitoring and Modelling	
Water	WA-08-01	TBD Integration of In-situ and Satellite Data for Water Cycle Monitoring	
Intercalibration	DA-06-02	Data Quality Assurance Framework	CEOS (Stephen G. Ungar)
AG Mon	AG-07-03	Operational Agricultural Monitoring System	USA (Chris Justice)
Sensors	DA-07-03	Virtual Constellations	CEOS (Stephen Briggs)
Sensors	DA-07-04	Sensor Web Enablement for In-Situ	South Africa (Terence Van Zyl)
Registry	DA-06-04	Data, Metadata and Products Harmonisation	USA (Douglas D. Nebert)
Overall	DA-06-01	Furthering the Practical Application of the Agreed GEOSS Data Sharing Principles	CODATA (Bob Chen)
Overall	AR-07-01	Enabling Deployment of a GEOSS Architecture	USA (Douglas D. Nebert)
Overall	AR-07-02	GEOSS Architecture Implementation Pilot	OGC (George Percivall)



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Breakout Session 1b:
Inter-calibration Scenario
- Stephen Ungar





GEOSS Harmonization of Sensor Observations

The Global Earth Observing System of Systems (GEOSS) is to be a global, coordinated, comprehensive and sustained system of earth observing systems. The GEOSS architecture is being designed to facilitate coordinated access to data and products produced amongst all contributing systems. However, to effectively exploit information derived from disparate data sources, it is necessary to introduce consistency of content through guidelines to data providers for the appropriate characterization of the observing systems and their derived products. Ultimately, consistency can be provided through standardized “best practices”



Workshop Session 1b

This session seeks interaction across the GEO Community to identify standards and best practices for: calibrating and validating sensors. We will start a dialog on what is needed to characterize sensor capabilities in a manner which satisfies GEO needs. Furthermore, we will explore how the Architecture Implementation Pilot can facilitate the CEOS Cal/Val Portal, as well as how the Cal/Val Portal can contribute to meeting the objectives AIP.



Coordination with GEO and related tasks:

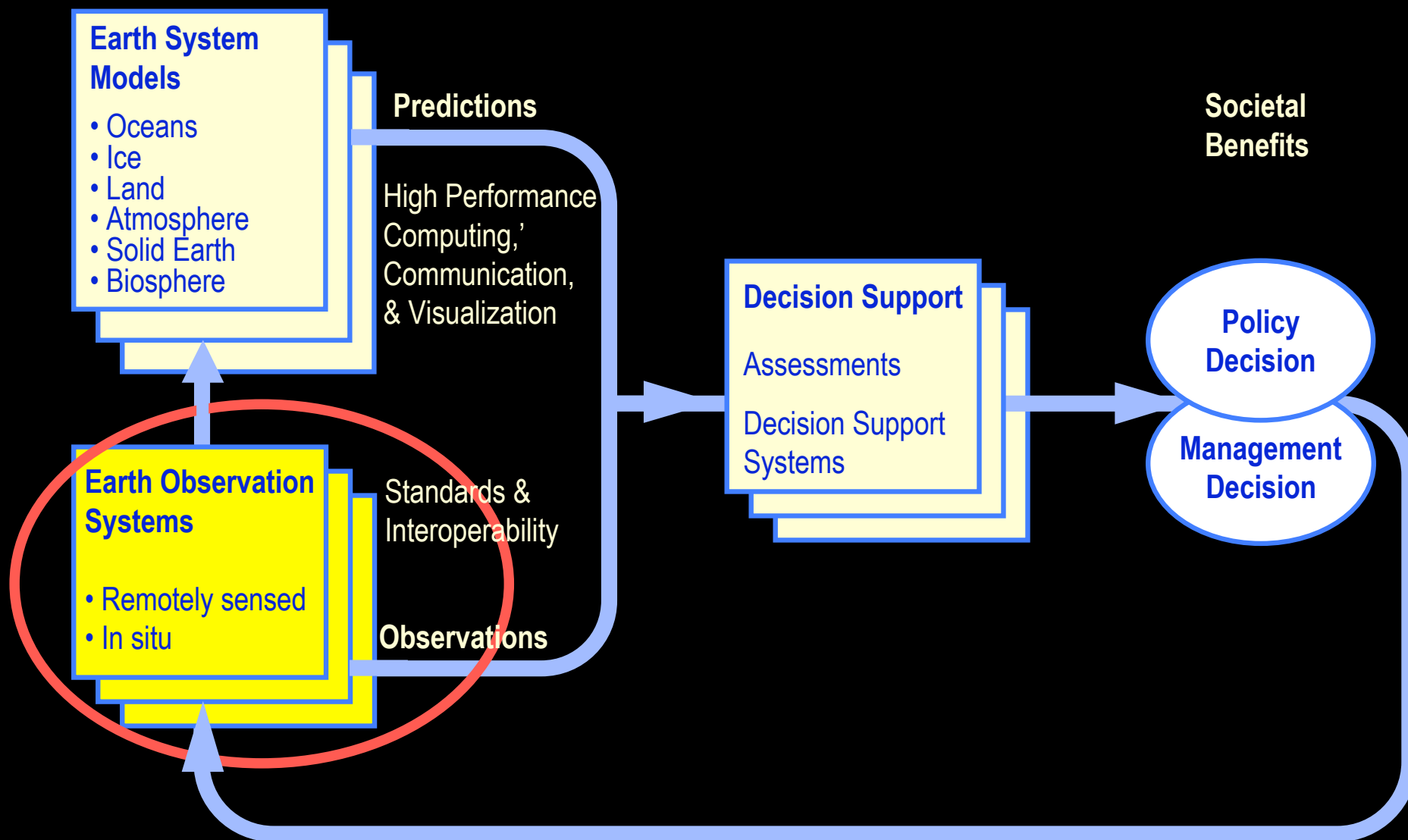
- DA-06-02 (Data quality assurance strategy for space-based and related in-situ observations)
- CL-06-02 (Key Climate Data from Satellite Systems)
- DA-07-04 (Sensor Web Enablement for In-Situ Observing Network Facilitation)
- DA-07-05 (Higher Level Data Product Tools)
- WE-06-02 (Space-based Global Observing System for Weather)
- CEOS WGCV (Committee on Earth Observation Satellites, Working Group on Calibration and Validation)



Refining the GEO Data Quality Framework

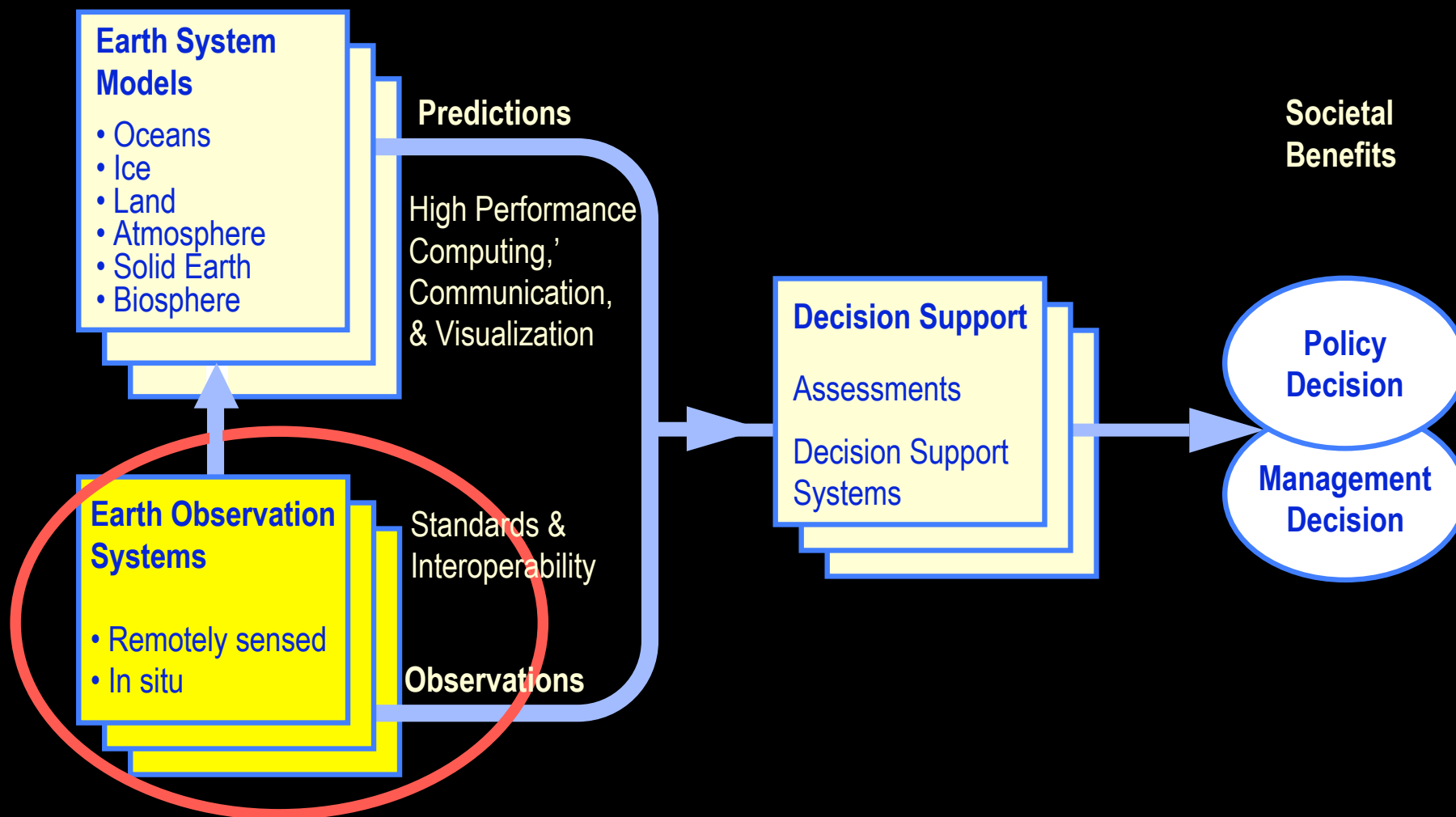
Over the past three years, the CEOS WGCV, in conjunction with participants in DA-06-02, has developed a Data Quality Framework (DQF) for GEO. The CEOS Cal/Val Portal, a prototyping activity, designed to test and refine the guidelines presented in the DQF, has been instituted under ESA sponsorship. This activity is an extension of the historic (and extensive) participation in the WGISS Test Facility (WTF) by WGCV. This task was the principle topic of the GEO-CEOS Quality Assurance Workshop held at the GEO Secretariat in Geneva last October. A follow-up workshop is to occur at NIST in Gaithersburg, Maryland during the first week of May. A scenario involving the use of a common Antarctic Cal/Val site (Dome C) for selected optical and microwave observing systems from several national agencies, will be introduced at the Joint WGCV/WGISS Plenary to be held in Sanya China during the last week of February

GEOSS Architecture



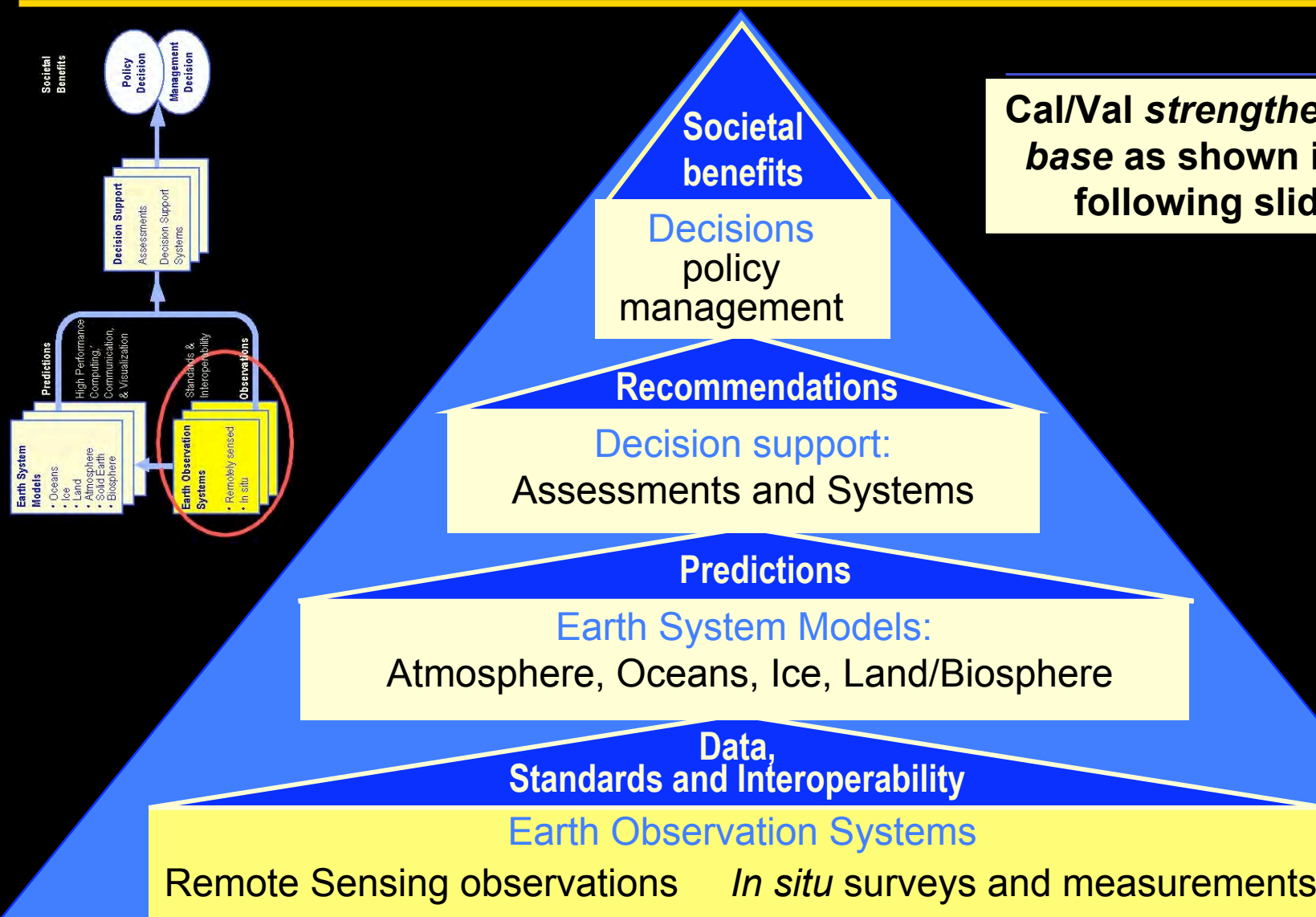
From: The Architecture of GEOSS (GEO4DOC 4.1 [2]; April 5, 2004)

GEOSS Information Flow

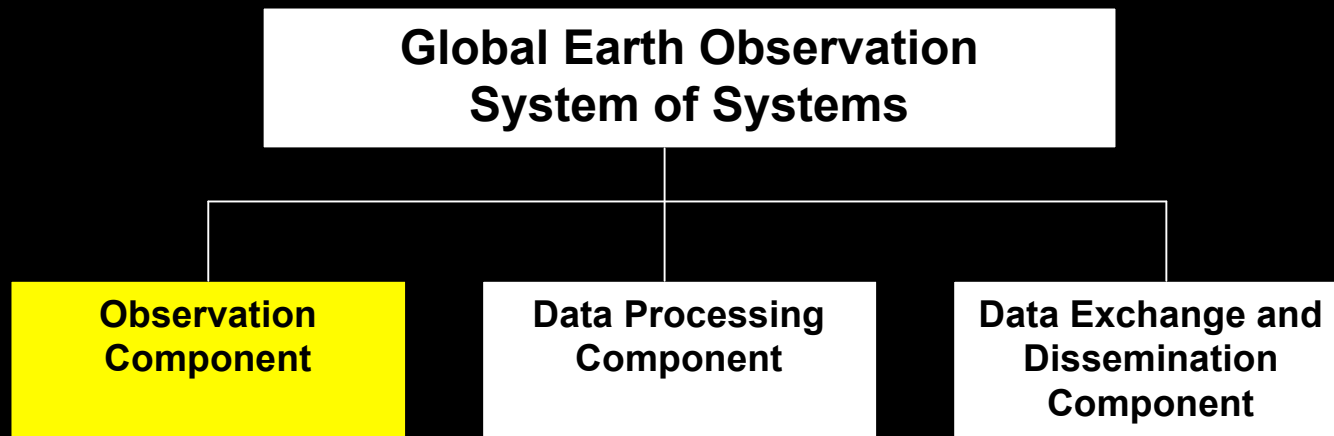


GEOSS Information Architecture

Cal/Val strengthens the base as shown in the following slides



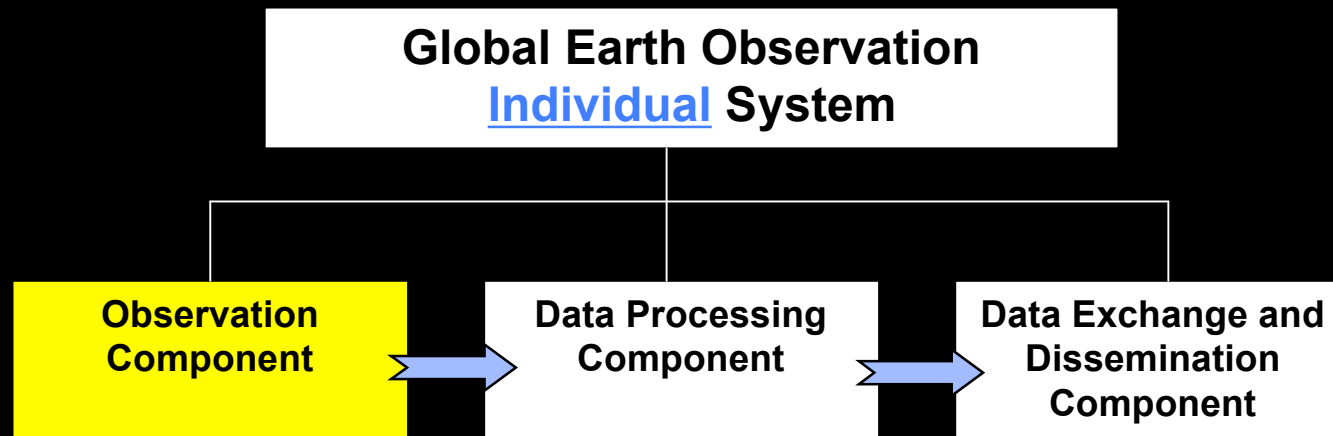
Components of GEOSS Architecture



GEOSS architecture builds incrementally on existing systems to create a distributed system of systems, incorporating:

- ✧ an observation component
- ✧ a data processing and archiving component
- ✧ a data exchange and dissemination component

Components of GEOSS Architecture



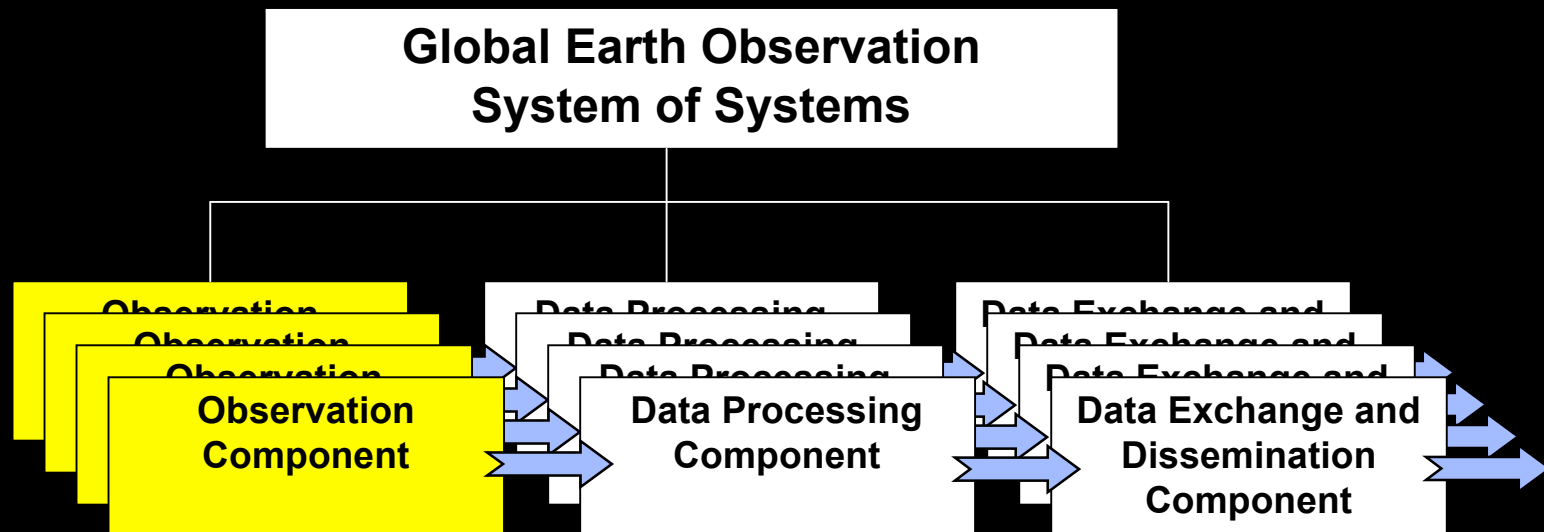
GEOSS architecture builds incrementally on existing systems to create a distributed system of systems. WGCV activities contribute to the following GEOSS components:

- ✧ Observation component
- ✧ Data processing and archiving component

To ensure:

- ✧ data and products interoperability, exchange and dissemination

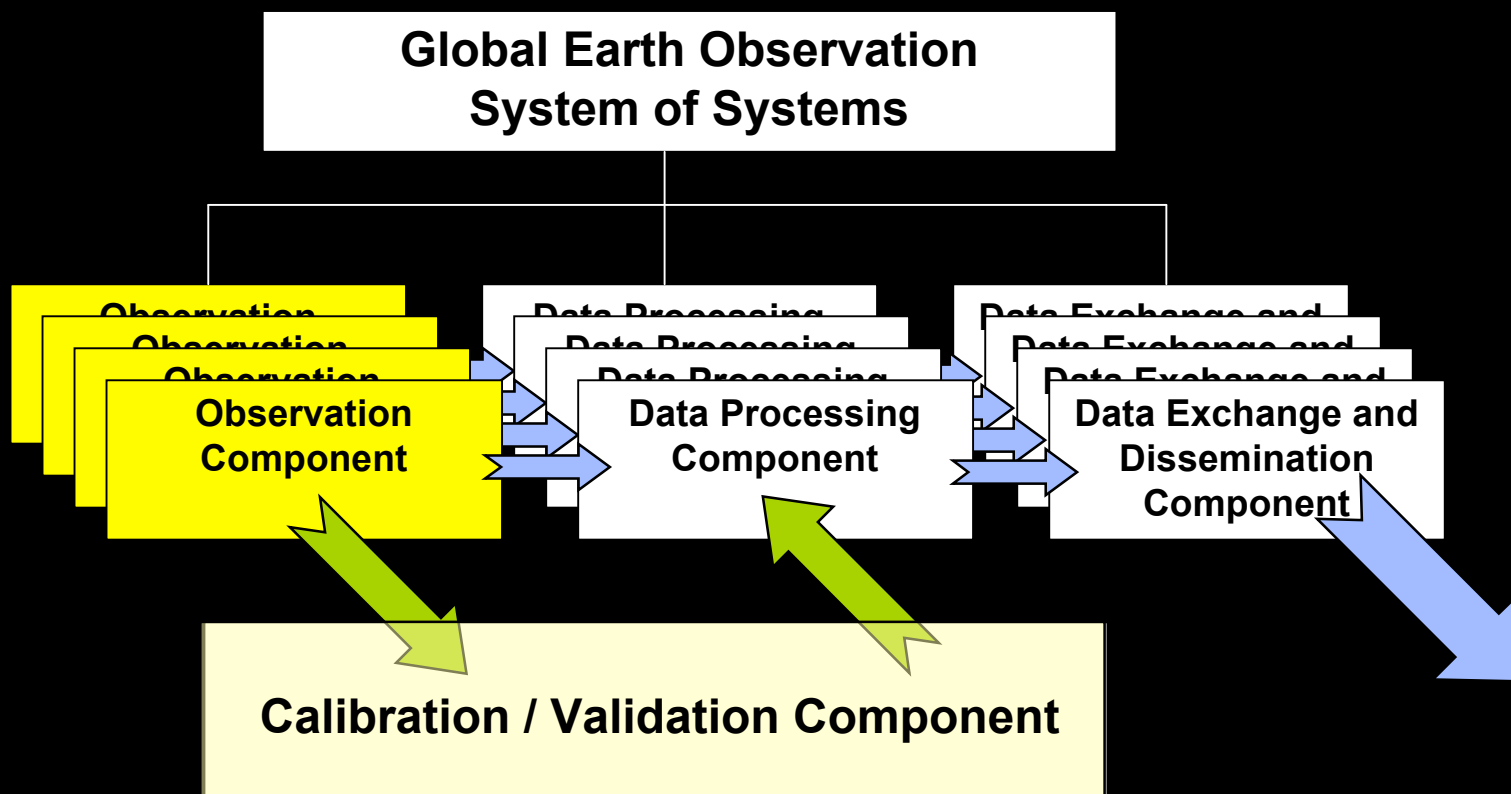
Inadequate Cal/Val in GEOSS Architecture



What's missing in this scenario?

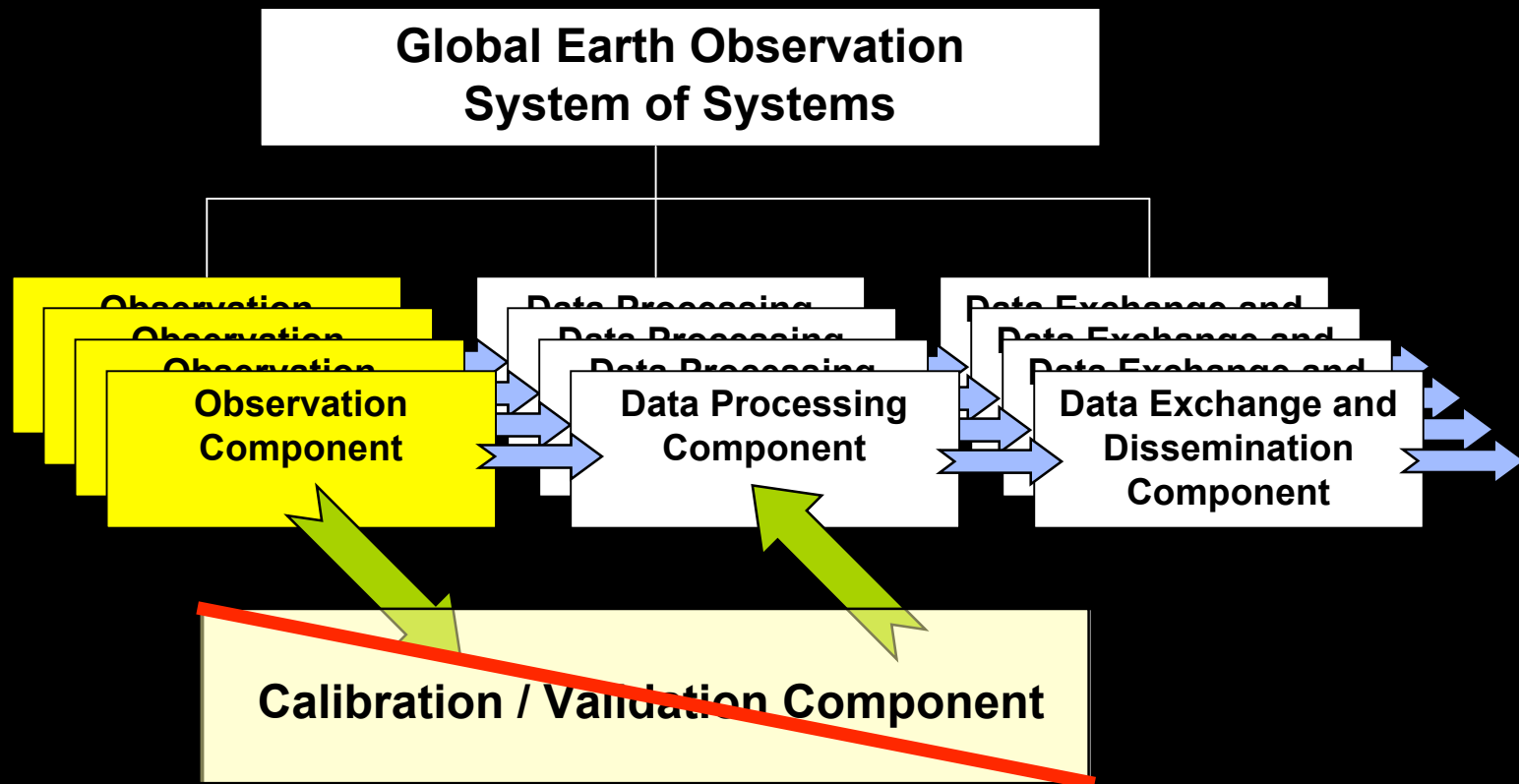
A simplistic view of a System of Systems results in the need to deal with potentially disparate information forcing policy makers to "choose" their outcomes.

WGCV contribution to GEOSS Architecture



*Role of WGCV in a true System of Systems where the operating space must cut across individual Systems **to provide integrated data for decision models***

Inadequate Cal/Val in GEOSS Architecture



Inadequate integration of data sources can lead to disparate model outcomes, introducing uncertainty into the decision process

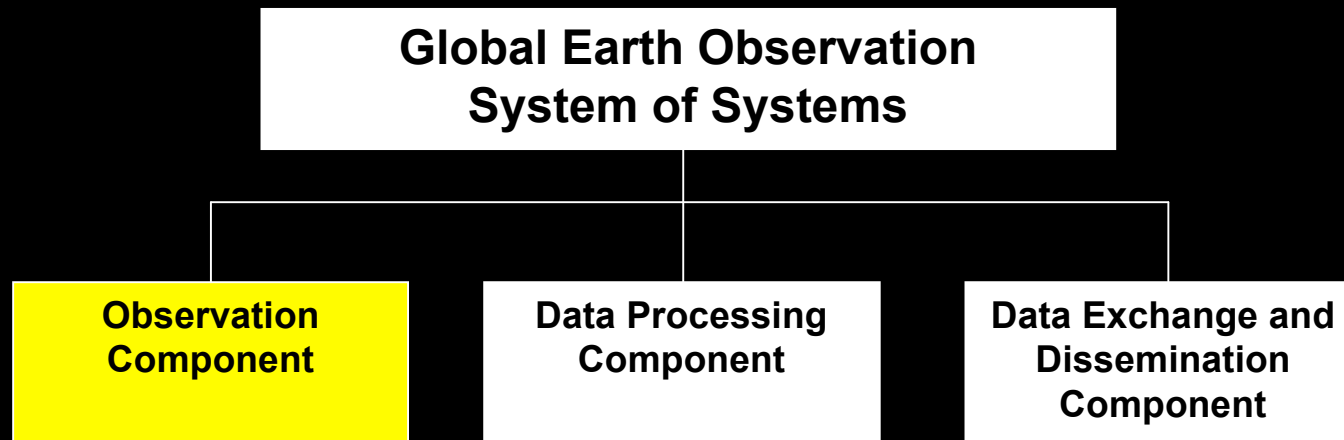
Establishing Calibration and Validation guidelines is a necessary ingredient in achieving Data Interoperability

WGCV proposes to establish Calibration and Validation guidelines, to ensure *effective* interoperability of GEOSS member satellite data sources, based on the current space agencies collaboration agreements, common formats and standards.

- **WGCV proposes that all GEOSS partners participate in the establishment of the following common practices:**
 - ✧ Document the methodologies used to derive and further process satellite measurements.
 - ✧ Create and maintain, in conjunction with WGISS, an internet-accessible information database containing, on an instrument or satellite basis, links to all instrument characteristics needed for insuring inter-operability.
 - ✧ Provide/publish Cal/Val reference methods in a readily accessible form.

These activities will ensure that the various data are integrable.

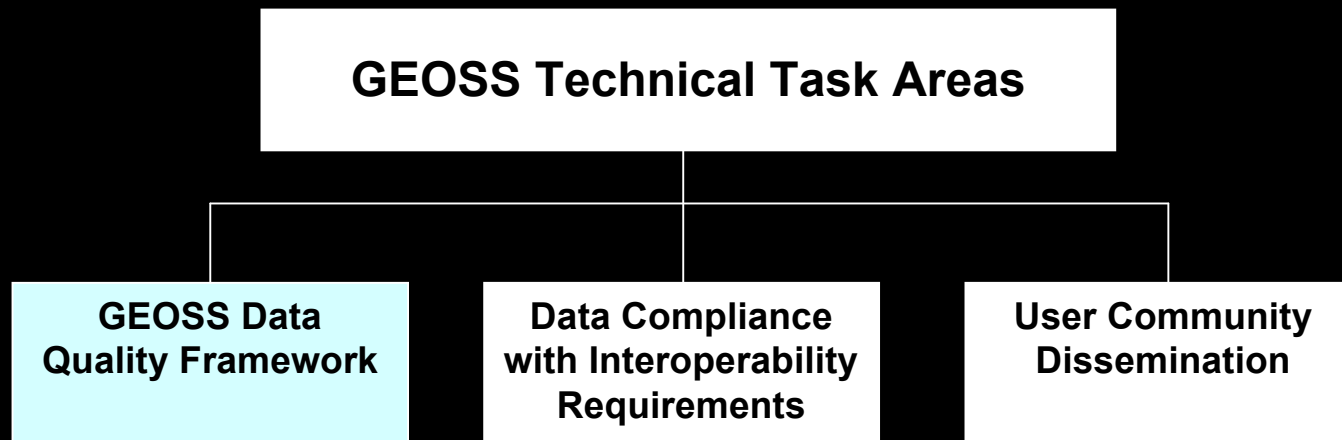
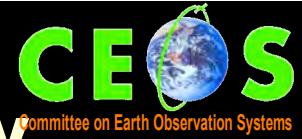
Components of GEOSS Architecture



The high level GEOSS **architecture** is a componentization of a structure required to accomplish the GEOSS objectives which is consistent with the structure of most contemporary Earth Observing data systems. There is a need to define the components of GEOSS **functionality** required to enable the fulfillment of GEOSS objectives through this architecture.

Further elaboration

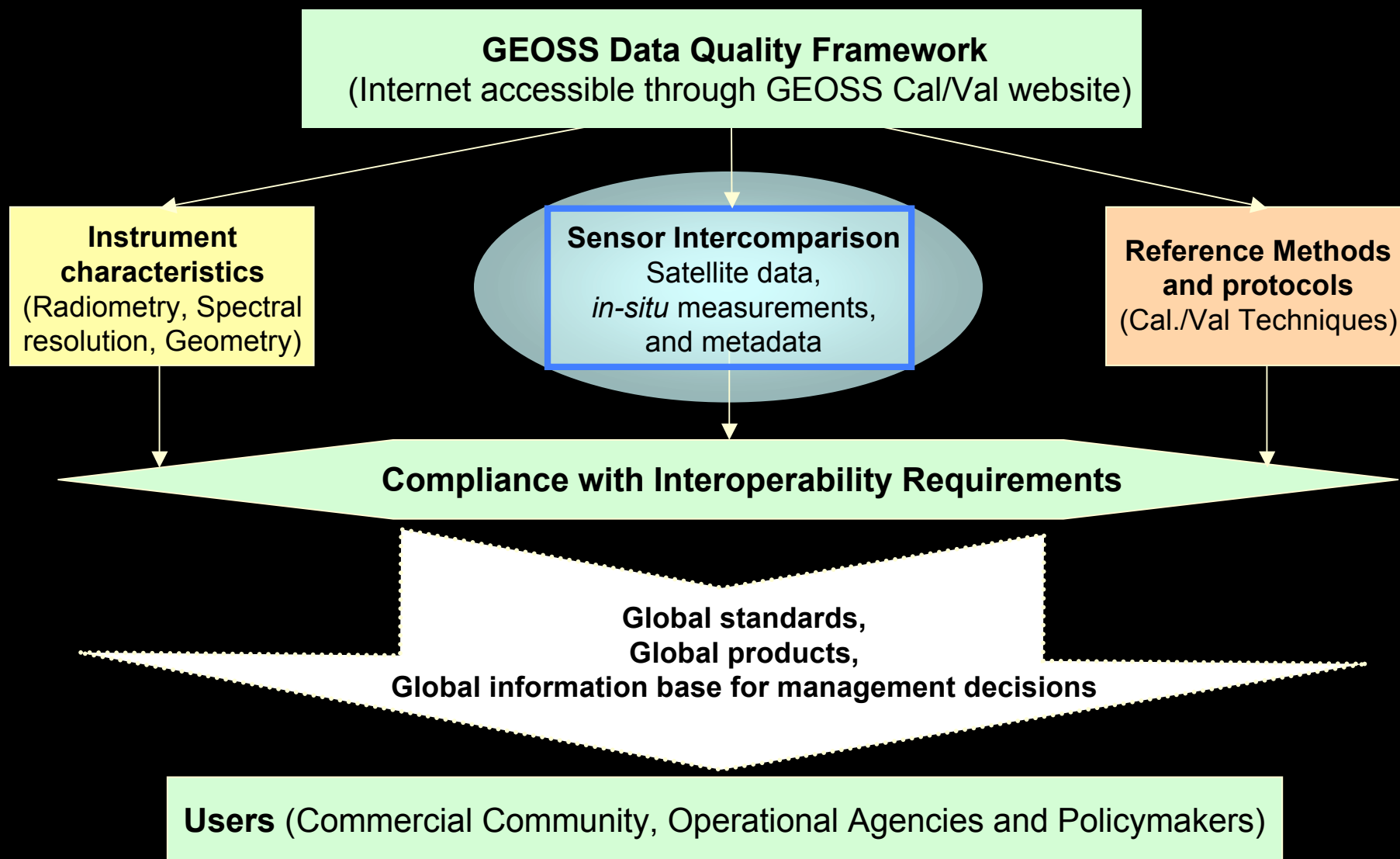
Components of GEOSS **Functionality**



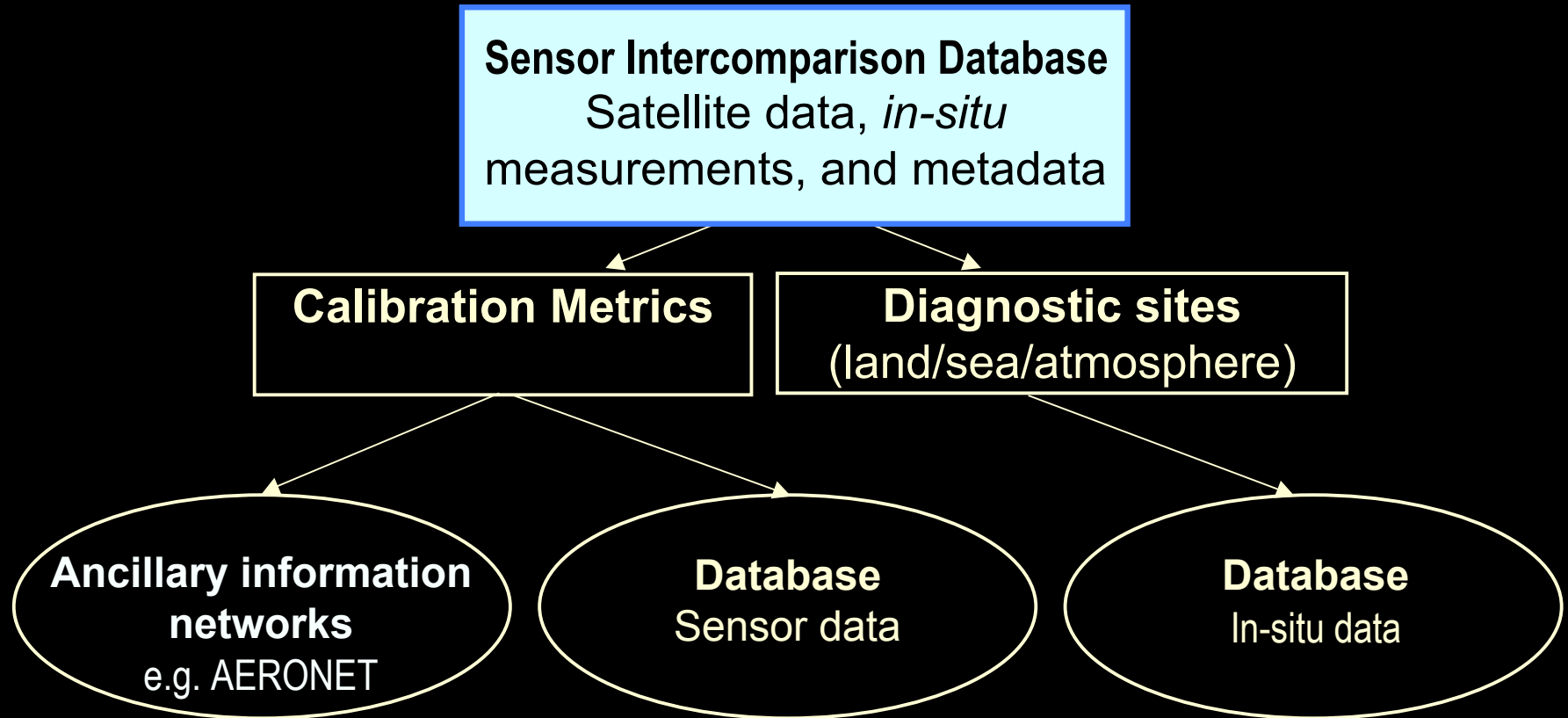
The high level GEOSS **functionality** componentization introduces a structure which ensures accomplishment of required GEOSS objectives within the proposed GEOSS **architecture**. There is a need to specify **functionality** for the components of GEOSS **architecture** to enable the fulfillment of GEOSS objectives through this architecture.

These components are designed to ensure data integrability and interoperability.

WGCV Proposal



WGCV Proposal GEOS Cal/Val Data Framework



Road Map for proposed activities addressing task GEO DA-06-02

Phase 1	Planning (develop strategies, determine elements/activities/tasks)					
Phase 2	Implementation (develop and/or establish a set of commonly accepted shared technical tools and inter-agencies collaborations and agreements)					
Phase 3	Delivery (present and explain to the community and distribute to CEOS member agencies)					
	2006	2007	2008	2009	2010	2011
						2012

Conclusion

The approach outlined in the WGCV White Paper entitled “Data Quality Guidelines for Satellite Sensor Observations Relevant to GEOSS: Calibration and Validation Issues” has been crafted to ensure the quality assessment of space-borne instrument data in the context of a service driven global operational Earth observation remote sensing system.

This approach exploits ongoing work and available expertise among the CEOS working group members, and provides a mechanism for further development over the 10-year timescale of the GEOSS Implementation Plan.



Breakout Sessions – Summary Findings I

- A narrow spectrum of Users
 - End Users are actually the Providers
 - Validators will focus on source and quality of data
- Users versus Providers
 - Encourage connectivity between the two and between models and data providers
 - Iterative, interactive feedback from users & ability to correct errors
- Modeling
 - Common approach to producing data used for inter-comparisons
- Key data characteristics
 - Static data consists of “best practices” documentation and observing systems descriptions/characterizations
 - Tentative data consists of initial deposits of observations of validation sites and preliminary calibration parameters/coefficients



Breakout Sessions – Summary findings II

Emphasis on Data

- Frequently mentioned concerns
 - Timeliness (from real time to paleo-data)
 - Access to initial data restricted to Cal/Val participants
 - Traceability absolutely required
 - Common practices in processing highly desired
 - Full disclosure if you wish to participate
- Data distribution mechanism
 - CEOS-GEO Cal/Val Portal provides entry point for inter-comparison data resides on provider's server
 - Portal hosts forum to provide feedback
- **Test Case:** encourage providers to acquire data from a subset of proposed CEOS WGCV validation sites and supply these data to The CEOS-GEO Cal/Val Portal for evaluation purposes
Initial test site is Dome-C in Antarctica ... multiplatform, multi-national and multi agency