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AGJENCIA KADASTRALE E KOSOVËS/ KATASTARSKA AGENCIJA KOSOVA/ KOSOVO CADASTRAL AGENCY

Geospatial information matters:

The Strategy for the Development of the National
Spatial Data Infrastructure of the Republic of
Kosovo

FOREWORD

In almost everything, people need to know when and where things happen: geospatial information matters.

In 2013, I asked The World Bank to fund the Strategy for the development of the National Spatial Data Infrastructure of the Republic of Kosovo.

This is the resulting report. It has been accepted by the National Spatial Data Infrastructure Strategy Team as the direction of travel for geospatial information in the Republic of Kosovo.

The Strategy for the Development of the National Spatial Data Infrastructure (NSDI) is a thoughtful, authoritative and important document and its recommendations are closely aligned to the delivery of Government policy in many areas. Several ministerial colleagues share with me in recognising the reality, identified by the Strategy that 'everything happens somewhere'.

The Government acknowledges that a better understanding of geospatial information is an important factor in moving forward the transformational government agenda. Implementation of this Strategy will make relevant, harmonised and quality geospatial information available for the purpose of formulation, implementation, monitoring and evaluation of policy-making in a broad range of sectors and for the citizen to access geospatial information, whether local or (inter)national. Moreover, it will maximise the value to the public, government and commercial companies in the Republic of Kosovo of the use of geospatial information and provide a consistent framework to assist national and local initiatives, and service delivery for the benefit of all our people.

Key areas where this NSDI Strategy will be of benefit are in policy and operational areas of the public and private sector, where shared and integrated geospatial information is essential for decision making, It will also be the basis for delivering the obligations under a newly formed Law on the Establishment of an Infrastructure for Spatial Information in the Republic of Kosovo and the EU INSPIRE Directive (2007/2/EC).

The important steps are:

- to invite comment on the Strategy and on how it should be taken forward; and
- to ensure the appropriate funding allocations have been made to support its implementation.

These steps are being forward by the NSDI Council as recommended in this report.

The NSDI Council will continue the excellent work undertaken by the NSDI Strategy Team, which will now be dissolved. I wish to place on record my thanks to NSDI Strategy Team, supervised by Prof. dr. Joep Crompvoets, for their excellent work in conceiving, developing and championing the NSDI Strategy of the Republic of Kosovo to this point.

Prof. Dr. Murat Meha

CEO of Kosovo Cadastral Agency – Ministry of Environment and Spatial Planning

EXECUTIVE SUMMARY

Geospatial Information matters. Information about a spatial location matters. Everything happens somewhere. If we can understand more about the nature of a location on Earth, where events happen, and the impacts on the people and assets at that location, we can plan better, manage risk better and use our resources better. This will increase the success rate for new initiatives, assist in the reduction of the potential for future problems and give tangible financial benefits.

Currently, too few government-owned geospatial datasets can be easily assembled and analysed with reliability from across local and central (national) government bodies. There remains too much duplication, too little re-use and too few linkages across datasets which are required to support policy implementation in, for example, planning, housing, social exclusion and traffic management.

The objective of the development of the Strategy for the National Spatial Data Infrastructure of Kosovo is to make relevant, harmonised and quality geospatial information available for the purpose of formulation, implementation, monitoring and evaluation of policy-making in a broad range of sectors and for the citizen to access geospatial information, whether local or (inter)national. Moreover, the Strategy also aims to contribute to maximise the value to the public, government and businesses of existing geospatial information. It will provide a consistent and comprehensive framework to assist national and local initiatives and service delivery.

Key areas where the Strategy will be of benefit are mainly in policy and operational areas of the public sector where shared and integrated geospatial information is valuable for decision making. These include among others (spatial) planning for communities, environment, health, education, security, construction, mining, transport, crime prevention, insurance, retail, energy, climate change, agriculture, cultural heritage, tourism, sport, employment and statistics.

The Strategy will be delivered in a cooperative effort owned by central (national) and local government in the Republic of Kosovo. It will focus on joining up and integrating information from many sources within a consistent reference framework, leading to more effective cross-organisational processes, far greater sharing and re-use across the public sector and beyond.

The NSDI Strategy Team has consulted widely (see list of stakeholders at appendix 2), and has agreed the recommendations and actions required to deliver this Strategy.

The members of the NSDI Strategy Team recommend this Strategy and the actions set out in it. They believe that the costs of implementation are far exceeded by the benefits which begin delivering substantially with the next three years. A Strategy for the development of the National Spatial Data Infrastructure is seen to be in the nation's interest and essential to ensure maximum value from the resources, which will need to be spent in any case on effective implementation of the (draft) 'Law on the Establishment of an Infrastructure for Spatial Information in Kosovo' and the EU INSPIRE Directive.

For more in-depth information, see: <http://www.kca-ks.org/>

GEOSPATIAL INFORMATION MATTERS: THE STRATEGY FOR THE DEVELOPMENT OF THE SPATIAL DATA INFRASTRUCTURE OF KOSOVO

Introduction

Much information collected by the public sector contains geospatial or 'location-based' information. When different types of information about a particular place are compared or related to each other, this can increase considerably the understanding, and hence the power to make effective decisions about a particular space on Earth.

To the citizen, effective geospatial information, combined with other information, translates into emergency services turning up quickly at the right place, knowing where local services are, avoiding traffic congestion and being able to manage one's life better by having access to greater information.

For communities, geospatial information facilitates equitable regeneration funding and enables solutions to problems such as deprivation, crime and disorder to be tackled effectively in a joined-up way.

To local government, geospatial information supports partnerships, helps it to deliver better and more effective public services, and creates efficiencies by helping to target the right resources in the right places; this in turn empowers citizens to be more independent.

For central (national) government geospatial information supports effective policy formulation and evaluation; it is essential in supporting the approach to climate change, in managing Kosovo-wide emergencies such as an outbreak of an animal disease or dealing with flooding, and also provides critical support for security services.

In July 2013, the Kosovo Cadastral Agency with financial support of The World Bank opened a tender for developing a Strategy for National Spatial Data Infrastructure of the Republic of Kosovo as an initiative for facilitating the access, sharing, and use of geospatial information (Meha et al, 2014). The background to the thinking behind the creation of the Strategy together with details of the members of the NSDI Strategy Team is listed in Appendices 1 and 2.

The aim of the Strategy is to make relevant, harmonised and quality geospatial information available for the purpose of formulation, implementation, monitoring and evaluation of policy-making in a broad range of sectors and for the citizen to access geospatial information, whether local or (inter)national. Moreover, the Strategy also aims to contribute to maximise exploitation and benefit to the public, government and businesses from geospatial information and to provide a framework to assist national and local initiatives. Implementation across Kosovo of the Strategy will build a coherent Information and Communication Technology (ICT) oriented information infrastructure for geospatial information, which will assist policy, local service delivery and operational decision making. It will drive out costs in collection of data, drive re-use of data and drive efficiency by improving targeting of both policy and operational delivery, which in turn will reduce the costs of implementation. It will be a cooperative effort owned by central and local governments in the Republic of Kosovo.

Why Geospatial Information matters?

The question ‘where?’ is asked constantly, for example

- Where should I locate the new school which amalgamates three existing ones?
- Where is my closest recycling centre or shop?
- Where will flooding happen?
- Where should a new drugs rehabilitation centre be located?
- Where will this pollution cause problems?
- Where are the neighbourhoods which need additional regeneration funding?

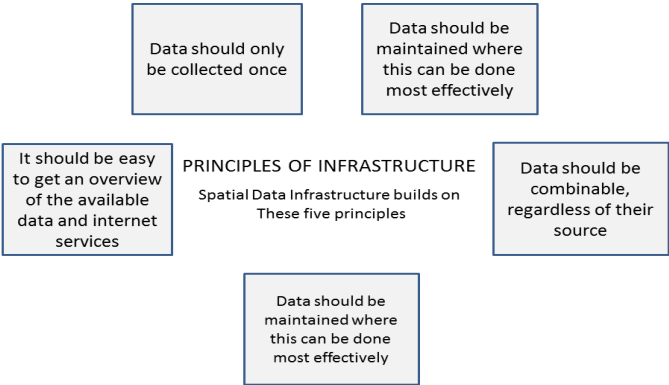
Although some of these ‘where’ questions can be answered easily, many are more complex to answer and require the merging of several sets of information from different sources to support the decision making process; this is where the Strategy comes into play. For example, the school consolidation process requires at least:

- the location of the schools
- the home addresses of the existing pupils
- census information to predict the future levels of school-aged children in the area
- the availability of suitable land
- travel times and distance to school.

The assimilation of this diverse information and the creation of several ‘what if?’ scenarios are made much easier by integrating all the sources within a consistent reference framework. This is where geospatial information and analysis tools add considerable value by providing the spatial dimension to support decision making.

Why National Spatial Data Infrastructure?

A NSDI benefits a nation by having a framework to facilitate the access, exchange and use of geospatial information (Masser and Cromptoets, 2015). Such framework contributes to make relevant, harmonised and quality geospatial information available for the purpose of formulation, implementation, monitoring and evaluation of policy-making in a broad range of sectors and for the citizen to access geospatial information and to maximise the value of existing geospatial information to the public, government and commercial companies. The figure below presents the main principles that a SDI needs to fulfil (partly derived from Danish Ministry of Environment, 2011).



Vision Statement

“The Kosovo NSDI will make harmonized and high quality geospatial information readily available for formulating, implementing, monitoring and evaluating policies and for the citizen to access spatial information, whether local, national or international and to maximise the value of existing geospatial information to the public, government and commercial companies”

D1.2 Mission Statement

“To establish a technological, institutional, legal and administrative framework for inter-organisational collaboration that will:

- Be in line with the INSPIRE Directive*
- Support e-Governance and institutionalisation*
- Integrate geospatial information from different sources into one infrastructure*
- Avoid duplication of geospatial data acquisition*
- Establish effective business processes*
- Meet the needs of the stakeholders*
- Promote the access, sharing, use and distribution of geospatial data”.*

Why do we need a Strategy for National Spatial Data infrastructure of the Republic of Kosovo?

Current users of geospatial information spend around 80 percent of their time collating and managing the information and only 20 percent analysing it to solve problems and generate benefits (Longhorn and Blakemore, 2008). This imbalance needs to be addressed. Much of the information collected is not available to be used again as it is not known widely that it was collected and it is not known where it is stored. Data is likely to have been collected using local rules preventing its use with data about the same location from another organisation. It may also have been collected in a particular data format that is not universally used and the quality of collection may not be known.

The current situation:

- imposes costs and inefficiency on a wide range of public sector bodies due to duplication of effort of collecting similar data and difficulties in sharing information
- hampers the use and integration of accurate geospatial information to inform policy development and the fair distribution of resources
- impedes government strategies for improving services to the citizen
- imposes difficulty for citizens to know where data can be sourced for community applications that encourage local contributions to the available information, e.g. a community’s web application combining different data to help resolve local issues.

It is very clear that within the Republic of Kosovo:

- There is currently little understanding of the data collected, stored or maintained by either the public or private sector
- In addition, it has been recognised that within the Republic of Kosovo there are too few data standards universally used for referencing and the collection of geospatial data prescribed by either government or the private sector

Moreover, most data in government has two key attributes:

- Who is it about? – the identity of individual people and companies
- Where is it about? – the location of communities, assets, events or environmental conditions.

The importance of identity management is already recognised – and the Government has a programme to establish a national infrastructure for identity matters. However, hitherto the importance of geospatial information has not been as widely recognised (Nushi et al., 2012). The Strategy for the Development of the National Spatial Data Infrastructure complements the focus already being given to ‘who’ by introducing a separate parallel focus on ‘where’. For many areas of policy and services delivery effectiveness requires good information on both.

During the development of the Strategy it was recognised that a high percentage of all public sector information has a geospatial element, for example:

- an address
- a postcode
- a neighbourhood
- a census output area
- a map coordinate
- a political or structural boundary.

In addition, several reports have been published involving ‘geospatial data’ over the last few years; they have demonstrated the importance of geospatial information:

- public sector information is a huge untapped asset with a value of 40 billion Euros for the European Union (Vikery, 2011)
- the geospatial sector generates between US \$ 150 billion and \$ 270 billion in revenue globally every year (Oxera, 2013)
- implementing the UK Location Strategy gains £70 - £130 million benefits to UK environmental protection activities and £470 - £510 million benefits to UK governmental departments.

A further influence on the development of the Strategy was the publication of the European Union (EU’s) INSPIRE Directive (Infrastructure for Spatial Information in Europe), which became European law on 15 May 2007. The INSPIRE Directive lays down general requirements to establish an infrastructure for spatial information in Europe for the purposes of EU environmental policies and activities which may have an impact on the environment, using geospatial data held by public authorities. Members of the European Union had to transpose the Directive (bring into force any laws, regulations and administrative provisions to comply with the Directive) within two years of that date (i.e. by 15 May 2009). Additionally, Implementing Rules, largely surrounding technical aspects of the Directive, had to be implemented directly as decisions and regulations, through the Comitology procedure (Masser and Cromptoets, 2015). The draft version of the Kosovo ‘Law on the Establishment of an Infrastructure for Spatial Information in the Republic of Kosovo’ is strongly aligned with this INSPIRE Directive.

However, the Strategy for the development of a National Spatial Data Infrastructure in Kosovo needs to go beyond the scope of INSPIRE itself. The local and national needs within the Republic of Kosovo require considerably more support. In addition to supporting individual ‘geospatial’ initiatives, there is a need to underpin legislative arrangement for the like of:

- traffic management
- countryside and rights of way

- land registration
- property valuation
- civil contingencies
- land protection

and to support public service requirements that directly impact on people's lives, for example:

- planning and land use needs
- social exclusion programmes
- waste collection
- monitoring the impact of climate change.

These all have a geospatial component and the need to view and share information at the local and national level is much broader than environmental policy, which is covered by INSPIRE.

Outcomes of the Strategy for National Spatial Data infrastructure of the Republic of Kosovo

The implementation of the Strategy for NSDI will focus on joining up and integrating information from many public sources within a consistent reference framework leading to far greater sharing and use across the public sector and beyond. It will build a coherent Information and Communication Technology (ICT) oriented information infrastructure to underpin data sharing for geospatial information, which will assist policy delivery and operational decision making. It will drive out costs in collection of data, drive re-use of data and drive efficiency by improving targeting of both policy and operational and local service delivery, which in turn will reduce the costs of implementation. This will result in information about Kosovo's land, waters, and air being:

- fit for purpose
- collected once to universally accepted standards
- appropriately maintained and used many times by the public and private sector, and citizens
- referenced to a definitive information framework which supports its seamless combination
- better enable effective cross-organisational business processes
- easy to discover, and with clear terms for its use
- simple to access and easy to share and integrate
- understood sufficiently to maximise its application, and
- aligned with Europe and the INSPIRE Directive.

Outcomes for stakeholders

The implementation of the NSDI Strategy will deliver benefits to a range of stakeholders across the economy:

Citizens will benefit through better targeted services. It will be much easier to answer the question 'where' and hence understand the question 'why'?

Public Sector/Government – service providers will share information across partnerships in the delivery of joined-up services that are more effectively targeted, e.g. tackling crime and disorder and emergency planning

Public Sector/Government – policy makers will have access to all the right information to support evidence-based policy development and monitoring. Policies will be better targeted through knowing the recipients' characteristics and locations, e.g. the use of low grade agricultural land for housing, road construction evaluation, etc.

Public Sector/Government – information suppliers will be expected to produce geospatial information that is consistent and compliant with accepted standards, allowing the seamless joining up of information. Appropriate licensing arrangements will increase the use of their information. Information will be collected once and shared and used many times

Third sector consisting of non-governmental organizations and other non-profit organizations will be able to partner more efficiently and effectively in the delivery of services through more information sharing

The **private sector** will be able to complement the public sector more effectively in the creation of geospatial information and associated value-added services using definitive information frameworks and standards. Geospatial information and its exploitation is a rapidly growing and profitable industry (Oxera, 2013) – the potential geospatial industry of Kosovo may gain if the technology is properly harnessed and managed.

As well as benefiting the individual citizen through greater efficiency and effectiveness of service design and delivery, the implementation of the NSDI Strategy will bring even greater levels of benefits directly to the overall economy, the business community and the academic and voluntary sectors.

This all means that geospatial information can play a central role in implementing a range of public policy agendas within three overarching themes:

- 1) Stimulating increased efficiency and social engagement by promoting the use of geospatial information in government
- 2) Protecting and sustaining the Kosovo environment through geographic knowledge
- 3) Supporting economic development by understanding the Kosovo economic landscape through geography.

Strategic Actions

To ensure that the Republic of Kosovo makes relevant, harmonised and quality geospatial information available for the purpose of formulation, implementation, monitoring and evaluation of policy-making in a broad range of sectors and for the citizen to access geospatial information, and exploits the full value of its information the Strategy for NSDI-development requires a programme of strategic actions which ensure that:

- It is known what data we have, and avoid duplicating it
- a common reference data is used so we know we are talking about the same locations
- geospatial information can be shared easily through a common infrastructure of standard, technology and business relationships
- the appropriate skills are available, both among geographic professionals and among other professional groups who use geospatial information or support its use

- strong leadership and governance exists to drive through change, including the implementation of INSPIRE and the (draft) 'Law on the Establishment of an Infrastructure for Spatial Information in the Republic of Kosovo'. (In this context, the NSDI Council is termed).

Knowing what data we have and avoiding duplication

This NSDI-Strategy seeks to ensure that information about the Kosovo's land, waters, and air is collected once and then used many times in the public and private sector.

Each public sector organisation should record and maintain up-to-date details of its geospatial datasets. This should be undertaken for all datasets with geospatial attributes, including but not limited to soils, environmental, agricultural, hydrographic, mapping, and socio-economic information.

Each public sector organisation should make publicly available the details of its geospatial datasets – even if the dataset itself is not publicly accessible or is not free of charge. The NSDI-Council should agree and publish criteria for exceptions, and individual exception proposals should require explicit approval by the NSDI Council.

The NSDI Council, possibly in consultation with the Agency of Information Society, should agree and maintain the minimum requirements and common standards for such details and public access, based where appropriate on recognised open standards. The details recorded should include information about how and when the dataset has been collected, its accuracy tolerances, its format, and its access rights. The NSDI-Council should monitor implementation closely and report to the government.

The NSDI Council should consider how such information can best universally accessed. It should consider the case, the scope and the delivery options for common portals, hubs or repositories. The scope of the consideration should look at the wider range of requirements, and not just at the implementation of INSPIRE (or the 'Law on the Establishment of an Infrastructure for Spatial Information') in the Republic of Kosovo.

Populating the information content of the centrally accessible information would be a mandatory requirement for the public sector. It would be inappropriate for the government to require private sector organisations to apply these requirements. However, it should be open to private sector organisations to apply standards and lodge details of their datasets in a central repository, if one is developed. In particular the NSDI Council should engage with collaborative groups to encourage and facilitate the application of these standards.

The NSDI Council should determine in consultation with public sector data holders and with other interested parties, a timescale for implementation of these recommendations, including the preparation and assembly of the metadata, aligned with the requirements of the INSPIRE Metadata Implementing Rules. This timescale should be published by not later than half year after governmental approval of this Strategy.

Each department and public sector body should ensure that its IS/IT strategy and work programme describes clearly its policies and implementation plans for geospatial data systems.

The NSDI Council should agree, possibly with the Agency for Information Society, to allow the timely challenge to projects involving geospatial data. The challenge would consider if there is duplication in

the creation of geospatial information, use of data which does not conform to NSDI Council standards or the creation of geospatial data for which there are no plans for public accessibility.

Common geospatial reference data

The efficient and cost-effective sharing of information with geospatial attributes across the public and private sector requires the use of common sets of underlying geospatial data. In particular, there are a small number of geospatial attributes which are widely used in organisations' datasets, so standardisation on these will give a major improvement in data sharing between organisations.

A small number of key datasets should be designated Core Reference Geographies, which will form common information frameworks that are defined, endorsed and used by all data holders in the public and private sector. These Core Reference Geographies are data that a user can trust – the best available data for an area, certified, standardised, and described according to a common standard. They provide a foundation on which organisations can build by adding their own detail and compiling other datasets (Bossler et al., 2015)

Each Core Reference Geography should be in the custody of a specified public sector body (or bodies – where the maintenance of the components of that Core Reference Geography is split for operational reasons). Each should be managed to published standards agreed by the NSDI Council in consultation with the departments and bodies concerned. In most cases it would be appropriate for a Core Reference Geography to be formally owned by a public sector, although operational collection and maintenance could be provided by public and/or private sectors.

The initial Core Reference Geographies should be: Geodetic Framework; Topographic Mapping (at different scales and including ground height information); Ortho-imagery; Geographic Names; Addresses; Streets; Land and Property Ownership; Hydrology/Hydrography; Statistical Boundaries; and Administrative Boundaries. This list of Core Reference Geographies is aligned with those listed in Annex I and Annex II of the INSPIRE Directive and the (draft) 'Law on the establishment of an Infrastructure for Spatial Information in the Republic of Kosovo' and is set out at the end of appendix 4. Moreover, they are also aligned with data themes of the US NSDI Framework (Bossler et al, 2015).

The NSDI Council should maintain the list of designated Core Reference Geographies. It should set and publish criteria for additional Core Reference Geographies. It should consider, when and where appropriate, the designation of additional datasets as Core Reference Geographies in accordance with the criteria and after consultation with data providers and users.

Establishing an infrastructure for sharing geospatial information

Sharing of information requires a common basis of business relationships and business processes, supported by business and technical standards and by consistent IT infrastructures which, together, ensure interoperability across the public sector and beyond.

The NSDI Council should develop and endorse the portfolio of Geospatial Information Standards to be used in the public sector. This would extend and develop for geospatial information the general principles of the European Interoperability Framework for pan-European e-Government Services (European Communities, 2004). The framework of Geospatial Information Standards would be based on appropriate Open Standards. The standards should not only cover technical formats but also business meaning and processes.

Each dataset owner should adopt the agreed Geospatial Information Standards into their datasets. This will largely be achieved through the INSPIRE Implementing Rules. However, any necessary amendments to Core Reference Geographies should be made as soon as feasible so that they give a stable, standards-based service to their users. In addition, the NSDI Council should identify any other datasets where early convergence on agreed standards would give significant business value to the users of the dataset or would allow the data to be shared and exploited more widely. Each dataset owner should agree their plans with the NSDI Council and publish them as part of the information about their datasets.

Each dataset owner (both Core Reference Geographies and other geospatial datasets) should simplify their licensing arrangements so as to facilitate the sharing of data to realise greater overall value. This is in line with the sharing arrangements required for INSPIRE and the (draft) 'Law on the establishment of an Infrastructure for Spatial Information in the Republic of Kosovo'.

The NSDI Council in consultation with the Agency for Information Society should set guidelines and minimum standards for simplification. The simplification should include:

- convergence of Terms and Conditions which are common issues and are largely dataset neutral
- a common approach to the 'derived data issue' of creating a dataset from the reference data, which could potentially be a substitute for it in a commercial market
- the introduction of developmental and non-commercial licenses to encourage innovation.

The simplification should take account of the trading nature of the owners of the Core Reference Geographies and should not duplicate the Government's separate review of the pricing of public sector information by trading funds. The simplification should also ensure that copyright is protected appropriately.

The Agency for Information Society should drive forward the implementation of ICT infrastructures which allow stakeholders to share geospatial information services within and across organisations. The Agency for Information Society should ensure the greater coordination of ICT investments so as to create shared web-based information services and to leverage significant efficiencies across the public sector.

Public sector bodies should form and promote local, national or functional partnerships to exploit geospatial information available on the shared technical infrastructure. This is in line with wider moves to join up the delivery of public services set out in EU Vision for public services (European Commission, 2013), and the ability to link and share information on a geospatial basis will itself enable more integrated delivery of services. Partnerships will also give economies of scale and will also support the implementation of INSPIRE and the (draft) 'Law on the establishment of an Infrastructure for Spatial Information in the Republic of Kosovo'. The NSDI Council should produce guidance and model terms of reference for such partnerships; it should actively facilitate the formation of partnerships; and it should promote the sharing of knowledge about achieving success through such partnerships.

Government departments and other public bodies should establish a number of pilots and joint ventures to encourage the adoption of the new standards and approaches by creating innovative public services combining different government data (for example in the context of agri-environmental measures, mining licensing, or emergency services).

An effective and efficient geospatial information infrastructure will require investment and change programmes, which will require a longer-term strategic planning horizon than that normally possible in a single budget review period. The NSDI Council should develop, in conjunction with, Ministry of Finance and Agency for Information Society, a strategic planning and business framework which establishes an adequate period of sufficient certainty and predictability (including funding and pricing) for dataset owners and users to make the necessary investments.

Skills and Knowledge

The delivery of the outcomes of the Strategy requires a step change in the capability to understand and use geospatial information, and better sharing of knowledge and best practice. Importantly, skills and knowledge about geospatial issues need to move from just a limited specialist community into the mainstream of policy development, service design and systems delivery.

The NSDI Council should lead a capacity building programme to embed geospatial information awareness and analytical skills as a business tool enabler across public services and professions. This should be informed by an initial audit, not only of current skills but also of future requirements. The most innovative use of geospatial information in the public sector is currently concentrated in the planning and delivery of services directly involving the physical environment, such as spatial planning, transportation, mining and environmental management. Wider diffusion and exploitation of geospatial information is sporadic across other parts of the public sector. A contributory factor is the lack of awareness and necessary skills, particularly among general managers, service designers and supporting professionals such as the IT profession. So the capacity building programme should leverage wherever possible existing capability building initiatives, such as workshops, meetings and seminars.

The NSDI Council should promote the sharing of knowledge about geospatial information and methods and their applications within and outside the public sector. It should communicate (use) case studies and examples of good practice, including examples within one organisation that could be adopted across a wider group of organisations. In doing so it should work closely with sector-specific innovation and improvement groups. It should establish networks and communities of interest to ensure continued participation, engagement and sharing of knowledge.

The NSDI Council and the Agency for Information Society should agree a programme of work to ensure mutually that geospatial issues are better understood by the wider IT community and that IT issues are better understood by the geospatial community.

Governance and Leadership

Delivering – and subsequently maintaining – the benefits achievable by the new approach to geospatial information described in this Strategy will require clear top management leadership and strong, authoritative and cross-cutting governance. The existing NSDI Strategy Team has brought together senior leaders from the public sector from which has to be built upon.

The Government should therefore create a new Council, based on the proposal of the NSDI Strategy team, to deliver this NSDI Strategy, the implementation of INSPIRE, the ‘Law on the establishment of an Infrastructure for Spatial Information in the Republic of Kosovo’ and associated initiatives. It should bring together senior professionals in government to ensure common, joined-up outcomes

for effective and efficient public services through coordinated action and convergence on best practice. It should: be an inclusive Council with an overview of all public sector geospatial initiatives at local and central government levels; develop the Implementation Plan for the NSDI Strategy and manage, coordinate and implement the NSDI Strategy alongside the INSPIRE Directive and the (draft) 'Law on the establishment of an Infrastructure for Spatial Information in the Republic of Kosovo'; act as the Steering Group coordinating the Kosovo's delivery of the implementation of the INSPIRE Directive and 'Law on the establishment of an Infrastructure for Spatial Information in the Republic of Kosovo'; and take the lead on continuing strategic issues about geospatial information and its use, including:

- monitoring technical advances, interoperability and information exchange within which geospatial information is collected and managed
- promoting best practice and supporting innovation in the collection and use of geospatial information
- facilitating a coordinated position on potential legislation that might impact on the geospatial information market
- tackling data quality and integrity issues, and in particular taking a broad and strategic view about investment requirements
- articulating the economic, national productivity and competitiveness benefits of an effective SDI for the Republic of Kosovo, and
- identifying other medium- and long-term geospatial information issues;

advise the responsible Minister accordingly (and through that Minister, as appropriate, the devolved administrations) and, under the authority of the Minister, set standards, policies and implementation requirements for those involved in geospatial information and its use; report once a year to the government on progress on the implementation of this Strategy and cross-government issues that require Ministerial decisions; and publish an Annual Report of its activities, of progress on implementation of this Strategy and of proposals for further strategic action to increase the value gained from geospatial information.

The NSDI Council should have a membership representative of all key public stakeholders who will act collectively to enable the delivery of common benefits. This should include all organisations listed in appendix 1.

The NSDI Council should be supported and advised by the NSDI Committee and four Working Groups. The objective of the NSDI Committee is to serve as the managerial and operational delivery group ensuring that the appropriate activities take place, coordinated at the right time and to the right quality standard in order to implement the NSDI of Kosovo and the associated activities required. The main purpose of the Working Groups is to provide specialist expert knowledge and opinions for decision making at the Council level, and to assist the Committee with delivery of the NSDI. There shall be four Working Groups for the following themes: 1) Institutional and Legal issues; 2) technological issues; 3) Public Relations (PR), Communications and Capacity Building; and 4) Business Model. In the future, it might be necessary to add other working groups, e.g. working groups dealing with issues such as innovation (R&D).

The proposed governance structure is set out in appendix 5. The NSDI Council, NSDI Committee and Working Groups will subsume the role of the NSDI Strategy Team and it will be established a half year after the governmental approval of this Strategy.

Costs and Benefits

The current costs for establishing the NSDI is estimated to be approximately Euro 1,300,000 and the annual ongoing costs is estimated to be around Euro 450,000. These figures are obtained by consultants of the NSDI Strategy Team during their work to develop this NSDI Strategy. These costs do not include the dataset creation/acquisition of the Core Reference Geographies. Appendix 6 presents an overview of the NSDI-implementation cost estimates.

Strategic Benefits

This Strategy will benefit government, the wider public sector, the private sector and the citizen when accessing, sharing or re-using geospatial information. Achievement of targets for government departments and other public bodies will be facilitated by greater integration of information assets within a simple, well maintained and readily available referencing framework, leading to better informed policy development and service delivery. The summary of the operational changes that the NSDI Strategy will support are tabled in appendix 3.

The Strategy is expected to realise both financial savings in the avoidance of duplicated systems and data collection, and indirect financial and intangible savings from better policy decisions and delivery of services enabled by the better use and sharing of geospatial information as the Strategy becomes adopted.

In particular, the Strategy will deliver benefits through:

- increased efficiency of the collection, maintenance, sharing and sustainable re-use of data collected by government and the wider public sector (and the adoption of similar principles would enable similar benefits in the private sector)
- better sharing of data through the implementation of effective interoperable data standards which will be used by government and may be used by the private sector
- the provision of Core Reference Geographies for the Republic of Kosovo, which provide a framework to connect all other geospatial data and so create opportunities for greater productivity and new products and services in public, private and third sectors
- ensuring that the Republic of Kosovo can implement the INSPIRE Directive and 'Law on the establishment of an Infrastructure for Spatial Information in the Republic of Kosovo' appropriately and within timescale
- more effective measures on sustainability and to manage the effects of climate change
- greater productivity and lower transaction costs in the public and private sector, and
- improved the competitiveness of the Republic of Kosovo.

The NSDI Strategy will also underpin the effective delivery of key government initiatives that will benefit from rigorous and appropriate geospatial information management policy and include future censuses; regeneration projects; emergency and security issues; local government developments; climate change and long-term transport planning.

Costs

The INSPIRE Directive (and 'Law on the establishment of an Infrastructure for Spatial Information in the Republic of Kosovo') obliges many of existing data holders to codify and modify their data in order to comply with the Directive (and the Law). The costs of meeting these requirements will need to be found from within the individual organisations' budgets and are not the responsibility of the NSDI Council and/or responsible Ministry. Identifying more precisely the implementation costs associated with the INSPIRE Directive (and the Law), together with the associated funding, will be an early task for the proposed NSDI Council to commission. This will help ensure that a properly funded programme is put in place, covering both own costs and any appropriate contribution towards shared, joint investments. Full implementation of the Strategy set out above is likely incur some additional costs over the bare minimum needed to comply with INSPIRE (and the Law). However, in many cases, it is anticipated that the additional cost is likely to be relatively small because the principal cost drivers (such as system development and implementation costs) are the same. In addition:

- Meeting the strategic goals for data modification, future collection, usage and maintenance of geospatial data and the coherent linking of all the datasets will give additional business benefits beyond INSPIRE (and the Law) compliance, and so give an attractive rate of return on any marginal additional investment
- Implementing the Strategy at the same time that systems have to be modified for INSPIRE (and the Law) will be much cheaper – both in money and in opportunity costs such as scarce skills – than making two separate sets of changes at two separate times, and
- The strategic approach described, and the effective governance to deliver it, should identify opportunities for common working, standardisation and re-use of assets within existing INSPIRE (and the Law) implementation plans, which will allow some of the existing planned resources to be freed to deliver additional strategic benefits.

However, implementation of the Strategy requires some additional items to start-up and infrastructure work over the first 36 months after the governmental approval of this Strategy, for which no provision exists in departmental budgets:

- Identify and catalogue existing repositories of public sector-owned geospatial data assets, making appropriate information available through a federated model
- Develop a framework, a prototyping infrastructure, mechanisms and best-practice practice principles for the management and maintenance of a new centrally accessible resource, detailing these assets, including adoption (and if necessary definition) of existing data and interoperability standards
- Align activities to delivery of Core Reference Geographies within government to meet INSPIRE Directive and the 'Law on the establishment of an Infrastructure for Spatial Information in the Republic of Kosovo' obligations, including guidance on modifying data where necessary.

A central budget contributed by stakeholder departments within central government would be required to accomplish these tasks. This would allow for the set-up of a management unit at the NSDI Committee, suitable levels of secondment to allow for the technical work identified above and to develop a demonstrator to facilitate the implementation of INSPIRE, the 'Law on the establishment of an Infrastructure for Spatial Information in the Republic of Kosovo' and to define methodologies to support adopting departments

In-depth information

The text written above is a compilation of the highlights of 24 deliveries made for the development of this Strategy which were grouped into the following six streams: 1) Strategic Vision/Mission; 2) Finance; 3) Governance Structure; 4) Outreach and Capacity Building; 5) Implementation Roadmap; and 6) Reporting. Stream 1 Mission was divided into deliverables: 'Alignment with European/National Policy', 'Mission and Vision', 'Objectives', and 'Stakeholders List'. Stream 2 Finance was divided into deliverables: 'Funding Model', 'Partnering Model', and 'Cost-Benefit Analysis'. Stream 3 Governance Structure was divided into deliverables: 'Governance Framework', 'Coordination Body', 'Inter-Ministerial Working Groups', 'Private/Public Sector Engagement', and 'Communication Plan'. Stream 4 Outreach and Capacity Building was divided into the deliverables 'Training KCA Staff Member(s)', 'SDI-Stakeholder Group Meetings', 'Stakeholders Engagement Workshops', 'Use Case Development', 'Pilot Applications', and 'Promotional Materials'. Stream 5 Implementation Roadmap was divided into the deliverables 'Outline Programme Plan', 'Roles and Responsibilities', 'Performance Monitoring', and 'Risk Management'. And, Stream 6 Reporting was divided into the deliverables 'NSDI Strategy' and 'Final Report'. Each deliverable forms a product report on its own. The reports of the deliverables can be found at: <http://www.kca-ks.org/>.

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Appendix 1: Background to the creation of the Strategy for the National Spatial Data Infrastructure of Kosovo

National Spatial Data Infrastructure (NSDI) Strategy Team

The NSDI Strategy Team was a group established in 2014 to prepare this Strategy. The aim was to raise awareness, to get full commitment of relevant stakeholders, to get feedback on the (inter)mediate results, to promote a coherent and comprehensive approach to the management of geospatial information in the Republic of Kosovo. This team was led by Kosovo Cadastral Agency with external support of consultants from KU Leuven (Belgium).

The members of the NSDI Strategy Team mainly represent key interest groups in the Government of the Republic of Kosovo. The membership as at Spring 2015 was:

- Agency for Information Society
- Association of Kosovo Municipalities
- Association of Kosovo Waters
- Hydro-economic Enterprise Iber Lepenci
- Independent Commission for Mines and Minerals
- Kosovo Agency for Privatisation
- Kosovo Agency of Statistics
- Kosovo Cadastral Agency
- Kosovo Police
- Kosovo Property Agency
- KUR Prishtina and other water supply companies
- Ministry of Culture, Youth, and Sport
- Ministry of Economic Development including Geological Survey of Kosovo and Kosovo Agency for Energy Efficiency
- Ministry of Environment and Spatial Planning including Kosovo Institute for Nature Protection, Institute for Spatial Planning, and Hydrometeorological Institute
- Ministry of Forestry, Agriculture and Rural Development
- Ministry of Health
- Ministry of Infrastructure
- Ministry of Internal Affairs
- Ministry of Kosovo Security Force
- Ministry of Local Government Administration
- Ministry of Public Administration
- Ministry of Trade and Industry
- Water and Wastewater Regulatory Office
- Water Supply Radoniqi

The situation at the commencement of the work on the Strategy for National Spatial Data Infrastructure for the Republic of Kosovo

The Government of Kosovo recognised the importance of developing a NSDI and in compliance with the Law on Cadastre No.04 L/013, Article 23 has assigned responsibility to Kosovo Cadastral Agency for taking initiative. The Kosovo Cadastral Agency is an executive agency under the Ministry of Environment and Spatial Planning (MESP), and is, besides the issues related to the development of the NSDI of Kosovo, mainly responsible for developing and implementing the cadastre in the Republic of Kosovo. In order to implement a successful NSDI, it appeared to be necessary to have a high level plan to achieve one or more goals related to the development of the NSDI. Therefore, it was recommended to formulate an overarching strategy for developing the NSDI in the Republic of Kosovo

Although, several recent initiatives in the context of managing geospatial information have brought benefits to their organisation or jurisdiction (see e.g. Independent Commission for Mines and Minerals, Kosovo Cadastral Agency (e.g. Geoportal: <http://geoportal.rks-gov.net/>), Kosovo Agency of Statistics, KUR Prishtina, Ministry of Environment and Spatial Planning, Ministry of Forestry, Agriculture and Rural Development, Ministry of Health), such efforts have been piecemeal in relation to geospatial information itself, patchy in coverage and inevitably, have been unable to fully support transformational government; many have lacked a senior champion to make change actually happen.

It is known that is likely that a form of a 'Law on the establishment of an Infrastructure for Spatial Information in the Republic of Kosovo' will be ratified by the Kosovar Parliament, which is strongly aligned with the EU Directive INSPIRE. This would require Kosovo to create an overarching strategic framework to support the Law and the EU Directive implementation across all data gathers across the public sector in the Republic of Kosovo, who relate their information to location. It was agreed that the proposed NSDI Strategy for the Republic of Kosovo needed to meet the requirements of the EU INSPIRE Directive and also maximize exploitation and benefit from geospatial information to provide a framework to guide local geographic initiatives.

The consultation supporting the formulation of the NSDI Strategy for the Republic of Kosovo

The formulation of the Strategy involved over 100 senior, key stakeholders and technical experts mainly drawn from the public sector. Appendix 2 lists the stakeholders consulted. Some stakeholders and organisations also provided written submissions. The report broadly reflects the views gathered from stakeholders and the overwhelming outcome of this consultation was positive agreement that a NSDI Strategy for the Republic of Kosovo was required in order to realise and maximize the benefits of geospatial information in the country.

Appendix 2: The development of the strategy for the National Spatial Data Infrastructure of Kosovo and the list of stakeholders consulted

The NSDI Strategy has been developed in six streams process. It commenced in February 2014 when the focus was on the strategic vision, mission and objectives followed by foci on financial issues, governance structure, outreach, and capacity building in the context of the development of a NSDI for Kosovo. The final activities focused on the roadmap for implementing the NSDI.

Much of the fieldwork was completed by April 2015. The fieldwork included the organisation of meetings with potential stakeholders of the NSDI of Kosovo, visits to key stakeholder organisations (in order to have insights in their NSDI-needs and activities), and the execution of relevant user workshops. The tables below present an overview of the organised meetings, visits made, and workshops. Time has been spent in 2014 and 2015 strategically positioning the Strategy within both the INSPIRE work programme of government and the 'Law on the establishment of an Infrastructure for Spatial Information in the Republic of Kosovo', and also other national geospatial Strategies.

Table: Overview Meetings with potential NSDI-Stakeholders

Number	Date	Host	Number of participants
1	20 March 2014	Kosovo Cadastral Agency	16
2	7 May 2014	Ministry of Environment and Spatial Planning	19
3	3 July 2014	Ministry of Economic Development	15
4	25 September 2014	Independent Commission of Mines and Minerals	15
5	6 November 2014	Ministry of Health	21
6	5 February 2015	KUR Pristina	30
7	2 April 2015	Ministry of Public Administration	28

Table: Overview of Visits to key stakeholder organisations

Date of visit	Stakeholder organisation
8 May 2014	Hydrometeorological institute
2 July 2014	Independent Commission of Mines and Minerals
24 September 2014	Ministry of Infrastructure
24 September 2014	Ministry of Forestry, Agriculture and Rural Development
5 November 2014	Ministry of Health
5 November 2014	Kosovo Agency of Statistics
5 November 2014	Ministry of Environment and Spatial Planning
3 February 2015	Ministry of Kosovo Security Force
3 February 2015	Association of Municipalities
6 February 2015	Agency of Information Society
31 March 2015	Kosovo Property Agency
31 March 2015	Kosovo Police
31 March 2015	Ministry of Culture, Youth and Sport
3 April 2015	Ministry of Trade and Industry

Table: Overview of organized Workshops

No.	Workshop Title	Date
1	Introduction to Spatial Data Infrastructures	4 July 2014
2	Interoperability and standardisation	26 September 2014
3	Geo-portal, collection and dissemination of geospatial data	11 December 2014
4	Kosovo NSDI Strategy	1 April 2015

The following stakeholders attended strategic meetings or workshops as a support for the formulation of the NSDI Strategy or participated to the visits made to key stakeholders' organisations.

Table: Overview of stakeholders involved in the NSDI Strategy development process

Name	Organisation
Kujtim Gashi	Agency of Information Society
Selim Lulaj	Agency of Information Society
Halim Thaçi	Agency of Information Society
Shqipe Arifaj	Association of Municipalities
Ramadan Klisurica	Association of Municipalities
Ismail Gagica	EU Implementation and Enforcement of Rural Spatial Planning (IRUSP)
Blerton Hoxha	EU Implementation and Enforcement of Rural Spatial Planning (IRUSP)
Premtim Ipshi	EU Implementation and Enforcement of Rural Spatial Planning (IRUSP)
Boris Leukert	EU Implementation and Enforcement of Rural Spatial Planning (IRUSP)
Adam Podolscak	EU Implementation and Enforcement of Rural Spatial Planning (IRUSP)
Marianna Posfai	EU Implementation and Enforcement of Rural Spatial Planning (IRUSP)
Asim Rragomi	Hydro-economic Enterprise N.P.H Iber Lepenci
Alisa Berisha Avdiu	Independent Commission of Mines and Minerals
Sami Duraku	Independent Commission of Mines and Minerals
Ramiz Krasniqi	Independent Commission of Mines and Minerals
Besa Zeqiraj Morina	Independent Commission of Mines and Minerals
Gazmend Morina	Independent Commission of Mines and Minerals
Sami Preteni	Independent Commission of Mines and Minerals
Edvin Cacaj	Geo-2000
Sabri Zylfiu	Gep Consulting
Durim Zylfiu	Geo Consulting
Jetmir Avdiaj	Geoing
Selajdin Haxhimurati	Geomodelling
Bejtullah Shehu	Geomodelling
Enis Hoda	Geopro
Qemajl Hoda	Geopro
Afet Axhami	Gjeomatje Shpk
Argjend Nela	IT, Engineering & GIS Solutions
Adriatik Sejdia	IT, Engineering & GIS Solutions
Agron Luta	Kosovo Agency for privatization
Ardita Hajredini Isufi	Kosovo Agency of Statistics
Haki Kurti	Kosovo Agency of Statistics
Idriz Shala	Kosovo Agency of Statistics
Rrahman Tara	Kosovo Agency of Statistics
Murat Meha	Kosovo Cadastral Agency
Violeta Hajdari	Kosovo Cadastral Agency
Muzafer Çaka	Kosovo Cadastral Agency
Habibe Metushi	Kosovo Cadastral Agency
Denis Pitarka	Kosovo Cadastral Agency
Arbresha Rexha	Kosovo Cadastral Agency
Qazim Sinani	Kosovo Cadastral Agency
Arbresha Starabaja	Kosovo Cadastral Agency
Besfort Thaçi	Kosovo Cadastral Agency
Albina Blakaj	Municipal Cadastral Office of Prishtina

Afërdita Çekaj Thaçi	Kosovo Police
Gazmend Krasniqi	Kosovo Police
Hajrush Lenjani	Kosovo Police
Arben Canolli	Kosovo Property Agency
Safete Isufi	KUR Prishtina
Lufti Kodra	KUR Prishtina
Jetish Krasniqi	KUR Prishtina
Nehru Maloku	KUR Radoniqi
Arben Pruthi	KUR Radoniqi
Burbuqe Bajrami Deva	Ministry of Culture, Youth and Sport
Valon Berisha	Ministry of Culture, Youth and Sport
Skender Sallahi	Ministry of Economic Development
Nol Zekolli	Ministry of Economic Development
Përparim Gashi	Ministry of Environment and Spatial Planning / Agency of Environmental Protection of Kosovo
Letafete Latifi	Ministry of Environment and Spatial Planning / Hydrometeorological Institute of Kosovo
Bajram Kafexholli	Ministry of Environment and Spatial Planning / Agency of Environmental Protection of Kosovo
Mentor Shala	Ministry of Environment and Spatial Planning / Hydrometeorological Institute of Kosovo
Rizah Murseli	Ministry of Environment and Spatial Planning
Shkumbin Shala	Ministry of Environment and Spatial Planning
Idriz Gashi	Ministry of Forestry, Agriculture and Rural Development
Fetije Muriqi	Ministry of Forestry, Agriculture and Rural Development
Arjeta Drenica	Ministry of Health
Hysni Dvorani	Ministry of Health
Albert Sutaj	Ministry of Health
Fatlume Uka	Ministry of Health
Xhevat Ukaj	Ministry of Health
Samedin Gerxhaliu	Ministry of Infrastructure
Besnik Hajdari	Ministry of Infrastructure
Naim Kelmendi	Ministry of Infrastructure
Hysen Merofci	Ministry of Infrastructure
Sokol Gashi	Ministry of Internal Affairs
Hysen Gecaj	Ministry of Kosovo Security Force
Afrim Xani	Ministry of Kosovo Security Force
Dugagjin Ethem	Ministry of Local Government Administration
Xhevahire Beqiri	Ministry of Public Administration
Shengjyle Betashi	Ministry of Public Administration
Shefki Gashi	Ministry of Public Administration
Xhevdet Hetemi	Ministry of Public Administration
Ajshe Kamberi	Ministry of Public Administration
Armend Kastrati	Ministry of Public Administration
Mimoza Kurteshi	Ministry of Public Administration
Saranda Maloku	Ministry of Public Administration
Laureta Mulliqi	Ministry of Public Administration
Jehona Murtezaj	Ministry of Public Administration
Blerim Mustafa	Ministry of Public Administration
Adil Bytyqi	Ministry of Trade and Industry

Isa Dukaj	Ministry of Trade and Industry
Kreshnik Thaçi	Ministry of Trade and Industry
Lumturie Geci	Ministry of Trade and Industry
Mesud Kuka	Water Supply Company Hidrodrini Pejë
Halil Peli	Water Supply Company Hidrodrini Pejë
Vehbi Duraku	Waste and Water Regulatory Office

Two consultants of KU Leuven were involved in the formulation of the Strategy of the NSDI of the Republic of Kosovo with strong support of staff members of Kosovo Cadastral Agency (Murat Meha, Muzafer Çaka, Denis Pitarka, and Arbresha Rexha).

Table: List of Consultants

Name	Organisation
Joep Cromptvoets	KU Leuven Public Governance Institute
Danny Vandenbroucke	KU Leuven – Spatial Applications Division Leuven

Finally, Kathrine Kelms (World Bank), Zdravko Galić (IT Consultant for World Bank) and Bujar Nushi reviewed the final text of this Strategy.

Appendix 3: Summary of the operational changes that the implementation of the Strategy for the National Spatial Data Infrastructure of Kosovo will facilitate

Topic	From	To
Metadata access	Inconsistent approach to the recording of important details about geospatial data being captured (Metadata)	Creation and enforcement of a consistent recording method for metadata and the storage of these artefacts in a readily accessible repository
Core reference data	A lack of consistency and clarity over the geospatial data that defines and underpins Kosovo geospatial information	Development of an agreed set of core reference geographies forming a common framework within which INSPIRE deliverables and the deliverables associated with the 'Law on the establishment of an infrastructure for a spatial information' may be met
Data exchange	Lack of interoperability standards from geospatial information and/or adoption of those that exist	Open standards for geospatial information (ISO & OGC) be adopted consistently into Kosovo geospatial datasets, creating a consistent framework within the INSPIRE Implementing Rules
Education	A lack of awareness of geospatial information and insufficiency in the skills to manage and exploit geospatial data within the public sector	A consistent and widely used exploitation model for geospatial information across funding, user and provider communities
Governance	Lack of a single point of independent ownership	A revised and modified governance model overseeing the implementation of the Strategy and ongoing monitoring
Licensing	Inconsistencies in the licensing models, which allows for unnecessary complexity and are difficult for the user to administer	A significant increase in the use of geospatial information through review and simplification of licensing of core geospatial datasets

Appendix 4: EU INSPIRE Directive themes and core reference geographies

INSPIRE (INfrastructure for SPatial InfoRmation in Europe) is an EU Directive that lays down a general framework for a Spatial Data Infrastructure (SDI) for the purposes of community environmental policies and policies or activities which may have an impact on the environment. It aims to improve the interoperability of, and access to, geospatial information across the European Union at a local, regional, national and international level, facilitate improvements in the sharing of geospatial information between public authorities and provide improved access to geospatial information. While environment is the primary policy area to be covered, INSPIRE has potential to extend to other policy areas such as agriculture and transport.

A premise of INSPIRE is that the spatial data infrastructure for Europe shall build upon the infrastructures established and operated by the Member States, which themselves should be designed to ensure that:

- Geospatial data are stored, made available and maintained at the most appropriate level.
- That it is possible to combine geospatial data from different sources across the community in a consistent way and share them between several users and applications.
- That it is possible for geospatial data collected at one level of public authority to be shared between other public authorities.
- That geospatial data are made available under conditions which do not unduly restrict their extensive use.
- That it is easy to discover available data, to evaluate their suitability for the purpose and to know the conditions applicable to their use.

Geospatial data held by a public authority that is related to one or more of the themes listed in the three priority annexes is covered by the Directive and its daughter legislation, in the form of Implementing Rules. These Implementing Rules which are legally binding as EU Decisions, cover key areas of:

- Metadata
- Interoperability of spatial datasets
- Network services
- Data and Service Sharing
- Monitoring, reporting and coordination

Although an Implementing Rule covers conditions of access to geospatial data by community institutions and bodies, data sharing within a Member State is covered by the Directive itself and is not subject to an Implementing Rule.

The Directive, which provides the framework and policy, came into force on 15 May 2007. Each Member State had to transpose the Directive into national law. The Implementing Rules, which provide much of the technical detail, are all developed, with phased compliance until 2020. The Rules themselves are mostly subject to European Parliament scrutiny prior to adoption by a Member State based regulatory Committee (chaired by the Commission).

INSPIRE Themes – covered by the Directive and Implementing Rules

Annex I

1. Coordinate reference systems
2. Geographic grid systems
3. Geographical names
4. Administrative units
5. Addresses
6. Cadastral parcels
7. Transport networks
8. Hydrography networks
9. Protected sites

Annex II

1. Elevation
2. Land cover
3. Orthoimagery
4. Geology

Annex III

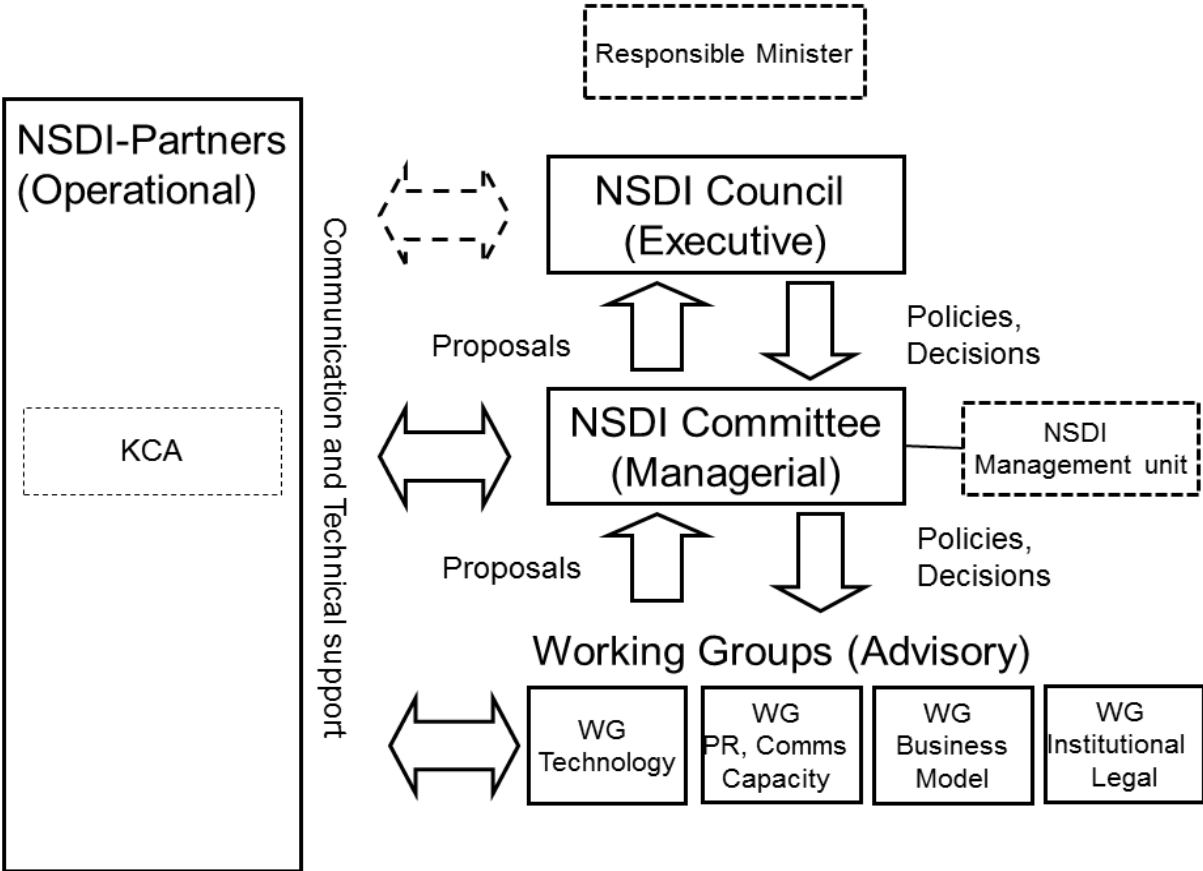
1. Statistical units
2. Buildings
3. Soil
4. Land use
5. Human health and safety
6. Utility and governmental services
7. Environmental monitoring facilities
8. Production and industrial facilities
9. Agricultural and aquaculture facilities
10. Population distribution – demography
11. Area management/restriction/regulation zones and reporting units
12. Natural risk zones
13. Atmospheric conditions
14. Meteorological geographical features
15. Oceanographic geographical features
16. Sea regions
17. Bio-geographical regions
18. Habitats and biotopes
19. Species distribution
20. Energy resources
21. Mineral resources

The recommended initial set of *Core Reference Geographies* to be implemented by the Strategy for the Development of the National Spatial Data infrastructure in the Republic of Kosovo is as follows:

- Geodetic Framework
- Topographic Mapping (at different scales and including ground height information)
- Ortho-imagery
- Geographic Names
- Addresses
- Streets
- Land & Property Ownership
- Hydrology/Hydrography
- Statistical units
- Administrative boundaries

These can be expanded to eventually encompass the scope of the EU INSPIRE Directives themes as well as the (draft) 'Law on the Establishment of an Infrastructure for Spatial Information in the Republic of Kosovo'.

Appendix 5: Proposed governance structure for the Development of the Strategy for the National Spatial Data Infrastructure of Kosovo



Abbreviations used in this figure

- KCA Kosovo Cadastral Agency
- NSDI National Spatial Data Infrastructure
- PR Public Relations
- WG Working Group

- Comms Communications

Appendix 6: NSDI-implementation cost estimates

Summary table of the NSDI-implementation cost estimates grouped by thirteen activities classes. For details, see <http://www.kca-ks.org/>.

Activity	One-time Set-up Cost (in Euros)	Ongoing Cost per year (in Euros)
1. METADATA *	11,800	4200
2. DATA *	231,000	7200
3. SERVICES	87,000	54,200
4. INFORMATION TECHNOLOGY **	760,000	235,000
5. STANDARDISATION	5000	1800
6. GOVERNANCE		74,600
7. DATA SHARING	25,000	5000
8. CAPACITY BUILDING	15,000	10,000
9. APPLICATIONS *	106,800	
10. OUTREACH	5700	10,700
11. PERFORMANCE MANAGEMENT	2400	1200
12. RESEARCH		25,000
13. UNFORESEEN	50,300	21,100
TOTAL	1,300,000	450,000

* International expertise is necessary to fulfill this activity successfully – It is assumed that the international IMPULS project ‘Cooperation in the Western Balkans region - Infrastructure for Spatial Information in the region of Western Balkan’ will provide this expertise ¹

** Rough estimation costs

¹ http://geospatialworldforum.org/workshop.asp?Sp_Department=IMPULS

Appendix 7: List of abbreviations

Abbreviation	Meaning
EU	European Union
GIS	Geographic Information Systems
ICT	Information and Communication Technology
INSPIRE	INfrastructure for SPatial InfoRmation in Europe
IS	Information System
IT	Information Technology
ISO	International organisation for Standardisation
KCA	Kosovo Cadastral Agency
MESP	Ministry of Environment and Spatial Planning
NSDI	National Spatial Data Infrastructure
OGC	Open Geospatial Consortium
PR	Public Relations
R&D	Research and Development
SDI	Spatial Data Infrastructure
WG	Working Group

Appendix 8: Glossary of terms

Term	Definition
Comitology	System of committees the European Union uses to put legally binding detail into framework legislation
Geoportal	Internet site, or equivalent, providing access to the services
Geospatial Information	Taken in its widest sense to mean geo-referenced information about land, water, and air
INSPIRE	European Directive which lays down general rules aimed at the establishment of the Infrastructure for Spatial Information in the European Community, for the purposes of Community environmental policies and policies or activities which may have an impact on the environment
Interoperability (Information)	Capability to reference objects from one dataset to objects in another dataset among a common system of geo-referencing incorporating common identifiers
Interoperability (System)	Capability to communicate, execute programs or transfer data among various functional units in a manner that requires the user to have little or no knowledge of the unique characteristics of those units
Information & Communication Technology	The study, design, development, implementation, support or management of computer-based information systems
Metadata	Data about data to support the discovery, exploration and exploitation of geospatial information and services
OGC	A non-profit, international consensus-based standards body is leading the development of open specifications for web access to geospatial information
Geospatial Data	Any data with a direct or indirect reference to a specific location or geographical area
Geospatial Dataset	An identifiable collection of geospatial data
Spatial Data Infrastructure	Infrastructure facilitating metadata, geospatial data sets and geospatial data services; network services and technologies; agreements on sharing, access and use; and coordination and monitoring mechanisms, processes and procedures
Geospatial Data Services	The operations which may be performed, by invoking a computer application, on the geospatial data contained in geospatial datasets or on the related metadata