

# EURADIN: TOWARDS A HARMONIZED ADDRESS INFRASTRUCTURE

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## SUMMARY

INSPIRE Directive lays down general rules for the establishment of an infrastructure for spatial information in Europe, based on Spatial Data Infrastructures created by the Member States that are made compatible and interoperable.

Over the last decade it has become commonly acknowledged that good address systems, due to the important functions they are used for, constitute a very important part of a society's infrastructure. In everyday life and in an infinite number of applications (Cartography, Cadastre, Postal services, Health and Risk management, Rescue services, Navigation tools, Transportation and logistics, Emergency situations management, Telecommunications, Tourism...), addresses are used as a common reference. A good address system and the availability of high quality address data is for the benefit of Governance, Business and Citizens.

The number of IT applications is very big, and given the importance of an Addresses Infrastructure as a useful tool for public and private services, it is logical to expect the EU should have an adequate European Address Infrastructure allowing the access in a seamless and interoperable way to the existing European Addresses. At this moment, nothing that could be considered as a European Address Infrastructure exists. The lack of harmonization regarding addresses definition, registration and access, prevents a European Addresses Infrastructure from being built, which means that addresses cannot be adequately and extensively used, shared and exploited.

Ideally, an Addresses Infrastructure (with a regional, national, European or global coverage) should allow accessing all the existing addresses via a central access point (this does not imply that all the addresses should be centralized but that the access to all

addresses could be done via single central hub), and the addresses data should be adequately actualized and of course geo-referenced.

EURADIN (European Addresses Infrastructure) is a European project cofinanced by the European Union (UE) under the e-content plus Program that aims at constituting a Best Practice Network to promote the European Addresses harmonization. The emphasis of the project is being put in defining how access to existing address data should be made to ensure the interoperability of existing address data and working out a strategy on how to build up access services to national or regional addresses infrastructures. EURADIN gathers 30 European partners<sup>1</sup> in a consortium lead by the Government of Navarre (ES).

At the first phase, the state-of-art has been carried out in order to know the current situation of address systems among the members of EURADIN project and to facilitate further studies during the project. The main conclusions of the diagnostic are

- The European address systems have an important level of heterogeneity due to the different national regulations, responsible offices and development status;
- This level of heterogeneity requires better coordination between all these stakeholders in order to create a European Address Infrastructure and avoid the delays on the updating process of new buildings/addresses and decrease the difficulty to share information from several sources;
- Address systems presenting metadata information does not reach the fifty percent of the total and most of the address systems that incorporate metadata use the standard ISO 19115;
- The interoperability of the address systems should be improved to be prepared for the technological framework of the coming years

During the first months of the project, EURADIN partners agreed about the necessity to get involved further within INSPIRE developments. Trying to achieve this new challenge, different actions were initiated.

EURADIN was registered as SDIC and have been participating in testing INSPIRE Address Data specifications at European level. For this purpose has organized and participated in several meetings with INSPIRE Thematic Working Group in ADresses (TWG-AD), an also members of TWG-AD are participating in EURADIN technical meetings. Together with INSPIRE Consolidation Team of Joint Research Centre from the European Commission and TWG-AD have organized a Technical Workshop to discuss the issues raised during the testing. The result has been very successful for all the teams: TWG-AD have receive feedback directly from Data providers, JRC CT has validated directly the testing carried out by different organizations and for EURADIN has represented the opportunity to present real casuistic and ensure the compliance of our model within INSPIRE.

The conclusion is that this kind of Forum that promotes participating in the harmonization and standardization process become really positive and necessary for INSPIRE implementation.

Therefore, the project, that will be running until May 2010, will be considered successfully if the results achieved contribute to fulfil the INSPIRE recommendations with respect to addresses, enabling to go further trying to establish bridges to collaborate with other initiatives in addresses at global level.

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<sup>1</sup> <http://euradin.eu/partners>

## INTRODUCTION

INSPIRE Directive lays down general rules for the establishment of an infrastructure for spatial information in Europe, based on Spatial Data Infrastructures created by the Member States that are made compatible and interoperable.

Addresses are part of Annex I of INSPIRE, and will therefore be part of the aforementioned European Spatial Data Infrastructures. Over the last decade it has become commonly acknowledged that good address systems constitute a very important part of a society's infrastructure. In everyday life and in an infinite number of applications (cartography, cadastre, postal services, health and risk management, rescue services, navigation tools, transportation and logistics, emergency situations management, telecommunications, tourism...), addresses are used as a common reference. The number of these IT applications is very big, having as users both the public and private sector.

Given the importance of an Addresses Infrastructure as a useful tool for public and private services, it is logical to expect the European Union should have an adequate European Address Infrastructure allowing the access in a seamless and interoperable way to the existing European Addresses. At this moment, nothing that could be considered as a European Address Infrastructure exists. From a European point of view, the lack of harmonization regarding European addresses definition, registration and access, prevents a European Addresses Infrastructure from being built, which consequently means that addresses cannot be adequately and extensively used, shared and exploited by European public and private sector.

In order to allow the effective reuse and share of the European addresses data, there is a clear need for creating an adequate European Addresses Infrastructure. Following the INSPIRE directive, the establishment of an European infrastructure for addresses should be based on the infrastructures for spatial information (addresses in this case) that are created by the Member States and that are made compatible and interoperable.

As stated before, the creation of this European Infrastructure (based on distributed infrastructures), needs to achieve first of all the European Addresses Harmonization (the adoption of some standards or specifications) to make the European Addresses data accessible and usable under the premise of the interoperability.

## OBJECTIVES

The project **EURADIN (EUROpean ADresses INfrastructure)**, aims at constituting a **Best Practice Network in order to promote the European Addresses harmonization** regarding the definition, registration and access to the European Addresses Data.

According to the description of work, the **general objective** of EURADIN is **to significantly contribute to harmonizing the European Addresses, proposing a solution to achieve their interoperability, and thus facilitating the effective access, reuse and exploitation of addresses**. The harmonization of the addresses will promote the creation of new added value products and services across Europe.

The emphasis of EURADIN (EUROpean ADresses INfrastructure) project has been placed on defining the best method of securing access to existing address datasets across the EU and on the steps that must be taken to ensure interoperability between them, so as to further open-up the access to pan-European information infrastructures.

The interrelationships between the different areas of work are presented below:



Figure 1: Interrelationships between areas of work

During the first year, the consortium has been working on achieving the **specific objectives** on the Consensus Building Phase :

- Analysing the current situation regarding addresses in Europe
- Collecting the existing best practices related to addresses definition, registration, and maintenance, in order to analyse, select, synthesize and document the best ones.
- Building the necessary consensus and preparing and delivering the specifications necessary to achieve the address harmonization (Data, Metadata and Procedures) and interoperability, based on the results and best practices selected.
- Delivering a proposal for the harmonization of European Addresses (Data, Metadata, Data Flow and Business Model) based on the available INSPIRE specifications and implementing rules.
- Establishing the basis for the European Best Practice Network of addresses stakeholders by creating the European Address Forum, which will continue its labour and activity after the project end.

Main activities of PHASE I have also included:

- Preparation of Annex I Address data specification testing for INSPIRE
- Networking to INSPIRE Drafting Teams and TWG Addresses

The partners involved in the project (30 from 16 countries) are the main European stakeholders and experts in the addresses topic, being the core of the project consortium several public organizations (regional governments, national mapping agencies, national cadastral offices) of those European countries that have already developed some work (at a regional or national level) in order to achieve the harmonization of their regional or national addresses and address systems.

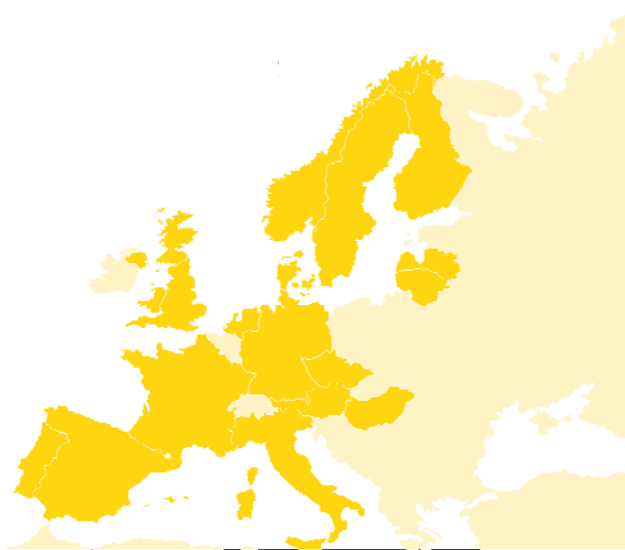


Figure 2: EURADIN Partnership

## RESULTS - ACHIEVEMENTS

Addressing is a fundamentally co-operative exercise which needs leadership but also crosses administrative and operational boundaries. There would be little purpose in an address base that only served one City. It must provide value to the Region, to the Cadastral Authorities (potentially a different shape of administrative area), to the education authority (potentially yet a different shaped area), and so forth, as well as to the Country, to other Member States and to Global Community. If it fails to do so then the value of the address data is limited and opportunities will be lost.

The use of addresses is all-pervasive across the EU. This is hardly surprising given that the vast majority of both public and private sector services are delivered by people to people at a given location described by an address.

Therefore user's requirements and also model business documentation are two key factors during the European Data Infrastructure definition process.

An extensive survey through all Europe has provided, thanks to the user's feed back collaboration, a rich overview of this subject.

Between the findings regarding the user's requirements, it has been noticed that some of the responses, even though from different countries, became repetitive possibly pointing out in some cases common requirements patrons. It has been also stated that addresses are important for the users; they have even been considered business critical for the majority of them. Likewise a big majority stated that addresses were a vital part of the information infrastructure.

Being one of the main strategically point of a business model, the potential benefit of delivering geocoded addresses to the European market, has been analysed taking into account social and economical benefits. The results have shown that if a harmonized and geocoded comprehensive address database was available across the EU, the

potential pay-back could amount to billions of Euros worth of improved efficiency every year, less unnecessary duplicated efforts, faster response times, the saving of life and property, more tax collected, and intangible socio-economic benefits affecting the welfare of the State.

The exact amount is difficult to evaluate but, given the extraordinary universality of the requirement, we have tentatively concluded that the overall value could be as high as 0.5% per annum of the EU's GDP – a total of about 63,000 million Euros.

Within the EU there exist several variations of in fact only two potential business models for the creation and management of address databases. The two models sit at either end of the spectrum and both create their own dilemmas:

- The first assumes that the data is collected at the cost of the Public Sector and either distributed free or at the marginal cost of distribution (which is frequently also free) with very light licensing terms. The economic justification for doing so is based upon the substantial value that the process, when efficiently and comprehensively managed, can bring to the wider economy and Public Sector itself. In this model, different parts of the Public Sector (National, Regional or Local) may play different but complementary roles;
- The second assumes that the data, whether collected by the Public or Private Sector (or publicly-owned body such as a Postal Service) is charged for, either at a profit or on some form of cost-recovery basis with a protective license covering Intellectual Property Rights.

As stated earlier at the beginning of this section, a well structured Address data infrastructure, regulated by Law; an European, regional or local collaboration and a proper role distribution are crucial for ensuring address data value. Collaboration success could be strongly influenced by the heterogeneity of the address systems through out Europe. Therefore, and following the project phase definition it was crucial during the first year, achieving a representative critical mass.

In order to get the big picture about addresses in Europe, several templates have been used that have highlighted the main issues in which the works should focus later on.

The first results of the project confirmed the complexity of working with “Addresses”. After analysing 41 Address systems we conclude that the systems have an important level of heterogeneity not only from the system responsibility point of view, but also from the policy support or development status including also the level of detail of the data included in the system.

This level of heterogeneity will require better coordination between all these stakeholders in order to create the European Address Infrastructure and avoid problems from the lack of coordination, delays in updating process or the difficulty for sharing the information coming from different sources

After this first diagnostic results, and taking into account the amount and level of expertises involved in EURADIN and the road map of INSPIRE, the work planned originally has been lightly modified in order to facilitate mutual collaboration. In this sense, before starting the project a very strong clustering activity has been carried out

from coordination in order to provide support to INSPIRE team and Thematic working group on addresses in charge of the proposal of Address data specification.

During the last year we have met in several occasions, we have shared all the information with TWG, moreover partners from the project have been also involved in the TWG and we have extended our meetings inviting TWG team to participate. We have been strongly involved in the testing process, analysing the specifications and providing comments and suggestions to better adapt to the current use of address data. Finally, at the end of this phase the suggestions from EURADIN partners have facilitated the proposal of a data model specification closer to the real data.

Based on these tasks and interacting with the INSPIRE data specifications draft, we have been able to match the existing INSPIRE framework to the address topic, delivering our technical proposal on Data to the European Commission as obtaining of the Harmonized Address Data Model. This technical proposal is the core result for the project, it is thought as strongly adherent to the INSPIRE Data Specification v2.0 on Addresses and it is now ready for experimentation in the forthcoming implementation phase of EURADIN.

Moreover the technical proposal will be able to add data requirements coming from the validation to the data requirements already addressed by the INSPIRE Data Specification v2.0 of the Address TWG. It also provided suggestions about a better integration and harmonization of the Address topic with other INSPIRE themes, in consideration that EURADIN project has a privileged view, as responsible of immediate implementation of a gazetteer service for addresses.

Following the INSPIRE guidelines; the incorporation of metadata information has been investigated as the basis for preparing the EURADIN Metadata profile (EMP). The amount of systems that incorporates metadata doesn't reach the 50 %, but most among them use the standard ISO 19115 also considered as standard in INSPIRE. This first approach has allowed analyzing in detail the current metadata profiles used and to propose a specific profile for the theme of addresses

However, being the potential use of the metadata partially unknown and working parallel to INSPIRE Roadmap, the data model definition has implied not to have an accurate assessment of the EMP applicability to real address data (maybe it is too complex or not, too wide or not, etc.) . Then, during the validation process, this may be reviewed and improved if necessary. Moreover the lack of experience in the implementation of feature type metadata has resulted also in a very complex work.

Regarding address system's functionality and data flow, we have obtained the following conclusions: All the process models include a complete set of functionalities, although not all of them are complete.

Facing this situation, proposing a general dataflow required a clear definition of the level of detail and scope that will represent. The general model is focused at national level, but analysing the gaps and barriers that the owners or organizations in charge of the Address systems could have.

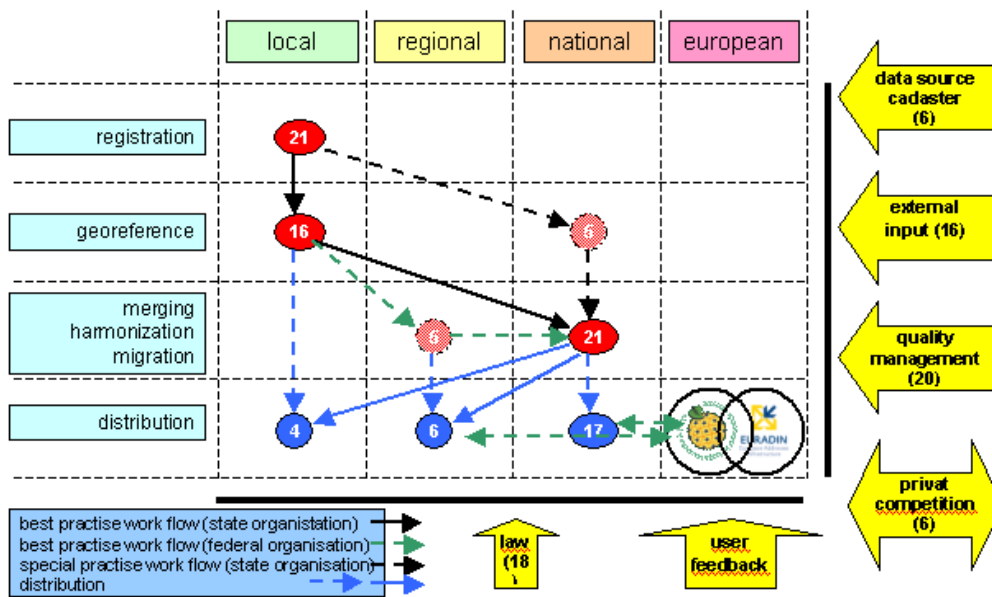


Figure 3: Address Data Flow Model

In this sense, the idea of preparing a “CookBook” as a guideline for other MS or organizations to prepare or adapt their address system data flow has proved to be a very interesting result leading the Cookbook more to a best practice FRAMEWORK than to a single Data Flow for Europe.

Stated that Data Flow depends on the size of the State and its political form of organisation, it is recommended to take the Data Flow into account in national, regional or local law. The framework has proved to be practical and could be already implemented in some Member States. It is flexible enough to handle the public and also the private sectors.

#### **ADDED-VALUE: Implication within INSPIRE development and Implementation**

When the proposal was presented in 2007 the idea was to prepare a EURADIN data model proposal. However, in November 2008 the first draft of INSPIRE Data Specification on addresses was published. The consortium decided in Bonn that the objective of the DATA model work package was to suggest improvements to the INSPIRE Address model and use this as the basis for EURADIN activities rather than create a new data model. INSPIRE Address data model was taken as “the” reference point on data modelling for EURADIN. Matching and testing of the INSPIRE data specification draft versions 1.0 and 2.0 were the core tasks for the WP, collaborating strategically in making step towards an harmonized data specification on Addresses, with the Address Data Model as conclusive output.

After the first results, and taking into account the amount and level of expertises involved in EURADIN and the road map of INSPIRE, the work planned originally has then been lightly modified in order to facilitate mutual collaboration. In this sense, before starting the project a very strong clustering activity has been carried out from



coordination in order to provide support to INSPIRE team and Thematic working group on addresses in charge of the proposal of Address data specification.

The activities supporting INSPIRE implementation will continue during the second year of the project with different activities like the participation in the Workshop “Tools and experience in support of implementing INSPIRE data specifications” organised by the JRC in Rotterdam during the GSDI and INSPIRE conference, in which EURADIN team presented the Experience from the testing of Address data specifications. Other activities will include the review of the final version of INSPIRE Data specification during the Validation phase, trying to apply the final data Model to the Gazzteer Service and providing comments or suggestions about the Data model.

## CONCLUSIONS

Regarding the **impact** to be achieved by the project, the consortium gathers the necessary mass of resources to achieve a significant impact in each of the 27 member states of the European Union: it involves directly partners from 16 different European countries, and has reached the rest of the European Union member states thanks to the contacts of the partnership with other European countries and thanks to the involvement of EUROGI (European Umbrella Organisation for Geographic Information) as partner of the project, and the support of Eurogeographics (Association of the national mapping agencies of the 27 European states) as networking and dissemination facilitator.

The project is carrying out a number of practical and achievable steps to facilitate and provide pan-European access to addresses following a specified standard; so as EURADIN project’s added value, until now, we can mention:

- It has increased the knowledge of what already exists at a European level regarding addresses;
- It has enabled this knowledge to be shared, now and in the future;
- It has provided a harmonized specification, based on the existing information and best practices at a European level, which all European countries may continue to build;
- It is creating a network of highly knowledgeable experts and is sowing the seeds for the ongoing Address Forum to monitor debate and encourage the development of harmonized addresses throughout Europe beyond the life of this *eContentplus* programme.

Nevertheless, it will continue providing added value during the second year:

- It will prove the viability of a central address multi-database hub for Europe, serving as a very interesting test bed for INSPIRE initiative.
- It will offer the opportunity to substantially expedite, the delivery of one of the core INSPIRE datasets and thus of the benefits intended by the Directive;

Regarding the **sustainability** of EURADIN after the end of the project, it will be very much facilitated thanks to the implementation of INSPIRE. The work that consortium members are performing within the project is providing them an important advantage in the implementation of the INSPIRE requirements regarding addresses, which includes

contributions coming from EURADIN testing core. In this sense, EURADIN is actually acting as the laboratory in which INSPIRE implementation requirements are being checked, using real data from the different partners. The services implemented in the framework of EURADIN will be very probably kept by the partners, as they will comply with the INSPIRE requirements regarding addresses (compulsory for all EU members) which will share at least some common requirements with the EURADIN results.

But the sustainability of the project is also based on the **European Address Forum** creation to monitor, debate, and encourage the development of harmonized addresses throughout Europe

The mission of the European Address Forum is to support the European Information Society and Knowledge economy through maximizing the availability and efficient use of good Address systems and quality Address data for the benefit of the citizens, good governance, and business. As a result of the EURADIN Project the first steps for the creation of the EAF have been done, and the objective of the creation of this Forum is more than never available.

It's expected that different address stakeholders could join the EAF during this year and later. For achieving the maximum number of participants in the Forum after the project, the coordination team is planning a final dissemination activity, centralising the final efforts in Brussels, to facilitate stakeholders' attendance. The objective is to focus not only in presenting the final results of the project but in attracting and getting involved all the different organizations: Politicians (we have already the approval from the Government of Navarra representatives), Communities (Open Street Map, Google, MS Virtual Earth,...), standardisation bodies (NEN, TC, ISO, OGC,...), other specific stakeholders (Postal Services, UPU, ...), the Forum participants and of course final address users.

The goal of the Pan-European Address Conference should be to create pan-European awareness on the value for society and the European Community of a strong address infrastructure, of the availability of high quality address data, of the dissemination of best practices and of the need for interoperable data and services across EU.

The achievement of the main objective of the conference to enlarge and underpin the address network will drive the chance of the EAF to remain sustainable.

## **REFERENCES**

EURADIN web site: <https://www.euradin.eu>