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Towards a common Geographic Information framework for England

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1 Introduction

Since the Chorley report in 1987 (DoE, 1987) highlighted the need for more joined up geographic information (GI), plenty of national programmes have been initiated. Most of them aimed at improving government services and access to geographic information and have contributed to the increased use of geographic information in local, regional and central government. This has led to a degree of success and, during the last decade, the debate has matured from justifying the existence of GIS to improving management, dissemination and sharing of geographic information. One such example is the national geographic data framework (NGDF) initiative established in 1995 which has resulted in some measurable deliverables. Importantly, GIS has now been identified as a key enabler in e-government (e-gov@local, 2002) and the use of geographic information has already delivered benefits across a wide spectrum of public sector services.

Yet barriers still exist. While joined-up government is a primary objective for Modernising Government, examples of effective and efficient data sharing across organisations (indeed, within organisations) remain the exception – not the norm. Many initiatives lack common guidelines, standards and resources to facilitate efficient information sharing between government organisations and associated bodies. Information is fragmented and stored in differing formats, to different standards, currency and cannot be easily unlocked to be used to support a common GI framework. Some of these issues are still the same as identified in the mid 1990s through the NGDF initiative (Rhind, 1997).

To address these issues, the AGI, IGGI and I&DeA jointly sponsored a workshop in June 2003 in London inviting speakers and attendees from all levels of government and other organisations. The overall aim of the workshop was to establish a case for a joined up geographic information framework for government to promote the effective management and sharing of geographic information between governments and with other institutions.

This paper reviews the objectives and achievements of the national geospatial data framework established in the mid 1990s (Nansen et al, 1995; Rhind, 1997), reports on the outcomes of GI framework workshop in June 2003 and proposes a way forward for establishing a GI framework by promoting a GI strategy for England.

2 National spatial data infrastructures

Over 50 nations around the world are developing National Spatial Data Infrastructures (NSDI) to create a framework for sharing and using geographic information effectively (Masser, 2002). They are being coordinated by the Global Spatial Data Infrastructure (GSDI) organisation whose mission is to:

"support ready global access to geographic information. This is achieved through the coordinated actions of nations and organisations that promote awareness and implementation of complimentary policies, common standards and effective mechanisms for the development and availability of interoperable digital geographic data and technologies to support decision making at all scales for multiple purposes." (www.gsdi.org)

According to the GSDI (2002), the elements of spatial data infrastructures are geographic data, metadata, framework, services, clearinghouses, standards and partnerships to effectively share GI to support good governance and economic and social development.

In 2002, the European commission launched an initiative to develop an Infrastructure for Spatial Data in Europe (INSPIRE), a legal framework that enables the delivery of integrated spatial information service (www.e-gis.org/inspire). In the European SDI context, infrastructure refers to all the materials, technologies and people necessary to acquire process, store and distribute such information to meet a variety of needs. (EUROGI, 1999, Masser 2002).

3 National Geospatial Data Framework (NGDF) for the UK

The issue of developing a GI framework for the UK are not new. The National Geographic data framework (NGDF) concept was launched by the OS in 1995 (Nansen, 1995; Rhind, 1997) to develop an over-arching UK framework to facilitate and encourage efficient linking, combining and widespread use of geospatial data which is fit for purpose. Rhind (1997) identified the following key issues as the driver for the implementation of the NGDF initiative in the UK, most of which are still valid today:

- Information about geospatial data sets is difficult to obtain.

- The information available varies greatly in quality between organisations.

- Valued datasets are held (especially by government bodies) but are not currently available for many reasons.

- Existing data sets have been collected to different specifications so it is not easy to integrate data safely from multiple sources.

- Data is often not easy to access physically.

- There are presently few services based on data combinations and extraction of added value.

The core objectives of the UK initiative (Rhind, 1997) were to facilitate and encourage:

- The collaboration in the collection, provision and use of geospatial data,

- the use of standards and best practice in the collection, provision and use of geospatial data

- access to geospatial data.

In 2000, the NGDF board (for membership, see Appendix 1) through its taskforce set itself an implementation programme divided into two phases to achieve 5 key objectives detailed in Appendix 2 of this paper. The goal was to ensure that certified NGDF compliant metadata, data and services are delivered to users which satisfy their business needs.

The main achievements of the NGDF are the implementation of the GIgateway service with its data locator, data directory and area search (www.GIgateway.org.uk). The data locator facilitates searches on a wide range of GI metadata from central, local and other data suppliers. To support the service, the UK standard geographic base (UKSGB) was established to integrate various spatial units including administrative, electoral and postal units, referenced against the national grid. This allows for area searches to identify the relevant administrative units for any given postcode.

While the achievement of the NGDF should be commended, the successes since 1995 are limited. Only a handful of organisations use the service and the objectives stated in the NGDF Strategic Plan in 2000 have only been met in part. Simply put, the ability to share geographic information across government is still prohibitively limited and the GI community has not yet established a spatial data infrastructure that promotes data sharing and increase usage of geographic information.

It is important to examine the barriers why success has been limited and why some of the issues discussed by the NGDF board in the last decade (Rhind, 1997) have not been solved. These include:

- the lack of a common standards especially for data quality issues;

- governance - who is in charge of the NGDF and who owns it;

- political support;

- lack of best practice guides (too few examples exist); and

- accreditation for data provision.

The NGDF board was dissolved when the AGI took over operations of the GIgateway in 2001. A GIgateway advisory board was established inviting all former members of NGDF to join (Appendix 1). The GIgateway advisory board deals with GIgateway matters only. In another development, the Acacia group was formed in 2002 (Acacia, 2002) with the remit to develop a single national infrastructure for Great Britain of definitive addresses and related property information and mapping to support key services from government and business (for membership, see Appendix 1). To-date neither of the replacements groups have established an overarching remit to take responsibility for a joined GI framework for the UK.

4 GI framework workshop

AGI, IGGI and I&DeA jointly sponsored a workshop on 24th June 2003 in London to address the recurring issues of a joined up GI framework initiative not resolved by the NGDF initiative or through other means. Speakers and attendees from all levels of government and other organisations were invited. The overall aim of the workshop was to establish a case for a joined up geographic information framework for government in England to promote the effective management and sharing of geographic information between governments and with other institutions. Specific objectives to support the overall aim were to identify:

- the issues for joined up GI framework;

- barriers that obstruct hinder joined up geographic information;

- existing and potential benefits for establishing a common framework; and

- realistic ways forward that would improve joining up information.

All speakers agreed that a common GI framework was needed and most emphasised the importance of leadership and vision, of establishing a business case and ensuring the GI framework is politically relevant, has political support and addresses concerns and issues that are important to politicians themselves. The following benefits were identified as the key drivers for establishing a framework:

- Improved service delivery by joining up information (operations);

- Better informed decision making by facilitating access to geographic information (policy); and

- Improved performance management by the ability to analyse joined up geographic information.

Component parts of a GI framework were identified that, in fact, currently exist. Indeed, there have been a number of significant achievements in the last decade which can –and should– contribute to an overarching and co-ordinate framework of geographic information. These include:

- A national geographic information metadata service has been established via the GIgateway

- Service Level Agreements are in place for local and central government agencies to use and access Ordnance Survey digital map data.

- A large-scale topographic data base is available via OS Mastermap

- The Office for National Statistics have set up the National Statistics Geography under Pat 18 which provides a joined-up geographic referencing framework for statistics

- A range of standards for geographic referencing (BS7666), for meta data definition (ISO 19115, 19136, e-government meta data standards), and for interoperability (e-GIF, GML, XML) have been established.

- National GI initiatives such as NLPG, NLIS, NLUD and NSG created joined up standardized geographic databases for England and Wales of varying quality.

- Regional strategies are being developed (Wales, N-Ireland, Scotland) to promote the benefits of using GI.

- Consultation on the development of an infrastructure for spatial information in Europe (INSPIRE) is under way.

- Working in partnership (joined up working) across common sectors facilitates data sharing and working to common standards (MAGIC, crime and disorder, planning portal, transport direct).

- Guidelines for geographic information strategies, for good data management (www.IGGI.org.uk), and for data quality (www.agi.org.uk), and best practice examples (www.powerofgeography.com), are freely available.

- GIS is recognised as an enabler in the local e-government strategy to provide the link to core business and information systems which support better intelligence-led decision making on services and policies (egov@local) (www.localegov.gov.uk).

- Working in partnership between local, regional and central government is possible as exemplified with the publication of the local/central government concordat for the exchange of statistical information by the Central and Local Government Information partnership (CLIP) (ODPM, 2002)

The issue is therefore not to start anew in establishing a GI framework for England (or for the UK as a whole), but to make better use of existing organisations and initiatives that currently use geographic information in a way that is co-ordinated and beneficial to the wider GI community. The workshop in June reiterated many of the barriers previously identified in the past but also highlighted a number of additional requirements to improve the successful sharing of geographic information within a framework. Listed below is a synopsis of the outcomes of the workshop:

1. Make better use of the GIgateway (www.gigateway.org.uk). Although the GIgateway has been successfully established there is still a lack of understanding what data is available, how data can be made available. Government organisations need to commit to record, maintain

and use metadata across all departments. Guidelines on how to establish a meta database is provided via IGGI guidelines (IGGI, 2001)

2. Improving and adopting comm on data quality standards. Data standards have been established for geospatial data (such as BS7666) but they have not been widely adopted. For example, the PAF and OS address databases do not comply with the standards. Quality standards for common referencing are required which reflect operational uses to share information across local authorities, with regional authorities and central government. The newly founded standards body will have an important role to play to establish these standards.

3. Develop and improve information management across departments within organisations. Information management has still a low priority in organisations. Information is often managed in isolation within departmental silos and not shared within organisations. The organisational barriers have to be overcome through awareness raising and by changing the culture to show to the stakeholders that improved information management and information sharing across departments benefits the organisation as a whole.

4. Provide sustainable resources for joining up and managing information. Resources are often project based and are not adequately filtered through to the users.

5. Improved communication via awareness raising and education is of importance to promote the joining up of GI and its management. Much has been achieved through awareness raising and education especially by the AGI but more best practice guides and seminars are required to promote the benefits of sharing GI.

6. Leadership and political relevance was identified as one of the key requirements to a successful joined up GI framework. Both Rhind (1997) and Masser (2002) already identified the importance of political support at the highest level as vital to the success of these types of projects.

7. Creating incentives to p articipate. Recognition and fame can give incentives to improve service delivery, to provide sustainable resources and to join up processes

8. Foster working in partnership across sectors. Where partnership working has been promoted it has shown clear successes (Panning Portal, NLIS, crime and disorder, transport direct, MAGIC) but there are areas where there needs to be further development to work across local, regional and central government (regional transport, local strategic partnerships, economic development)

9. Wider availability of OS Mastermap. Despite the pan government agreement and local authority Service Level Agreements (SLA), certain sectors are still excluded from OS SLAs, which form key partners in regional and local strategic partnerships. These sectors include regional government, the health sector and the voluntary sector.

10. Guidance on confidentially issues. Knowledge about confidentially issues that affect information sharing is still lacking. Specific education on intellectual property rights, data protection act, freedom of information act, and public sector information initiative are required.

11. Learn from and engage in other national and international spatial infrastructure initiatives. Although there are national differences between the political and organisational environment to implement spatial infrastructures, working with the international initiatives may help to resolve and overcome some of the national barriers (Masser, 2002).

12. A GI strategy for England   is required to establish a GI framework. Strategies are emerging for the regions but do not presently exist for England as a single entity. To create an overarching framework for the UK, England has to identify its needs and define a vision first.

5 Learning from Regional Strategies

Any future GI framework for England can learn from the proposed Welsh (AGI Cymru, 2002) and Northern Ireland (ONSI, 2003) strategies. Both strategies were developed in partnership between government organisations, stakeholder groups with the regional AGIs being a key driver. At the time of writing this article, the development of a GI strategy for Scotland was recently out for consultation with strong support from the Scottish executive.

It is important that the Welsh strategy had strong political support from Andrew Davies, Minister for Economic Development and Transport, who wanted to support the GI industry in Wales (Cymru Ar-Lein, 2002). Based on a questionnaire survey carried out in 2002, barriers and opportunities were identified which formed a strong vision and action plan. The guiding principles for establishing the strategy are:

- Avoiding duplication of effort

- Promoting and learning from best practice

- Providing guidance on confidentiality issues

- Promoting the use of data locators

- Encouraging the exchange of data

- Providing guidance and promotion for joined up working

- Having leadership for GI

- Applying metadata standards

- Dealing with Ordnance Survey Issues

- Promoting GI around Wales

- Providing Guidance on Strategies

The drivers for the GI strategy in Northern Ireland were a stakeholder group that aims to better coordinate GI via a strategic framework. The strategy is moved forward using individual steering groups responsible for key sectors such as public safety and emergency services, land and property, environment, transport and utilities and networks. The vision of the strategy is underpinned by a set of principles: a common reference frame, common geographics, the use of existing standards, the development of a more open and collaborative culture in developing public sector GIS, better co-operation across public and private sector boundaries, leadership, and funding (GI strategy project team, 2003).

While both of the above regional examples are still in their infancy and still require ongoing commitment and funding to ensure their long-term sustainability, they do illustrate that moving towards a joined up GI framework requires a strong vision, resources, and strong political and government leadership and support. A regional approach can bring the stakeholders more easily together. These regional approaches can then form the basis for a national initiative to establish a UK GI strategy (Figure 1).
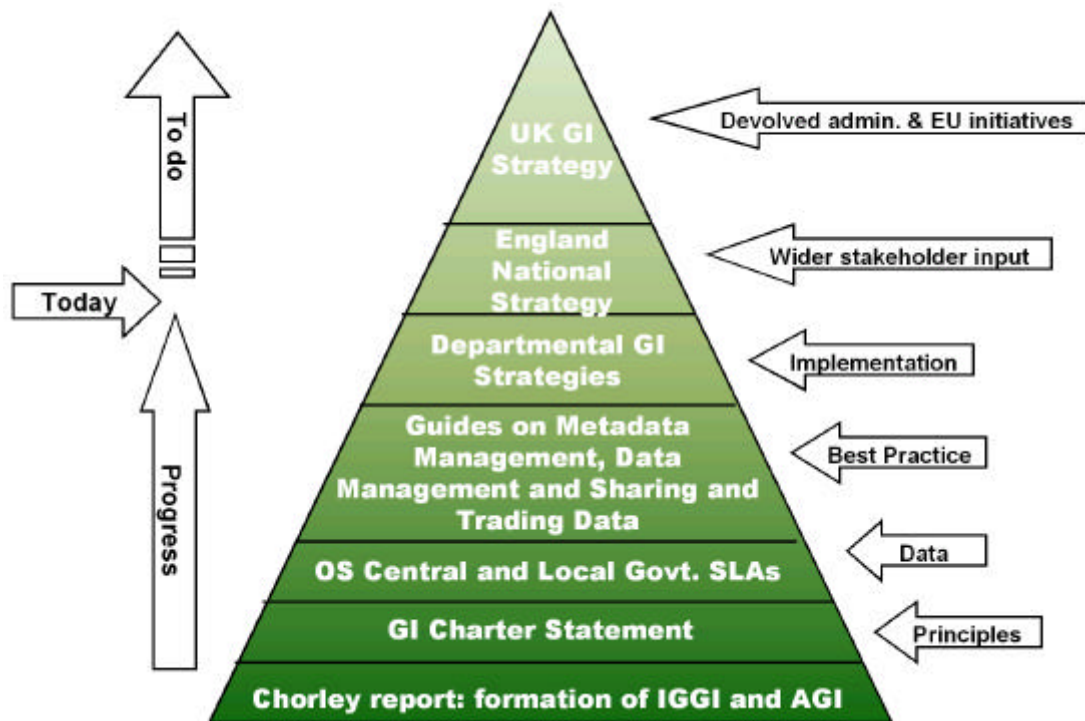
Figure 1: Towards a national GI strategy (after P. Capell and J. Rhind)

6 The way forward

While there have been successes towards a joined up GI framework since the first NGDF initiative in the mid 1990, the AGI workshop provides sufficient evidence that a satisfying GI framework has not been established. Strategies in the regions have shown that a strategic approach with strong leadership and an overarching vision that spans across organisation, government and sector interest is required to establish a GI framework.

The implementation of a GI strategy would work towards the following vision:

To be abl e to access and share up -to-date and accurate geographic information between all government departments and national organisations according to a common reference framework with the overall aim to facilitate joined up e -service delivery to the citizens. T he guiding principle of the strategy would be to create once and share many times.

A positive outcome from the June workshop is that the AGI, IDEA and IGGI have agreed to form a working group to explore the development of a GI framework for England. The working group will prepare:

- a terms of reference to scope the work and identify the level of funding and type of resources required;

- a business case to ensure that, if a GI framework is established, it supports political priorities, improves service delivery for all partners and delivers benefits; and

- a communication plan to promote and educate politicians and senior government officials as well as the GI community.

However, it is fundamental that this work is not done in isolation as it will fail if it does not have leadership and political support. The strategy requires participation from senior public officials in local and central government as well as the politicians themselves. Given the successes of geographic information in support of Modernising Government initiatives, the Office of the e-Envoy

will be an important partner in this process. There is also a role for data providers such as Ordnance Survey and the Office of National Statistics. This should not be understated and clearly-defined responsibilities are fundamental if the GI Framework has any chance of success. The AGI will have an important role to play as it represents the GI user base that requests the establishment of a framework and will not accept barriers in sharing of geographic information to continue.

The building blocks for a GI framework are in place. The GI community now needs the builders to join these blocks into a coherent framework and develop a strategy for its implementation to fulfil the vision. The challenge is for government departments and the AGI to make the establishment of a GI framework this time a reality.

7 References

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INSPIRE: Infrastructure for Spatial Information in Europe www.e-gis.org/inspire

Intra Government Group For Geographic Information: www.iggi.gov.uk

Gateway for geographic information in the UK.www.GIgateway.co.uk

The power of geography. www.powerofgeography.com

Appendix 1: Membership of initiatives linked to the NGDF

Name of membership organisation	NGDF board (Rhind, 1997)	GI gateway advisory board, (AGI, 2003)	Acacia, 2002)
HM land registry	Yes		Yes
Office for National Statistics	Yes	Yes	
IGGI	Yes		
Information management Advisory Group of Local Government (now LGIH)	Yes		Yes
Landmark information groups LTD	Yes		
Ordnance Survey	Yes	Yes	Yes
OSNI	Yes		No
Property Intelligence Plc/ Intelligent Addressing	Yes	Yes	Yes
National Joint Utilities Group	Yes		
Natural and environmental research group	Yes		
NGDF Advisory Council	Yes		
Registers of Scotland	Yes		
Royal Mail	Yes		Yes
AGI	Yes (advisory function)	Yes	
Registers of Scotland			Yes
Academia		Yes	
Standards Committee		Yes	
Valuation Office			Yes

Appendix 2 : Deliverables of the NGDF strategic plan (2000)

Objective	Phase 1 deliverables	Phase 1 achievements	Phase 2 deliverables	Phase 2 achievements
To improve knowledge about what GI currently exists and encourage easier access to it	• Meta data gateway • Broad set of meta data within the metadata service • Distribution nodes	• GI gateway established • Exists • Exists	Broad base of easily accessible geospatial information	Available for national statistics geography (ONSI)
To enable easier integration of GI through the use of standards and guidelines	• UKSGB gateway • NGDF recommended standards on NGDF website • Best practice guidelines	• Exists under GI gateway • Not achieved • Some available	• UKSGB gateway • Revised guidelines and lists of standards	Interoperability guidelines but no quality standards available
To encourage more widespread use of geospatial information	• Summary of key GI issues • Summary of existing application • Identification of parallel and related initiatives	Available on AGI website, for examples power of geography	Summary of potential applications	Too few examples published
To provide users with assurance that he information is consistent and of defined quality			GI conformance and testing clauses	Not available