

The Environmental Information Systems *UDK, gein[®], and Portal-U* as Part of the German national SDI

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Introduction: One of the main purposes of digital maps, areal photos, and other spatial data is to present information about features on the earth's surface in a comprehensible and user-friendly way. Consequently, geospatial data do always have a thematic as well as a geographic component. While the number of thematic contexts of geospatial data is almost unlimited, the INSPIRE initiative is focused on the topic of environmental information as one of the most common thematic contexts of geospatial data. The three annexes of the proposed INSPIRE directive list a number of environmental topics that are to be covered by the future European Geodata Infrastructure (ESDI).

But where will the environmental data come from? Unlike "basic" geospatial data, which are compiled mainly by the national and regional mapping agencies, environmental information is gathered by a diverse number of national, regional and local government agencies, as well as by private and semi-private organizations. It is obvious that, in addition to the mapping agencies, these organizations will have to be included as data providers in any successful regional, national, or European SDI.

Metainformation Systems for Environmental Data: In Germany, the management of environmental information with the help of data catalogs and online information systems has a long-standing and successful tradition. Since the early 1990's, the German federal and state environmental agencies jointly maintain an environmental metainformation system, the UDK (Umweltdatenkatalog). This *Environmental Data Catalog* is based on a number of distributed databases that are made accessible through individual web-servers and a central online information broker at <http://www.umweltdatenkatalog.de> (Swoboda 1999, Karschnick 2003). The federal government and almost every federal state maintain a UDK data catalog, and the system is well established within the organizational structures of the participating agencies. All participants have committed to funding the organizational structures necessary to ensure long-term metadata collection and quality control, as well as the technical maintenance and development of the necessary software.

The UDK applies a metadata model that is compatible with international standards (e.g., Dublin Core, ISO), but was tailored to meet the specific needs of the environmental community. Within the more than 10 years of its existence, the UDK metadata model has evolved into a quasi-standard for environmental metadata in Germany. Since Version 5 (released in September 2004), the UDK metadata model has been aligned with the ISO 19115 and ISO 19119 standards for geospatial data and services. Metadata descriptions of digital maps and geo-services can now be stored in ISO-compatible format. This enhancement will strengthen the position of the UDK as the major metainformation system for geo-referenced environmental information in Germany. In this capacity, the UDK plays an important role in the emerging national SDI in

Germany (Geodateninfrastruktur Deutschland, GDI-DE). The UDK databases of several federal states were already connected to GeoMIS.bund, the SDI's metainformation broker. To further improve integration with the GDI-DE, a catalog interface based on the OGC CS-W 2.0 specification was added (UDK 5.1). This interface implements an application profile that was developed by a national working group ("AK Metadaten") of experts in the field of environmental and geospatial metadata (OGC2004). The application profile is intended to serve as a national guideline for the technical implementation of geodata catalogs.

Information brokers and portals: A second online information system, the *German Environmental Information Network - gein[®]*, provides access to metadata as well as to information that is online but not referenced by metadata. The *gein[®]* portal (<http://www.gein.de>) features extensive search mechanisms that cover not only a number of databases and online information systems (including the UDK), but also the web-pages of most environment agencies and related organizations in Germany. *gein[®]* was initiated by the *Federal Environmental Agency (UBA)* and the *Federal Ministry of the Environment, Nature Conservation and Nuclear Safety (BMU)* in 1998, but since 2003 has been financed and controlled through an administrative agreement between the German federal government and the governments of the German states, represented by the respective environment ministries (Bilo2000, Kruse2003, Vögele2004).

In 2003, it was decided to merge both the UDK and *gein[®]* into a new and comprehensive environmental information system, *Portal-U*. The planning phase for *Portal-U* has been completed and the system is expected to be released by spring 2006. The new system will combine the main features of both the UDK and *gein[®]*, i.e. it will feature comprehensive search- and visualization tools to access environmental metadata, web pages, databases, and geospatial data. In *Portal-U*, web-pages and documents can be geo-referenced based on a semantic analysis of their content. Thus the system will support spatial search tools not only to access digital maps and other "standard" geospatial data, but also to search for web-pages and text documents.

Driven by the EU-Directive 2003/4/EC on public access to environmental information (EU2003), one objective of *Portal-U* is to integrate as information providers all holders of environmental information on the federal-, the state-, and eventually also the community-level of the administrative hierarchy. Once this goal is achieved, the new system will offer a comprehensive coverage of government-held environmental information in Germany.

Like the UDK, the new information system will support all relevant ISO standards and OGC specifications for geospatial metadata, catalog-services and web mapping interfaces. Equipped with OGC compliant input and output interfaces, the system will be able to work as a portal for other OGC compliant catalog services as well as to become a source of geo-referenced information for catalogs and metainformation systems like the GeoPortal.bund (the metainformation broker of the German national SDI), or any other metainformation broker within the ESDI.

Summary and Conclusions: The proposed INSPIRE directive identifies environmental information as one of the main topics to be covered by the future ESDI. Environmental

information and data are typically produced by a large and heterogeneous group of government agencies and private organizations. With the *Environmental Data Catalog*, (UDK), the *German Environmental Information Network* (*gein*[®]), and *Portal-U*, Germany can contribute a number of well established and successful environmental (meta)information systems and standards that provide access to government-owned environmental information and data. Maintenance and development of these systems are supported by a long-term commitment of federal and state environment agencies. As the most comprehensive providers of geo-referenced environmental information in Germany, the systems can be expected to play an important role for the implementation of the German national SDI, as well as the European SDI.

Literature

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