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Country Report of United Kingdom *

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Global Geospatial Information Management Country Report – United Kingdom (UK)

Administrative geography of the United Kingdom

The United Kingdom comprises the countries of England, Scotland, Wales and Northern Ireland.

Since 1998, selected powers of the UK Parliament have been transferred to legislative bodies located in Scotland, Northern Ireland and Wales, conferring varying degrees of autonomy on those parts of the union.

This document covers the management of geospatial information in the UK as a whole. Where arrangements differ in the devolved administrations these are described in the relevant sections.

The United Kingdom is a member of the European Union, and as such is subject to EU directives and regulations. A number of these legislative instruments have affected the management of spatial information in the UK, most notably the INSPIRE Directive.

The UK geospatial information environment

The United Kingdom benefits from a combination of:

- long established public sector data providers such as Ordnance Survey and the UK Hydrographic Office;
- a range of private sector suppliers for data as diverse as terrain models and aerial imagery; and
- a mature systems supply industry providing a wide range of hardware, software and systems.

Geospatial information users are found in all areas of British economic, social and administrative life. Geospatial information is relied upon by a wide range of public and private sector organisations in the delivery of their business functions and decisions. An independent assessment concluded that over £100 billion per year of British economic activity is underpinned by the information provided by the national mapping agency alone.

More recently, developments in on-line and mobile technology have provided much wider access to geospatial information which in turn has stimulated innovation and creativity in the use of such data for both business and personal applications. Trends towards openness and transparency of public information and for crowd sourcing and community collaborations are bringing new perspectives to the provision of geospatial information and are challenging traditional approaches and assumptions.

Together these developments, overlaid on a tradition of widely available and extensive high quality public sector information, are sustaining a dynamic and growing geospatial information environment within the UK.

Governance of geospatial information management

Strategic oversight of geospatial information management is the responsibility of the **UK Location Council**, which reports to a Minister of the UK Parliament and his or her equivalents in the devolved administrations. Its purpose is to provide leadership and strategic direction for the implementation of the UK Location Strategy and the INSPIRE Directive (both explained below). The Council is made up of representatives from departments and agencies which are significant users and suppliers of location information in the UK at all levels of government.

Supporting the UK Location Council are the **Location Interoperability Board**, the **Location User Group** and the **Devolved Administrations Co-ordination Group**.

Implementation of the UK Location Strategy and the INSPIRE Directive is managed through the **UK Location Programme**, with the Department of Environment, Food and Rural Affairs having the lead role.

The wider interests of the geographic information community within UK are promoted through the work of the [UK] Association for Geographic Information and its special interest groups.

Ordnance Survey is the national mapping agency for Great Britain (England, Scotland and Wales). Its Director General and Chief Executive is the adviser to the British Government on the short and medium strategy for mapping, surveying and geographical information.

Land registration in England and Wales is the responsibility of **Land Registry**. In Scotland the land registration body is **Registers of Scotland**. The UK has no cadastre as such, since the UK operates under a General Boundaries system for defining land and property ownership extents and rights. The Ordnance Survey large scales topographic map is used as the geographic reference base for land registration; Ordnance Survey and Land Registry publish a joint statement of their respective roles.

Land valuation for taxation purposes in England and Wales is undertaken by the **Valuation Office Agency**, while in Scotland this role falls to **The Scottish Assessors**, appointed by each Local Authority.

In Northern Ireland a single agency, **Land & Property Services**, is responsible for mapping, land registration, rating and valuation.

Maritime information is provided by the **United Kingdom Hydrographic Office**; geological information by the **British Geological Survey** and **Geological Survey of Northern Ireland**, and environmental data by the **Environment Agency (England and Wales), The Scottish Environment Protection Agency and the Northern Ireland Environment Agency**.

Place matters: the Location Strategy for the United Kingdom

Place matters: the UK Location Strategy (UKLS) was published in 2008. Its objective is to maximise the value to the public, government, UK business and industry of geographic information. The overall aim is to provide a consistent framework to assist national, regional and local initiatives and service delivery.

The UKLS incorporates the implementation of the EU INSPIRE Directive, but recognises that more needs to be done to eliminate duplication, encourage re-use and build linkages across datasets.

To ensure that the UK exploits the full value of its information the Location Strategy requires a programme of strategic actions which ensure that within the United Kingdom:

(1) we know what data we have, and avoid duplicating it;

(2) we use common reference data so we know we are talking about the same places;

(3) we can share location-related information easily through a common infrastructure of standards, technology and business relationships;

(4) we have the appropriate skills, both among geographic professionals and among other professional groups who use location information or support its use;

(5) we have strong leadership and governance to drive through change, including the implementation of this Strategy and the implementation of INSPIRE.

The UKLS introduced the concept of *core reference geographies*, a small number of key datasets that form common information frameworks which are defined, endorsed and used by all data holders in both the public and private sector.

Local equivalents of the UK Location Strategy exist in Northern Ireland, Scotland and Wales, reflecting local agendas and priorities. These are administered by groups within these countries who have similar roles to the UK Location Council.

The INSPIRE Directive

INSPIRE is a Directive of the European Parliament and Council which lays down general rules aimed at the establishment of an **IN**frastructure for **SP**atial **I**nfo**R**mation in the **E**uropean Community, 'for the purposes of Community environmental policies and policies or activities which may have an impact on the environment'. The rules should improve sharing of environmental spatial information among public sector organisations and also facilitate public access.

The drafting of INSPIRE was based on a number of principles:

- Data should be collected only once and kept where it can be maintained most effectively;

- It should be possible to combine seamless spatial information from different sources across Europe and share it with many users and applications;

- It should be possible for information collected at one level/scale to be shared with all levels/scales; detailed for thorough investigations, general for strategic purposes;

- Geographic information needed for good governance at all levels should be readily and transparently available;

- It should be easy to find what geographic information is available, how it can be used to meet a particular need, and under which conditions it can be acquired and used.

Although it aims at the creation of a European spatial data infrastructure, as a Directive INSPIRE binds the 27 Member States individually. The intention is that the combined actions of the Member States should lead to greater interoperability among their geospatial data and licensing regimes. The Member States are required to take action in a number of related areas:

- Comply with 34 data specifications (reference geographies and environmental datasets);

- Provide catalogues that allow users to identify what information is available (metadata);

- Provide online services such as discovery (to find out what data exists), view (to display, navigate, zoom in/out, pan, or overlay viewable spatial data sets), download (to obtain the data) and transform (to enable data interoperability);

- Have licensing arrangements that allow information to be shared, accessed and used in accordance with Freedom of Information legislation, the Environmental Information Regulations and the Public Sector Information Regulations;

- Set up e-commerce arrangements where charging is applicable;

- Introduce monitoring mechanisms to demonstrate that the information is being made available;

- Introduce co-ordination mechanisms to ensure effective operation of the infrastructure.

The INSPIRE Directive entered into force on 15 May 2007 and was transposed into UK law through the INSPIRE Regulations (Statutory Instrument 2009/3157) for England, Wales and Northern Ireland and by the INSPIRE (Scotland) Regulations 2009 SSI/2009/440. It is being implemented in various stages with full implementation scheduled for 2020.

The UK Location Programme – progress and challenges

As explained above, the UK Location Strategy includes national implementation of INSPIRE but goes further. It expands the scope beyond environmental policy and public authorities, introduces the concept of core reference geographies and includes the development of skills and knowledge in geospatial information and its management and exploitation.

The UK Location Programme is now established and has successfully delivered to the initial deadlines of the INSPIRE programme. Among the steps completed so far are:

- − Introduction of INSPIRE Regulations that transpose the Directive into UK legislation;
- − Setting up of governance bodies;
- − Launch and maintenance of the UK Location web site;
- − Publication of a conceptual design and roadmap;
- − Stakeholder engagement and outreach programmes;
- − Pilot and benefits delivery projects;
- − Data provider theme groups;
- − Discovery and View services as initial operating capability for INSPIRE Annex I and II themes, with Ordnance Survey as technical delivery partner;
- − An integrated co-ordination and publication approach with the devolved administrations;
- − Progress in preparing geographic search and evaluation capabilities in the government's data portal data.gov.uk.

A strategic review identified a number of challenges facing the programme in 2011, among them:

- − The programme needs to respond to a dynamic policy and technical environment while delivering to set deadlines for INSPIRE;
- − The INSPIRE schedule tends to dominate, while to date no demand process has been established for non-INSPIRE data. To what extent should the programme concentrate on the wider aims of the UKLS?
- − Financing the programme continues to be an issue, in the absence of pre-agreed cross-government funding. Costs are incurred centrally but also in public authorities who are data providers;
- − Improving understanding of the benefits of the programme at the highest levels of government is a constant challenge;
- − Skills have been lost in government cuts and to date no concerted action has been taken to address this.

Access to location information in the UK

Access to geospatial information in the UK is governed by the INSPIRE Directive and a number of other legislative and non-legislative instruments.

A wide range of Ordnance Survey's core geographic datasets are made available via collective licensing agreements to the public sector. The **Public Sector Mapping Agreement** provides access to these geographic datasets for the public sector in England and Wales, while the **One Scotland Mapping Agreement** provides a comparable arrangement for the Scottish public sector. In Northern Ireland, geographic information

products and services from Land and Property Services are available to the public sector under a similar agreement: the **Northern Ireland Mapping Agreement** (NIMA).

These agreements provide a common geographic framework for the public sector that facilitates the sharing of information and improves public service delivery.

Geospatial information is also provided by a range of other organisations including other Government bodies, local authorities, utility companies and private sector businesses. Availability of data is supported by a wide range of mapping and Geographical Information Systems product offerings from a mature and successful private sector software and systems industry, and through a number of multi-national on-line providers.

High-quality geographic information requires significant and sustainable funding to maintain, manage and disseminate. Ordnance Survey, Land Registry and Registers of Scotland are government trading funds, which operate in a way similar to commercial businesses with Government as the sole shareholder. They have to ensure that their revenues, generated from trading their information or by charging fees for their services, cover their costs and provide a return sufficient to pay an annual dividend to government.

Charges made for geographic information in the UK are made in line with the European Union Directive on the Re-use of Public Sector Information and the INSPIRE Directive. Since April 2010 Ordnance Survey has operated a variation on the 'freemium' business model whereby charges are made only for premium datasets which require the greatest investment and maintenance costs, such as OS MasterMap.

Uses of geospatial information

Geospatial information is relied on daily by government, the wider public sector, businesses and the citizen to deliver services, solve problems and support decision making. For example:

- Police forces use OS Net, the GPS correction service for Great Britain which is maintained by Ordnance Survey, to record road traffic incidents at up to 2cm accuracy; Highways Agency studies have shown that roads are opened up to 40 minutes sooner;

- Gas, electricity and water companies are able more accurately to match their billing and supply records;

- Local authorities are able to improve the efficiency and effectiveness of school bus services using integrated transport data; one authority saved £160 000 per year by improving services to just two schools;

- Another local authority has been able to rationalise the number of domestic waste collection routes from nine to eight, reducing diesel costs by 12%, increasing spare capacity by 14% and eliminating overtime costs;

- Emergency services can improve responsiveness and reduce costs by locating resources such as vehicles close to demand using map-based evidence;

- Local health services have been able to identify properties where no patient is registered with a doctor;

- Insurance companies can use location data to spot fraud; in one case a scam involving a staged fraudulent road accident was identified and 42 of 43 claims were withdrawn or rejected.

Open data

Pressure for wider, easier, low cost or free access to public sector information, including geospatial information, has been gathering momentum within the UK over the past decade.

A number of reviews and studies have been undertaken in the past five years to identify and articulate economic and social cases for increased access to public information made available for re-use, including commercially, either at marginal cost or free at the point of use.

Over the past fifteen years United Kingdom Governments have become increasingly committed to open government and open data. Geographic information is seen as key to making sense of a wide range of public data, with one of the UK Government's Information Advisers, Professor Nigel Shadbolt, describing location as "the connective tissue of open data".

One manifestation of this move to open data is the provision of a portfolio of products by Ordnance Survey for free re-use by all including commercially. Launched on 1 April 2010, this portfolio of maintained national datasets – OS OpenData™ – includes topographic data, height data, post code and administrative boundaries information. The provision of this data under an open licence, which incorporates the UK's Open Government Licence, is funded through a commercial agreement between the UK Government and Ordnance Survey. This geographic information is available for download direct from Ordnance Survey and also via the UK's online portal, data.gov.uk, which provides access to a wide range of public data.

Ordnance Survey also makes available the OS OpenSpace API (Application Programming Interface), which allows users to embed Ordnance Survey mapping into web applications. It provides the functionality to interact with a map, such as panning, zooming in and out, and adding markers and polygons. For commercial applications there is OS OpenSpace Pro.

To stimulate new uses of geospatial information, Ordnance Survey has, in addition, sponsored GeoVation (www.geovation.org.uk) which has run a series of challenges to help individuals, businesses and communities bring their map-based ideas to life, whilst encouraging and supporting innovation for social, economic and environmental benefit through the use of geographic information.

Linked data

Linked Data represents one of the emerging areas of interest for geographic information in the UK. Linked Data is a growing part of the Web where data is published on the Web and then linked to other published data in much the same way that web pages are interlinked using hypertext. This offers the opportunity to identify things such as people, places and organisations and make useful connections between them, increasing the value and intelligence of that information. A number of Ordnance Survey products have been published in this form and are also available via data.gov.uk.

Core reference geographies

Geodetic Framework

The UK's geodetic framework is managed by Ordnance Survey, which operates a permanent national GNSS network (OS Net) consisting of a network of around 110 geodetic grade GNSS base stations. This network has a spatial density of 50 km – 80 km across the country and the coordinates are produced in the ETRS89 coordinate system. The receivers/antennas support current as well as new (for example, GPS L5) GPS and GLONASS signals as well as the European Galileo when that functionality becomes available.

OS Net exists to provide:

- the definition of the coordinate system in Great Britain;
- internal Ordnance Survey positioning services;
- a backbone for GPS commercial services; and

- a GPS data series for scientific study.

Topographic Mapping

Ordnance Survey provides detailed topographic mapping of England, Scotland and Wales. Survey is carried out at nominal scales of 1:1 250 (urban), 1:2 500 (rural) and 1:10 000 (mountain and moorland). OS MasterMap® is a continually maintained geographic database. Its four layers – topography, addresses, integrated transport network and imagery - contain over 450 million geographic features found in the real world including individual addresses, buildings and roads. Every one of those has a unique common reference, called TOID®, enabling consistent identification of each feature and linking of other information to it. Around 5 000 changes are made to the database every working day.

In Northern Ireland Land & Property Services produces a range of mapping under the brand of Ordnance Survey of Northern Ireland (OSNI). Basic scales are 1:1 250 and 1:2 500.

Geographic Names

Distinctive place names are collected by Ordnance Survey in the course of map product revision in consultation with local authorities, reliable organisations and expert individuals. Since 2000, particular emphasis has been placed on standardising Welsh names in Wales and Gaelic names in the Gaelic-speaking areas of north-west Scotland. A Gaelic Names Policy was established in 2000 and led to the setting up of a Gaelic Names Liaison Committee, and the appointment of a Gaelic Names Liaison Officer to assist Ordnance Survey in the implementation of the policy. A Welsh Language Scheme, approved in 2001 and amended in 2006, sets out Ordnance Survey's commitment to the provision of information in Welsh.

Ordnance Survey is in the process of consolidating geographical names across its databases and working to identify the geographical extent of some named features. The objective is to generate a consistent and maintainable basis for geographical names in Great Britain as well as improving consistency across the portfolio of Ordnance Survey products.

Addresses and Streets

Address data for England and Wales is managed by GeoPlace, a centre of excellence for spatial address and street information in Great Britain established in 2010. GeoPlace is a Limited Liability Partnership jointly owned by the Local Government Group and Ordnance Survey. It brings together local government's address and street gazetteers with Ordnance Survey's addressing products into a central spatial address data hub.

This data is updated by GeoPlace based upon the receipt of Change-Only Update files to Local Land and Property Gazetteers from 348 creating local authorities and updates to Local Street Gazetteers from 174 creating local authorities. These are matched to regular updates from Royal Mail, Ordnance Survey and the Valuation Office Agency. This data is then used to form the AddressBase™ range of products available from Ordnance Survey.

Local government in Scotland and Scottish Government are supportive of the goal to create a National Address Gazetteer and are working with local government and Ordnance Survey to explore options for achieving this goal. The Northern Ireland address database, Pointer, is maintained by Land & Property Services, with input from Local Councils and Royal Mail. Pointer has been allocated a set of Unique Property Reference Number (UPRNs) from the national hub, which are allocated to all addresses within the dataset. This will ensure consistency of UPRNs across Northern Ireland and Great Britain.

Land and Property Ownership

Land registration in England and Wales is the responsibility of Land Registry. In Scotland the land registration body is Registers of Scotland. The UK has no cadastre as such since

the UK operates under a General Boundaries system for defining land and property ownership extents and rights. The Ordnance Survey large scales topographic map is used as the geographic reference base for land registration; Ordnance Survey and Land Registry publish a joint statement of their respective roles.

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Hydrology/Hydrography

Inland water is mapped by Ordnance Survey at various scales, while marine navigation information is the responsibility of the UK Hydrographic Office. The Centre for Ecology and Hydrology (CEH) is the UK's Centre of Excellence for integrated research in terrestrial and freshwater ecosystems and their interaction with the atmosphere.

Statistical Boundaries

Statistical Boundaries are the responsibility of the relevant national statistical organisations across the United Kingdom – the Office for National Statistics for England and Wales, the General Register Office for Scotland and the Northern Ireland Statistics and Research Agency.

Administrative Boundaries

The Boundary Commissions of England, Wales, Scotland and Northern Ireland concerned variously with Parliamentary and Local Government boundaries are responsible for the process of proposing and gaining parliamentary agreement to the establishment of new and revised extents for electoral and administrative areas.

Ordnance Survey supports the geographic aspects of this process and is responsible for the precise mapping and dissemination of the alignments of these boundaries and the extents of the relative areas once these are agreed and established in law. Land and Property Services in Northern Ireland perform a similar role with respect to the boundary authorities of Northern Ireland.

Ordnance Survey's Boundary-Line™ product contains all levels of electoral and administrative boundaries, from district, wards and civil parishes (or communities) up to parliamentary, assembly and European constituencies at a nominal 1:10 000 scale.

Links:

The INSPIRE Directive: http://inspire.jrc.ec.europa.eu/

UK Location Programme: http://location.defra.gov.uk/

Place Matters: the Location Strategy for the United Kingdom:
http://location.defra.gov.uk/wp-content/uploads/2009/12/uk-location-strategy.pdf

One Scotland – One Geography: a Geographic Information Strategy for Scotland:
http://www.scotland.gov.uk/Resource/Doc/57346/0016922.pdf

Northern Ireland Geographic Information Strategy 2009-2019:
http://www.gistrategyni.gov.uk/gi_for_ni_strategy_09-19_web.pdf

Ordnance Survey: www.ordnancesurvey.co.uk

Land Registry: www.hmlr.gov.uk

Registers of Scotland: www.ros.gov.uk

Land & Property Services (Northern Ireland): http://www.dfpni.gov.uk/lps/

Valuation Office Agency: http://www.voa.gov.uk/corporate/index.html

Scottish Assessors Association: http://www.saa.gov.uk/

United Kingdom Hydrographic Office: http://www.ukho.gov.uk/

Centre for Ecology and Hydrology: http://www.ceh.ac.uk/index.html

British Geological Survey: www.bgs.ac.uk

Geological Survey of Northern Ireland: http://www.bgs.ac.uk/gsni/