INSPIRE
Infrastructure for Spatial Information in Europe

Member State Report: Luxembourg, 2010

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1 INSPIRE Reporting – Overview of requirements

There are five topics addressed in the Reporting chapter of the IR:

1. Organisation, co-ordination and quality assurance

   The first part of this section is concerned with the way in which the contact point and co-ordinating structure for the infrastructure for spatial information are organised – the body responsible, its associated co-ordinating structure and some information about how this works. The second part offers the MS the opportunity to report on quality assurance processes within the infrastructure for spatial information (as required by Art 21 of the Directive).

2. Contribution to the functioning and coordination of the infrastructure

   The second section asks for information about the stakeholders involved in the infrastructure for spatial information – including a description of their roles, how they co-operate, how they share data/services and how access is made to services via the INSPIRE geo-portal.

3. Usage of the infrastructure for spatial information

   Having some or all of the various components of the infrastructure for spatial information in place is important, but equally important is if, or how much, the infrastructure is being used. This part of the report is intended to give MS the opportunity to comment and explain the results of the indicators on the usage of the different services, and to describe how spatial data and services are being used by public bodies and if possible (because it is recognised that this is difficult to observe) how they are being used by members of the general public. Because of the environmental emphasis of the Directive MS are particularly encouraged to find and describe examples of use within the field of environmental policy. The report should also describe examples of cross-border usage, efforts to improve cross-border consistency and examples of the use of transformation services.

4. Data sharing arrangements

   Chapter 5 of the INSPIRE Directive is concerned with data sharing. It has not been possible to derive adequate indicators to monitor data sharing – the subject does not lend itself to quantitative methods in a way that would provide meaningful output. It is a major part of the Directive however and so this Chapter is dealt with, in terms of monitoring and reporting, by asking MS to describe data sharing arrangements in their 3 yearly reports. MS are required to provide an "*overview*" of data sharing arrangements i.e. not all such agreements have to be listed and described (which would be very difficult and extremely onerous) – but MS are encouraged to provide sufficient description to enable readers to understand the main type or types of agreement that are used – both for sharing of data between public bodies in the MS and between those public bodies and the institutions of the EU. An important section also required is a description of known barriers that may be inhibiting the sharing of spatial data and services, and what steps the MS are taking to overcome those barriers.

5. Cost and benefit aspects

   Finally, the Directive requires MS to quantify the costs and benefits involved in the establishment and maintenance of the infrastructure for spatial information *that are directly attributable to the implementation of the Directive*. The report should attempt to estimate the costs and to provide examples of benefits as described in the IR. As with other aspects of the report MS are responsible for deciding the depth/level of reporting that they find appropriate to satisfy the IR and to provide a suitable level of information for stakeholders.

2 How to use this template

This template provides a structure Member States can use to collect and transmit the reporting information to the EC.

This template mainly reflects the list of elements required by the Commission Decision 2009/442/EC on monitoring and reporting. These are the mandatory elements. For every chapter the relevant article of the implementing rules on monitoring and reporting will be reported.

Also some optional features, not strictly required by the relevant legislation, are included. These features can either contain a suggestion on what elements can be grouped under a certain topic foreseen by the legislation or they can contain additional elements that enhance the readability of the document. These features are optional.

You have full rights to deliver this report in your own language, we will then translate it internally. Of course if the report will be already in English, or accompanied by its English translation, that will be welcome.

Disclaimer: This 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 Executive summary

Please refer to the introduction in chapter 5 for an executive summary.

4 Abbreviations and Acronyms

INSPIRE Directive	Directive 2007/2/EC
MS	Member State
SDI	Spatial Data Infrastructure
OGC	Open GIS Consortium
ACT	Administration of Cadastre and Topography
PCH	Administration des Ponts et Chaussées (Road administration)
ASTA	Services Techniques de l'Agriculture (Agricultural services administration)
AGE	Administration de la Gestion de l'Eau (Water management administration)
WMS	Web Map Service
WFS	Web Feature Service
LSDI	Luxembourgish Spatial Data Infrastructure
ILDG	Infrastructure Luxembourgeoise de Données Géographiques
CTIE	Centre des Technologies de l'Information de l'Etat (National IT administration)

5 Introduction

The Government of the Grand-Duchy of Luxembourg has created an interdisciplinary and inter-ministerial task force that takes care of the Luxembourgish Spatial Data Infrastructure (LSDI) / ILDG (Infrastructure Luxembourgeoise de Données Géographiques). This group is lead by the Administration of Cadastre and Topography (ACT), who is responsible for the biggest part of the geographic data available in the Grand-Duchy.

The metadata is managed using the online metadata editor and validator of the ACT's geoportal (http://www.geoportal.lu).
All the datasets and services that are relevant for INSPIRE can be discovered in the geoportal's metadata catalogue, can be visualised in the geoportal map viewer, accessed / downloaded through OGC webservices (WMS, WFS) or ordered online through the geoportal's shop module.

All the metadata that is available in the catalogue (or through the geonetwork-based CSW service) are compliant with INSPIRE and have been validated using the online INSPIRE metadata validator.

The metadata editor is available to every stakeholder, so that everyone can create and define the metadata sets of the datasets and services that he defines as being relevant for INSPIRE Annexes I, II and III.

The Monitoring Document for 2010 lists all the datasets and services that are defined in the metadata catalogue at the current state.

6 Co-ordination and quality assurance (Art. 12)

6.1 Coordination (Art. 12.1.)

6.1.1 Member State contact point

Art. 12.1. (a) the name, contact information, role and responsibilities of the Member State contact point;

Name and contact information

Member State Contact Point	
Name of the public authority	Administration du Cadastre et de la Topographie
Contact information:	
Mailing address	54, av Gaston Diderich
Telephone number	+352 44 901 1
Telefax number	+352 44 901 333
Email address	ecadastre@act.etat.lu
Organisation's website URL	http://www.act.etat.lu
Contact person (if available)	Francis Kaell
Telephone number	+352 44 901 244
Email address	Francis.Kaell@act.etat.lu
Contact person - substitute (if available)	Jeff Konnen
Telephone number	+352 44 901 261
Email address	Jeff.Konnen@act.etat.lu

Role and responsibilities

The Administration of Cadastre and Topography (ACT) is a central key player in Luxembourg in the field of geodata. Indeed, among the responsibilities of ACT provided for by law, appear the creation, updating and delivery of the main basic geodata like the cadastral map and its subsets, the different topographic and cartographic maps and databases, the digital terrain model, the official national orthophoto etc. Considering this and the fact that ACT has launched many years ago an innovative project that should lead to the creation of the national geoportal, it seems natural that ACT has been given the lead of the LSDI task force and that ACT assumes the role of INSPIRE contact point.

The indicated contact person, M. Francis Kaell, is the leader of the Geoportal Service inside the ACT and is thus responsible for the geoportal which is the central distribution point for all the INSPIRE relevant data sets and services.

All other public bodies concerned by geodata relevant for INSPIRE are closely linked to the LSDI, and provide delegates for the LSDI coordination committee CC-ILDG (comité de coordination de l'Infrastructure Luxembourgeoise de Données Géographiques).

6.1.2 The coordination structure

Art. 12.1.
(b) the name, contact information, role and responsibilities, organisation chart of the coordinating structure supporting the contact point of the Member State
(c) a description of the relationship with third parties;
(d) an overview of the working practices and procedures of the coordinating body;
(e) comments on the monitoring and reporting process.

Name and contact information

Coordinating structure supporting the MSCP	
Name of the coordination structure	Comité de Coordination de l'Infrastructure Luxembourgeoise de Géodonnées CC-ILDG
Contact information:	
Mailing address	B.P. 1761 L-1017 Luxembourg
Telephone number	+352 44901 - 1
Telefax number	+352 44901 - 333
Email address	Francis.Kaell@act.etat.lu
Organisation's website URL	http://www.act.public.lu
Contact person (if available)	M. Francis Kaell
Telephone number	+352 44901 - 244
Email address	Francis.kaell@act.etat.lu
Contact person - substitute (if available)	M. Remy Dhur
Telephone number	+352 44901 - 567
Email address	Remy.dhur@act.etat.lu
Date and period of mandate	

Role and responsibilities

The CC-ILDG is an organization that acts as a steering committee of all the activities concerning the creation, updating, management and distribution of geographic data, either in analog or in digital form. The idea behind this committee is to gather the geodata stakeholders' decision makers, in order to create a platform for a coordinated approach in all activities concerning geodata.

Organisation chart

The committee has been created quite recently (mid 2009) and has its initial organisational shape:

President: one senior representative of Administration du Cadastre et de la Topographie (ACT) – actually assumed by M. André Jean PEFFER, director of ACT

Vice president: one senior representative of Administration du Cadastre et de la Topographie (ACT) – actually assumed by M. Remy DHUR, senior engineer of ACT

Members: the members are representatives of their respective public organizations, appointed by their ministers or directors in charge. Among the collaborating institutions figure the following:

- Administration du Cadastre et de la Topographie ACT
- Administration des Ponts et Chaussées PCH
- Administration de la Gestion de l'Eau AGE
- Ministère du développement durable MDDI
- Administration des services techniques de l'agriculture ASTA
- Administration de l'environnement AEV
- Service géologique du Luxembourg AGL
- Ministère des Finances MFin
- Ministère des Transports MT
- Service central de la statistique et des études économiques STATEC
- Inspection générale de la sécurité sociale IGSS

- Musée national d'Histoire et d'Art MNHA
- Musée national d'Histoire Naturelle MNHN
- …

Thematic Working Groups: following the actual subjects on the agenda, the detailed work is done within smaller groups, called Working Groups. They consist of several representatives and work independently on their subject, produce the corresponding deliverables and report to the general assembly.

The actual WGs are:

- WG for the creation of an INSPIRE law text
- WG for the publication of the agricultural use reference parcels
- WG for the water data
- WG for socio-economic data
- WG for the management of metadata
- WG for the inventory of INSPIRE data

Relation with third parties

Relations with third parties always happen following the administrative hierarchy procedures: contact is made via the president, and actual director of ACT, via the Minister of Finance, with the minister responsible for the third party in case of a public body, or directly with the third party in the other cases.

Overview of working practices and procedures

The CC-ILDG has been designed as a collaborative instance, and has been operational until now without any official system of rules. The proposed INSPIRE law text, which actually is undergoing the official legislatory procedure, institutionalizes the CC-ILDG but does not give any precisions about its working principle. A more precise rule text, which will determine the working procedures in the future, can be established after the national INSPIRE law enters into force. The working practices that have been followed until now consist in monthly general assemblies, at the head offices of ACT in Luxembourg, where all the activities are discussed and decided. One central topic has dominated the agendas in 2009 and 2010, i.e. INSPIRE and its implementation in Luxembourg.

At the same time, next to INSPIRE, which puts a huge workload on the much reduced workforce available, the CC-ILDG has nevertheless been able to initiate other projects, which need common studies and activities between several actors. This leads to interesting synergy effects and in the long run to a much more cost effective cooperation. Several examples may illustrate this new approach, which is only possible because of the new central coordination in the field of geodata:

- ASTA (agriculture administration) and ACT cooperate to create a special function in the geoportal mapper, which allows the farmers to view and verify the officially determined agricultural land use parcels, and which offers graphic and interactive tools to declare new or modified situations.
- AGE and ACT cooperate intensively to publish the well-known water-GIS in the geoportal
- Many members work together to create a new public address database, and to establish a procedure to update it.

- MNHN and ACT developed a biodiversity geoportal soon to be available on map.mnhn.lu
- AEV and ACT currently work on a renewed polluted area data management system

Following eventual new demands that may be made, new different working groups will be created to treat those specific themes.

6.1.3 Comments on the monitoring and reporting process

6.2 Quality Assurance (Art. 12.2.)

6.2.1 Quality assurance procedures

Art. 12.2. (a) a description of quality assurance procedures, including the maintenance of the infrastructure for spatial information

The Geoportal, which is the LSDI's backbone, is up-to-date and state-of-the-art regarding IT infrastructure. The entire geoportal is running on a farm of clustered virtualised machines, that are fully backuped, and a physically distinct set of machines will be set up for the means of disaster recovery in 2010 and 2011. Disaster recovery will enter into production in the first half of 2011. In this regard, the strong collaboration between ACT and the Water management administration AGE (Administration de la Gestion de l'Eau) will be intensified; IT related know-how and workforce will be made available.

Specialised software has been implemented to continuously scan the different webservices available at the geoportal. Low trigger levels make sure that the staffs are immediately informed if webservices tend to have too long response times or time out.

In regard to the usability, in the end of 2009 and the first part of 2010 much work has been dedicated to improve the ergonomic quality of the geoportal. The mapping tool has been integrated in the welcome page, graphic appearance has been rendered in a more pleasant design, buttons have been redesigned, and the ordering function (geographic definition) has been completely revised and made more homogeneous.

A second map viewer available at map.geoportal.lu and aimed to the general public has been developed in order to democratise the access to the available geodata. The chosen approach has been inspired by the Swiss geoportal and proves to be very successful.

For quality assurance in terms of geodata, it is important to establish strong links between the ILDG, the geoportal team, and the data holder and producer. In the actual state, the available geodata essentially come from ACT itself, which acts at the same time as the data producer and the geoportal manager. This means there will be no problems in terms of availability of the cadastral parcel data, the topographic and cartographic databases and all the other geodata ACT provides. The links with SGL, PCH and AGE, as well as with the environmental ministries are very strong and are based on excellent relationships between the directors and on a common goal regarding optimized fulfilment of the official obligations in terms of geodata. For other data, that might be taken into consideration for INSPIRE in the future (updating of Monitoring & Reporting in the coming years), this level of co-operation has yet to be established.

6.2.2 Analysis of quality assurance problems

Art. 12.2. (b) an analysis of quality assurance problems related to the development of the infrastructure for spatial information, taking into account the general and specific indicators

Concerning quality problems of geodata, many datasets are not too problematic, in the sense that they are quite static:

- the official orthophoto is renewed in a 3 year cycle, and does not need any maintenance
- the official maps have a similar renewal cycle
- the official cartographic databases are not (yet) updated incrementally

One geodata ensemble which is difficult to manage in terms of quality however, is the cadastral map:

- The parcel layer is continuously updated in a specialised procedure, as well as the corresponding database. Due to the complexity of the actions undertaken, errors on the data level regularly occur. It is important to be very effective in the quality control when the weekly synchronisation is performed.
- the cadastral buildings' dataset is far from completion, workforce is lacking to achieve completion so far

6.2.3 Measures taken to improve the quality assurance

Art. 12.2. (c) a description of the measures taken to improve the quality assurance of the infrastructure
The service of the geoportal continually aims to perfection and the services offered by the geoportal are improved on a daily basis by becoming more complete, more reliable and more powerful.

In terms of data quality, the geoportal department of ACT has established several procedures that are able to identify major problems concerning the data and their availability.

- specialized software permanently scans the general availability of the WMS & WFS webservices, as well as their response time, and files alarm messages when certain trigger values are passed
- at data synchronisation, several critical data are analysed manually, graphically and statistically, before the new dataset version is released into the geoportal database and the webservices
- the virtualisation of the servers, which begun 2 years ago, is nearly complete. This allows a more flexible management and an easier implementation of high availability measures.

6.2.4 Quality certification mechanisms

Art. 12.2. (d) where a certification mechanism has been established, a description of that mechanism

A very complete monitoring mechanism has been defined in order to continuously track the availability and performance of machines, services, webpages etc. A central server regularly sends check requests to every service to be monitored and dispatches warnings through eMail and SMS to the concerned actors. A detailed needs assessment and benchmark has been completed in 2009 to choose the software best suited for this task.

7 Functioning and coordination of the infrastructure (Art.13)

7.1 General overview description of the SDI

Vision / policy / strategy (where applicable, reference could be given to existing documents, as well as a short summary within the report)

Luxembourg's SDI has not been created solely to respond to the INSPIRE obligations, but the need of a more coordinated and organised approach to the national geodata subject had been recognised earlier. Indeed, more and more public authorities need maps to represent their core data, or are involved in the capture ore creation process of geographically presentable information. Therefore, the overall demand of GIS specialists, geomaticians, GIS software, web mapping, interoperability, data exchange etc has constantly been on a rise to a degree that government actors have asked for a better organised and eventually more centralised approach. Upon this demand, ACT and the National IT administration CTIE (Centre des Technologies de l'Information de l'Etat) launched a study on the possibilities, impacts and needs of a national SDI, based upon the geoportal, which previously had been created and launched by ACT.

The main targets of the LSDI are

- the optimised use of the public geodata sets at Government level
- easier access to geodata in general, better availability
- better basis for decision taking
- respect of the general standards and norms
- centralised know-how and support to all public bodies
- metadata creation, updating and management
- geodata creation, updating and management
- support in GIS and geodata project management for all the public bodies
- centralised geodata and metadata extraction and delivery

7.2 INSPIRE Stakeholders

Art. 13 (a) an overview of the various stakeholders contributing to the implementation of the infrastructure for spatial information according to the following typology: users, data producers, service providers, coordinating bodies

Stakeholders contributing to the implementation of the SDI could be classified according to the following typology: users, data producers, service providers, coordinating bodies)

The following table shows the actually identified stakeholders of INSPIRE in Luxembourg.

Name of stakeholder or group of stakeholders	Role(s)
Administration du Cadastre et de la Topographie ACT (National Cadastre and Topography administration)	coordinating body, service provider, data producer, user
Centre des Technologies de l'Information de l'Etat (National State Information Technology administration)	coordinating body, service provider

Administration des Ponts et Chaussées PCH (Road administration)	service provider, data producer, user
Administration de la Gestion de l'Eau AGE (Water management administration)	data producer, user
Administration des services techniques de l'agriculture ASTA (Agricultural technical services administration)	data producer, user
Administration de l'environnement (Environment administration)	data producer, user
STATEC (Statistics administration)	data producer, user
Ministère du développement durable (Ministry of sustainable development)	data producer, user
Service géologique du Luxembourg AGL (Geological service)	data producer, user
Inspection générale de la sécurité sociale (Social security inspection)	data producer, user
Ministère des Transports (Transportation ministry)	data producer, user
Ministries & other state services in general	data producer, user
Municipalities in general	data producer, user
Public research centers, university	data producer, user

7.3 Role of the various stakeholders

Art. 13 (b) a description of the role of the various stakeholders in the development and maintenance of the infrastructure for spatial information, including their role in the coordination of tasks, in the provision of data and metadata, and in the management, development and hosting of services

Name of stakeholder or group of stakeholders	Role(s)
Administration du Cadastre et de la Topographie (National Cadastre and Topography administration) - ACT	ACT was, together with CTIE, responsible for the concept study about the need, feasibility and impacts of a national SDI in Luxembourg. As ACT had started developing the so-called eCadastre solution, which continuously was further developed into the national geoportal (www.geoportal.lu), one of the main points of this study, concluded by the report dated on 3rd January 2008, was the analysis in how far ACT's geoportal would be a suitable technical platform for a national SDI, already taking into account the needs established by the INSPIRE directive. The result was the diagnosis that the geoportal, in its main functionalities, was principally very well equipped to respond to the different needs enumerated and considered in the study. As a consequence, government took the official decision to have the national SDI created, and entrusted ACT with the coordination, organisation and management of this infrastructure. Funds were made available to implement a dedicated workforce in a dedicated department at ACT. This department is active since the beginning of 2009, but the necessary minimal workforce was only available at the end of 2009. A 5 person team manages the geoportal, its IT platform, its content, its services, functions etc. On the other hand ACT also acts as a geodata provider, as

	mentioned above : cadastral map, parcels, buildings, region names, topographic content in digital and analog form, administrative boundaries, maps, orthoimagery, digital terrain models are basic geographic content created, maintained and provided by ACT. The geoportal and LSDI department also provides general geodata and GIS knowhow as well as project management support to other public bodies, in the field of geodata. By doing so, it helps making GIS developments compliant to the general principles of the LSDI in order to facilitate data compliance, exchange, and standardisation and in order to lower costs.
Centre des Technologies de l'Information de l'Etat (National State Information Technology administration) - CTIE	CTIE was the official initiator of the GIS and LSDI study mentioned above. Its department for internet project coordination was often approached regarding new GIS or e-mapping projects and felt obliged to take a more general and collaborative approach. After the study, after ACT took over the real production tasks, CTIE remained involved: the entire networking infrastructure of Luxembourg's government is under its control and the cadastral database as well. In this sense, there are still interactions.
Administration des Ponts et Chaussées (Road administration) - PCH	This is a main actor in the field of geodata. Many internal data are created and maintained, but none that have been considered as INSPIRE relevant at the present date. IT and GIS knowhow is important however, therefore PCH is a key actor in the LSDI.
Administration de la Gestion de l'Eau (Water management administration) - AGE	AGE is a very important data producer, as it maintains one of the most widely used geodata ensembles called the water GIS. More than 60 water related themes are produced and maintained with updating rhythms varying from yearly down to daily. AGE has delegated all issues related to data publication to ACT and the geoportal, and collaborates closely in the scope of INSPIRE.
Administration des services techniques de l'agriculture (Agricultural technical services administration) - ASTA	ASTA produces important data sets that are used to calculate the agriculture subsidies.
Administration de l'environnement (Environment administration) - AEV	AEV maintains interesting data that might become relevant for INSPIRE later, like the polluted areas.
Service central de la statistique et des études économiques STATEC (Statistics administration)	STATEC maintains interesting data that might become relevant for INSPIRE later, if it is possible to establish spatial links
Ministère du développement durable (Ministry of sustainable development)	This ministry maintains interesting data that are relevant for INSPIRE, like Natura 2000 zones.
Service géologique du Luxembourg AGL (Geological service) - SGL	SGL is an important geodata producer as it responsible for the geological maps and related information.
Inspection générale de la sécurité sociale (Social	IGSS maintains interesting data that might become relevant for INSPIRE later, in so far they can be rendered as

security inspection) - IGSS	geographic data.
Musée National d'Histoire Naturelle	This actor maintains interesting data that might become relevant for INSPIRE later, in so far they can be rendered as geographic data.
Musée National d'Histoire et d'Art	This actor maintains interesting data that might become relevant for INSPIRE later, in so far they can be rendered as geographic data.
Ministère des Transports (Transportation ministry)	This actor maintains interesting data that might become relevant for INSPIRE later, in so far they can be rendered as geographic data.
Ministries & other state services in general	These actors maintain possibly interesting data that might become relevant for INSPIRE later, in so far they can be rendered as geographic data.
Municipalities in general	These actors maintain interesting data that might become relevant for INSPIRE later, in so far they can be rendered as geographic data.
Public research centers, university	These actors maintain possibly interesting data that might become relevant for INSPIRE later, in so far they can be rendered as geographic data.

7.4 Measures taken to facilitate sharing

Art. 13 (c) a general description of the main measures taken to facilitate the sharing of spatial data sets and services between public authorities and a description of how sharing has improved as a result

Before the implementation of the LSDI, data sharing was quite difficult even among closely related administrations and services. One of the principal goals of the new SDI was to offer new ways to improve this situation. In this regard, one of the main principles of the LSDI has been the publication of all geodata via standardised geographic network services. At the current state, only OGC compliant services are implemented, but more services, based on different techniques and protocols, will follow.

When the first versions of WMS and WFS services of cadastral and topographic datasets were available (in 2007), several ministries and administrations, that otherwise had to rely on regular deliveries on CD or other physical supports, switched over to the webservices and implemented them into their internal GIS systems. In some cases this led to a significant reduction of the regular workload, which had previously been necessary to locally install and make available the new data versions. Several new systems have either been realised or are planned, that rely on the delivery of existing geodata via webservices, to make this content available either in professional intranet GIS applications or in commonly accessible internet applications.

These new possibilities in data sharing do however not remain restricted to the mere public sector: more and more private data users (engineering firms, architects etc) show their interest in accessing geodata from public bodies via webservices, when they need them in the scope of projects.

7.5 Stakeholder cooperation

Art.13 (d) a description of how stakeholders cooperate

This could for example include the description of:
- Written framework for cooperation
- Working groups (list of active working groups)
- News letters, other publications (references)

- Description of the National geoportal (including URL), and where relevant regional or thematic portals

Until now, cooperation has not yet been fixed in written statements, but is nevertheless real. Generally, written demands for access to data or webservices are issued, and are the base for the technical realisation of the connections. Cooperation is limited neither to a participation in the CC-ILDG, nor to the reciprocal use or exchange of geodata in whatever form, but is also effective in practical issues. For example, ACT and SGL decided to centralise the sale of all geological maps and other scientific geological material at ACT's sale desks and the geoportal. Most of the preparations for this common undertaking are finished, and the real collaboration is soon to be started. This will make geological information easier accessible, more visible while significantly unburdening the SGL staff and better use the capacity of ACT's sale department.

One important aspect in terms of cooperation is the collaboration between the principal actors in the Luxembourgish geodata sector on the national public side, and the communal sector. Indeed, due to the territorial autonomy of the municipalities, at least the more important ones tend to build up huge and interesting data sets, based on the data made available by ACT and other State bodies. In the future, it will be very important to involve the municipalities' representatives, as well as the communal syndicates, in the LSDI's activities.

As the cooperation among geodata stakeholders is coordinated within the CC-ILDG, the most representative cooperation projects tend to happen in the respective CC-ILDG working groups. The actual WGs are :

- WG for the creation of an INSPIRE law text: as the draft text for the law has been delivered to the Ministry of Finance, responsible for ACT and for the geoportal, its main task is achieved. It remains active during the legislatory consultation process, until the law enters into force.
- WG for the publication of the agricultural use reference parcels: a special function designed for farmers has been implemented in the geoportal. It allows farmers to view their agricultural parcels and to interactively fill out a form with detailed information about the whereabouts of the parcels.
- WG for the water data: strong collaboration between ACT and AGE, especially in the field of publication of water data via the geoportal, and in regard to the exchange of basic geodata for special water studies
- WG for socio-economic data: this WG focuses on the creation of new and highly demanded geodata content. Actually it works on a national public address file and on the project of a national building database.
- WG for the management of metadata: this WG will be a permanent working force, trying to make sure the necessary metadata is collected, verifying and validating its content and managing the metadata catalogue of the geoportal
- WG for the inventory of INSPIRE data: this WG has done preliminary work to the overall activities of the CC-ILDG and tries to identify the possible stakeholders of INSPIRE.

7.6 Access to services through the INSPIRE Geoportal

Art.13 (e) a description of the access to the services through the Inspire geo-portal, as referred to in Article 15(2) of Directive 2007/2/EC

All geodata that have been considered INSPIRE relevant at the current state, are available via OGC conform spatial data services. They are only directly accessible from the inside of the official governmental network, as these datasets are not free of charge or use. For this

reason, Luxembourg is at the moment not able to provide direct links via the INSPIRE geoportal.

However, the corresponding metadata are discoverable via the OGC compliant (CS-W) webservice at the URL ws.geoportal.lu/geonetwork, or via the geoportal www.geoportal.lu.

8 Usage of the infrastructure for spatial information (Art.14)

8.1 Use of spatial data services in the SDI

Art.14 (a) the use of the spatial data services of the infrastructure for spatial information, taking into account the general and specific indicators

This could include an explanation of how this information was collected, and how it should be interpreted/understood.

We distinguish different types of spatial data services:

8.1.1 GEOPORTAL.LU

The backbone of the LSDI is the Luxembourgish geoportal which opens up an access to the different users.

On one hand, there are different viewers allowing registered or public users to view the data that are relevant to the LSDI.

- http://www.geoportal.lu is the general page of the geoportal informing the users about available datasets and services as well as view or order data. Specialists can obtain a login giving them access to special functions such as advanced querying / overlay capabilities of cadastral information.
- http://map.geoportal.lu is the web mapping platform bringing the LSDI's data to the general public. It is simple to understand and use for the general public and contains the basic functionality people are used to (zoom, pan, search, print). The speed of the data display can be compared to the speed of all the other popular map – portals on the internet. Since it has been launched several months ago, the portal is a huge success and the number of daily users has been multiplied by 6. An average number of 250 distinct users are using the portal day by day, generate 4+GB of traffic a day and print an average of 200 PDFs a day.

The use of the portal is monitored by an analysis of the weblogs, allowing us to know the number of hits per day at a fine granular level.
Furthermore, the most important clicks on the geoportal are logged to allow us to have a very detailed overview of the usage of the geoportal.
Finally, a monitoring tool is used to track availability and response time of the different parts of the LSDI.

8.1.2 OGC-Compliant Webservices

The LSDI offers a lot of OGC compliant webservices (WMS,WFS,WCS,CSW).
These are oriented to 4 types of users:

- Users that are inside the Luxembourgish State Network (wsetat.geoportal.lu/…)
- Users that have a login and a data sharing agreement with the Luxembourgish State (wssec.geoportal.lu/…)
- General Public (ws.geoportal.lu/…)
- Users that want to access INSPIRE compliant and relevant data (wsinspire.geoportal.lu/…)

The use of these webservices is analysed through web server logs and a special function is currently being developed to track the requests one by one so that statistics at feature level

become possible. For this detailed tracking to become possible, the entire TCP traffic is being dumped and parsed.

The figures declared in 2010's Monitoring are taken from the web server logs.

8.2 Use of the spatial datasets

Art.14 (b) the use of spatial data sets corresponding to the themes listed in Annexes I, II and III to Directive 2007/2/EC by public authorities, with particular attention to good examples in the field of environmental policy

All the spatial datasets that have been listed in the Monitoring Document are available to the users through Services (WMS/WFS) or can be ordered online as Shape files / DXF data (vectors) or TIFF (rasters).
All the Data that is free of charge can be accessed through open WMS / WFS services.

8.3 Use of the SDI by the general public

Art.14 (c) if available, evidence showing the use of the infrastructure for spatial information by the general public

Since its launch several months ago, the general public viewer (http://map.geoportal.lu) becomes more and more popular and the number of users per day is constantly growing.
The general public shows a huge interest for precise data and a portal that is simple to use, with response time that can be compared to the generally available mapping portals on the internet.

8.4 Cross-border usage

Art.14 (d) examples of cross-border use and efforts made to improve cross-border consistency of spatial data sets corresponding to the themes listed in Annexes I, II and III to Directive 2007/2/EC

At the current state, there is a project going on in the Greater Region (Luxembourg, Germany, France, and Belgium) to improve cross-border consistency of spatial data sets.

8.5 Use of transformation services

Art.14 (e) how transformation services are used to achieve data interoperability

All the LSDI's webservices can be used in EPSG:2169 (local Luxembourgish SRS) or in EPSG:4326 (WGS84 Lat/Lon) for interoperability.

The available Map Viewers are able to reproject the data or (at least) indicate the mouse coordinates in EPSG: 4326

9 Data sharing arrangements (Art.15)

9.1 Data sharing arrangements between public authorities

Art.15 (a) an overview of data sharing arrangements that have been, or are being, created between public authorities

The Luxembourgish Law stipulates that the data can be shared free of charge between all the public authorities. That's why a set of non-secured OGC-compliant webservices (WMS/WFS) are available to all the people having access to the state network.

9.2 Data sharing arrangements between public authorities and Community institutions and bodies

Art.15 (b) an overview of data sharing arrangements that have been, or are being, created between public authorities and Community institutions and bodies, including examples of data sharing arrangements for a particular spatial data set

Community institutions and bodies can access the data available in the LSDI through Webservices that can be opened case by case. Once a convention has been signed and a price fixed for the access to the data, Community institutions and bodies can access the data by using a HTTP BASIC login to the OGC compliant WMS / WFS services available on http://wssec.geoportal.lu

9.3 Barriers to the sharing and the actions taken to overcome them

Art.15 (c) a list of barriers to the sharing of spatial data sets and services between public authorities and between public authorities and the Community institutions and bodies, as well as a description of the actions which are taken to overcome those barriers

The main barrier to the sharing of data is the pricing.
Even if most of the data is not free of charge speaking in terms of download services, all the data can be viewed and queried free of charge in the geoportal's viewer(S),

10 Cost / Benefit aspects (Art.16)

10.1 Costs resulting from implementing INSPIRE Directive

Art.16 (a) an estimate of the costs resulting from the implementation of Directive 2007/2/EC

These costs could be subdivided as follows:

- *metadata*
- *data harmonisation*
- *network services*
- *monitoring and reporting*
- *coordination and horizontal measures*

The implementation of the eCadastre/geoportal project produced a total cost of about 2.000.000 EUR (external services, IT material, software, developments, internal project management, internal workforce, maintenance), until end of 2009. From 2010 on, a yearly cost of approximatively 750.000 EUR are to be reckoned with. It is impossible to exactly split these figures up in any subdivision, but it is clear that external services can be counted for by far the greatest part of the expenditures (appr. 70 %) as the internal workforce available is extremely reduced. Hardware costs take appr. 10 % of the total sum.

10.2 Benefits observed

Art.16 (b) examples of the benefits observed, including examples of the positive effects on policy preparation, implementation, evaluation, examples of improved services to the citizen as well as examples of cross-border cooperation.

The paragraphs in chapter 6 contain many examples of success stories due to the implementation of the Luxembourg SDI and the geoportal, in spite of its young age.

11 Conclusions

Since its first implementation, Luxembourg's Spatial Data Infrastructure has helped resolving many problems in the field of geodata. In the coordination committee CC-ILDG, stakeholders' representatives regularly meet, discuss, decide and collaborate actively on the level of working groups. The obligations derived from the INSPIRE directive put a supplementary strain on the agenda: not only the internal national needs in terms of geodata creation, availability and accessibility had to be met but also the needs of the European Commission.

On the legislatory side, Luxembourg has finalised a draft law text which currenty is on its institutional route.

On the technical side, the Grand-Duchy can provide a more advanced situation: as the geoportal put in place by ACT was already operational before the INSPIRE directive entered into force, many necessary principles had already been realised or were already operational: norm compliance, webservices, view services, centralised metadata editor etc.

Regarding the content itself, Luxembourg has an easier situation than the big countries, as there are only quite a small number of involved bodies, and the political structure of the country and its public bodies is quite simple. What's more, the state bodies working in the field of geodata have a long tradition of cooperation, and the new means provided by LSDI can build on the preliminary experiences. For all the actually retained data sets, contained in the monitoring document, metadata exist and are fully compliant. The data sets themselves are not yet compliant to INSPIRE, and delivery is often limited by pricing and procedural barriers. The work of LSDI and CC-ILDG in the near future will have to focus on 3 main topics in terms of INSPIRE:

- find, create or identify new data sets that can be added to the list of INSPIRE data sets made available
- modify the data sets in order to achieve a better or complete compliance
- adapt the technical means to access the data

Annexes

11.1 List of organisations – names and contact details

Organisations	Contact for INSPIRE questions	Address
Administration du Cadastre et de la Topographie (National Cadastre and Topography administration)	M. Francis Kaell Francis.kaell@act.etat.lu	54, avenue Gaston Diderich L-1420 Luxembourg (+352) 44901-1
Centre des Technologies de l'Information de l'Etat (National State Information Technology administration)	M. Pierre Schilling (vice director) Pierre.schilling@ctie.etat.lu	1, rue Mercier B.P. 1111 L - 2144 - Luxembourg Luxembourg **Tél. :** (+352) 49925-1 **Fax :** (+352) 48 23
Administration des Ponts et Chaussées (Road administration)	M. Tom Schuller Tom.schuller@pch.etat.lu	38, bvd de la Foire B.P. 243 L-2012 Luxembourg **Luxembourg** Tél: +352 45 05 91 Fax: +352 45 32 98 E-mail: info@pch.public.lu
Administration de la Gestion de l'Eau (Water management administration)	M. Stéphane Levy Stephane.levy@eau.etat..lu	51-53 rue de Merl L-2146 Luxembourg Luxembourg Tél.: (+352) 260286-1 Fax: (+352) 260286-63 E-mail: info@eau.public.lu
Administration des services techniques de l'agriculture (Agricultural technical services administration) - ASTA	Mrs Anne Peschon Anne.peschon@asta.etat.lu	16, route d'Esch B.P. 1904 L-1019 Luxemburg
Administration de l'environnement (Environment administration) - AEV	Mrs Sophie Capus Sophie.Capus@aev.etat.lu	Administration de l'Environnement 16, rue Eugène Ruppert L - 2453 Luxembourg
Service central de la statistique et des études économiques STATEC (Statistics administration)	M. Paul Zahlen Paul.Zahlen@statec.etat.lu	STATEC B.P. 304 L-2013 Luxembourg Fax: (+352) 46 42 89
Ministère du développement durable et des infrastructures (Ministry of sustainable development)	M. Patrick Grivet Patrick.Grivet@mev.etat.lu	4, boulevard F. D. Roosevelt L-2450 Luxembourg Adresse postale: L-2940 Luxembourg Tél : (+352) 2478-2478

		Fax : (+352) 46 27 09
Service géologique du Luxembourg AGL (Geological service) - SGL	M. Roby Colbach robert.colbach@pch.etat.lu	**Administration des ponts et chaussées** 38, bvd de la Foire B.P. 243 L-2012 Luxembourg **Luxembourg** Tél: +352 45 05 91 Fax: +352 45 32 98
Inspection générale de la sécurité sociale (Social security inspection) - IGSS	M. Raymond Wagener Raymond.Wagener@igss.etat.lu	Ministère de la Sécurité sociale 26, rue Sainte Zithe L-2763 Luxembourg Tél. : (+352) 247-86311 Fax : (+352) 247-86328 E-mail : mss@mss.etat.lu
Musée National d'Histoire Naturelle	Mrs Tania Walisch twalisch@mnhn.lu	25, rue Münster L-2160 Luxembourg
Musée National d'Histoire et d'Art	M. André Schoellen Andre.Schoellen@mnha.etat.lu	Marché-aux-Poissons L- 2345 Luxembourg

11.2 List of references for the compilation of the report

- LSDI concept study document 2008