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# Systems Harmonization and Convergence - the GIGAS Approach

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## 0.1 Background

The GIGAS[1] Support Action promotes the coherent and interoperable development of the GMES, INSPIRE and GEOSS initiatives through their concerted adoption of standards, protocols, and open architectures.

## 0.2 Preparing for Coordinated Data Access

The GMES Coordinated Data Access System is under design and implementation[2]. This objective has motivated the definition of the interoperability standards between the contributing missions.

The following elements have been addressed with associated papers submitted to OGC:

- The EO Product Metadata has been based on the OGC Geographic Markup Language, addressing sensor characteristics for optical, radar and atmospheric products.
- Collection and service discovery: an ISO extension package for CSW ebRim has been proposed.
- Catalogue Service (CSW): an Earth Observation extension package of the CSW ebRim has been proposed.
- Feasibility Analysis and Order: an Order interface control document and an Earth Observation profile of the Sensor Planning Service have been proposed.
- Online Data Access: an Earth Observation profile of the Web Map Services (WMS) for visualization and evaluation purposes has been proposed.
- Identity (user) management: the objective in the long term is to allow for a single sign-on to the Coordinated Data Access system by users registered in the various Earth Observation ground segments by providing a federated identity across participating ground segments, exploiting OASIS standards.

## 0.3 The GIGAS proposed harmonization approach

The approach proposed by GIGAS is based on three elements:

- Technology watch
- Comparative analysis
- Shaping of initiatives and standards

[1] http://www.thegigasforum.eu/
[2] See additional information on standards at http://wiki.services.eoportal.org

This paper concentrates on the methodology for technology watch and comparative analysis.

The complexity of the GIGAS scenario involving huge systems (i.e. GEOSS, INSPIRE, GMES etc.) entails the interaction with different heterogeneous partners, each with a specific competence, expertise and know-how.

### 0.3.1 Technology watch

The methodology proposed is based on an RM-ODP based study supported by interoperability use cases and scenarios used to derive requirements.

GIGAS will monitor

- the INSPIRE, GMES and GEOSS evolution and analyze the requirements, the standards, the services and the architecture, the models, the processes and the consensus mechanisms with the same elements of the other systems under analysis.
- activities in the fields of standard development that are part of the three initiatives. This task will provide the basis for how these three initiatives will strategically support consensus and efficient standards development going forward.
- architecture, specifications, innovative concepts and software developments of past or ongoing FP6/FP7 research topics.

The use of an RM-ODP approach is selected as:

- most of the architectural approaches to be compared are based on RM-ODP,
- it supports distributed processing,
- it aims at fostering interoperability across heterogeneous systems,
- it tries to hide distribution to systems developers.

However, as most of the systems to be considered have the characteristic of a loosely-coupled network of systems and services instead of a “distributed processing system based on interacting objects”, the RM-ODP concepts are tailored for the GIGAS needs.

The usage of RM-ODP for GIGAS Requirements and Technology Watch is two-fold:

- Architectural analysis: It is performed for all projects and initiatives. Its purpose is to identify possibilities but also major obstacles for interoperability. Furthermore, it identifies the major use cases to be analysed in more detail.
- Use Case Implementation Analysis: It is used to describe how selected use cases of the projects and initiatives are implemented in the different architectures. Its purpose is to identify technological gaps and concrete problems of interoperability. It is performed only for selected use cases.

The output of the Technology Watch is an RM-ODP based report containing parallel analysis on the same aspects on the three initiatives integrated by analysis of relevant FP6-FP7 projects and standardization activities.

### 0.3.2 Comparative Analysis

Based on the outcomes of the previous monitoring tasks, GIGAS undertakes a comparative analysis on solutions, requirements, architecture, models, processes and consensus mechanisms used by INSPIRE, GMES and GEOSS,

taking into account the inputs from the monitoring of FP6/FP7 research projects and the ongoing standardization activities.

Initiative Contact Points will insure that the overall policy framework and schedules for each of the three initiatives will be factored in.

The result of the Comparative Analysis includes:

- A list of recommendations to GEOSS, INSPIRE and GMES to be expanded and processed in depth in the following shaping phase
- The identification of technological gaps to be explored in the following shaping phase.
- Guidelines and objectives for the architectural approach within GIGAS
- Analysis on the schedules of the three initiatives and on the FP6/FP7 programs and standardization activities, with identification of key milestones or intervention points.