

“ONE SCOTLAND - ONE GEOGRAPHY”

A GEOGRAPHIC INFORMATION STRATEGY FOR SCOTLAND

MINISTERIAL FOREWORD



A central aim for the Executive is the delivery of better and more cost-effective public services. Scotland's public services must combine best value and a strong focus on meeting the needs of our service users - the people of Scotland.

Place is an important issue in the efficient delivery of public services, helping service providers to identify needs, decide on policy priorities, target the effective delivery of policy initiatives and local and national services, and evaluate their effectiveness. That is why I see the effective use of geographic information as a powerful tool in support of our policy objectives.

Scotland is a small country, where strong partnerships and shared approaches not only make good sense, but are achievable. We need to develop common approaches, common standards and the capacity to share as much as possible of the resulting data and information, to ensure a joined up response to peoples' needs.

I welcome this strategy, and the intention to develop it further. I have been encouraged by the support expressed during the consultation on the draft of the strategy, and I am grateful to the stakeholders who have contributed to shaping this final version. I see the strategy as one important part of making best possible use of the resources we have, and of supporting the process of securing efficient delivery of modern public services in Scotland.

A handwritten signature in black ink, reading "T. McCabe." The signature is written in a cursive style and is positioned above a horizontal line that extends to the left.

Tom McCabe, MSP
Minister for Finance and Public Service Reform

A GEOGRAPHIC INFORMATION STRATEGY FOR SCOTLAND

This Strategy has been drawn up by the Scottish Executive at the request of and in discussion with key interested parties. In their responses to consultation on the initial draft of the Strategy, key stakeholders showed strong support for the Executive's approach. The final Strategy has taken account of the views expressed during the consultation period.

The Strategy sets out a proposed approach to the more systematic and effective use of geographic information in the development and delivery of policy and services to the benefit of the people of Scotland. It is intended to support the delivery of better and more cost-effective public services in Scotland. Geographic information, if used properly, can support better policy making and service delivery, monitor the effectiveness of performance, identify and analyse specific problems, make public services more responsive, provide better information on needs and provide new insights into Scotland and its people. In the case of the Scottish Executive, geographic information can provide evidence to help achieve the objectives set out in "A Partnership for a Better Scotland".

The Scottish Executive has responded to the calls for it to take a lead in developing a Scotland wide strategy in this area. Many of the direct commitments to specific actions below are therefore for the Executive, in providing a framework for future action. However, this Strategy is not for the Executive alone, but for all involved in public service delivery in Scotland. The effectiveness of this strategy, its development and its implementation will depend on the continuing involvement of a wide group of partners from public, private and academic sectors. It is not set in stone and will continue to evolve in the light of experience and further discussion. However, it is intended that implementation of many of the key recommendations in the Strategy should take place during the period 2006 – 2011, the timescale of the implementation plan that will support this Strategy

Geographic or spatial information can mean different things to different people. For the purposes of this Strategy, geographic information has been interpreted widely, to encompass all physical, map based, address and text based mechanisms that can be used to describe and characterise places in Scotland and the people who live there.

INTRODUCTION

A frequently quoted statistic is that at least 80% of all government information has a geographic basis. The majority of geographic information used in Scotland is created or supported by the use of public funds. This ranges from the public support of the Ordnance Survey as Britain's national mapping agency to the provision of three dimensional land surface data to local authorities for the assessment and management of flood risk. The Scottish Executive, in common with other Government Departments, is committed to the development and implementation of evidence-based policy. Government programmes, therefore, are increasingly dependent on geographic information to provide in-depth understanding of what is needed to achieve objectives, assist targeting of resources, monitor delivery of targets and assist the many bodies who are involved in implementation at local level. This will be greatly assisted if we develop coherent, integrated, efficient and effective mechanisms to manage and share geographic information. This will support Executive policy, the Executive's and its partners' responsibilities for service delivery, and make best use of public sector geographic information in Scotland, at both national and local level.,

Other sectors in Scotland are equally dependent on geographic information - in particular local government, the health service and the emergency services. Many well-respected businesses are engaged in the supply, management and presentation of geographic information, while much of the work of the voluntary sector and community groups is based on the concept of "people and place".

This Strategy presents a framework within which detailed policies can be developed to ensure wide use of geographic information to support the public, private, and voluntary sectors and community groups in Scotland. Although the Strategy is intended to cover the whole range of sectors in Scotland, many stakeholders have stressed the importance of resolving the issues that affect spatial data management by central government¹ as a priority for action. For this reason, the Strategy focuses on central government as a first step in resolving the issues that have been identified. In particular, this Strategy is directly applicable to the work of the Scottish Executive and its associated Agencies and Non-Departmental Public Bodies (NDPBs).

This Strategy document is not the place for detailed targets, delivery mechanisms or resource requirements. These will be set out in an implementation plan that will explain how the prescriptions in the Strategy can be achieved, and how different stakeholders need to be involved in the process. The comments received during the consultation process will help determine the detail of the implementation plan, which will be produced by the Scottish Executive in partnership with key stakeholders.

Some background information about the nature of geographic information and examples of some its existing and potential uses and potential benefits are set out in a Technical Appendix

¹ Throughout this Strategy the term "central government" is used to refer to the government Departments, Agencies and Non-Departmental Public Bodies (NDPBs) that are responsible to Scottish Ministers. The term "wider public sector" covers the full range of organisations supported by public funds and includes central government, local government, the National Health Service and the emergency services.

to the Strategy – “Geographic Information – The Spaces, Faces and Places of Scotland. This shows some of the ways that we currently support and make use of the data in the most efficient and effective way possible. Both now and in future, best value will only be achieved by joining up information from a variety of sources in a way that provides the most effective return on data gathered at public expense. However, there are still many barriers to doing this. Many of these were clearly identified by the Association for Geographic Information (AGI) Scotland report - "Towards a Geographic Information Strategy for Scotland - Joining Places and Spaces to connect the Faces of Scotland". This identified the barriers to efficient and effective use of geographic information to support the people of Scotland, and identified some possible solutions.

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It is the aim of this Strategy to identify how we overcome these barriers and ensure that we maximise the usefulness of our geographic information, for the benefit of Scotland and its people. It is also the aim of this Strategy to raise awareness and understanding of the benefits of geographic information to all aspects of Scottish life, whether in government, business or voluntary sectors.

Therefore, the purpose of the Strategy and the detailed implementation plan is to:

- Provide strategic vision and leadership to ensure an inclusive, co-ordinated and pragmatic approach to information about Scotland's geographic base.
- Ensure access to the most up-to-date and accurate geographic information about Scotland that can be delivered with best use of resources.
- Develop and promote the sharing of geographic information, within the practical limits of best value, so as to give a high quality and knowledge "return" from each set of data.
- Promote the benefits of geographic information across the public, private, community and voluntary sectors in Scotland, taking account of national and international activities and ensuring that Scotland's successes are celebrated and communicated to an international audience.
- Promote the appropriate technical and professional standards for efficient and effective use of geographic information in Scotland.
- Engage interested parties in these processes.

Given the range of issues to be covered, it is inevitable that the Strategy has had to include prescriptions that relate to both policy and technical matters. At the request of stakeholders, the Scottish Executive is committed to taking the lead in developing the Strategy and its associated implementation plan. Many of the actions fall to the Executive to deliver. This is an inevitable consequence of the key roles of the Executive in leadership, facilitation and promotion of action. But delivery of the Strategy will only be possible through a truly collaborative approach between the Scottish Executive and all other interested parties. This is the basis of the Strategy's vision – "One Scotland – One Geography".

SPECIFIC OBJECTIVES

1. PROVIDE STRATEGIC VISION AND LEADERSHIP TO ENSURE AN INCLUSIVE, CO-ORDINATED AND PRAGMATIC APPROACH TO INFORMATION ABOUT SCOTLAND'S GEOGRAPHIC BASE

This will require to the development and implementation of mechanisms to bring key stakeholders together to agree ways to co-ordinate activities and shape priorities for the future use of geographic information.

The Technical Appendix to this Strategy shows how geographic information and GIS underpin a wide range of activity in the public, private and voluntary sectors, and community groups in Scottish society, and are vital in supporting Scotland's priorities for economic and social development, health, justice, transport, education, environment and culture.

The examples in the Technical Appendix show good practice in the use of geographic information in support of the development and implementation of government policy. They are also good examples of the type of problems that can often be associated with such geographic information. Each of these information system initiatives was developed for a specific purpose. While each involves a range of appropriate stakeholders, each tends to be managed in isolation from other initiatives, collects data for its own purposes and takes limited account of similar initiatives elsewhere in Scotland.

The AGI consultation identified widespread concern about this lack of connection between different geographic information initiatives, and about the lack of any overview on the priority afforded to the development of different initiatives and the context within which they have been developed. A recurrent theme was the need for better leadership and governance of geographic information in Scotland. The consistent view was that only central government can provide the necessary leadership and so must take responsibility for development of governance mechanisms.

The Scottish Executive is seen as the most appropriate organisation to take the lead in ensuring that geographic information initiatives in Scotland are developed in an appropriate context and resolve the problems that prevent better use of geographic information. This reflects the Executive's role in policy development, leadership and governance in Scotland and the need to develop more specific links between geographic information and e-Government initiatives.

This Strategy recognises the need for a high level group or groups to develop and deliver the vision for better use of geographic information to support Scotland. The Scottish Executive's Geography Steering Group has been fulfilling that role in the development of geographic information for the Scottish Executive. In order to represent the range of interest more fully, membership of this Group will be broadened. However, at present there is no single group that can look comprehensively at the development of geographic information to support the public, private, and voluntary sectors and community groups in Scotland, apart from AGI

Scotland. AGI is a voluntary network whose remit does not extend to governance of geographic information initiatives in Scotland. AGI has made it clear that it would welcome the creation of such a group. Therefore to ensure that the views of key stakeholders are adequately represented, a much wider group is required, involving representatives of all interested parties. The Scottish Executive will establish this group, which could be known as the “Scottish Geography Forum”.

There is a need for a corresponding technical or specialist group to support the development and implementation of high level policy on geographic information. The Scottish Executive's Geography Technical Working Group currently fulfils this function for the Executive and its agencies, but wider involvement will be required, reflecting the range of interests represented in the Scottish Geography Forum.

Several groups and networks already exist in the wider public sector, and provide effective methods of communication and co-ordination of activity, for example:

- The Scottish Central Government GIS Users Group (SCGISUG);
- The Scottish Local Authority GIS Forum (SLAGIS);
- The Ordnance Survey Pan-Government Agreement Liaison Officer (OSLO) network.

These groups will have an important communication role in the future and will provide valuable support for the governance framework proposed here.

The delivery of the vision for better use of geographic information in Scotland will have resource implications. However, geographic information in Scotland is already supported by public funding. For example:

- The Modernising Government Fund and Scottish Local Authorities are supporting the Definitive National Address (DNA) Project to a level of £10 million over three years to resolve fundamental issues over Scotland's address based data.
- The central government sector in Scotland pays in the region of £2 million per year to maintain the supply of the fundamental underpinning Ordnance Survey map-based data.
- The Scottish Executive has paid in the region of £2 million to acquire the three dimensional detailed topographic data needed to support development of flood prediction and prevention schemes by central and local government.
- The Scottish Executive has recently invested £250,000 in new computer systems to support the collection, maintenance, analysis and presentation of geographic data by the Scottish Executive Geographic Information Service (SEGIS).
- The Scottish Executive will invest in the region of £500,000 in system development to maximise efficiency of data sharing across SEERAD and with the rural and environmental agencies and NDPBs.

These sums are in addition to the annual budgets for groups which create and maintain core geographic information for Scotland such as the SEGIS, Scottish Neighbourhood Statistics, General Register Office for Scotland, the Local Government Boundary Commission, Registers of Scotland and many others.

The AGI consultation raised a number of questions about this expenditure and whether appropriate mechanisms were in place to co-ordinate and prioritise expenditure. There seem to be two main issues:

- The existing range of funding mechanisms does not necessarily cover all the requirements for geographic information.
- Policy requirements are not necessarily covered by existing provision of geographic information.

While there will always be calls for new funding, it may be more sensible to review existing expenditure mechanisms, in order that they may be appraised against best value criteria. It may be that more efficient and effective co-ordination and deployment of existing funding mechanisms could go some way to support the current and future requirements for geographic information in Scotland. Therefore, the main need is to link existing funding mechanisms with the geographic information required for priorities in policy development and implementation. For example, the Efficient Government Fund may provide funding opportunities for projects aimed at maximising the efficiency of geographic information management.

The need to define benefits, and make best use of existing funding mechanisms is a fundamental element of the governance of geographic information for Scotland. Given that the majority of geographic information is collected and maintained at public expense, central government must have a key role in developing such mechanisms. However none of this can be achieved without the involvement of partners across all sectors in Scotland.

SOME PARTNERS IN THE DEVELOPMENT OF A GI STRATEGY FOR SCOTLAND

There is a wide range of interest and involvement in geographic information, and so many potential partners. The list below is an illustration of the range of partners that could be involved in the development of a GI Strategy for Scotland.

Organisational partners:

- Central Government
- Local Government
- Health
- Voluntary sector, charities, NGOs.
- Business

- Community groups

Functional partners:

- Social services
- Economic development
- Justice
- Housing
- Education
- Arts, culture, sport and leisure
- Environment, land/marine management
- Property
- Public safety and emergency services
- Transport
- Utilities and networks
- Insurance

User Groups:

- Geographic data, technology and service providers
- GIS users/experts
- Researchers
- Statisticians
- Planners
- Surveyors
- Community groups
- Citizens

Therefore the Scottish Executive will:

- 1.1 In partnership with key stakeholders, create a Scottish Geography Forum to augment the existing governance mechanisms for development and promotion of geographic information in Scotland.
- 1.2 In partnership with key stakeholders, review and evaluate mechanisms for developing and promoting technical standards and solutions.
- 1.3 Promote the adoption of common technical standards for geographic data and information across the public sector in Scotland.
- 1.4 In partnership with key stakeholders, identify the benefits of improved use of geographic information in Scotland, and where appropriate provide guidance to assist development of new or improved systems.

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| 1.5 | In partnership with key stakeholders, review existing funding arrangements for supporting geographic information in Scotland and make recommendations for improvement, where appropriate. |
| 1.6 | In partnership with key stakeholders, seek to ensure that geographic information initiatives and projects supported by the Modernising Government and Efficient Government Funds contribute to the overall aims of this Strategy.. |

2. ENSURE ACCESS TO THE MOST UP-TO-DATE AND ACCURATE GEOGRAPHIC INFORMATION ABOUT SCOTLAND THAT CAN BE DELIVERED WITH BEST USE OF RESOURCES.

This will require the development and implementation of mechanisms to identify, acquire, manage, utilise and where appropriate rationalise key geographic information for the benefit of Scotland and its people.

There is a massive store of geographic data about Scotland held by public, private, voluntary and community organisations. However, real problems exist in mobilising these data. In its geographic information resources Scotland is "data rich and information poor".

A fundamental element of this Strategy is to promote better use of the geographic information available to Scotland, whether relating to physical, map, address or name-based geography. Management of geographic information has three aspects.

- Acquisition or creation of the basic data.
- Processes for manipulating and storing data.
- Analysis and presentation of the data to create relevant, accurate and timely information appropriate to the requirements of policy.

Each of these aspects must be rationalised if best use is to be made of existing resources.

Every review of the issues surrounding geographic data and information has identified the need to define and maintain the geographies that provide the fundamental descriptions and characterisation of Scotland. These have been variously described as "core", "key" or "strategic" geographies, but for the purposes of this Strategy we consistently use the term "key". For the purposes of this Strategy, key geographies are those physical, address or name based data that are required for government administrative functions, service delivery, legislation, research or publication of official statistics. The challenge is to develop mechanisms to deliver Scotland's key geographies in the most cost-efficient and effective manner practicable.

The public sector already makes significant contributions to the provision of key geographic information for Scotland, both at national and local level.

THE PUBLIC SECTOR AND “KEY” GEOGRAPHIES FOR SCOTLAND

- Scotland's public sector organisations pay substantial amounts to secure the use of base Ordnance Survey data through the Pan-Government Agreement with OS.
- The Definitive National Address Project will develop a standardised approach to the management of addresses across the public sector.
- The Scottish Executive has secured the three dimensional data needed to allow central and local government to develop flood prediction and prevention schemes.
- The General Register Office for Scotland creates, manages and makes available the postcode boundaries and "higher geography" indices necessary to support its core business, including the census.
- The Boundary Commission creates electoral and administrative boundaries that support a wide range of "higher geographies".
- The Scottish Executive's Neighbourhood Statistics Project is making substantial developments in the management of standard statistical boundaries. While these are not real boundaries, they are derived from address based geographies and provide the basis for Scotland's statistical information and related address based information.
- Registers of Scotland creates and maintains the definitive record of interests in property for Scotland.

The development of Neighbourhood Statistics and the associated creation of standard statistical boundaries mean that substantial developments are occurring in the management of boundary data, the statistical information associated with it and related address based information sources.

Many more public sector organisations create and maintain geographic information at both national and local level. However, much of this activity is sectoral, and current processes do not necessarily achieve best value. Many important datasets are created by Government Trading Funds and research organisations or by the public sector. However, these data may be unavailable to many data users, because no funding has as yet been secured to acquire them. Some examples are:

- Hydrographical data for seas and coasts.
- The definitive rivers network.
- Soils and geology.
- Aerial photography.
- Location of public and retail services.

Obtaining and maintaining these datasets may incur costs. However there may be major costs savings in a central acquisition, access and corresponding rationalisation programme, thereby achieving best value. In some cases, opportunities may exist for the off-setting of cost through value-added commercial exploitation of data, thereby making most effective use of the data that we have. This would also contribute to best value management of our key data.

Many stakeholders have stressed the importance of central government organisations in the creation, management and supply of key geographies, and have identified the need to resolve the issues affecting this sector as a priority. For this reason the actions outlined here and detailed in the implementation plan will initially focus on central government. However, the principles apply to all other sectors, and similar actions will need to be taken by all stakeholders involved in Scotland's key geographies.

Therefore the Scottish Executive will, in partnership with key stakeholders:

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| 2.1 | Identify the key geographies for Scotland. |
| 2.2 | Review the existing mechanisms for acquisition, creation and management of Scotland's key geographies. |
| 2.3 | Identify the gaps in provision of key geographies and the costs for access to additional datasets. |
| 2.4 | Make recommendations for a programme of acquisition and access to additional key geographic datasets. |
| 2.5 | Promote, in the first instance for central government, more efficient and effective mechanisms for rationalisation of systems and processes for acquisition and access to key data for Scotland, to include funding and organisational requirements. |
| 2.6 | Identify, in the first instance for central government, cases where rationalisation of data acquisition and management processes may contribute to cost savings through economies of scale, while avoiding the risk of over-centralisation. |
| 2.7 | Establish, if appropriate, a group to monitor and maintain standards for key geographies for Scotland. |
| 2.8 | Ensure that key geographies for Scotland are made available, in the first instance by central government, to the public, private and voluntary sectors and to the citizen in the most cost-efficient and effective manner possible, consistent with best value. |
| 2.9 | Ensure that the information about the key geographies of Scotland is made available, in the first instance by central government, to the public, private and voluntary sectors, community groups and the citizen. |

3. DEVELOP AND PROMOTE THE MEANS WHEREBY GEOGRAPHIC INFORMATION CAN BE SHARED, WITHIN THE PRACTICAL LIMITS OF BEST VALUE SO AS TO GIVE A HIGH QUALITY AND KNOWLEDGE “RETURN” FROM EACH SET OF DATA.

This will require the development and implementation of mechanisms to remove barriers to efficient and effective use of geographic information for the benefit of Scotland and its people.

Many of the barriers to better use of geographic information are created by the way that organisations and individuals work. In some cases these are institutional problems, in others the difficulties are created by individual attitudes. There is a need for a fundamental review of the way we have “always done things”, in order to define new and better ways of working.

Perhaps the most fundamental barrier to the better use of geographic information in Scotland and elsewhere is the problem of data sharing. Data that should be used widely are not available, and virtually every public sector organisation has to allocate resources to finding out about and accessing data that have already been created by other public sector organisations. There is a great deal of unnecessary duplication of effort.

There is potential for confusion about the legislation on data availability and release. The aspirations of organisations to promote the use of data and information, and the requirements of the Freedom of Information (Scotland) Act 2002 and the Freedom of Environmental Information Regulations 2003 signify a desire to make data and information widely available. However the requirements of the Data Protection Act, the Government Trading Fund regime under which bodies such as the Ordnance Survey and Hydrographic Office operate, and the commercial value of some datasets are sometimes perceived as obstacles to the release of data and information. The lack of information about the requirements of these different imperatives can sometimes act to limit the realisation of benefits from use of geographic information. Therefore there is a need to clarify the issues and ensure that there is common understanding about what may and may not be done with geographic information.

Wherever possible geographic information should be co-ordinated and “joined up” across central and local government bodies. Data should be created once and used many times. This means that the barriers to data sharing within and between organisations must be identified and resolved. This Strategy defines how these issues may be resolved for geographic information, and complements other initiatives, both within and outwith the public sector. The principles apply equally to all sectors. However, many stakeholders have stressed the importance of resolving data sharing issues within the public sector and have indicated that this should be a priority for the Strategy. This applies to data sharing between central government organisations and between central and local government.

The Scottish Executive will, in partnership with key stakeholders:

- 3.1 Review existing structures and processes in the public sector with a view to identifying barriers to geographic data sharing and information dissemination.
- 3.2 If appropriate, make recommendations for the revision of existing structures and processes in order to ensure best value and the efficient and effective use of geographic information by the public sector.
- 3.3 Develop and publicise guidance on the links between efficient and effective use of geographic information, the requirements of Freedom of Information and Data Protection legislation, and the Government Trading Funds regime under which organisations such as the Ordnance Survey and Hydrographic Office operate.
- 3.4 Develop guidelines for best value and best practice in the efficient and effective use of geographic information and promote their use by all sectors.

4. PROMOTE THE BENEFITS OF GEOGRAPHIC INFORMATION ACROSS THE PUBLIC, PRIVATE, COMMUNITY AND VOLUNTARY SECTORS IN SCOTLAND, TAKING ACCOUNT OF NATIONAL AND INTERNATIONAL ACTIVITIES AND ENSURING THAT SCOTLAND'S SUCCESSES ARE CELEBRATED AND COMMUNICATED TO AN INTERNATIONAL AUDIENCE.

This will require the development of mechanisms to identify appropriate UK, European and international initiatives, and feed back Scotland's successes to the international community.

The use of GIS to manage geographic data and information can bring great benefits in terms of cost savings as well as effectiveness gains. Often, however, the nature of these benefits are not articulated clearly enough, and opportunities for cost savings and efficiency gains can be missed. The speed of development of the technology and the rapidly expanding breadth of applications means that it is difficult for the public sector, private organisations, and particularly Small and Medium-sized Enterprises (SMEs), community and voluntary bodies to keep pace with the rate of change. It is important that mechanisms are put in place to ensure that new ideas and benefits are communicated to those who need them. This will require an education process to raise awareness of geographic information in sectors which do not use it at the moment.

Scotland does not work in isolation. Many geographic information initiatives are GB or UK wide and there is much experience and knowledge about geographic matters in the European and international communities. Increasingly, European Community initiatives define the requirements for and use of geographic data and information in Scotland. Some examples are:

- Strategic Environmental Assessment Directive.
- Water Framework Directive.
- Freedom of Environmental Information Directive.
- Directive on re-use of Public Sector Information

The forthcoming Directive establishing an infrastructure for spatial environmental information in the Community (INSPIRE) could have a significant impact on Scotland's requirements for and use of geographic information.

It is important to keep abreast of these initiatives. Conversely there is much to be proud of in Scotland. We are a small country, but have a tightly knit policy and information community. We have a number of centres of academic excellence in geographic information. The research that these institutions undertake supports many different initiatives, and brings recognition to our geographic information community.

Therefore we have the potential to join up and develop our geographic data and information initiatives and pass on our experiences to others. It is important that Scotland celebrates its successes while continuing to learn from the experience of others and shows the international community that we can contribute to wider initiatives.

The Scottish Executive will, in partnership with key stakeholders:

- 4.1 Develop and promote mechanisms to communicate information about developments in geographic information to those who will benefit in the public, private and voluntary sectors in Scotland.
- 4.2 Develop and promote mechanisms to identify and raise awareness of the benefits of geographic information among those who do not yet use it to support their business operations.
- 4.3 Promote wider use of geographic information for teaching and learning in Scotland's education system.
- 4.4 Review links between Scotland's geographic information initiatives and research activity and, where appropriate, identify and promote opportunities for improved engagement between users of geographic information and the research community.
- 4.5 Build links with the geographic information communities in the United Kingdom, Europe and internationally, identify the appropriate context and communicate information to users of geographic information in Scotland.
- 4.6 Recognise Scotland's capability in developing new ways of joining up geographic data, information and organisations in order to maximise the benefits in support of the economic performance of a small country, celebrate our successes and communicate them to a wider UK and international audience.

5. PROMOTE THE APPROPRIATE TECHNICAL AND PROFESSIONAL STANDARDS FOR EFFICIENT AND EFFECTIVE USE OF GEOGRAPHIC INFORMATION IN SCOTLAND.

This will require identification, adoption and promotion of appropriate professional and technical standards to support the efficient and effective use of geographic information in Scotland.

It is normally assumed that the main barriers to better use of geographic information in Scotland are technical. This is not necessarily so. Process and attitude are often the main barriers affecting its efficient and effective use. But some technical problems *do* exist, and affect how we use geographic information.

Many of the technical standards for systems, data and interoperability are already well defined and are being implemented. However, these are not always co-ordinated, or implemented in the most efficient manner. Part of the reason is the absence of governance, co-ordination and communication mechanisms to promote the adoption of appropriate national and international standards, as highlighted elsewhere in this Strategy.

Despite the specialist nature of some applications, geographic data and information are a simply a subset of the wider information support base for Scotland. Their requirements for underpinning infrastructure are similar to those of other ICT based systems. However, there is a risk that geographic information could be treated differently from mainstream organisational IS/ICT programmes and procurement, thereby missing out on the benefits of economies of scale and cost savings. Increasingly there are no technical reasons for this to occur, but organisational barriers can still create difficulty. Conversely, developments in mainstream IS/ICT could have significant benefits for geographic information systems. Possibly the main factor limiting more widespread data sharing is the availability and accessibility of broadband connections across Scotland. These would allow transfer of geographic information and facilitate the development of distributed data networks. In turn this would allow data to be managed once – by the organisation responsible for it - and used many times, by the organisations that need to use it. This would avoid the overheads of duplicated data management and problems of co-ordination generated by current data warehousing systems, which have to be maintained by individual organisations. While this would also require a change in process, attitude and the data-sharing culture, as referred to earlier, in many cases, organisations cannot even get to this stage because of the limitations in infrastructure.

The growth and use of geographic information and GIS across public, private and voluntary sectors, the increasing complexity of geographic data and systems and the increasing use of mainstream corporate network applications and data management systems mean that GIS staff require the same levels of knowledge and expertise as ICT and other professional staff. Therefore there is a case for development of good standards for professional development of GI staff. Continuing Professional Development (CPD) schemes for GI professionals would facilitate the development and adoption of high professional standards and promote a more formal network for maintenance of both professional and technical standards. Such schemes

already exist, promoted by the Royal Institute for Chartered Surveyors (RICS) and the Royal Geographical Society (RGS). AGI has also tried to develop a CPD programme for geographic information professionals. Therefore there is an opportunity for the public sector to work with partners to encourage professional standards and appropriate training/development schemes in Scotland.

The Scottish Executive will, in partnership with key stakeholders:

- 5.1 Facilitate the definition and adoption of standards for geographic data and information systems, interoperability and accessibility.
- 5.2 Identify examples of good practice, and promote integration of geographic information systems with mainstream IS/ICT programmes and procurement procedures.
- 5.3 Identify the infrastructure requirements for geographic information and, working with other organisations, develop and promote implementation of appropriate elements of the data, systems, communications and physical infrastructure to support “One Geography – One Scotland”.
- 5.4 Encourage and support the development of geographic data and information training, by promoting appropriate professional standards and continuing professional development schemes for those who work with geographic data and information in Scotland.

CONCLUSION

This Strategy is not intended to be a complete or prescriptive solution to all issues that affect the development and better use of geographic information for the benefit of Scotland and its people. Rather it sets out a framework for action, intended to stimulate and facilitate continuing engagement with key stakeholders in the public, private, community and voluntary sectors in the development of shared, definitive solutions to the issues described in this document. In order to reflect progress in implementation, and the inevitability of change in the wider context of geographic information, the Strategy will be revised in five years time.

More specific targets and the mechanisms needed to achieve them will be detailed in the implementation plan that will be produced to support the Strategy. Agreement on mechanisms for monitoring and review of progress on development and implementation of the Strategy will be a part of this process. The implementation plan will be published towards the end of 2005, and will cover the period 2006 – 2011.

The Strategy has largely focussed on actions that need to be taken by the public sector, and in particular central government. This is because stakeholders have repeatedly expressed the view that resolution of issues affecting data management and data sharing within central government and between central and local government will go a long way to resolving the wider issues in this area for Scotland as a whole. There has been a clear mandate for the

Strategy to give priority to issues affecting the public sector in general and central government in particular. Specifically, because of its pivotal role in Scotland, the Scottish Executive has been asked to take a lead role in ensuring that the objectives of the Strategy are achieved and the prescriptions fulfilled. For this reason, many of the actions prescribed refer to the Executive and its role in facilitation and co-ordination. However, implementation of the Strategy will involve all stakeholders, and can only be achieved through partnership, collaboration and co-ordination of effort. Therefore the Strategy is not just for the Scottish Executive, or even the public sector, but for Scotland as a whole.

The Scottish Executive is committed to taking lead responsibility for the actions described in this Strategy, but is also committed to working in partnership with stakeholders to achieve the Strategy's objectives. Only if all interested parties engage with the continuing process will the people of Scotland realise the benefits of "One Scotland – One Geography".

TECHNICAL APPENDIX

GEOGRAPHIC INFORMATION – THE SPACES, FACES AND PLACES OF SCOTLAND.

Geographic information touches the life of most people in Scotland at one time or another. It may be helpful to place this strategy in context with some definitions of geographic information and some examples of its application.

1. DEFINITIONS

Geographic information is a wide-ranging term, used to describe any data collected about places on the earth's surface. Places can be identified by a computer as areas, points or lines, and the computer can also store any data collected about the place, or the people who are associated with it. The computer-based systems that capture, store, analyse and present these data are known as Geographic Information Systems (GIS).

There are three main types of geographic information.

- Physical and map-based data. (*The Spaces of Scotland*). This is information about the physical land surface and the boundaries that can be drawn upon it. Further data can be added to describe the areas so defined. This is known as geographically referenced data. For example, a local authority has a physical boundary that can be drawn on a map. Associated with the local authority is a huge range of information, which can range from the simple (e.g. its name and standard code) to the complex statistical data summarising social and economic activity. This information has traditionally been collected and managed using Geographic Information Systems (GIS), referenced through the Ordnance Survey's National Grid (for land based information) or latitude/longitude projection systems for offshore data. Increasingly such GIS are used to collate data other than basic physical and boundary information. Socio-economic, statistical and text-based information are now routinely stored, analysed and presented by GIS.
- Address data. (*The Faces of Scotland*) This is information about addresses and the people who live there. This includes all geographically referenced information collected about people, including socio-economic, health and attitudinal data. The basic units of information are the postal address and postcode, together with any information that can be associated with them, describing the property or the people who live there. Information about addresses is referenced in databases by means of a geographical index, and the basic units can be aggregated in various ways for statistical purposes, into administrative boundaries and wider classifications of area, known as "higher geographies". These include census output areas, data zones and the European statistical classification hierarchy known as NUTS (Nomenclature for Units of Territorial Statistics). This information has traditionally been managed by statistical analysis and presentation techniques. Increasingly GIS are used to analyse and present this information.
- Place name data. (*The Places of Scotland*) Most, if not all, geographic features and places have a name. This might refer to a town, hill or river. These names allow us to catalogue and retrieve geographically referenced text-based and graphical information about the place and the people who live there. This is one of the basic elements of library, museum and other archive catalogues, and traditionally such information has been managed by

libraries, museums and the national archive systems. Such name-based archives are not an immediately obvious source of geographic information, but in fact provide an enormously rich background source of information about Scotland's places and people. Place names are referenced in gazetteer systems. Increasingly names are the first element in searching for information about places with computer search tools that use the name of the place as the key to the archive. Such techniques have the potential to unlock Scotland's "hidden wealth" of archived information about its places and people, but are currently limited by the lack of a standardised approach to place names in Scotland. This was raised as a significant issue during consultation on the draft Strategy and subsequently, particularly with regard to Gaelic place-names. This issue will be investigated further as part of the implementation plan for the Strategy.

Each of these types of geographic information has three components:

- The basic geographic data, whether physical, address or name based.
- The coding data about the geographies that provide a standard referencing/context system. These may be the latitude/longitude system, Ordnance Survey Grid References, addresses, post codes or gazetteer systems.
- The geographically referenced data that is associated with the physical space, address based face or text based place in Scotland. In GIS terms this is the "attribute" data collected about physical entities on the earth's surface. All statistical data collected about Scotland falls into this category, as does all text-based and graphical information that refers to particular places.

The distinctions between these categories may seem complex, but they are important in defining the different elements that make up the geographic data and information that describe and characterise Scotland.

Whilst in practice all such information can be contained within a Geographic Information System, there have been critical differences between them in terms of who manages each and how they are managed. However, improvements in data management technology and GIS mean that such traditional distinctions between these types of data and the ways they are stored, managed and used are now less relevant. Digital spatial or geographic data can, potentially, be stored as a single entity, regardless of the original nature of the data. However, there are still critical differences between these types of information depending on who manages them and how they are managed. It is one of the crucial aims of this Strategy to minimise such artificial barriers between the types of geographic information. Therefore, in this Strategy, while each of these terms will be used as appropriate, the term *geographic information* is used to refer to all three types of data, and their individual components.

2. THE ROLE OF GEOGRAPHIC INFORMATION

In one form or another, geographic information supports virtually every aspect of the work of the public sector in Scotland, for both central and local government. It is equally important for the private, community, voluntary and academic sectors. Sometimes the use of geographic information is explicit, and the benefits are clearly apparent. In other cases the role of

geographic information is less directly obvious. The following examples are a small selection of the uses of geographic information in supporting policy and service delivery for Scotland.

Geographic information is at the heart of the work of central government. For example, GI supports virtually every aspect of the work of the Scottish Executive. Some examples are:

- *Service delivery*
 - The agriculture subsidy programme for Scotland, worth £500 million per annum would not operate efficiently without the basic ability to identify individual fields using GIS.
 - Geographic information is fundamental to the development and maintenance programmes for Scotland's trunk road network.

- *Policy Development*
 - GIS has been fundamental in developing the basic definitions of rural and urban Scotland that are essential to underpin all rural development and support policies.
 - Development of policies for health, social inclusion, justice and education are based on up-to-date and accurate statistics, which in most cases are collected for specific geographic areas.

- *Policy Implementation.*
 - Scotland's system for land use and property planning and development control, is based entirely on information about geographic information and specific properties.
 - Renewable energy policy is based on knowledge about impact of developments on particular geographic areas.

Virtually every other central government agency and Non-Departmental Public Body (NDPB) also uses geographic information as the basis of many of its activities.

THE USE OF GEOGRAPHIC INFORMATION BY CENTRAL GOVERNMENT

- Registers of Scotland creates and maintains the definitive record of interests in property for Scotland.
- The General Register Office for Scotland is responsible for Scotland's census. Results are produced for specific areas - 'census output areas' created from individual postcode and address information.
- The Royal Commission for Ancient and Historical Monuments for Scotland maintains the record of Scotland's archaeological heritage, based on specific information about the location of individual monuments and sites.
- The Scottish Environment Protection Agency's regulatory functions are dependent on geographic information, including knowledge of environmental quality and identification of the location of pollution incidents.

- Scottish Natural Heritage and the Forestry Commission share geographic information with the Scottish Executive to ensure that there is no overlap of public subsidy for land use in Scotland.

Most local government services are location based services. This ranges from the pragmatic (the location of the nearest recycling facility) to the critical (the addresses of children at risk). The Definitive National Address Project for Scotland (DNAS) will develop a standardised approach to the management of addresses by local authorities, and other bodies.

Scotland's health services are dependent on information based round a specific location – health centre, hospital, dental surgery etc, or based round a specific person – the patient, who has an address and postcode.

Scotland's emergency services are dependent on information about location, as emergency vehicles must be targeted to an accurate location, travelling by the quickest possible route.

The requirements for geographic information of the voluntary sector, charities and community groups mirror that of the public and private sector. However, the cost of systems and data can often constrain the actual use of geographic information by these sectors.

3. THE BENEFITS OF USING GEOGRAPHIC INFORMATION

It is widely recognised that the use of geographic information allows better resource allocation and improved working arrangements within and between organisations. Therefore action to improve the way we manage and use geographic information will provide benefits for the public, private and voluntary sectors and for the people of Scotland.

A good example of the potential benefits of using geographic information is at the core of the Scottish Executive's policy. The Executive's vision for Scotland is laid out in "A Partnership for a Better Scotland", under the main themes:

- Growing Scotland's economy.
- Delivering excellent public services.
- Supporting stronger, safer communities.
- Developing a confident, democratic Scotland.

Most of the policy objectives could be supported by geographic information, as three random examples of policy commitments show.

Example 1 - "We will extend the neighbourhood warden scheme across Scotland and continue to evaluate its success".²

- Geographic information will allow identification of the priority areas for neighbourhood wardens by using social and crime statistics for particular areas to identify the need for a warden scheme, ensuring that warden schemes are distributed in a cost efficient and effective manner across communities.

Example 2 - "We will support measures to improve the availability of affordable, quality, healthy food in low income areas"³

- Implementation of this policy will be dependent on geographic information that defines "low income areas" establishes where they are and provides the basic information about the availability of such food and the impact in health and socio-economic terms.

Example 3 - "We will ensure sufficient resources are available for the non-trunk road network, particularly recognising the needs of pressurised rural roads affected by timber production and other primary industries"⁴

- Geographic information will be fundamental to the definition of the non-trunk road network and the fundamental differentiation into rural and urban Scotland. GIS can provide the basic information on the state of each road/section of road, the demands made on it and the location of the forestry/other industrial activity. GIS can also model and predict the potential future loading on any individual road or section of road.

SCOTTISH NEIGHBOURHOOD STATISTICS

Geographic information is the basis of the Scottish Neighbourhood Statistics Project that will provide the information to support and evaluate many of the commitments in the "Partnership Agreement". This Project exemplifies the wide range of geographic information needed by government and the need to move away from traditional approaches to the collection and management of physical, statistical and address-based geographies. Specifically, the SNS Project is creating standard statistical boundaries derived from address based geographies.

² "A Partnership for a Better Scotland" 2003. Page 37 – 'Supporting Stronger, Safer Communities' - Social Justice

³ "A Partnership for a Better Scotland" 2003. Page 22 – 'Delivering Excellent Public Services' - Health

⁴ "A Partnership for a Better Scotland" 2003. Page 13 – 'Growing Scotland's Economy' -Transport