



# ■ INTEROPERABILITY OF GEOSPATIAL DATA

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## ■ QUALITY, STANDARDS, AND INTEROPERABILITY OF GEOSPATIAL DATA

As the use of geographical information systems (GIS) in decision-making increases, the quality, up-to-dateness, and authorship of data gain more importance. It is necessary to include mechanisms to verify and notify users about the quality of data, and should be included into database design. Data viewers should also be able to send metadata parameters along with data to improve confidence. Given the thousands of providers, commercial products and services in the area of geospatial data, users have the possibility to access to enormous amounts of environmental data provided by different organizations. Often, this information is available in different resolutions and levels of precision, with many dates and formats.

So that users worldwide are able to exchange high-quality geospatial data, it is necessary that data be “interoperable.”

**“INTEROPERABILITY TRIES TO MAKE IT POSSIBLE FOR USERS TO EXCHANGE INFORMATION IN A SIMPLE, TRANSPARENT, OPEN, EFFECTIVE, AND UNIVERSAL MANNER.”**

## ■ INTEROPERABILITY OF INFORMATION SYSTEMS

This is a big challenge, and beyond data standardization. The number of standards of syntactic interoperability for geospatial data is constantly increasing, but efforts in this direction are not yet sufficient. To achieve total interoperability, it is necessary to continue working to shape a technological interoperability structure which masks its complexity and allows access to and exchange of high-quality data between organizations and users. It is also necessary to create a culture of information sharing and open data policies.

## ■ COMMUNITIES OF GEOSPATIAL INFORMATION

The Open Geospatial Consortium Inc. (OGC) promotes the creation of “communities of geospatial information”; that is, collections of systems or individuals who can exchange digital geospatial information without any issues. To maintain these communities active, it is necessary that the individuals and organizations become acquainted with each other in addition to the data they share. Next, they need to adopt a common vocabulary making it possible to achieve semantic interoperability. All the members of the community should be capable of providing their data to other external users to make it possible to create global data-sharing communities such as INSPIRE or GEOSS.



For 10 years CREAM has been collaborating actively in the development of INSPIRE and GEOSS, and directly contributes to the creation and final approval of new OGC standards: Web Map Tile Service v 1.0, GMLCov for JPEG2000 v 1.0, GMLJP2 v 2.0, and the single profile WMTS v 1.0.

We lead the map standards group, the documentation of user feedback, and the regional Iberian and Latin-American forum of the OGC (ILAF). We actively collaborate in the processes of creation of ISO geospatial standards, such as the new metadata standard 19115-1, the quality standard 19157, and the preservation standard.

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## CREAF HAS 6 RESEARCH AREAS IN INTEROPERABILITY

- 1 Development of Geographic Information Systems.** For 20 years we have been developing the MiraMon GIS and remote sensing software, a platform for development and experimentation using the primary geospatial standards. MiraMon's metadata manager GeMM, incorporates the primary standards concerning documentation and lineage of data and processes. More information: [www.mirammon.cat](http://www.mirammon.cat)
- 2 Development of data format interoperability standards, compression, and data preservation.** Creation of the MMZX compression and exchange format, based on the OpenXML standard in addition to our own technology. Publication of the OGC 07-057r7 WMTS standard for data visualization on the internet, and member of the WMS, WCs, and GML2JP2 workgroups. Harmonization of data compression formats (GMLJP2 and GMLCOV) for the WCS JPEG2000 extension. Writing of the Engineering Report on the applicability of the W3C PROV standard in the geospatial context.
- 3 Development of servers and geospatial data portals using international standards.** In addition to the MiraMon technology and existing international standards, various internet-based visualization, query, and download portals of interoperable geospatial information have been created. This has included SatCat, SIGPesca and SIGMA, among others.
- 4 Geospatial data quality.** Research on standardization of data describing the quality and reliability of geospatial data. Creation of models of data quality (Producer Quality Model - PQM, and User Quality Model - UQM). Creation of the dictionary of quality indicators, QualityML, <http://qualityml.geoviqua.org>.
- 5 Incorporation and use of information and communication technologies applied to the water sector.** Incorporation of applications and standards in the water sector at the European level, and determination of the degree of interoperability via interoperability experiments.
- 6 Large volumes of data (Big Data).** Automation of processes, design and implementation of algorithms in high-performance distributed systems (parallelisation) or in multi-core computers (multi-thread applications). Research in scalable standards for large volumes of data.

## RELATED RESEARCH PROJECTS CIONADOS

- OGC Interoperability Program Initiative designated OGC Web Services <http://www.opengeospatial.org/pressroom/pressreleases/2118>
- OGC Architecture and Interoperability Pilots
- QUALity aware Visualisation for the Global Earth Observation system of systems (GeoViQua) (FP7-ENV-2010-1 265178). [www.geoviqua.org](http://www.geoviqua.org)

## PARTICIPATION IN INTEROPERABILITY COMMITTEES

- Open Geospatial Consortium - OGC <http://www.opengeospatial.org/>
- OGC Iberian and Latin American Forum - ILAF [http://external.opengeospatial.org/twiki\\_public/ILAFpublic/WebHome](http://external.opengeospatial.org/twiki_public/ILAFpublic/WebHome)
- GEO Standards and Interoperability Forum <http://seabass.ieee.org/groups/geoss>
- ISO/TC 211 Geographic information/Geomatics <http://www.isotc211.org>

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