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## **GEOSS Architecture Implementation Pilot**

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The Global Earth Observation System of Systems (GEOSS) will achieve comprehensive, coordinated, and sustained Earth Observations providing decision-support to a wide variety of users. This ‘system of systems’ will promote common technical standards so that data from the thousands of different sensors and models can be combined into coherent information. The compatibility of different types of data and systems will be ensured by the emerging architecture of GEOSS making the components interoperable. (<http://earthobservations.org/>)

The GEOSS Core Architecture for exchange and dissemination of observations consists of the GEO Web Portal, Clearinghouse, and Registry components along with a process to register, discover and use numerous services accessible using GEOSS Interoperability Arrangements. In 2007, The Architecture Data Committee (ADC), through its core tasks, has guided development of an Initial Operating Capability of the GEOSS Core Architecture. Results of the development were demonstrated including use of the services for several Societal Benefit Areas. This presentation describes the programmatic and technical approaches used to initially establish a service-oriented architecture for the core components of GEOSS.

As a core task of the ADC, the GEOSS Architecture Implementation Pilot: defined a service-oriented architecture; enlisted participation of service providers; supported registration of service instances; and, demonstrated the deployed architecture in multiple scenarios. A core component of the architecture is the GEOSS Registry System, developed by the other core task of the ADC.

The AI Pilot reused a development process from the Open Geospatial Consortium

(OGC) for defining the architecture, soliciting participants in the pilot initiative, providing mechanisms for collaborative communications in an international framework, and testing interoperable services between components demonstrated as end user scenarios. The OGC Interoperability Program procedures have been used in 37 previous initiatives. A key step in the process is the Call for Participation (CFP) which for the AI Pilot in coordination with the OGC FedEO Pilot garnered 35 responses representing 105 organizations.

The AI Pilot defined an architecture using the ISO Reference Model for Open Distributed Processing (RM-ODP). RM-ODP standardizes a set of viewpoints for documenting the various aspects of a networked information system architecture. The AI Pilot architecture document includes a GEOSS enterprise viewpoint; an information viewpoint focused on Earth observations; a service-oriented approach for the computational viewpoint based on interoperability arrangements; an engineering viewpoint with components that implement the services for interoperable access to the Earth observations; and a listing of the deployed and registered components in the technology viewpoint. The architecture documentation was developed through a series of requests for information on specific topics. The architecture was a key element of the CFP and it was used to organize the development into 10 teams. The architecture document is now being evolved based upon the implementation experience in the initial development cycle. [http://www.earthobservations.org/docs/CFP\\_GEOSS\\_AR-07-02\\_11.4.2007.pdf](http://www.earthobservations.org/docs/CFP_GEOSS_AR-07-02_11.4.2007.pdf)

Results of deploying a service-oriented architecture for GEOSS include:

- Demonstration of the core architecture showing: 1) the service registration and discovery process, 2) application of the architecture to eight societal benefit area scenarios, and 3) use of the portal candidates. Screencast videos of the demonstrations are available on-line: <http://www.ogcnetwork.net/AIPdemos>
- An Initial Operating Capability has been established for GEOSS. An on-line site describing the IOC has been developed ([http://www.ogcnetwork.net/GEOSS\\_IOC](http://www.ogcnetwork.net/GEOSS_IOC)).
- To date, the GEOSS Components Registry contains 67 components; the Services Registry contained 76 services utilizing interoperability arrangements listed in the GEOSS Standards Registry. (<http://geossregistries.info/>)