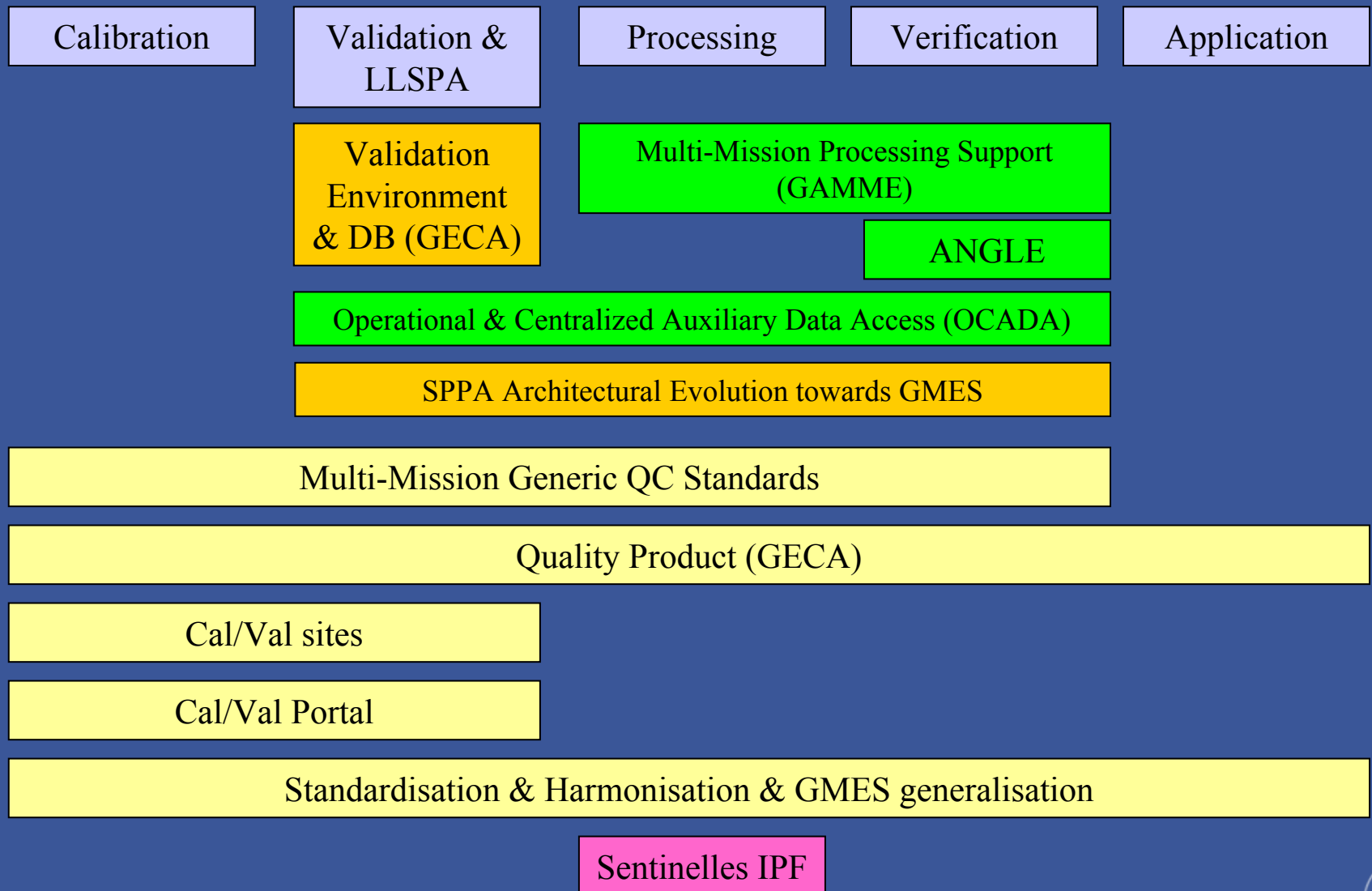


# ESA Report to CEOS WGCV

## Sensor Performance, Product and Algorithm

### Activities in the context of Product and Processes harmonisation

- The activities proposed are divided into three main lines:
  - **Ground Segment Components**
    - » Development of ESA components in support to SPPA and Cal/Val activities
  - **Sensor Performance, Products and Algorithms**
    - » Routine Long Loop Sensor Performance, Quality Control, Verification and Algorithm development activities
  - **Calibration and Validation Activities**
    - » Activities supporting Calibration and Validation



Multi-Mission Processing (GAMME)		Development Terminated	
ANGLE – Multi Mission Amalfi		End contract by July 2008	
Generic Environment for Cal/Val Analysis Sep.07-Mar.10	Cal/Val Data Centre	URR	Apr. 08
	Quality Product	QIAP	Mar. 08
Operational & Centralized Auxiliary Data Access (OCADA) Dec.07-May 09		URR	Apr. 08
Multi-Mission Generic Quality Control Standards Apr. 06-Mar. 08		Final Report	Mar. 08
		Demonstrator	Summer 09
SPPA Architectural Evol. towards GMES	Oct.08-Oct.09	URD	Apr. 08
Cal/Val Portal		Version 2.1	Mar. 08
		Further release	Jul. 08
Cal/Val sites	Dec.07-Jan.09	Report #1	Mar. 08
GMES Product Harmonization study (φ1)	Oct.07-Oct.08	Intermediate report	Apr. 08
Sentinel IPFs (SAR – MSI - OLCI, SLST - RA)		Planned start spring 2008	

## 1 - GECA - Objectives

### Top-Level Objective:

- **Contribute to Cal/Val standardisation & traceability in support of CEOS, GMES and GEOSS**

### High-Level Objectives:

- **Harmonise/Standardise Correlative Data**
  - Building on the common Envisat/Aura (and recently NDACC) standard
- **Support Collocation and Intercomparison**
  - Develop toolboxes and libraries for cal/val teams and also centralised bulk operations on data sets
- **Support Data Access for Cal/Val**
  - Contribute to standardisation of inter-data-centre exchanges
  - Implement data access rules as defined in protocols
- **Support Correlative Data Originators**
  - Present providers to multiple centres with a single drop-off point, and arrange for further dissemination

## 1 - GECA project definition phase involved

- presentations and subsequent interactions during and after three CEOS-WGCV-ACSG subgroup meetings
- Direct collaboration with NASA on project requirements specification

The project deliverables will be

- documents describing proposals for standardisation of correlative data and standardisation of data centre inter-operability
- Algorithm description for 'canonical' data handling processes
- Server tools and client libraries for 'canonical' data handling (including conversion between collaborating but not-yet harmonised standards)
- On-line facilities for data query and access
- Cal/val data storage at the GECA server
- Demonstrable inter-operability of data centres
- A proposed single upload portal with quality control and multicast capabilities for further distribution

Further collaboration has been sought with several other CEOS agencies in the course of the initial user requirements review phase. In addition to NASA, also EUMETSAT has already participated to the first project meeting.

The User Requirements Review (URR) phase has been doubled with respect to initial planning, due to the large variety in detailed requirements between geophysical/instrumental domains, which led to interesting findings worth exploring deeper in this phase. The URR meeting will be held in April.

## 1 – GECA - Quality Information and Action Protocol

**The GECA project also includes a study and development to connect Sources and Users of Quality Information (called “QIAP”: Quality Information and Action Protocol”)**

- Convert **selected categories** of quality information records and actions into electronic form
- Enable traceability of quality-related interventions
- Provide support to humans and machines at the input and output ends of the quality information chains
- ..and do all the above in a manner that only intervenes with user consent

## 1 – GECA – Best Practices

The GECA contribution to formulation and implementation of Cal/Val best practices is three-fold:

- It contributes to formulation of guidelines for the description of correlative observations, including recommended auxiliary observations and parameters, to allow interpretation by independent peer cal/val scientists. This part of the project builds on a heritage from earlier ESA, NASA and EC projects
- It provides intercomparison support utilities (a server-side environment and client-side libraries and toolboxes) with default configuration aligned with already formulated best practices (e.g. criteria formulated CEOS subgroups, but also from GMES Service projects like PROMOTE).
- The implementation of domain-specific best-practices in a common environment will contribute to proliferation to other domains

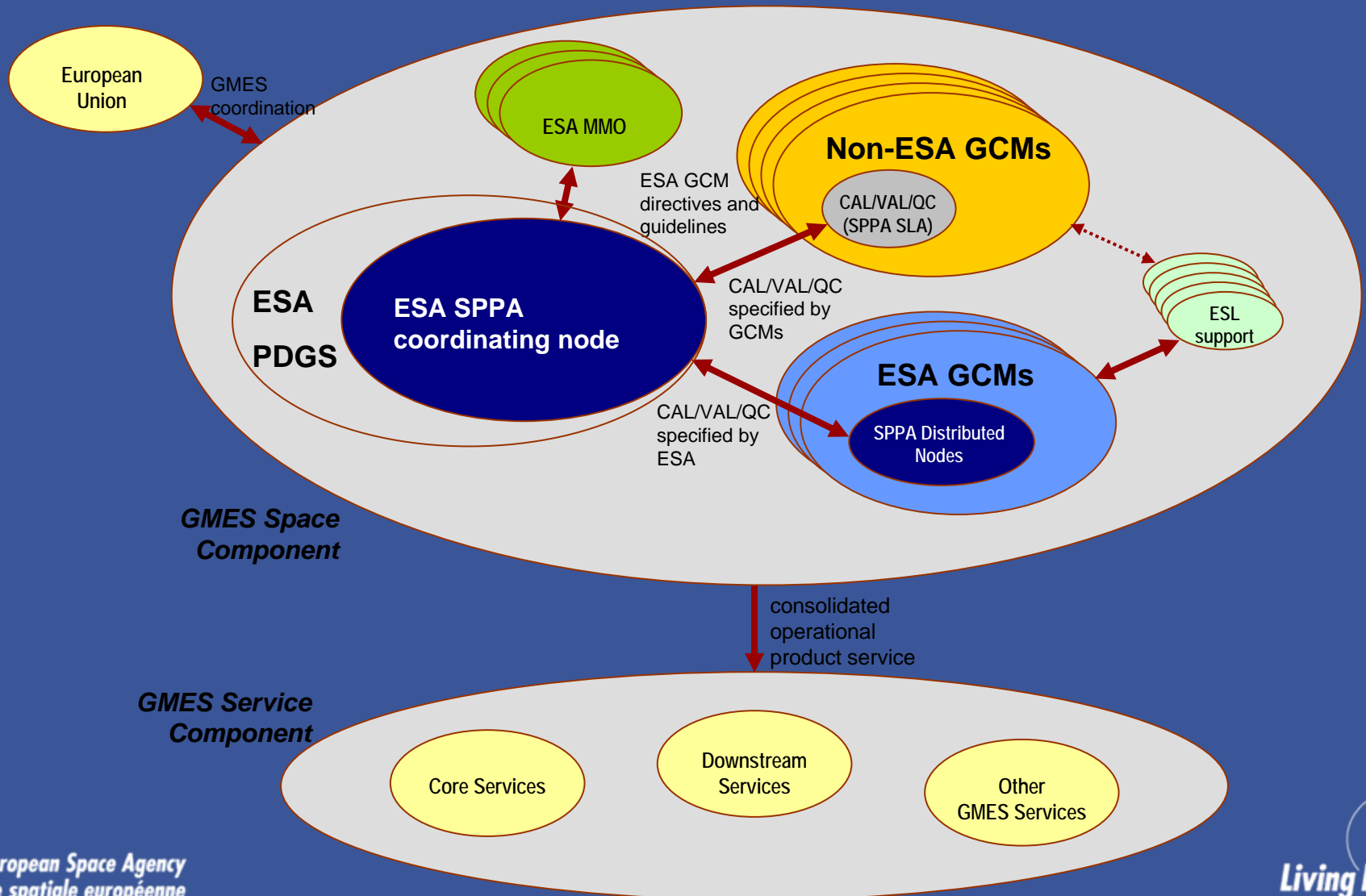


## 2 - SPPA Architectural Evolution towards GMES

The objective will be achieved by:

1. identifying all interfaces towards the Sentinel G/S elements and towards the wider GMES EO architecture
2. identifying gaps in the architecture by mapping the SPPA interfaces and elements to the existing set-up,
3. including a definition of resources, processes and communication links (not only taking care of the technological issues) to support coordination and information flow.
4. producing a critical analysis of the current SPPA organization for ensuring products quality control, focussing specifically on the activities close to the daily operations as covered today by the DPQC service.
5. specifying the SPPA evolution roadmap taking the existing system to the target architecture

- 2 - SPPA Architectural Evolution towards GMES



## 1 - Cal/Val Portal – Main changes

Main changes which have been introduced in the CalValPortal since the last WGISS/WGCV meeting in Munich:

- WTF sites have been integrated into the Portal. MERIS and AATSR data are systematically extracted over these sites and can be downloaded from the portal
- WTF data have been physically moved to Brockmann. The software to read the products, extract the meta data and generate quick-looks is currently being developed (ENVI reader for AVHRR averaged products and SPOT VGT is already completed).
- The CalVal Portal has been re-organised to better support information access
  - a new section on sites has been introduced. This gives technical information on all supported sites, provides the “site characterisation template” developed by IVOS and links to USGS site database
  - a new section on “Ressources” combines and extends information previously scattered throughout the portal:

## 1 - Cal/Val Portal

- Tools (Software and online services)
- Workshops (announcements, presentations, minutes)
- Links (Weblinks to other CalVal resources)
- Literature (Publications, reference documents)
  - Methods section has been extended by documents on SAR (based on ASAR CalVal)
- SensorML has been fully integrated. In cooperation with the Open GIS Consortium the SensorML specification has been further elaborated in order to support Earth Observation sensors. A set of 10 sensors is now described in SensorML, available both as formatted html pages as well as SensorML XML files.
- A newsletter has been prepared that shall inform the users about changes in the CalValPortal and future extension plans.
- Version 2.1 of the portal will be released in March. It will include the WTF data (see above).

## 1 - Cal/Val Portal – Evolution for the next four months

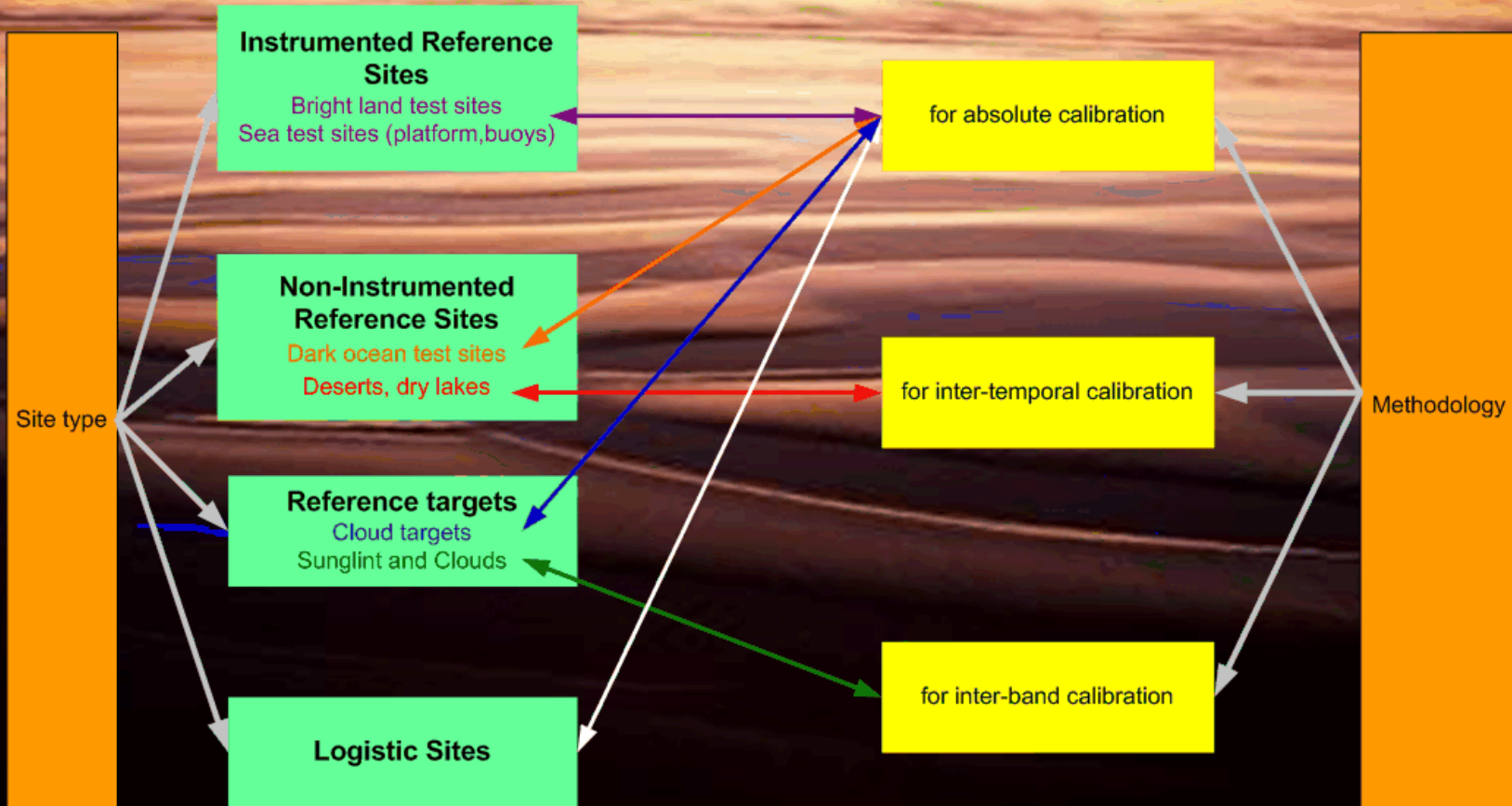
- A faster quality control system to have quicker update cycles of the Portal with new data, links, documents etc. Instead of several days, new information submitted to the Portal will now be checked and published within one day.
- Support to geometry validation
- Revision of supported sites: more sensor data will be made available for the supported sites, including historic products. The number of supported sites will be reduced.
- Support to SMOS calibration phase. The Cal/Val Portal will support the L1a,b,c and L2 products for all CalVal sites. Some of the sites are floating, i.e. we have to extend the site concept. Correlative data will come with some delay and have to be distributed as well. L1c and L2 products will be treated normally, i.e. integration into the EO data repository, accessible via catalogue search, QL and meta data. Child products have to be extracted for CalVal sites. The L1a and b data will not be registered but distributed through a project page download mechanism.
- In the long term, support to Calibration and intercalibration results will be included. A new Webservice tool will be developed for this purpose.
- The portal will be moved to a Content Management System (CMS).
  - Interactivity and faster updates of content
  - Strict quality control (where required) to ensure highest standards.

## 2- Cal/Val Sites

### Objectives:

Calibration test sites identification and characterisation

- Start of project : December 2007.
- End of project: early 2009.
- Lead by Vega (F) with Richard Santer, Gael, ETH, Brix System, Armine
- Calibration = Radiometric calibration, geometric calibration, Image quality
- Phase 1 – Analysis of the external calibration requirements
- Phase 2 – Selection and Identification of test sites calibration
- Phase 3 – Generation of a strategy for external calibration
- Phase 4 – Integration into the CalVal portal



Site identification and classification



## 3 - GMES Requirement Definition for Multi-Mission Generic Quality Control Standards

### Objectives:

- Establish a baseline specification of QA /QC tools and procedures needed to ensure implementation of “best practise” for operations of future sensors/missions in the “multi-mission” environment.
  - - All sensor technologies and ground segment
  - Via analysis of existing missions
  - To meet needs of applications as specified by users
  - Appropriate adoption/adaptation of practises of non EO industrial sector
- Identification of a set of (if possible) generic “quality reporting indicators” and/or a means of “certification” of data products and their production, appropriate to the needs of their application and those of all stakeholders in the EO sector – data producer and user.



## 3 - GMES Requirement Definition for Multi-Mission Generic Quality Control Standards

### Conclusions:

- ESA has made significant progress towards a coherent QA system based on Envisat
  - But
    - Lacks clear full easily accessible documentation
    - Evidence of traceability inconsistent and not rigorous
- Survey of stakeholders indicates broad satisfaction with delivered services but recognise need and desire to establish QA framework based on documented evidence but
  - Not keen on ISO prefer system implemented and administered by agencies
- Propose adoption of QA framework based on the requirement to document procedures and quantitative evidence of traceability to international standards.
  - Consistent with GEO/CEOSS workshop conclusions
- Implementation strategy proposals:
  - Establish tools/databases to provide access to information e.g GECA, portal
  - Team (internal or external) to review documentation/evidence, organise comparisons, provide guidance/training on analysis etc
  - Potential two stage “certification scheme”
  - Requirement driven, system architecture based on a set of linked (interchangeable) documented modules mapping the “flow of data” from collection to delivery (through software allows full process simulation)
- Quality indicators are crucial to services and “information products” but are generally bespoke to a requirement but can and should be based on statistically derived measures to allow commonality of understanding

## 1- Product Harmonization

### ➤ Project description

- “Data Harmonization” is considered a prerequisite for interoperability among spatial information systems; it will allow Europe to realize its objectives for a sustainable and interoperable functioning of GMES
- Tasks
  - Classification of sensors/products per GMES applications
  - Gather the sensors/products which give similar information
  - Survey of existing program/project RISE Glob-program (ex: Globcover) Medspiration
  - Identify coordination among project and the need in term of harmonization
  - According to the classification per products, identification of parameters that can be harmonized across products/missions)
  - Format harmonization (generic)

### ➤ Project status

- Initiated in October 2007 – 1 year contract

## 1- IPF sentinels

### ➤ Project description

- Procurement of the data processing facility in the case of Sentinel-1 and of the processing prototypes in the case of Sentinel-2&3.
- Definition of the Sentinel-1/2/3 missions Products and Algorithms.

### ➤ Project status

- To be initiated in early 2008
- Intended duration of 4.8 years for Sentinel 1 and 4 years for Sentinels 2/3

## 2- Amalfi Multi-Mission (ANGLE)

### ➤ Project description

- Implement a multi-mission facility for the systematic end-user product quality control. The scope is to ensure that all data provided to users independently of the distribution process (media on-request, NRT on line, subscriptions, etc) has been quality checked before delivery. For this purpose, AMALFI MM shall become an integrated element in the multi-mission ground segment
- AMALFI MM will also provide the means to monitor the quality of the products distributed to the users at any ESA facility
- AMALFI MM will initially cover the following missions: ERS SAR, ENVISAT, ALOS, Cryosat

### ➤ Project status

- To be initiated in early 2007

## 3 - Operational and Centralized Auxiliary Data Access

- A way towards the harmonization and optimization of the Auxiliary Data (AD) handling within ESA Ground Segments, covering present and future ESA EO operational missions (from Envisat to GMES Sentinels)
- A way to guarantee **completeness, availability and accessibility** of auxiliary information, reducing the external interfaces to the GS and optimising the data-flows
- Demonstration of the underlying concept through the **OCADA** project (part of the generic elements developments for the ESA multi-mission PDGS)

## 3 - OCADA

Within the overall ESA PDGS/SPPA context, the **OCADA multi-mission system** shall:

- provide a common internal source for Auxiliary Data gathered from multiple and heterogeneous sources
- be able to guarantee provision of and access to auxiliary information (mainly for support to EO instrument data processing chains)
- allow “proactive” maintenance of handled datasets
- cover AD gathering, handling, managing, integrity checking, configuration controlling, transforming/ reformatting and distributing responsibilities

## 3 - OCADA

Project planning decomposed into two Phases:

- 1) design, implementation and validation of the system on a single mission in a non-operational environment (1yr)
  - 2) configuration and validation of the system for a multi-mission operational environment (6m)
- The project KO has been held in December 2007

The system interfaces analysis and definition is in progress to identify the involved external entities and the processes to be associated with them (Aux. Data exchange mechanisms)

