

# IRISH SPATIAL DATA INFRASTRUCTURE CONSULTATION DOCUMENT

Issued by  
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Custom House  
Dublin 1

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# PART 1 : CONSULTATION INFORMATION

## 1 YOUR DETAILS

NAME*	
POSITION	
ORGANISATION*	
POSTAL ADDRESS	
EMAIL ADDRESS*	
PHONE NUMBER	

\* Represents a required field.

## 2 BACKGROUND INFORMATION ABOUT THIS DOCUMENT

This document deals with issues at a broad level and does not set out specific policy proposals. Rather, the intention is to provide a framework within which responses can be elicited. Your responses may be general or specific as we would welcome all types of feedback.

The responses that are obtained on the basis of this consultation document will form an important input into a draft Irish Spatial Data Infrastructure (ISDI) policy framework document that will also be made available for comment.

This consultation document is directed mainly at people or organisations that are involved as spatial data providers or users and who have a level of familiarity with spatial data matters. More specifically it is aimed at :-

- People in government departments, national agencies, local authorities and utilities who are responsible for managing data, preparing data/statistics/information strategies for their departments/agencies, organising spatial data and using such data
- People in the teaching and research community
- Software or hardware system providers and developers
- Private sector data and information providers
- Private sector data service providers (i.e. people who undertake data audits, data cleansing, data formatting etc)
- Professional bodies (planners, engineers etc)
- Data users from the public, private, voluntary, academic and research sectors.

PART 1 : ISDI CONSULTATION INFORMATION contains background information which will assist you to provide your comments to the Department.

PART 2 : ISDI BACKGROUND ISSUES provides a brief overview of a number of general issues which should help provide a context for the responses and comments from stakeholders and interested parties.

PART 3 : YOUR RESPONSES is organised around major topic areas. Within each of these areas the material is organised in the same way.

- Firstly, there is a brief discussion related to the topic. In some cases broad options regarding the way forward are suggested.
- Secondly, some key questions or issues are listed.
- Finally, space is provided for a response by you or your organisation. You may wish to respond directly to the questions / issues or you may wish to make other comments within the broad topic area. Certainly we would appreciate your comments on the questions but please do not feel constrained to deal only with them. We are also very keen to understand how your organisation is constrained by the lack of an ISDI, priorities you see in the development of an ISDI, and how your organisation can support this development  
Just type your comments into the boxes and hit the send button so that your comments are sent to the Department.

ACCONYMS. This part contains a list of acronyms and their full meaning.

### **3 SOURCES OF THE CONSULTATION DOCUMENT**

This consultation document is available in the following ways.

- On the National Spatial Strategy web site [www.irishspatialstrategy.ie](http://www.irishspatialstrategy.ie).
- By downloading from the NSS web site to receive a copy in MS Word or PDF formats. This download facility is available by clicking the MS Word or PDF buttons on the web version of this document.
- By contacting Cathal McNulty by email on [cathal\\_mcnulty@environ.ie](mailto:cathal_mcnulty@environ.ie). Cathal will send you an electronic copy in MS Word format.
- By contacting Cathal at 01 888 2721.

### **4 DEADLINE FOR RECEIPT OF RESPONSES**

2 July 2004.

### **5 SUBMISSIONS OF RESPONSES**

Responses can be submitted in the following ways.

- Web Based
  - By clicking the 'Send' button at the end of each box in Part 3 of the web version of this document.
- MS Word Version

- If you downloaded the MS Word version of the document from the web site or received one directly from Cathal McNulty you can email your returns to Cathal at [cathal\\_mcnulty@environ.ie](mailto:cathal_mcnulty@environ.ie).
- Hardcopy
  - Any written responses or additional documentation should be sent to Cathal McNulty at Department of Environment, Heritage and Local Government, Custom House, Dublin 1.

From the Department's perspective electronic responses are preferable.

## **6 VIEWING AND PRINTING YOUR COMMENTS FOR RECORD PURPOSES**

If you are providing your comments on the web site you may wish to view them prior to finalising them. 'View your comments' buttons are provided for this purpose. You may wish to keep a hardcopy or electronic record of your web based comments. Provision is made for you to do this at the end of each section where there is a 'Printer friendly version' button.

## **7 CONTACT FOR FURTHER INFORMATION**

Should you wish to discuss any matter relating to the ISDI prior to submitting your responses you may contact Bruce McCormack of the Department at 01 888 2490 or email him directly at [bruce\\_mccormack@environ.ie](mailto:bruce_mccormack@environ.ie)

## **8 DRAFT ISDI POLICY FRAMEWORK**

It is intended to produce a draft Policy Framework document later in 2004. This document will form the basis for consultation. If you wish to be notified when this document becomes available please type 'Yes' in the relevant box below.

I would like to get a copy of the draft Policy Framework when it becomes available	
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## PART 2 : ISDI BACKGROUND ISSUES

### 1 INTRODUCTION

In the March 2002 New Connections Action Plan issued by the Irish government<sup>1</sup> it was stated that a National Spatial Data Infrastructure should be established for Ireland.

In November 2002 the Department of Environment, Heritage and Local Government was appointed by the government to take the lead role in developing an Irish Spatial Data Infrastructure (ISDI). Since this time the Department has undertaken a number of initiatives, including establishing an ISDI Work Group<sup>2</sup> which provides specialist advice and comment, holding a seminar on ISDI for all government departments and selected government agencies, establishing reporting procedures from the ISDI Work Group through the Inter-departmental Committee responsible for overseeing the implementation of the National Spatial Strategy (NSS) to the Cabinet Sub-committee on Infrastructure and PPPs.

A key aim during 2004 is to produce a policy framework for the ISDI. Prior to developing such a framework it is necessary and appropriate for stakeholders and interested parties to make an input regarding issues or specific policies that they believe should be covered in such a framework. It is also appropriate to provide an opportunity for stakeholders to indicate the kind of contribution which they may wish to make to the ongoing process of building the ISDI. This document provides an opportunity to make such input.

### 2 WHAT IS A SPATIAL DATA INFRASTRUCTURE

In essence, **spatial data** are data that in some way relate to a position in space, or more specifically, a position on the earth. The term **infrastructure** conveys the idea of an underlying foundation or basic framework on which data, activities or procedures are built.

A formal definition of a SDI which has often been quoted in the SDI literature states that an SDI is ***'the technology, policies, standards, human resources, and related activities necessary to acquire, process, distribute, use, maintain, and***

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<sup>1</sup> See <http://www.taoiseach.gov.ie/index.asp?locID=214&docID=-1> for a copy of the Plan.

<sup>2</sup> The Group comprises representatives from Ordnance Survey Ireland (OSi), Land Registry, Local Government Computer Services Board (LGCSB), Central Statistics Office (CSO), the Department of the Taoiseach and academics with knowledge in the field. The Work Group has had seven meetings to date.

**preserve spatial data.**<sup>3</sup> A key element of this definition is the scope of issues which are covered by an SDI. It is clearly not just about technology nor even the straightforward provision of certain datasets.

Put simply, an SDI is the 'ground rules' and arrangements which are put in place to enable spatial data from separate digital data bases to be combined seamlessly without undue difficulty and for such data to be widely available and used.

In practical terms, if an ISDI were operational, spatial data would be readily discoverable and available via the Internet or for some users, on an organisation's Intranet. For example, any device (PDA, mobile phone, laptop, desktop computer, etc.) connected to the Internet could access a GIS client application on a geo-portal which would allow the user to create customised maps from diverse data derived from distributed databases. This could be carried out without the user having to search for and explicitly link to the individual servers. A user could thus create maps consisting of base layers overlain with more specialist "thematic" data from a variety of fields (e.g., health, demography, transport, education, planning, etc.). GIS users would have a range of options available, from the relatively simple visualisation of data (map viewers) to more sophisticated analyses of spatial data. Spatial data could also be made available for download to local desktop GIS applications.

A range of types of operations could be conducted on the data layers that would depend on the types of functionality which were built into the system. However at its heart the system would allow the viewing of multiple datasets overlaid on each other, and the user being able to perform interactive analysis on these multiple datasets (for instance, to consider possible locations for a new hospital with reference to mapping, demographics, and accident statistics).

Accessing relevant data and using the various functionalities which can be performed on the data should ideally take place with a minimum of delay (seconds in some cases, depending on the type and size of the data files being downloaded into the system).

The databases that would be involved in the ISDI would remain the property and responsibility of the host organisations (termed data custodians).

This is not a full description of a possible future situation but merely an outline which serves to provide a glimpse of what could be involved.

### **3 WHY IS AN ISDI NEEDED**

In general terms some of the benefits of an ISDI could include :-

- Making 'joined up government' more of a reality
- Making government more transparent
- Creating more evidence based policy making
- Facilitating more targeted service provision
- Making more effective use of government resources

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<sup>3</sup> US Federal Government circular issued on 19 August 2002, and available at [http://www.whitehouse.gov/omb/circulars/a016/print/a016\\_rev.html](http://www.whitehouse.gov/omb/circulars/a016/print/a016_rev.html)

- Facilitating more robust spatial analysis and modelling
- Better monitoring of expenditure and government actions
- Creating a more informed general public
- Supporting a more competitive economy
- Releasing back office resources for front office services through the freeing up staff devoted to unnecessary data capture, data location, data formatting etc processes.

A critical feature of an SDI is that the whole is greater than the sum of the parts. By linking separate databases in an integrated network, new and innovative insights would become possible which could not be obtained through considering individual non-linked databases. In fact the greater the number of separate data bases which are linked the greater the extent of the benefits.

#### 4 THE POLICY CONTEXT

The policy framework within which the ISDI should be considered ranges from the international to the national and local levels.

At the **international level** there are a number of bodies which set a policy context, namely, the International Organisation for Standardisation (ISO)<sup>4</sup>, the Open GIS Consortium (OGC)<sup>5</sup> and the Global Spatial Data Association (GSDA)<sup>6</sup> which is striving to create a world SDI based on national SDIs.

At the **European level** there is the European Committee for Standardisation (CEN)<sup>7</sup> and the INSPIRE initiative<sup>8</sup> which is aimed at producing an EU Directive related to the establishment of a European SDI. There are also many other initiatives, Directives and Regulations which impact directly or indirectly on ISDI matters, including for example the Information Society initiative, the Use of Public Sector Information Directive, the Water Framework Directive and many others. The ongoing cooperation between the Republic and Northern Ireland initiated by the Good Friday Agreement also provides a broad policy context.

Within the **Irish context** the main policy context for the ISDI is the Information Society Agenda that is directed to promoting eGovernment, eBusiness and eInclusion. Other important policies or initiatives include Better Local Government, government modernisation, the Management Information Framework and the policy whereby all government departments must have statistics / information policies in place by the end of 2004.

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<sup>4</sup> Of particular relevance is the work of the ISO's Technical Committee 211 which deals with standards in the geographical information sphere. See [www.iso.org](http://www.iso.org) for general background regarding the ISO.

<sup>5</sup> See [www.opengis.org](http://www.opengis.org).

<sup>6</sup> See [www.gsdi.org](http://www.gsdi.org).

<sup>7</sup> See [www.cenorm.be](http://www.cenorm.be).

<sup>8</sup> See [www.ec-gis.inspire.org](http://www.ec-gis.inspire.org). A draft EU Directive is currently being considered within the EU Commission. If supported by the Commission the Directive will be submitted to the Parliament and the Council in Summer. The Directive identifies priority data sets which require harmonization and other actions. If the Directive is approved Ireland would need to operate within the terms prescribed.

## 5 THE CURRENT SITUATION IN IRELAND

Although no SDI currently exists in Ireland, elements required to build a first rank spatial data infrastructure do exist. If these components can be adequately organised, combined and developed Ireland would have the ability to derive the substantial potential benefits arising from an SDI which are mentioned in section 3 above. Some of the important positive elements include :-

- an increasing realisation that spatial data can play a major role in government and business
- the realisation in government that an ISDI is necessary and the appointment of a government department to take a lead role in creating such an infrastructure
- the fact that many organisations have a GIS capacity. For example virtually all County Councils have such a capacity and many government departments are in a similar situation
- a number of tertiary education bodies provide education and training in GIS and related matters
- research bodies are building increasing competency in spatial analysis. A national centre for geocomputational analysis is to be established
- large quantities of data are already spatially 'tagged' in a variety of ways. However, the method of tagging for many of these datasets does not facilitate seamless integration with other databases
- the OSi has a sound and expanding digital spatial data base
- an umbrella organisation (Irish Organisation for Geographical Information – IRLOGI) exists. This organisation is concerned specifically with spatial data matters and draws together interested individuals and organisations from a variety of sectors
- the infrastructure exists through OSi to provide real-time GPS positioning.

However in striving for a first rank ISDI there are also difficulties and problems which need to be overcome, including :-

- lack of adequate funding arrangements
- no coherent overall policy framework, a matter which is currently being addressed
- fragmented data bases containing data which can not be seamlessly combined
- lack of an integration mechanism such as an ISDI Internet portal
- institutional issues and unresolved questions, including the balance between public good and the rights of the individual to privacy and suitable frameworks for protecting intellectual property rights (including copyright) while at the same time ensuring appropriate levels of access to information.
- lack of a data sharing culture
- maintaining interest and support.



## **6 THE KEY CHALLENGE**

The key challenge is to develop an ISDI that meets the key spatial data needs of policy makers and other users.

An important initial stage is to develop and gain government approval for an overall policy framework for the ISDI. Given the importance of this framework it is vitally important that stakeholders and interest groups make a significant input into the process of developing such a framework. Thus your contribution is seen as being of great interest and relevance. Please could you give careful consideration to the issues raised in Part 3 and provide your responses in the spaces provided.

## PART 3 : YOUR RESPONSES

### 1 THE MAJOR TOPICS TO BE DEALT WITH IN THE POLICY FRAMEWORK

#### DISCUSSION

As mentioned in Part 1, a draft ISDI Policy Framework will be prepared later in 2004. Based on the discussions that have been held to date it would appear that the proposed ISDI Policy Framework would need to cover the following main topics.

- Vision and basic principles
- User needs
- Overall structure of the ISDI
- Spatial area of coverage
- Standards
- Key data issues
- A small areas framework
- Organisational issues
- Education and training
- Legal issues
- Financial issues, including data costs
- Consultation, publicity and communications
- Education and training
- Implementation issues.

This document deals with each of the above topics in the sections that follow.

#### QUESTIONS / ISSUES

- (1) Are there any other broad topics which should be dealt with in an ISDI policy framework?
- (2) Do you feel that any of these broad topic areas are of particular importance? Why?

**COMMENT** (please type your comments into this space)

## 2 VISION AND PRINCIPLES

### DISCUSSION

#### Vision

One possible **vision** for the ISDI is set out below.

‘To have substantial amounts of harmonised, high quality spatial data readily available and widely used in ways which effectively meet social, economic, environmental and governance needs within the State and which fulfil Ireland’s international obligations.’

#### Principles

A set of possible **principles** which is based on those prepared as part of the EU INSPIRE initiative is indicated below.

- Spatial data should be collected once and maintained at the level where this can be done most effectively.
- It should be possible to combine seamlessly spatial data from different sources, and share such data between many users.
- Spatial data needed for good governance at all levels should be abundant and available under conditions that place minimal or no restraints on its extensive use.
- It should be easy to discover which spatial data are available, fits the needs for a particular use and under which conditions it can be acquired and used.
- Spatial data should be easy to understand and interpret in a user-friendly way, within an appropriate context.
- Spatial data in Ireland should be substantially compatible with Northern Ireland spatial data and with emerging European and world spatial data infrastructures.

### QUESTIONS / ISSUES

- (1) Are the vision and principles suitable?
- (2) Are they sufficiently clear?
- (3) Are they sufficient to provide enthusiasm and motivation?
- (4) What might be some of the consequences of adopting the vision and the principles?
- (5) If they require alteration, what changes should be made?

**COMMENT**(please type your comments into this space)

### 3 SPATIAL AREA OF COVERAGE

#### DISCUSSION

It has been suggested that the ISDI should focus on both the land area of the Republic as well as the State's territorial waters. By including Island's territorial waters, marine data would become integrated into the ISDI and this would generate additional environmental, social and economic benefits for the country. Such a focus would also facilitate coastal zone management which is becoming an increasingly important area of concern.

Given the fact that rivers, people flows, movement of goods, roads etc freely cross the Republic / Northern Ireland boundary it makes sound practical sense to ensure that a special effort is made to ensure integration between spatial data infrastructures North and South of the Border.

#### QUESTIONS / ISSUES

- (1) Do you agree that the ISDI should focus on both the land and sea areas?
- (2) Should land or sea areas be prioritised?
- (3) Are there aspects which should be prioritised which cover both land and sea and if so what?
- (4) Have you any comments on the need to ensure adequate co-ordination or integration with initiatives in Northern Ireland and the appropriate means of doing so?

**COMMENT**(please type your comments into this space)

### 4 USER NEEDS

#### DISCUSSION

Clearly it is pointless spending time and resources creating a system which is not useful. We believe that spatial data has many uses and that there are many potential users. Examples of such users are policy makers, agencies delivering a wide variety of services (health, transport, local government etc), various types of professionals (e.g. conveyancers, planners, etc.), academics and researchers and the general public.

#### QUESTIONS / ISSUES

- (1) Who are likely to be the main users of the ISDI and what do you consider to be their specific needs?
- (2) What are your own organisation's needs in relation to spatial data and how might these be satisfied?

**COMMENT**(please type your comments into this space)

## 5 OVERALL STRUCTURE OF THE SYSTEM

### DISCUSSION

Overall system structure refers to the basic ways in which separate databases should be linked.

Two basic models exist for how data can be stored and provided.

In the case of a **distributed system** data would reside in separate databases and would only be connected when a specific enquiry was made which required data from these databases to be brought together. This integration would take place through a software structure (often called a hub or an Internet portal) which draws data from the separate databases over a communications network such as the Internet. The databases would be physically stored and maintained in different organisations and at different locations. The data providers would retain responsibility for their data and may be regarded as the data custodians for their data.

In the **warehouse** model all, or virtually all, the data which could be accessed by a user through a software structure would be held in one large database.

The above two models represent extreme cases. In fact various combinations of the distributed and warehouse models are possible.

The INSPIRE principles favour the distributed system model.

### QUESTIONS / ISSUES

- (1) What are your views on an appropriate model for the ISDI?
- (2) What constraints could there be for your organisation in adopting either of the 'extreme' models set out above?
- (3) Are there security difficulties that could arise from the different models?
- (4) Should some form of system that combines elements of both models be developed? If so, can you provide an idea of how such a system could be arranged?
- (5) Are there alternative models that should be considered?

**COMMENT** (please type your comments into this space)

## 6 STANDARDS

### DISCUSSION

A considerable amount of work in relation to standards for spatial data has taken place at an international level. The International Organisation for Standardisation (ISO) has a technical committee (TC 211) which has focused exclusively on this type of information.

The Committee is overseeing the development of over 40 separate spatial data related standards. Some of these standards have been adopted by the ISO and others are in various stages of development or approval.

The Open GIS Consortium (OGC), in conjunction with ISO, has produced a variety of data interoperability standards relating to spatial data.

The Comité Européen de Normalisation (CEN) is the European body responsible for standards. When CEN adopts standards they become mandatory on Member States. CEN will probably consider ISO and Open GIS Consortium standards and adopt them with possible variations to suite European conditions.

The National Standards Authority of Ireland (NSAI) is responsible for representing Ireland's views on developing European and international standards, and for implementing them as national standards.

eGovernment initiatives across Europe (and beyond) are also defining standard elements of services and data, many of which inevitably include spatial information.

More generally, the Open Source software model of development promotes standardisation in addition to dealing with other important aspects such as portability, sustainability, and flexibility<sup>9</sup>.

Some key areas for standardisation from the point of view of the ISDI are set out below.

- **Catalogue.** A catalogue is the system that enables spatial data to be organised, discovered and accessed. Catalogues have been described as being 'at the heart of any SDI'.<sup>10</sup> It is thus important that catalogues can be easily and unambiguously accessed by all users using various software tools.
- **Metadata.** Metadata is 'data about data' and describes the contents, structure, format and lineage of data sets. Again, easy and unambiguous access to this information is vital for an SDI. The key standards in this case are probably Dublin Core<sup>11</sup> which would provide a high level set of information about spatial data set contents and the ISO Standard 19115<sup>12</sup> which provides for considerably more detail regarding a dataset.
- **Gazetteer.** A gazetteer is a listing of information in a standard format, for instance of postal addresses, street names or locality names. The necessary format needs to be standardised to ensure that definitive information is accessed.
- **Georeferencing system.** A coordinate reference system is a fundamental basis of all spatial data. It is therefore vital that the systems in use are clearly defined and there are definitive means of moving between them. Relevant systems for an ISDI probably include the Irish Transverse Mercator (ITM) which has been adopted by Ordnance Survey Ireland as the basis for its mapping, Universal Transverse Mercator (UTM) for international applications, and a sea level (height) reference system.
- **Interoperability standards including data transfer language.** It is vital that data can be exchanged between systems in a way which does not lose, alter or corrupt

<sup>9</sup> See [www.opensource.org/](http://www.opensource.org/)

<sup>10</sup> INSPIRE Architecture and Standards Position Paper, October 2002. (see [www.ec-gis.org](http://www.ec-gis.org))

<sup>11</sup> See <http://uk.dublincore.org/>

<sup>12</sup> See [www.isotc211.org/](http://www.isotc211.org/)

information. To support this, OGC and ISO TC211 are documenting and standardising the Geography Markup Language (GML)<sup>13</sup> which is a form of Extensible Markup Language (XML). GML is the likely future standard for the encoding and transport (e.g., over the Internet) of spatial data.

- **Software.** It will be vital to ensure that organisations using different software systems can share data between themselves. The OGC has undertaken a considerable amount of work in this area, including a programme of verification that various software systems meet interoperability requirements. Many organisations, however, are using systems which have been developed many years ago, or for their own particular purposes. Such systems many not meet the latest interoperability standards.
- **eServices.** The OGC is currently working in this area and there may be an EU Directive dealing with services at some point in the future.
- **Semantic interoperability.** Terminological confusion can create substantial difficulties. It may be that clarity in this regard will be introduced through the EU's eGovernment Directive (refer to the EU IDA web site).
- **Data quality standards.** It is vital that we all understand each other when discussing the 'quality' of a dataset, to ensure that the most appropriate dataset is used for each particular purpose, particularly in cases where differing datasets exist. This requires clear definition of quality measures, and consistent use of terminology.

In all of these cases, we will need to consider what use Ireland makes of official standards and where we choose to develop standard specifications that focus particularly on Ireland's needs.

#### QUESTIONS / ISSUES

- (1) What are the possible practical implications for Ireland of implementing the catalogue, metadata, geo-referencing and data transfer and other standards mentioned above? What are some of the difficulties?
- (2) Are there other issues to which standards should apply?
- (3) Are there particular types of data which should on a priority basis be collected, transformed etc in accordance with these standards?
- (4) In what fields can open source standards be used?
- (5) What body should be responsible for determining standards in the Irish context?

**COMMENT** (please type your comments into this space)

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<sup>13</sup> GML is an [XML](http://www.opengis.org)-based language for encoding and transport of geographic information. See [www.opengis.org](http://www.opengis.org).

## 7 DATA ISSUES

### DISCUSSION

Data are at the heart of any spatial information system and thus data needs to be a specific and important focus of attention.

From an SDI perspective data may be viewed and categorised in various ways. The importance of whatever categorisation is adopted can not be overemphasised as data policies will be developed on the basis of the data categories which are adopted.

Probably one of the most basic concepts in an SDI is the notion of spatial data (see Part 2, section 2). Broadly spatial data can be classified as reference data and attribute data.

Another approach to categorising spatial data is to distinguish between core data and thematic data. These four categories (reference, attribute, core and thematic data) are not mutually distinct and thus any single data set may fall into more than one of the above four categories. As the categories provide a framework for viewing data matters and shaping policies, it is thus important that further comment is provided regarding the nature of each type of data.

- **Spatial data** refers to data which has been linked to a point, area or volume in space. The links (also sometimes referred to colloquially as 'tags') can take a number of forms<sup>14</sup>. The information which is tagged may take any form. In the context of the ISDI, digital data are the type of data which is of greatest interest.
- **Reference data** refer to maps or remotely sensed images (air photographs, satellite images) against which other data (e.g. road accidents, location of school pupils, monuments etc) are 'referenced' so as to show geographical position. It is vitally important that such maps or images indicate accurately the spatial location of the objects (roads, houses, trees etc) which they show. Reference data as defined here are normally in raster format, but may also be available in vector format.
- **Attribute data** are data which provide additional information about a spatially identified 'object'. For example, a car crash may be represented by a star on a map, in which case the associated attribute data may be the make of car, the time of day of the crash etc. To a large extent the power of GIS systems lies in them being able to quickly and easily access such attribute data. In principle all data can be linked to spatial position and thus all of the data held by organisations can become spatial data, provided it is linked to a spatially defined object. The real benefits of an SDI will emerge as more and more otherwise non-linked data become spatially tagged. Attribute data may be held in tabular, text, image or other formats.
- **Core data** are the priority spatial data which in the ISDI should be maintained to the highest standard and be made widely and easily available. Core Data may be reference or attribute data. Some of the kinds of data which could be regarded as Core Data are :-

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<sup>14</sup> The tags can be :-

- Through identifying x, y and z co-ordinates which define unique points on the earth
- In real-time through linking to some positioning system such as GPS (or Galileo in future)
- Through word linkages (e.g. County Meath)
- Through alphanumeric 'bar codes' which are unique to defined spatial objects
- By linking to other 'objects' which are themselves spatially positioned (e.g. a vector boundary data set).



- (1) Coordinate reference systems
- (2) Base maps
- (3) Remotely sensed rectified images (orthophotographs, satellite images)
- (4) Geographical place names
- (5) Geographical grid systems
- (6) Addresses
- (7) Legal and administrative boundaries
- (8) Transport networks (road, rail, airports, harbours)
- (9) Hydrography including water catchment areas
- (10) Terrestrial elevation
- (11) Bathymetry and coastline
- (12) Oceanic spatial features
- (13) Protected sites
- (14) Land cover
- (15) Cadastral parcels
- (16) Development Plans
- (17) Planning applications
- (18) Selected basic demographic data
- (19) Selected infrastructure (gas, telecommunications, electricity)
- (20) Selected basic enterprise data
- (21) Selected public facilities data (schools, hospitals, Garda stations etc)
- (22) Geology.

- **Thematic data** are data in broad fields or areas such as education, health, planning etc. Given the relative lack of resources it is necessary to identify priority thematic areas so that the data in these areas can be adequately spatially referenced, harmonised on a priority basis.

#### **QUESTIONS / ISSUES**

- (1) Does Ireland have adequate types of reference data, and if not what other types should we have?
- (2) What forms of data should be regarded as Core Data?
- (3) What are the priority thematic areas in which special effort should be made to get spatial data properly organised?
- (4) What are the constraints which would limit your organisation adequately organising its data holdings?
- (5) What additional resources would be needed to adequately organise your data?
- (6) What are the priority data in your organisation which should be adequately organised?
- (7) Have you any views on the various forms of spatial referencing?

**COMMENT** (please type your comments into this space)

## 8 SMALL AREAS FRAMEWORK

### DISCUSSION

The full power of GIS systems can be harnessed when data are coded in terms of xy (and z) co-ordinates. Spatially 'tagging' data in this way can indicate positions at very high levels of accuracy. High levels of spatial accuracy are very useful for most purposes and there is little doubt that where possible this form of spatial tagging should be undertaken when data are being collected. However two basic problems may exist if data were to be provided (outputted) only in xy(z) format.

Firstly, tagging in this way means that in the case of some types of data (e.g. census information, household surveys), the privacy of data suppliers (individuals, households, businesses, organisations) can be compromised.

Secondly, many data users would not have access to software which can manipulate data which are in xy(z) format.

In order to get round these difficulties it would be necessary before outputting data to aggregate the information. This would ensure that individual records can not be identified. It would also make it possible for standard widely used software programmes (e.g. Excel) to store and manipulate the output data.

From the ISDI perspective, the questions become :-

- is it possible and appropriate to identify a network of areas across the whole State which would be the smallest spatial units ('atomic' areas) for the supply of certain kinds of data?
- In the case of data which do not have potential privacy difficulties, what types of data should be made available (outputted) in terms of areas rather than in xy(z) terms?

From an analytical point of view the smaller the extent of the atomic areas the better.

Having established such a small area network other data which are not tagged in terms of xy(z) co-ordinates could be tagged using these atomic areas.

Having established such a network of smallest areas, it is desirable that whenever larger areas are used to collect or display data these larger areas are whole multiples of the atomic areas (i.e. the larger areas do not involve splitting any of the atomic areas). For many purposes a basic hierarchy of areas along the lines set out below may be appropriate.

- Atomic areas at the bottom of the spatial hierarchy
- Electoral Divisions
- Local authority areas
- Regions
- The State
- The island of Ireland.

Obviously this basic hierarchy would not be suitable for all purposes (e.g. analysing water quality by water catchment) and data providers would need to shape their data output areas to suit their user needs. However where possible and appropriate data providers would be encouraged to issue data in terms of these areas or in a form which would enable the data to be aggregated or disaggregated into these basic types of areas without the necessity to split atomic areas.

**QUESTIONS / ISSUES**

- (1) Have you any suggestions regarding principles or guidelines which should underpin a small areas framework of atomic areas?
- (2) Have you any comments on the six level basic hierarchy?

**COMMENT** (please type your comments into this space)

## 9 ORGANISATIONAL ISSUES

### DISCUSSION

The ISDI will not happen without focussed intervention. It needs to be created and then developed and maintained on an ongoing basis. Roles and responsibilities regarding the ISDI as a whole and the various elements within the ISDI need to be clearly set out. Some of the key functions for which responsibility would need to be allocated are :-

- Taking overall responsibility for the ISDI. As mentioned earlier, the Department of Environment, Heritage and Local Government has this responsibility at present. This role would entail a variety of duties that may be carried out directly by the body taking overall responsibility or by other bodies on its behalf
- Maintaining and developing core reference data
- Aligning existing and future attribute data sets in the various thematic areas so that they meet the agreed standards. This would be the responsibility of data custodians in departments, agencies, local authorities etc.
- Co-ordinating interested bodies
- Research and development
- Education and training
- Data regulation and compliance certification.

### QUESTIONS / ISSUES

- (1) What kind of organisation should have overall responsibility?
- (2) What are the other key functions which need to have roles and responsibilities clearly defined and allocated?
- (3) What role should the private sector and the NGO sector (e.g. IRLOGI, the umbrella Irish Organisation for Geographical Information) play?
- (4) What contribution could your organisation make and what support would you require to play a positive role?

**COMMENT** (please type your comments into this space)

## 10 EDUCATION AND TRAINING (Capacity Building)

### DISCUSSION

The ISDI will generate a need for people with specific skills or types of knowledge. For example skills / knowledge in the following areas may be necessary :-

- GIS
- Web services and systems
- Standards
- Data base management
- Legal issues
- Policy and strategy formulation
- Integration of spatial data bases with document management systems
- Network development and management
- Production of manuals and protocols
- Data collection and coding
- Communication and liaison.

Without an adequate skills / knowledge base the development and roll-out of the ISDI would be slowed.

### QUESTIONS / ISSUES

- (1) What should be the education and training priorities?
- (2) What other education and skills-related issues can you identify which require attention?
- (3) What training and education will be needed to allow your organisation to use its spatial data effectively?
- (4) Could your organisation contribute in any way to providing education and training?

**COMMENT** (please type your comments into this space)

## 11 LEGAL ISSUES

### DISCUSSION

Some of the important legal issues are mentioned below.

- **Legislation.** Over 120 countries around the world are working on creating national SDIs. In some countries it has been necessary to enact legislation to underpin the creation of their SDIs whereas in others policy and specific inter-organisational arrangements have been seen to be adequate. At a European level the INSPIRE initiative has produced a draft European SDI Directive which if adopted would need to be translated into national legislation. Thus if such a Directive were to be adopted the issue of whether or not legislation should be passed would almost certainly be resolved. However the issue would then be around what specific factors would be covered in Irish SDI legislation. Another issue would be whether it is appropriate to wait until the Directive comes into effect (which could involve translation into Irish legislation after 2007) or whether legislation is necessary in the near future.
- **Privacy.** Some people may consider that some types of attribute data are sensitive and should not be made available. The mechanism for dealing with these issues is through the Data Protection Act. A central issue here may be that in isolation some data may not contravene data privacy requirements but when full integration of separate databases takes place it may be possible to build up a picture of someone which would not otherwise be the case without this easy seamless integration of data.
- **Intellectual Property Rights (IPR).** Data costs money to create and maintain. In order to recoup expenditure and cover ongoing investment costs it is necessary to establish contractual agreements between producers and users. These contracts can significantly limit the widespread use of spatial data which would be available in an ISDI framework. Contracts are a mechanism for retaining ownership and securing financial return. The basic financial issues related to IPR in the ISDI context are what types of data should be available free, at marginal cost, or on a full cost recovery basis. However there may also be IPR issues related directly to the means used to protect intellectual property rights (i.e. contracts) that are of a specific legal nature. Patents, copyright and applied copyright are all issues which also needs to be addressed.
- **Data Custodian Responsibilities.** If an organisation makes its data available and they contain inaccuracies this organisation may be open to claims for damages arising from these inaccurate data. Obviously it is possible to place disclaimers in relation to data but the likelihood is that the stronger the disclaimer the less inclination there is for the custodian to keep their data up to acceptable standards. Furthermore, there is the problem that less use will be made of such heavily disclaimed data precisely because it is so heavily disclaimed.
- **Freedom of Information Act.** Application of this Act raises issues such as what data may be provided and how such provision is to take place.

**QUESTIONS / ISSUES**

- (1) Do you feel that legislation will be necessary to ensure the speedy and orderly roll-out of the ISDI? Why do you hold this view?
- (2) If you regard legislation as being necessary, have you any thoughts on the kinds of issues which should be dealt with in legislation?
- (3) Have you any thoughts on the privacy issue?
- (4) Have you any ideas on appropriate legal mechanisms to protect intellectual property rights and secure legitimate income for the use of spatial data?

**COMMENT** (please type your comments into this space)

## 12 FINANCE / COST MATTERS

### **DISCUSSION**

Some of the important financial issues in relation to the ISDI are mentioned below.

#### **Funding ISDI Development and Operation**

Funds would need to be available for the following purposes :-

- The establishment of an ISDI Unit to manage and co-ordinate the roll-out and maintenance of the ISDI on a hands-on day-to-day basis
- Harmonisation of attribute data by data custodians, particularly in priority thematic areas
- The creation of the hardware, software and human resources necessary to ensure full and appropriate participation by data custodians in the creation and ongoing operation of the ISDI
- Publicity and consultation
- Research
- Development of tools to facilitate access to data
- Development of pilot / demonstration projects
- The purchase of copyright protected spatial data
- Training for those most directly involved in various facets of the ISDI
- Development of certain data sets, in particular some of the core data sets.

#### **The Cost of Spatial Data**

A high cost associated with accessing and using spatial data (particularly reference data) can be a significant hindrance to the widespread use of such data. Given the principle indicating that spatial data should be 'abundant' and available 'under conditions that do not restrain its extensive use' it is clearly necessary to deal directly with issues linked to the cost of spatial data, clearly recognising the significant cost in collecting and maintaining such data.

The cost of data may be different depending on how the data are used by customers. Uses may include viewing, downloading, adding value and reselling products. Different levels or types of access to data can be used to structure a payment scheme. For example there may be open access, password protected members only access, viewing of low grade data for free with download or high quality data only possible after payment has been made, etc.

### **QUESTION / ISSUE**

- (1) What in your view are appropriate ways to pay for the development and ongoing sustainability of the ISDI?
- (2) Have you any views on how best to ensure adequate recompense for data providers and yet ensure that such data is 'abundant' and widely available and used amongst all stakeholder / user groups?
- (3) Have you any thoughts on what payment schemes should be in place for different types of access to data?

**COMMENT** (please type your comments into this space)



## 13 CONSULTATION, PUBLICITY AND COMMUNICATION

### DISCUSSION

It is suggested that consultation, publicity and communication should be aimed at achieving the following main results :-

- Obtaining input regarding needs
- Developing a culture of data sharing
- Informing stakeholders and the general public about progress and available means of accessing data once appropriate datasets have been developed
- Obtaining feedback regarding the products and services which would become available
- Gaining and maintaining support for the ISDI.

Some means of communicating with the various stakeholders and the general public include :-

- A web site
- A regular newsletter which is sent to bodies or individuals on a mailing list
- Presentations at conferences
- Occasional questionnaires on specific topics
- Occasional press releases
- Through IRLOGI, the umbrella geographical information / GIS body in Ireland.

### QUESTIONS / ISSUES

(1) What should be the objectives of consultation and communication (“top-down” information provision or two-way exchange of views, participation in the process)?

(2) Would you or your organisation like to be placed on a mailing list so that you can be informed about latest developments regarding the ISDI?

(3) Have you any suggestions regarding how best to communicate with relevant bodies or individuals?

**COMMENT** (please type your comments into this space)

## 14 IMPLEMENTATION ISSUES

### DISCUSSION

The creation of an ISDI will take many years and the ongoing operation of the ISDI will mean that it will be a continuing aspect of public sector activity into the future. Just as national roads or school buildings require ongoing maintenance and redevelopment so it will be the case with the spatial data infrastructure.

One approach to considering implementation matters is to set out certain milestones which when achieved would represent important stages in the implementation process.

Some short term (say the next two to three years) milestones could include :-

- The adoption by the government of an ISDI policy framework. This framework would address the wide range of relevant issues which are covered in this consultation document and possibly others which may come to the fore
- Getting ISDI principles and requirements embedded in the information strategies, statements of strategy and business plans of all government departments and most public sector agencies
- The establishment of an adequately resourced ISDI Unit which would drive the initiative on an ongoing day-to-day basis
- Establishment of an ISDI portal
- The establishment of a mechanism for making reference data widely and quickly available using funding and pricing mechanisms which maximise the widespread use of such data
- Establishing the infrastructure (or linking to infrastructure currently under development) that would enable linkage of distributed databases, particularly those involving Core Data.

Another implementation issue is what may be termed 'short term deliverables', i.e. products or services that could be made available reasonably quickly. In this regard the OSi has undertaken to focus additional resources on producing digital boundary layers (statutory, administrative, organisational etc).

Milestones in the medium term (say 4 – 7 years) would essentially include consolidation and expansion on the base that would be created in the short term.

### QUESTIONS / ISSUES

- (1) Are there other important milestones which should be targeted in the short term?
- (2) Are some of the above milestones (or any others which you may consider relevant) particularly important and should they be prioritised?
- (3) What are some of the key difficulties which you believe could hold back implementation of the ISDI or which could facilitate its more rapid implementation? Have you any thoughts on how such impediments could be overcome?
- (3) Can you suggest any 'short term deliverables' which would be of particular benefit to your organisation? What resource could your organisation provide to assist with the realisation of these deliverables?

**COMMENT** (please type your comments into this space)

## 15 CAN YOU HELP?

### DISCUSSION

The ISDI needs support in various fields and this would generate the need for people who can take a lead in moving it forward in these fields.

### QUESTIONS / ISSUES

- (1) Are you or your organisation willing to take a lead in your field and if so how do you feel you could make a contribution?
- (2) Who in your organisation is the best person at a policy or decision-making level who could be contacted so as to discuss ISDI matters?

**COMMENT** (please type your comments into this space)

## 16 ANY OTHER COMMENTS

Please feel free to comment on any issue related to the ISDI which you feel has not been adequately covered.

**COMMENT** (please type your comments into this space)

## ACRONYMS

CEN - Comité Européen de Normalisation  
GIS – Geographical Information System  
GML – Geography Markup Language  
GPS – Global Positioning System  
GSDA – Global Spatial Data Association  
INSPIRE - Infrastructure for Spatial Information in Europe  
IRLOGI – Irish Organisation for Geographical Information  
ISDI – Irish Spatial Data Infrastructure  
ISO - International Organisation for Standardisation  
ITM - Irish Transverse Mercator  
NGO - Non-governmental Organisation  
NSAI - National Standards Authority of Ireland  
OGC – Open GIS Consortium  
OSi – Ordnance Survey Ireland  
PDA - Personal Digital Assistant  
PPPs - Public Private Partnerships  
SDI – Spatial Data Infrastructure  
UTM – Universal Transverse Mercator  
XML – Extensible Markup Language

### YOUR RESPONSES

Email responses should be sent to Cathal McNulty at [cathal\\_mcnulty@environ.ie](mailto:cathal_mcnulty@environ.ie) by 2 July 2004.

Should you wish to discuss any matter prior to submitting your response you may contact Bruce McCormack of the Department by email at [bruce\\_mccormack@environ.ie](mailto:bruce_mccormack@environ.ie) or at 01 888 2490.