



# INSPIRE

Infrastructure for Spatial Information in Europe  
Technical documents

## Consolidation Team

# INSPIRE Annex I data specifications testing Call for Participation

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These are Dublin Core metadata elements. See for more details and examples <http://www.dublincore.org/>.

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# 1 Acronyms / Glossary

<b>Used Term</b>	<b>Definition</b>
CT	Consolidation Team
DS DT	Data Specifications Drafting Team
GML	Geography Markup Language
ISO	International Organisation for Standardisation
LMO	Legally Mandated Organisation
OGC	Open Geospatial Consortium
SDIC	Spatial Data Interest Community
SLD	Styled Layer Descriptor
CfP	Call for Participation
TWG	Thematic Working Group
UML	Unified Modelling Language
WCS	Web Coverage Service
WFS	Web Feature Service
XML	eXtensible Markup Language

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## 2 Purpose of the document

The purpose of this document is to inform INSPIRE stakeholders about the upcoming testing activities for the draft INSPIRE Data Specifications for the INSPIRE Annex I spatial data themes. The period of the testing will span October 2008 to February 2009.

The intended readership of this document is the stakeholders of the INSPIRE Directive, and in particular Spatial Data Interest Communities (SDICs) and Legally Mandated Organisations (LMOs).

This document describes the rationale and objectives of two types of testing, defines the required background material, and identifies the principal contributions sought and the timeframe of the process.

*The document will be publicly available as a ‘non-paper’, as it does not represent an official position of the Commission, and as such can not be invoked in the context of legal procedures.*

## 3 Introduction

The Directive 2007/2/EC of the European Parliament and the Council establishing an Infrastructure for Spatial Information in the European Community (INSPIRE) foresees Implementing Rules laying down technical arrangement for interoperability, and where practicable, harmonisation of spatial datasets and services as part of the infrastructure.

This Call for Participation (CfP) concerns the testing phase of the draft INSPIRE Data Specifications for the Annex I spatial data themes. The testing phase is part of the roadmap defined by the Consolidation Team (CT) in order to guide the work of the Thematic Working Groups (TWGs) for the Annex I data specifications<sup>1</sup>.

Two types of tests are identified: “transformation” and “application” testing. The objective of the transformation testing is to measure the technical feasibility and the efforts related to transforming the local data into the draft INSPIRE schemas. The objective of application testing is mainly to assess the benefits of harmonised data specifications from an end-user or application point of view.

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<sup>1</sup>[http://www.ec-gis.org/inspire/reports/ImplementingRules/DataSpecifications/Roadmap\\_annexI.pdf](http://www.ec-gis.org/inspire/reports/ImplementingRules/DataSpecifications/Roadmap_annexI.pdf)

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### **3.1 *INSPIRE Directive : recitals and articles related to testing***

The following recitals and articles of the Directive refer to the testing of the data specifications:

Art. 7 of the Directive foresees Implementing Rules laying down technical arrangement for interoperability, and where practicable, harmonisation of spatial datasets and services.

The Implementing Rules will be based on the technical provisions of the INSPIRE data specifications, currently being developed by the Thematic Working Groups for each of the data themes listed in Annex I of the Directive.

Art. 7 further specifies that the Implementing Rules shall consider, amongst others, feasibility and cost-benefit aspects.

Recital (6) is particularly relevant to the vision of INSPIRE stating that the European spatial data infrastructure should allow “to combine spatial data from different sources across the Community in a consistent way”.

Recital (13) clarifies that INSPIRE should not set requirements for the collection of new data, while (16) states that the Implementing Rules should be based, where possible, on international standards and should not result in excessive costs for the Member States.

### **3.2 *Scope of testing***

The current CfP defines the scope of testing to encompass and is limited to :

- The INSPIRE Data Specifications
- The INSPIRE Annex I themes:
  - o Coordinate reference systems
  - o Geographical grid systems
  - o Geographical names
  - o Administrative units
  - o Addresses
  - o Cadastral parcels
  - o Transport networks
  - o Hydrography
  - o Protected sites
- The technical feasibility of harmonising data
- Cost-benefits considerations of harmonising data

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### 3.3 *Types of testing*

Transformation testing focuses on the transformation of local data (e.g., from Member States' organisations) into the draft INSPIRE application schemas. The encoding of these schemas, is specified in the INSPIRE data specifications. The testing can use transformation services, but they are not necessarily part of the testing. Although the focus of the testing is on the transformation of the data structure encodings, other aspects of the data specifications should also be taken into account (such as metadata, quality, and portrayal).

Application testing is based on real world use cases in order to test the INSPIRE harmonised data specifications, possibly involving cross-theme, cross-border and cross-language elements.

### 3.4 *Purpose of testing*

The TWGs will use the results of the testing to adapt and/or refine the data specifications for their respective themes.

The INSPIRE CT will use the results of testing and the general feedback received during the testing phase in the elaboration of the draft Implementing Rules for the “Interoperability of Spatial Data Sets and Services” for the Annex I themes. In particular, the feedback will be used to decide which content of the data specifications will be used in the Implementing Rules, and which will be as guidance documents.

SDICs and LMOs can use the testing results to

- Assess which of their data sets are relevant in order to fulfil the requirements from the draft INSPIRE data specifications
- Assess how well their data sets are aligned with the INSPIRE data specifications
- Assess how to support the transformation process
- Assess the readiness and demonstrate the usefulness of transformation tools and methods

## 4 **CfP addressees and contributions**

This CfP addresses registered INSPIRE SDICs and LMOs. Projects, organisations, companies, consortia, or other parties that are interested, but not yet registered as a SDIC or LMO, are invited to register as such through the INSPIRE website ([http://inspire.jrc.it/sdic\\_call/register.cfm](http://inspire.jrc.it/sdic_call/register.cfm)) in order to take part in the testing. Participation is based on in-kind contribution.

The following (non-exhaustive) list gives examples of possible contributions:

Testing infrastructure

- Providing data for testing including the technical documentation of the data set (Application schema (UML), encoding (GML/XML or other), data format specification, code lists, ...) related to INSPIRE Directive Annex I spatial data themes

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- Providing test licences for software for the duration of the testing period.
- Providing software tool assistance (support functionality)
- Providing training or guidance in the use of the testing tools

#### Transformation Testing

- Developing and documenting transformation testing methodology
- Developing transformation rules or mappings from input data set to INSPIRE data specifications.
- Performing and documenting transformation tests
- Demonstrating the efficiency of the chosen technical solution
- Coordinating transformation tests
- Reporting on the need and requirements for registers such as code list registers

#### Application Testing

- Developing and documenting application testing methodology
- Developing and documenting use cases for application testing
- Performing and reporting about application tests
- Demonstrating the usefulness of the harmonised schemas for applications
- Coordinating application tests

#### Other

- Providing contextual cost-benefit elements not directly related to the testing (e.g number of data sets in Member state/per LMO level, Average/min/max size of data sets, Frequency and type of use, etc)
- Reviewing test results

A proposal for contribution does not necessarily have to cover all aspects necessary for a test to be performed. It is for instance quite acceptable that a contributor only proposes to provide data sets for testing while another contributor proposes software licences for testing purposes. In order to match proposed contributions, the JRC INSPIRE CT in collaboration with contributors, will try to match the complementary parts from all responses in order to establish test teams that cover all aspects needed for the testing.

## 5 Background material

Input information is provided by the JRC and represent the work of the Data Specifications Drafting Team, the Annex I Thematic Working Groups and the INSPIRE Consolidation Team. The following documents will be provided for the testing process:

- The draft versions of the data specifications for the Annex I themes, including the application schemas and their encodings;
- This CfP for testing;
- A test report template;
- The “INSPIRE Data Specifications Cost-benefit considerations” document (as a guideline for the cost-benefit considerations that are part of the test report template).

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Access will be given to the user requirements survey and to the use cases described by the TWGs in order to facilitate the testing.

## 6 Transformation Testing

Transformation Testing concerns the Annex I draft data specifications, specified by each of the TWGs. The first versions of the draft specifications shall be used for planning the testing, whereas the second versions shall be used for the actual testing once they become available (for schedule see Section 9.6). The data specifications produced by the TWGs follow ISO 19131:2007 (Geographic information – Data product specifications) and include a number of sections that may be subject for testing. In particular, the sections concerned are:

- Sections 5 and 9, which constitute the application schema and its encoding and Section 6 specifying the coordinate reference system (CRS), can be subject to testing on schema/data transformations.
- Sections 7 and 8 specifying metadata and quality can subject to testing whether member state have required information available.
- Section 10 specifying portrayal can be subject to testing whether harmonised data can be portrayed using the specified portrayal rules.

### 6.1 Data transformation

The main technical challenge is the testing of transforming data in local schemas (e.g., from Member States) into the encoding of the (common) application schema, which is specified in the delivery section (Section 9.2) of the INSPIRE data specification for each theme in Annex 1. The transformation of data also covers transformation of data in one coordinate reference system into another (here according to Section 6 in the data specifications and the specification of the Annex 1 theme Coordinate Reference Systems).

The main issues to be addressed for data transformation include:

- Can local data be mapped to common schema?
- Do existing data cover the content required?
- Can local CRS be mapped to target CRS and is there loss in precision?
- What are the technical challenges for transformations?

The Commission does not prescribe any particular approach for the data transformation testing. Broadly, two overall approaches can be distinguished:

- On-the-fly transformations
- Off-line transformations

On-the-fly transformations are used when data stored in one schema is requested in another, and the transformation is executed synchronously. Here, request/transformation/response are considered as one action. An example is that national road data in a local schema is, upon requested, transformed into an INSPIRE-compliant schema. The data is not stored (persistently) in the INSPIRE-compliant schema but transformed into the INSPIRE-compliant schema when requested. In the

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on-the-fly transformation, query transformation needs to be taken into consideration. If the data is not stored persistently in the common schema, any query expressed using the common schema has to be transformed into the local schema.

Off-line transformations are used in two different situations: 1) ad-hoc or 2) at (ir)regular intervals. (1) occurs when data stored in one schema is requested in another, and the transformation is executed asynchronously. Here, request/transformation/response are executed as a sequence of actions. An example is that a request for road data in the INSPIRE-compliant schema is received. Then a transformation process is initiated and, when it has completed, the requester is notified and he/she can download the data. This approach is useful, e.g., when data is stored in complex models and considerable processing time is required in order to execute the transformation. (2) occurs when data stored in one schema is transformed at (ir)regular intervals into another schema independently of external requests. An example is that road data in a local schema is transformed every night into a representation in the INSPIRE-compliant schema. Such a transformation could be scoped only to data that has been updated since the last transformation. In the off-line transformation setting, attention should be given to the fact that replicas will exist of the same features, thus inconsistencies may occur.

The transformations can be done either via (network) services or using desktop software solutions/products.

LMOs and SDICs are free to choose which approach to take for the testing purposes. The decision depends on skills, experience, and software available. Even a comparative test of various approaches would be useful. What is important is that the required costs (resources, investment in software/software developments, and hardware) are assessed.

The data output of the transformations can be stored either in files or distributed via OGC WFS (or WCS).

## **6.2 Data quality and metadata**

Data quality and metadata are considered together even though they raise different issues for the testing.

Concerning metadata (for evaluation and use), the main issue to be addressed is:

- Are metadata (including quality elements) available for filling the required metadata elements?
- Is it possible to generate automatically the metadata required?

The transformation testing will mainly focus on how to transform existing metadata into the required metadata elements required by each data specification. It could also be that generation of new metadata is required which then should include an assessment of the cost related to the generation (e.g., automated or manual).

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The INSPIRE data specification may also specify minimum data quality requirements. Concerning these, the main issues to be addressed include:

- Can the minimum data quality requirements be tested? How?
- Are the minimum data quality requirements met?

The testing of minimum requirements of data quality can be difficult. It is important for the testing that evaluation criteria are specified and that costs related the assessment of quality (if not already available) are assessed.

### **6.3 Portrayal**

Testing the portrayal section of the INSPIRE data specifications involves assessing whether the data from the member states can be portrayed according to the specified rules. The test will reveal any problems/errors with the specification of portrayal rules, in particular the Styled Layer Descriptor (SLD), but also whether these rules are suitable.

The testing will apply the provided SLD in order render the data, e.g., via an OGC WMS or if possible INSPIRE View Services.

## **7 Application Testing**

Application Testing is concerned with using the harmonised INSPIRE data for implementing real-world use cases. The testing can be based on the high-level use cases developed by the TWGs or other use cases defined by the contributors. Ideally, the use case should require the combination of different INSPIRE data themes and themes from different administrative units in order to show cross-thematic, cross-border and cross-language benefits.

The goal of the testing is twofold:

- to show whether the chosen use case can be implemented using data that is harmonised according to an INSPIRE data specification
- to illustrate benefits of a scenario that uses harmonised INSPIRE data (called INSPIRE scenario) by comparing the required efforts to a baseline scenario that does not use INSPIRE-compliant data.

The use case can be implemented using an existing software application that uses data that is not harmonised according to an INSPIRE data specification, e.g. data from different Member States or harmonised European data in a non-INSPIRE schema. Alternatively, it can be an application that is particularly developed for the testing. Such an application should follow as closely as possible a real world use case. However, in order to facilitate testing, certain simplifications can be made in the implementation, example, e.g., the application need not use data that is distributed on several servers or have a fully functional user interface.

The INSPIRE scenario assumes data to be available in the schema and encoding defined in the relevant INSPIRE data specification. Thus, application testing can

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clearly benefit from having access to the harmonised data, which are a result of transformation testing. The INSPIRE scenario can be used to show that the chosen use case can be implemented using INSPIRE-compliant data and (optionally) to illustrate the benefits of harmonised INSPIRE data.

One way for illustrating these benefits is comparing the INSPIRE scenario to a baseline scenario, which assumes the data used in the application are delivered/accessed in their local schema and encoding. This means that some kind of harmonisation was required for the data to be used in the application. For the comparison with the INSPIRE scenario, it is important to document and estimate the effort that was required for the harmonisation. This effort can be considered as a benefit of having harmonised data available.

## 8 Expected Outcome

The expected outcome includes:

- Documentation of the architecture used for the testing including, e.g., components and software
- Documentation of the transformation test methodology (guidance document) including specifications of, e.g., mappings, configurations and schemas
- Documentation of the application test methodology (guidance document) including use case specification
- Documentation of the testing results and experiences, including
  - o sample input/output data (if possible under the license conditions)
  - o problems, e.g. related to the mappings and used tools, and solutions
- Documentation of cost-benefit considerations
- Continuous feedback to the TWGs (including JRC contact points) so that comments can be taken into account

Individual contributors are not expected to cover all of these aspects. Rather, each contributor shall provide documentation of those aspects that cover their contribution. The contributor(s) shall compile the documentation of the above aspects (one or more, including others if they found important) into a single test-report following the guidelines in the template that will be provided later.

The outcome will be published with restricted access to the TWGs, the drafting teams, and the European Commission. If agreed with contributors, the outcome will be made publicly available.

## 9 Administrative issues

### 9.1 *Who can apply?*

- Participation to the testing is limited to registered SDICs and LMOs.

## 9.2 *How to apply?*

- An online application form will be made available to registered SDICs and LMOs. Not yet registered and interested parties to participate in the testing can register as SDIC or LMO on INSPIRE web site first ([http://www.ec-gis.org/inspire/sdic\\_call/register.cfm](http://www.ec-gis.org/inspire/sdic_call/register.cfm)).
- SDICs/LMOs can apply only through online application form which will be available from 15 August 2008 until 15 September 2008. In order to facilitate planning we would appreciate a first indication of interest by 1 September 2008 by email to Freddy Fierens (freddy.fierens@jrc.it). The scope is a preliminary assessment of complementarities, coverage and gaps and potential teaming of contributors.

## 9.3 *Deadline for submission*

- The application form shall arrive by 15 September 2008 12h00 CEST.

## 9.4 *Type of contribution*

- The contribution of SDICs and LMOs to the testing is in-kind contribution. This includes the use of testing infrastructure needed to perform the tests;

## 9.5 *Deliverables*

- The deliverable of the testing is test reports according to a template that will be provided to the testers by the JRC.

## 9.6 *Time Planning*

CfP published	24 July 2008
First indication of interest outlining briefly contributions (by email to Freddy Fierens - freddy.fierens@jrc.it)	1 September 2008
Submission of application form	15 September 2008
1 <sup>st</sup> draft of themes data specifications	30 September 2008
Testing begins	16 October 2008
2 <sup>nd</sup> draft of themes data specifications	15 November 2008
Testing finished + test reports/documentation delivered to CT	13 February 2009