

EuroRoadS – A pan-European road data solution



Vision, results and the way forward

The EuroRoadS project started in March 2004 and will be finalised by end of August 2006.

This brochure gives an overview of results and findings so far (January 2006), a short description of remaining work within the project and some ideas about the future direction – after the project period.

More information about the project and its results can be found on www.euroroads.org.

Vision

The vision of EuroRoadS is:

- to establish a European-wide public road data infrastructure delivering access, through a single portal, to harmonised and quality assured road information for multipurpose use. (But not to create a European road database.)
- that EuroRoadS-compliant national road databases will cover the EU25+ by end of 2012.
- that the European Directive establishing an infrastructure for spatial information in the European Community (INSPIRE) will, for the European road network, be based on the EuroRoadS specifications and other results.

In order to realise this vision the EuroRoadS project will identify the business environment and user requirements, develop a specification framework, develop and test a prototype and devise proposals for implementation and exploitation of the outlined solution.

Results

The EuroRoadS results comprise:

- a framework of specifications describing an information model, core data content, as well as an exchange model and exchange format for European road data. The specifications are based on investigations of the business environment and user requirements.
- a model for handling evaluation and quality control of road data in the information chain (from data producers to end users),
- a metadata catalogue,
- a terminology catalogue,
- results from practical demonstrations verifying: that the specifications function well for likely use cases, that the quality model gives expected results and can be used in practice, and that the metadata catalogue can be implemented in a practical solution and give expected information to the users,
- furthermore the project will develop a plan for implementation and exploitation as well as information materials.

The implementation plan will investigate possible organisational, technical and business solutions to support a network to deliver harmonised European road data.

The exploitation plan will explore the prerequisites for a successful roll-out of this network and for creating a sustainable demand for a European road data infrastructure and services.



Business environment and user requirements

The project has investigated the business environment, user groups and user requirements for road data in Europe.

In view of the current and expected market evolution, EuroRoadS has concentrated on meeting the core data needs for the following applications:

- navigation systems – authoritative updates reflecting changes to basic road network data,
- advanced driver assistance systems (ADAS) – enhanced network data with greater accuracy, full lane detail, 3-D representation, official and posted speed limits, accident statistics and other safety attributes,
- fleet, freight and logistics management systems – specific features, attributes and restrictions for goods transport,
- tolling and road charging – road data for tolling and road charging zones,
- road asset and traffic management – data for construction, operation, maintenance and environmental impact etc,
- map production, community planning, safety, social planning, military and security planning,
- planning and reporting linked to EU transportation and environment directives.

More detailed descriptions of the business environment, user groups and user requirements are available in reports from the project. These results have also informed the development of road data exchange specifications able to meet the core user needs of today and in the foreseen future.

Specification framework

The EuroRoadS project has developed specifications to enable the uniform and efficient transfer of data between producers of road data and providers of information and services for end users. The specification framework consists of:

- a road network information model that defines road network feature types and a method for relating attributes and features to the network,
- a definition of core European road data within the proposed structure. This specifies a basic level of data content proposed to be provided to the European market,
- a specification of a data exchange model and format together with a meta-data catalogue, showing the characteristics and coverage of the accessible information.

The data exchange model and format will support exchange of complete data sets and incremental updates,

- a terminology catalogue including definitions of road data related words used in the different specifications.

These specifications can be implemented in an interface solution, supporting an easy access to European road data defined as above.

Road network information model

The road network information model expresses the various road data concepts in a formalized way using application schema rules from ISO 19100 in order to create a “unified and harmonized road data language”. Using these rules means in practice to create application schemas using the UML language defining classes that represent the various concepts from the EuroRoadS domain. This is fundamental for exchanging data.

EuroRoadS exchange format

Existing road data arrangements across Europe are highly variable, EuroRoadS will specify harmonized ways to represent road data. Therefore, when providing data in EuroRoadS format, each content provider will need to transform their data according to the EuroRoadS representation. Data users may also need to transform data received, in the EuroRoadS format, according to their own data model.

The aim is to facilitate exchange of data between EuroRoadS and GDF and RADEF, as well as other formats.

Core European road data

EuroRoadS is focused on core European road data. The definition of core European road data specifies a basic level of data content that is expected to be needed for the European market. Core road data can be seen as comprising the minimum requirements for a “road data infrastructure”, when:

- functioning as reference data, to which other kinds of information may be linked,
- serving many different kinds of applications (as common denominator and integrator between different data suppliers and product and service providers),
- containing information of specific interest for the public sector in its role to support efficient transportation, traffic safety, to handle environmental and social planning etc,
- being part of the European Spatial Data Infrastructure and thereby, for example, being easily linked to other kinds of reference information, such as geographical names, administrative units and addresses,



- covering (the entire) Europe,
- providing a structure stable over time – even if data content changes frequently,
- having specific interest for applications needing cross border (pan-European) data.

EuroRoadS defines core European road data in three groups:

1. **mandatory** – data that must be supplied by the EuroRoadS exchange format regardless of the application to be supported – e.g. geometry, UUID/GUID (Universal Unique Identifier/Global Unique Identifier), functional road class, traffic importance, form of way, road type,
2. **optional** – data that can be supplied by the EuroRoadS exchange format regardless of the application to be supported – e.g. address, border node information etc. and
3. **conditional** – data needed for a specific application area – e.g. data needed for navigation.

Data exchange

The data exchange specification defines how the real world objects represented by concepts in the information model are expressed in a data format. The same data format should apply regardless of the data source of the conversion tools used. GML – Geography Markup Language – is prescribed for exchanging EuroRoadS data. There should be a clear connection between the information model classes and the various XML elements specifying the data structures for EuroRoadS data.

EuroRoadS and INSPIRE

EuroRoadS will deliver specifications for road information exchange as well as for processes to handle information, thus supporting the INSPIRE initiative to create a European geographical data infrastructure, especially for the road transport network. The aim is to link these specifications to other data components within the scope of INSPIRE, such as geodetic reference systems, water bodies/hydrography, elevation, administrative and statistical units, geographical names, buildings, cadastral parcels and addresses, including postal codes.

EuroRoadS has based its approach on the INSPIRE concept for architecture and standards, which means – amongst other things – that a future goal is to link national road data on a European level by using a portal architecture. It is, however, not included in the project to establish such a solution, but to develop a demonstrator and prepare for the implementation by recommending standards and other tools.

Evaluation and quality management

EuroRoadS is defining efficient procedures for evaluation and quality control of the data flow from acquisition and updating to use in final applications. This concept underpins the integration of a quality management scheme needed to assure data quality.

The draft EuroRoadS specification contains two quality models (a profile based on ISO 19113, and a closely linked but more detailed quality model) to be tested and validated in the demonstrator. The results from these tests will give recommendations for the specifications.

Architecture

An important task of EuroRoadS is to carry out practical demonstrations verifying that the specifications function well for different use cases, that the quality model gives expected results and can be used in practice and that the metadata catalogue can be implemented in a practical solution and give expected information to the users.

The EuroRoadS approach is not to create a single centralised pan-European road database, but rather to arrange for individual national (or regional) databases to communicate through the same exchange format and common underlying data model – created and maintained by a distributed supplier community.

System architecture of the demonstrator

The EuroRoadS project and its demonstrator put emphasis on solving problems related to the feasibility of data conversion and use between data suppliers and data providers. The demonstrator focuses on building the information chain, allowing the testing and evaluation of the data processing steps involved. The task is not to develop and implement an integrated IT architecture for this purpose, rather to put together existing solutions into a common information chain, without deep technical integration.

The demonstration covers the whole information chain from data capture and maintenance to the final application. However, only the transfer of the data from the data supplier to the data integrator or application developer is specified under EuroRoadS. The demonstrator also includes elements that are covered by the EuroRoadS specification framework – in particular data maintenance and data processing towards a final end-user application.

Implementation and exploitation

The EuroRoadS implementation plan will evaluate options and actions for implementing the EuroRoadS data service solution. The implementation plan also assesses current and projected availability of public sector road data across Europe, and arrangements needed to access them.

The recommendations deal with many aspects such as:

- data content and quality – minimum recommended data content and quality,
- harmonised data model,
- data exchange,
- business case,
- demonstrations,
- best practice.

The implementation plan will also discuss and recommend how to organise the future maintenance of the specification framework and the operation of a “Virtual Shop”.

EuroRoadS will explore possible business models and develop an exploitation plan to support a wide use of the European road data infrastructure and to facilitate services built on it. The aim is to start building a virtual supplier community that will eventually extend across all countries of Europe and that will offer a harmonised range of compatible and interoperable road data – a pan-European road data infrastructure. While the first priority is to open up access to existing publicly-held and public-sourced data, if EuroRoadS is successful then even commercial providers could become part of the supplier community, and offer EuroRoadS compliant products to a wider public-private market.

The EuroRoadS project will explore options for a future organisation on how to access road data from different countries/sources. However there are today several alternatives how to establish such an organisation, for example:

- national coordinated solutions linked to the INSPIRE portal (according to the proposed INSPIRE directive with discovery services, view services, download services, transformation services and invoke spatial data services) and/or the developments within EuroSpec,

- setting up of a specific EuroRoadS road data supplier “Road Data Shop and Operator” in which the data providers have a direct interest,

- suppliers rely upon market forces; each road data supplier separately provides data to resellers.

The way forward

In order to reach the vision and to achieve a sustainable solution for giving access to harmonised and quality assured road information for multipurpose use a number of functionalities must be met, such as to discover, view, download and subscribe for data. Furthermore general information on the EuroRoadS solution including organisation, progress plans, latest versions of specifications and catalogues etc. must be available.

Based on EuroRoadS a positive business model can be developed providing certain criteria are met. The aim is to make available data that are currently inaccessible or difficult to access, by making the data themselves and their delivery much more attractive to potential customers. Thus, data already in existence may find a future buyer. The new factor in the equation is the current and expected future growth in mass-market or pan-European applications – these will need a comprehensive, extensive and consistent dataset and especially one that is kept permanently up-to-date with latest official data changes. So it can be expected that a growing number of new markets will emerge in time as the EuroRoadS dataset becomes richer, deeper and better known. Also, it must offer sufficiently easy access so users are not tempted to collect the data themselves.

To gain the confidence of the “marketplace” in the largest sense (users and customers), a timetable must be set for the new European dataset to be available. This will be a staged introduction, with different countries making different parts of their content available as they are readied for distribution. As a first step the project partners need to decide when and how far to implement the common data exchange solution so that a substantial amount of data do indeed become available at the time of “launching” the availability of the EuroRoadS dataset.

Contact

For further information about the project, please visit EuroRoadS on www.euroroads.org or contact the project co-ordinators:

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