

**POLICIES AND PRINCIPLES ON ACCESS TO AND
REUSE OF PUBLIC SECTOR INFORMATION: a review of
the literature in Australia and selected jurisdictions**

Chapter 5: The United States of America

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with assistance from

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Chapter 5: United States of America

Introduction

Information is the currency of democracy.
Thomas Jefferson

Among the first, perhaps the very first instrument for improvement of the condition of the governed, is knowledge, and to the acquisition of much of the knowledge adapted to the wants, the comforts, and the enjoyments of human life public institutions and seminaries of learning are essential.
John Quincy Adams

A popular government without popular information or the means of acquiring it, is but a prologue to a farce, or a tragedy, or both.
James Madison

The United States of America, like Australia and Canada, has a federal system of government. However, unlike Canada and Australia, the United States has a long history of support for public access to government information, as illustrated in the comments above by Thomas Jefferson, John Quincy Adams and James Madison. There has also been a long held commitment to the principle that scientific information and research results should, as far as possible, be shared broadly within the scientific community.¹

This strong support of the open access philosophy appears to be due to a variety of factors including historical, governmental and cultural. In this regard whilst it is important to recognise that the absence of copyright to protect federal government agencies' information is one clear contributing factor it certainly is not the only one. Whilst the Office of Management and Budget (OMB) Circular A-130 issued by the federal government in 2000 clearly reinforced the open access policy, this initiative needs to be seen as part of a much longer historical process through which open access policy has been progressively developed and strengthened. Consistent with this longstanding and strong commitment to an open access policy position the United States federal government has developed and articulated a clear set of underpinning open access principles which are to be implemented.

The US framework for access to government information is characterised by broad rights to electronically access government information and re-use it for commercial purposes, a lack of restrictions on re-use, the limiting of charges to the marginal costs of reproduction and dissemination and the absence of copyright in federal government materials. In view of the long-standing commitment to the accessibility of government information in the United States, it is not surprising that there is a large body of material addressing the economic, social and legal aspects of open access.

¹ See the National Security Decision Directive 189, *National Policy on the Transfer of Scientific, Technical and Engineering Information*, issued by the Reagan White House on 21 September 1986, which stated that “[i]t is the policy of this Administration that, to the maximum extent possible, the products of fundamental research remain unrestricted”. The term “fundamental research” is defined as meaning “basic and applied research in science and engineering, the results of which ordinarily are published and shared broadly within the scientific community, as distinguished from proprietary research and from industrial development, design, production, and product utilization, the results of which ordinarily are restricted for proprietary or national security reasons.” See <http://www.aau.edu/research/ITAR-NSDD189.html>.

Central to the US legislative and policy framework supporting access to and re-use of PSI are two key documents: the US *Copyright Act 1976* and the Office of Management and Budget's Circular A-130 ("OMB Circular A-130").² Section 105 of the US *Copyright Act 1976* excludes works of the federal government from being eligible for copyright protection. Circular A-130, issued by the OMB in 2000, establishes guidelines for the management of federal information based on the *Paperwork Reduction Act 1980* (PRA), as amended by the *Paperwork Reduction Act 1995* (44 U.S.C. Chapter 35), and several other statutes and orders, requiring federal agencies to actively disseminate public information without restrictions or conditions, at a cost no greater than the cost of dissemination.³ It is the US federal government's most significant policy statement on access to PSI. As well as acknowledging that government information is a valuable public resource and that the nation stands to benefit from the dissemination of government information, OMB Circular A-130 requires improperly restrictive practices to be avoided. Additionally, Circular A-16, entitled *Coordination of Geographic Information and Related Spatial Data Activities*, provides that US federal agencies have a responsibility to "[c]ollect, maintain, disseminate, and preserve spatial information such that the resulting data, information, or products can be readily shared with other federal agencies and non-federal users, and promote data integration between all sources."⁴

Open access remains a key point of interest in current US political and administrative discourse. In 2008, the US National Institutes of Health⁵ (the largest funder of basic biomedical research in the world, spending US\$27 billion in the 2005 financial year) and Harvard University faculties (the Law School⁶ and the Faculty of Arts and Sciences⁷) introduced mandatory open access publishing policies, requiring peer-reviewed journal publications to be made available in open access repository.⁸ President Obama came into office in January 2009 with a technology policy aimed at creating "a transparent and connected democracy", including the use of technology "to reform government and improve the exchange of information between the federal government and citizens while ensuring the security of our networks".⁹ On his first day in office President Obama issued a Presidential Memorandum on *Transparency and Open Government*, encouraging transparency in

² See Office of Management and Budget (OMB), OMB Information Initiative, FGDC Newsletter, Vol 5, No 1, at <http://www.fgdc.gov/>.

³ For an overview of the US regulatory framework, see Nancy E Weiss, *Overview of US Federal Government Information Policy*, presented at OECD Working Party on Information Economy workshop on public sector information, Paris, 4 – 5 February 2008, at <http://www.oecd.org/dataoecd/28/0/40047022.pdf> accessed on 5 June 2009.

⁴ Office of Management and Budget Circular A-16 on the Coordination of Geographic Information and Related Spatial Data Activities (OMB Circular A-16) (issued 16 January 1953, revised in 1967, 1990, 2002) Section 8, http://www.whitehouse.gov/omb/circulars_a016_rev/#8.

⁵ See NIH's Revised Policy on Enhancing Public Access to Archived Publications Resulting from NIH-Funded Research, at <http://grants.nih.gov/grants/guide/notice-files/NOT-OD-08-033.html> accessed on 22 May 2009. NIH's mandatory open access policy has received legislative backing by the Consolidated Appropriations Act 2008 (Division G, Title II, Section 218 of Public Law 110-161); see NIH's Revised Policy on Enhancing Public Access to Archived Publications Resulting from NIH-Funded Research, at <http://grants.nih.gov/grants/guide/notice-files/NOT-OD-08-033.html>.

⁶ See http://www.law.harvard.edu/news/2008/05/07_openaccess.php.

⁷ Adopted 12 February 2008, see http://www.fas.harvard.edu/~secfas/February_2008_Agenda.pdf and <http://www.eprints.org/openaccess/policysignup/fullinfo.php?inst=Harvard%20University%20Faculty%20of%20Arts%20and%20Sciences>. In an important advance on previous practice, instead of requiring academic authors to deposit their publications in the institutional repository themselves (which requires individual academic authors to assume responsibility for negotiating copyright interests with their publishers) Harvard's Faculty of Arts and Sciences obtains a licence from faculty authors which allows Harvard to deposit and make available faculty authors' publications on their behalf. Importantly, the Faculty of Arts and Sciences' policy also provides that any transfer of copyright to a publisher is subject to the licence granted by the faculty author to Harvard.

⁸ Subsequently, the Kennedy School of Government, MIT, the Stanford School of Education and Harvard's Graduate School of Education (GSE) also endorsed open access policies.

⁹ See the Technology Policy on the White House web site at <http://www.whitehouse.gov/agenda/technology/>.



government and instructing US government agencies to err on the side of making information public.¹⁰

As part of the Obama administration's Open Government Initiative,¹¹ the data.gov portal was launched in May 2009 providing access to large numbers of federal datasets, which are continually being added to.¹² For example, machine-readable datasets may be accessed from the "raw" data catalogue, in a variety of formats (including XML, CSV/TXT, KL/KMZ and Esri) with accompanying metadata and analysed using tools available on the portal. Since then, various U.S. states and localities such as Washington D.C., California and San Francisco have followed suit and taken "bold steps towards greater openness"¹³ by establishing their own web portals and releasing valuable datasets online.¹⁴

In accordance with the President's memorandum on *Transparency and Open Government*,¹⁵ the White House crafted recommendations for an Open Government Directive using an inverted policymaking process.¹⁶ After an extensive three-phase process which invited the public to collaboratively Brainstorm, Discuss and Draft the directive, the Open Government Directive was released on 8 December 2009.¹⁷ Broadly, the Open Government Directive charged federal agencies with making high value data publicly available and with quickly coming up with formal open government plans.¹⁸

Steps to put the Open Government Directive into practice have steadily gained momentum since its release in December 2009. Two days after the release of the Directive, the Office of Science and Technology Policy (OSTP) launched a public consultation on access to publicly-funded research results.¹⁹ Although the final phase of this Public Access Policy Forum officially ended on 7 January 2010, the OSTP created a "bonus round" due to a high number of requests, allowing access to all phases of the Forum for a further two weeks.

¹⁰ *Transparency and Open Government*, Memorandum for the Heads of Executive and Agencies, Office of the Press Secretary, The White House, 21 January 2009, available at http://www.whitehouse.gov/the_press_office/Transparency_and_Open_Government/. See also the Press Secretary's Statement of 21 January 2009 at http://www.whitehouse.gov/the_press_office/StatementfromthePressSecretaryonthePresidentssigningoftwoExecutiveOrdersandthreeMe/, accessed 14 July 2009.

¹¹ See <http://www.whitehouse.gov/open/> and <http://www.whitehouse.gov/open/blog/> accessed 14 July 2009.

¹² Following the launch strategically important datasets continue to be promptly and progressively uploaded, with Landsat Satellite data and the US Geological Survey (USGS) Oil and Gas Assessment Database being included in the datasets currently available. Additionally, the US Geological Survey's mineral resource database is available at <http://www.data.gov/details/14>.

¹³ See Robynn Sturm (Assistant Deputy Chief Technology Officer), *Open Government Agenda Spills into States and Localities*, The White House – Blog, 27 August 2009, available at <http://www.whitehouse.gov/blog/Open-Government-Agenda-Spills-into-States-and-Localities/>.

¹⁴ See <http://data.octo.dc.gov/>, <http://www.ca.gov> and <http://datasf.org/>. See further Vivek Kundra, *They Gave Us The Beatles, We Gave Them Data.gov*, 21 January 2010 at <http://www.whitehouse.gov/blog/2010/01/21/they-gave-us-beatles-we-gave-them-datagov> accessed on 11 February 2010.

¹⁵ See http://www.whitehouse.gov/the_press_office/TransparencyandOpenGovernment/.

¹⁶ National Academy of Public Administration, *Summary Analysis of the Open Government Brainstorm*, Memo from Lena Trudeau, Vice President of NAPA to Beth Noveck, Deputy Chief Technology Officer, 1 June 2009, at p 1, available at http://www.ostp.gov/galleries/opengov_inbox/NAPA_analysis.pdf accessed on 1 October 2009.

¹⁷ Available at <http://www.whitehouse.gov/open/documents/open-government-directive> accessed 22 January 2010. See also generally <http://www.whitehouse.gov/open>.

¹⁸ See Daniel Terdiman, 'White House unveils open government directive', *Geek Gestalt* (blog), CNET News, 8 December 2009 available at http://news.cnet.com/8301-13772_3-10411429-52.html accessed on 22 January 2010.

¹⁹ See OSTP Public Access Policy Forum, at <http://www.whitehouse.gov/administration/eop/ostp/public-access-policy> and <http://www.whitehouse.gov/blog/2009/12/09/ostp-launch-public-forum-how-best-make-federally-funded-research-results-available-f> accessed on 11 February 2010.



Also in accordance with the Directive, two working groups were established to help implement the principles set forth in the President’s Memorandum on Transparency and Open Government.²⁰ The two working groups, with representation from across government, are to provide support federal agencies in encouraging transparency, cultivating public participation, and creating opportunity for innovative collaborations.²¹ In addition, the OSTP itself has implemented the Directive by releasing three high-value data sets online in machine-readable format.²² Each Federal agency’s progress in carrying out the deliverables required by the Directive can be tracked on the recently launched Open Government Dashboard.²³

A. Key broad application public sector information policies, laws and developments

US Copyright Act 1976, s105

§ 105 - Subject matter of copyright: United States Government works

Copyright protection under this title is not available for any work of the United States Government, but the United States Government is not precluded from receiving and holding copyrights transferred to it by assignment, bequest, or otherwise.²⁴

Section 105 of the US *Copyright Act* 1976 specifically and explicitly prohibits copyright protection for “any work of the US Government”. The section makes it clear that, while copyright does not subsist in “any work of the United States Government”,²⁵ the US federal government may nevertheless own copyright. For example, where copyright in a work is transferred to the US Government, the work retains copyright and it can be exercised by the Government. A “work of the United States Government” is defined (in s 101) as a work prepared by an officer or employee of the US Government as part of the person’s official duties. Exceptions to the rule in s 105 of the *Copyright Act* are provided for certain works of the National Institute for Standards and Technology (NIST) and the US Postal Service, which are copyrightable.²⁶

²⁰ Vivek Kundra & Aneesh Chopra, *Two New Groups Dedicated to Open Government*, 5 February 2010, available at <http://www.whitehouse.gov/blog/2010/02/05/two-new-groups-dedicated-open-government> accessed on 11 February 2010.

²¹ Ibid.

²² Aneesh Chopra, *U.S. Government, OSTP, Open New Troves of Data to the Public*, 22 January 2010, <http://www.whitehouse.gov/blog/2010/01/22/us-government-ostp-open-new-troves-data-public> accessed on 11 February 2010.

²³ See <http://www.whitehouse.gov/Open/Around> (launched 6 February 2010) accessed on 11 February 2010. See also the Open Government Milestones which sets out a full timeline of Directive milestones and deadlines at <http://www.whitehouse.gov/open/about/milestones> accessed on 11 February 2010.

²⁴ See <http://www.copyright.gov/title17/92chap1.html#105> accessed 17 September 2009.

²⁵ For discussion of the operation of copyright and copyright management in relation to US government materials, see *CENDI, Frequently Asked Questions About Copyright – Issues Affecting the US Government*, Commerce, Energy, NASA, Defense Information Managers Group (CENDI), CENDI/2004-8, updated August 2007, available at <http://www.cendi.gov/publications/04-8copyright.html>.

²⁶ The *Standard Reference Data Act* provided an exception to section 105, Pub. L. No. 90-396, 82 Stat. 339. Section 6 of that Act amended title 15 of the United States Code by authorizing the Secretary of Commerce, at 15 U.S.C. 290e, to secure copyright and renewal thereof on behalf of the United States as author or proprietor “in all or any part of any standard reference data which he prepares or makes available under this chapter,” and to “authorize the reproduction



Section 105 applies only to federal government works. It has no application in relation to the works of state and local governments which can, and often do, claim copyright in their publications. The absence of copyright protection for US federal Government works under s 105 of the *Copyright Act* does not create a requirement for all US Government works to be made publicly available without restriction. Rather, access to and re-use of US Government information is governed by federal legislation and policies.

Although the absence of copyright protection for US federal Government materials is widely regarded as an important factor in enabling access to and re-use of federal Government information, the s 105 exclusion is not universally supported. In an LLM thesis submitted at George Washington University in August 2002, *Works of the United States Government: Time to Consider Copyright Protection*,²⁷ Bradley W. Mitchell examines the development of the s 105 exclusion and compares the position of the US federal government with that of US state governments and governments in other countries. Mitchell argues that copyright protection should be afforded to US federal Government works, thereby bringing federal policy into line with the practice of many US states and other countries, and proposes (in chapter 6) how this change could be achieved.

“Office of Management and Budget’s Circular A-130 on Management of Federal Information Resources”, (OMB Circular A-130) (2000)

OMB Circular A-130,²⁸ which establishes the data access and reuse policy for executive branch departments and agencies of the US Federal Government, was initially issued on 28 November 2000 and is reviewable every three years. It sets out the conceptual basis of US Federal Government’s data access and reuse policy as follows:

7. Basic Considerations and Assumptions:

- a. The Federal Government is the largest single producer, collector, consumer, and disseminator of information in the United States. Because of the extent of the government's information activities, and the dependence of those activities upon public cooperation, the management of Federal information resources is an issue of continuing importance to all Federal agencies, State and local governments, and the public.
- b. Government information is a valuable national resource. It provides the public with knowledge of the government, society, and economy -- past, present, and future. It is a means to ensure the accountability of government, to manage the government's operations, to maintain the healthy performance of the economy, and is itself a commodity in the marketplace.
- c. The free flow of information between the government and the public is essential to a democratic society. It is also essential that the government minimize the Federal paperwork burden on the public, minimize the cost of its information activities, and maximize the usefulness of government information.
- d. In order to minimize the cost and maximize the usefulness of government information, the expected public and private benefits derived from government information should exceed the public and private costs of

and publication thereof by others.” See also section 105(f) of the Transitional and Supplementary Provisions of the Copyright Act of 1976, in Appendix A. Pub. L. No. 94-553, 90 Stat. 2541.

²⁷ Available at the Defense Technical Information Center website at <http://stinet.dtic.mil/oai/oai?verb=getRecord&metadataPrefix=html&identifier=ADA406618>.

²⁸ Available at <http://www.whitehouse.gov/omb/circulars/a130/a130trans4.pdf> and <http://www.whitehouse.gov/omb/circulars/a130/a130trans4.html>. For background generally, see Wikipedia at http://en.wikipedia.org/wiki/OMB_Circular_A-130.



the information, recognizing that the benefits to be derived from government information may not always be quantifiable.

- e. The nation can benefit from government information disseminated both by Federal agencies and by diverse nonfederal parties, including State and local government agencies, educational and other not-for-profit institutions, and for-profit organizations.
- f. Because the public disclosure of government information is essential to the operation of a democracy, the management of Federal information resources should protect the public's right of access to government information.
- g. The individual's right to privacy must be protected in Federal Government information activities involving personal information.
- h. Systematic attention to the management of government records is an essential component of sound public resources management which ensures public accountability. Together with records preservation, it protects the government's historical record and guards the legal and financial rights of the government and the public.
- i. Strategic planning improves the operation of government programs. The agency strategic plan will shape the redesign of work processes and guide the development and maintenance of an Enterprise Architecture and a capital planning and investment control process. This management approach promotes the appropriate application of Federal information resources.
- j. Because State and local governments are important producers of government information for many areas such as health, social welfare, labor, transportation, and education, the Federal Government must cooperate with these governments in the management of information resources.
- k. The open and efficient exchange of scientific and technical government information, subject to applicable national security controls and the proprietary rights of others, fosters excellence in scientific research and effective use of Federal research and development funds.
- l. Information technology is not an end in itself. It is one set of resources that can improve the effectiveness and efficiency of Federal program delivery.
- m. Federal Government information resources management policies and activities can affect, and be affected by, the information policies and activities of other nations.
- n. Users of Federal information resources must have skills, knowledge, and training to manage information resources, enabling the Federal government to effectively serve the public through automated means.
- o. The application of up-to-date information technology presents opportunities to promote fundamental changes in agency structures, work processes, and ways of interacting with the public that improve the effectiveness and efficiency of Federal agencies.
- p. The availability of government information in diverse media, including electronic formats, permits agencies and the public greater flexibility in using the information.
- q. Federal managers with program delivery responsibilities should recognize the importance of information resources management to mission performance.
- r. The Chief Information Officers Council and the Information Technology Resources Board will help in the development and operation of interagency and interoperable shared information resources to support the performance of government missions.²⁹

OMB Circular A-130 consolidates provisions found in about 20 federal statutes and orders, including:

²⁹ Ibid, paragraph 7.



- the *Paperwork Reduction Act* (PRA) 1980, as amended by the *Paperwork Reduction Act 1995* (44 U.S.C. Chapter 35);
- the *Computer Security Act* 1987 (Pub. L. 100-235);
- the *Federal Information Security Management Act* 2002 (FISMA);
- the *Clinger-Cohen Act* (Pub. L. 104-106, Division E) (also known as the Information Technology Management Reform Act of 1996);
- the *Privacy Act* 1974, as amended (5 U.S.C. 552a);
- the *Chief Financial Officers Act* 1990 (31 U.S.C. 3512 et seq.);
- the *Federal Property and Administrative Services Act* 1949, as amended (40 U.S.C. 487);
- the *Budget and Accounting Act*, as amended (31 U.S.C. Chapter 11);
- the *Government Performance and Results Act* 1993;
- the *Office of Federal Procurement Policy Act* (41 U.S.C. Chapter 7);
- the *Government Paperwork Elimination Act* 1998 (Pub. L. 105-277, Title XVII);
- Executive Order 12046 of March 27, 1978;
- Executive Order 12472 of April 3, 1984;
- Executive Order 13011 of July 17, 1996.

Appendix IV to OMB Circular A-130 – Analysis of key sections, observes:

The information policies contained in the [Paperwork Reduction Act] PRA and Circular A-130 are based on the premise that government information is a valuable national resource, and that the economic benefits to society are maximized when government information is available in a timely and equitable manner to all. Maximizing the benefits of government information to society depends, in turn, on fostering diversity among the entities involved in disseminating it. These include for-profit and not-for-profit entities, such as information vendors and libraries, as well as State, local and tribal governments. The policies on charging the cost of dissemination and against restrictive practices contained in the PRA and Circular A-130 are aimed at achieving this goal.

Other nations do not necessarily share these values. Although an increasing number are embracing the concept of equitable and unrestricted access to public information -- particularly scientific, environmental, and geographic information of great public benefit -- other nations are treating their information as a commodity to be "commercialized". Whereas the Copyright Act, 17 U.S.C. 105, has long provided that "[c]opyright protection under this title is not available for any work of the United States Government," some other nations take advantage of their domestic copyright laws that do permit government copyright and assert a monopoly on certain categories of information in order to maximize revenues. Such arrangements tend to preclude other entities from developing markets for the information or otherwise disseminating the information in the public interest.³⁰

Thus, Federal agencies involved in international data exchanges are sometimes faced with problems in disseminating data stemming from differing national treatment of government copyright. For example, one country may attempt to condition the sharing of data with a Federal agency on an agreement that the agency will withhold release of the information or otherwise restrict its availability to the public. Since the Freedom of Information Act does not provide a categorical exemption for copyrighted information, and Federal agencies have neither the authority nor capability to enforce restrictions on behalf of other nations, agencies faced with such restrictive conditions lack clear guidance as to how to respond.

.....
Accordingly, since the PRA and Circular A-130 are silent as to how agencies should respond to similar situations, we are providing the following suggestions. They are intended to foster globally the open and unrestricted information policy embraced by the United States and like minded nations, while permitting agencies to have access to data provided by foreign governments with restrictive conditions.

³⁰ This extract from OMB Circular A-130 is reproduced in the Office of Spatial Data Management's *A Proposal for a Commonwealth Policy on Spatial Data Access and Pricing* (OSDM Policy), 2001, Attachment E, p 155.



Release by a Federal agency of copyrighted information, whether under a FOIA request or otherwise, does not affect any rights the copyright holder might otherwise possess. Accordingly, agencies should inform any concerned foreign governments that their copyright claims may be enforceable under United States law, but that the agency is not authorized to prosecute any such claim on behalf of the foreign government.

Whenever an agency seeks to negotiate an international agreement in which a foreign party seeks to impose restrictive practices on information to be exchanged, the agency should first coordinate with the State Department. The State Department will work with the agency to develop the least restrictive terms consistent with United States policy, and ensure that those terms receive full interagency clearance through the established process for granting agencies authority to negotiate and conclude international agreements.

Finally, whenever an agency is attending meetings of international or multilateral organizations where restrictive practices are being proposed as binding on member states, the agency should coordinate with the State Department, the Office of Management and Budget, the Office of Science and Technology Policy, or the U.S. Trade Representative, as appropriate, before expressing a position on behalf of the United States.³¹

OMB Circular A-130 applies to the information activities of all agencies of the executive branch of the US federal government (clause 4(a)), subject to the proviso that information classified for national security purpose should also be handled in accordance with the appropriate national security directives and national security emergency preparedness activities are to be conducted in accordance with Executive Order 12472 (clause 4(b)). “Government information” is defined to mean “information created, collected, processed, disseminated, or disposed of by or for the Federal Government” (clause 6(h)); “information” is defined as meaning “any communication or representation of knowledge such as facts, data or opinions in any medium or form, including textual, numerical, graphic, cartographic, narrative, or audiovisual form”.

As well as acknowledging that government information is a valuable public resource and that the nation stands to benefit from the dissemination of government information, the Circular requires improperly restrictive practices to be avoided.

The Policy is set out in detail in clause 8, which addresses (in paragraph 5(1)) how agencies are to provide information to the public:

Agencies have a responsibility to provide information to the public consistent with their missions. Agencies will discharge this responsibility by:

- (a) Providing information, as required by law, describing agency organization, activities, programs, meetings, systems of records, and other information holdings, and how the public may gain access to agency information resources;
- (b) Providing access to agency records under provisions of the Freedom of Information Act and the Privacy Act, subject to the protections and limitations provided for in these Acts;
- (c) Providing such other information as is necessary or appropriate for the proper performance of agency functions; and in determining whether and how to disseminate information to the public, agencies will:
 - (i) Disseminate information in a manner that achieves the best balance between the goals of maximizing the usefulness of the information and minimizing the cost to the government and the public;
 - (ii) Disseminate information dissemination products on equitable and timely terms;
 - (iii) Take advantage of all dissemination channels, Federal and nonfederal, including State and local governments, libraries and private sector entities, in discharging agency information dissemination responsibilities;
 - (iv) Help the public locate government information maintained by or for the agency.

³¹ See http://www.whitehouse.gov/omb/circulars/a130/a130appendix_iv.html.



The steps that agencies must take to avoid improperly restrictive practices are described in paragraph 7 of clause 8, as follows:

Agencies will:

- (a) Avoid establishing, or permitting others to establish on their behalf, exclusive, restricted, or other distribution arrangements that interfere with the availability of information dissemination products on a timely and equitable basis;
- (b) Avoid establishing restrictions or regulations, including the charging of fees or royalties, on the reuse, resale, or redissemination of Federal information dissemination products by the public; and,
- (c) **Set user charges for information dissemination products at a level sufficient to recover the cost of dissemination but no higher. They must exclude from calculation of the charges costs associated with original collection and processing of the information.** Exceptions to this policy are:
 - (i) Where statutory requirements are at variance with the policy;
 - (ii) Where the agency collects, processes, and disseminates the information for the benefit of a specific identifiable group beyond the benefit to the general public;
 - (iii) Where the agency plans to establish user charges at less than cost of dissemination because of a determination that higher charges would constitute a significant barrier to properly performing the agency's functions, including reaching members of the public whom the agency has a responsibility to inform; or
 - (iv) Where the Director of OMB determines an exception is warranted.

“Public Sector Information: A Key Resource for Europe”, European Commission Green Paper on Public Sector Information in the Information Society (1999)

The *Green Paper on Public Sector Information in the Information Society*³² produced by the European Commission’s Directorate General (DG) XIII/E-1 in 1998 (and adopted in January 1999) provided an overview of the legal position in the United States at that time:

The United States have a long experience of active public sector information policy. In 1966 the Freedom of Information Act (FOIA) was enacted. The FOIA was amended in 1996 by the Electronic Freedom of Information Act (EFOIA) which guarantees public access to federal government information electronically.

Government Information Locator Services (GILS) have been set up with a view to ensuring access to federal information by identifying resources relevant to users, describing the information available and assisting in assuring access (see <http://www.gils.net/>).

Through a number of acts additional to the FOIA (like the Paperwork Reduction Act and the Government in the Sunshine Act and detailed policy documents such as the Office of Management and Budget circular A130) – the US has strongly encouraged the private sector to exploit public sector information commercially.

³² European Commission, Directorate General (DG) XIII/E-1, *Green Paper on Public Sector Information in the Information Society*, COM 1998(585), final 20 January 1999 at <http://cordis.europa.eu/econtent/publicsector/gp-index.html>, <http://aei.pitt.edu/1168/> and ftp://ftp.cordis.europa.eu/pub/econtent/docs/gp_en.pdf accessed 25 August 2008.



The 1986 Uniform Freedom of Information Act Fee Schedule and Guidelines issued by the Office of Management and Budget (OMB) deals amongst others with pricing issues. It contains provisions essentially charging for search, duplication and (possibly) review costs but not for the value added by the public sector to the raw data. The US pricing philosophy is that the public sector should see the adding of value only as a tool for its own efficiency purposes, and not as an incentive for profit making. On the other hand, if the private sector is to make a commercially viable product or service, it should be able to add value beyond that added by the public sector and sell it at a profit making price. There is no copyright on government information at federal level.

In the US, the most important reference to competition related issues is made in the 4.1.1995 Paperwork reduction Act, Section 3506, dealing with federal agency responsibilities. It stipulates that:

"each agency shall ensure that the public has timely and equitable access to the agency's public information..."

but also indicates that it should not, except where specifically authorised by statute:

- A. "establish an exclusive, restricted, or other distribution arrangement that interferes with timely and equitable availability of public information to the public;
- B. restrict or regulate the use, resale, or re dissemination of public information by the public;
- C. charge fees or royalties for resale or re-dissemination of public information; or
- D. establish user fees for public information that exceed the cost of dissemination".³³

"Borders in Cyberspace: Conflicting Public Sector Information Policies and their Economic Impacts" Peter Weiss (2002)

In an influential article entitled *Borders in Cyberspace: Conflicting Public Sector Information Policies and their Economic Impacts*³⁴ published in 2002, the (late) Peter N. Weiss, of the U.S. National Weather Service, considered economic research which supported the advantages of facilitating access to and reuse of PSI. The report examines the fundamental differences in the access and use policies, and related funding models, adopted for public sector information in the US and Europe. The access policy adopted in the US is referred to as open access whilst the policy in place in Europe is called cost recovery.

In his recent work "The Public Domain: Enclosing the Commons of the Mind",³⁵ James Boyle also addresses these two fundamentally different schools of thought on access to public sector information. Boyle assesses the analysis by Peter Weiss in "Borders in Cyberspace" in the following glowing terms:

I have been studying the issue [of access and use policy] for fifteen years, and if I had to suggest a single article it would be the magisterial study by Peter Weiss called "Borders in Cyberspace," published by the National Academies of Science. Weiss shows that the U.S. approach generates far more social wealth [than the so-called cost recovery European approach].³⁶

In the course of his analysis of the two fundamentally different schools of thought on access, Weiss refers to research work undertaken by the US National Academy of Sciences which examined the practices of commercialized government agencies in Europe, and US experiences with privatization

³³ Annex 3 at <http://cordis.europa.eu/econtent/publicsector/gp-annex.html#a3> accessed 25 August 2008.

³⁴ Peter Weiss, *Borders in Cyberspace: Conflicting Public Sector Information Policies and their Economic Impacts* (February 2002) available at http://www.weather.gov/sp/Borders_report.pdf accessed 5 June 2009.

³⁵ James Boyle, *The Public Domain: Enclosing the Commons of the Mind*, Yale University Press, New Haven & London (2008) <http://thepublicdomain.org/thepublicdomain1.pdf>.

³⁶ *Ibid*, p 221.



of environmental data. The study identified the restrictive access impact of these practices and concluded:

[c]ountries that exercise intellectual property rights over government data...limit the extent to which government-collected data can be used, even in international collaborations. By making it more difficult to integrate global data sets and share knowledge, such a commercialization policy will fail to achieve the maximum benefits provided by international collaboration in the scientific endeavor.³⁷

The case studies examined by Weiss in “Borders in Cyberspace” include failed cost recovery initiatives in the United States and limitations on cost recovery in Europe (citing examples in the (UK) Ordnance Survey, (UK) Met Office, Deutscher Wetterdienst, European Centre for Medium Range Weather Forecasting and Meteo France) as well as recent developments in Finland, UK, Germany and The Netherlands. On the basis of this analysis the author expresses the view that:

recognition is slowly emerging in Europe that open access to government information is critical to the information society, the scientific endeavour, and economic growth. However, recent trends towards more "liberal" policies face opposition. This comes from treasuries as well as from entrepreneurial civil servants in charge of "government commercialization" initiatives, who are sometimes tempted to engage in anti-competitive practices. Therefore, these issues require consideration at the highest policy making levels of government.

Recognizing the scale of the opportunity presented, and the speed of enabling technological change, the US and the EU should commit to move forward together to take the practical steps necessary to establish internationally harmonized open and unrestricted data policies for all public sector information.³⁸

In drawing his above conclusions on access, and the impact of various funding models, Weiss observes that:

The consensus of recent research is that charging marginal cost of dissemination for public sector information will lead to optimal economic growth in society and will far outweigh the immediate perceived benefits of aggressive cost recovery. Open government information policies foster significant, but not easily quantifiable, economic benefits to society. Over the long term, the cost recovery goal of European governments' commercialisation approach cannot succeed...³⁹

.....
The most sensible solution [in Europe] is to separate commercial activities into truly commercial entities separate from the government and adopt open access policies. Separation of commercial activities would be the basis not only for an open market in accordance with European competition law, but also guarantee market structures with maximum overall economic potential.⁴⁰

In the course of examining a core issue relevant to government information policy⁴¹ - the appropriate role of government in the context of competition between government and the private sector - Weiss cites with approval the US National Academy's work on the privatisation of environmental data.⁴² Weiss observes:

³⁷ Committee on Geophysical and Environmental Data, Board on Earth Sciences and Resources, Division on Earth and Life Studies, National Research Council, *Resolving conflicts arising from the privatisation of environmental data*, Washington, DC, National Academy Press, 2001, p 6.

³⁸ Peter Weiss, *Borders in Cyberspace: Conflicting Public Sector Information Policies and their Economic Impacts* (February 2002) p 18, available at http://www.weather.gov/sp/Borders_report.pdf accessed 5 June 2009.

³⁹ Ibid, p 17.

⁴⁰ Ibid, p 18.

⁴¹ Ibid, p 9.

⁴² Committee on Geophysical and Environmental Data, Board on Earth Sciences and Resources, Division on Earth and Life Studies, National Research Council, *Resolving conflicts arising from the privatisation of environmental data*, Washington, DC, National Academy Press, 2001.

The larger public policy issue behind public sector information policies is whether or not commercial government activities that compete with the private sector are proper for a government agency funded primarily by the taxpayers. In 1995, European national meteorological services prevailed in the World Meteorological Organization on the issue of replacing the organization's previous policy of full and open exchange of meteorological information with a procedure (WMO Resolution 40, CgXII), which sanctions charging and use restrictions on broad categories of data. In the words of the National Academy's "Privatization" study...

"The change of policy was aimed at preventing private sector entities from competing with national meteorological services in Europe, which recoup costs through sales of data and services... WMO Resolution 40 substantially decreased the amount of data member nations made freely available."⁴³

Weiss comments on the adverse operational impact of WMO Resolution 40 on researchers at the India Institute of Technology.⁴⁴ When charges are applied to meteorological data:

basic research on monsoon prediction at the India Institute of Technology is hampered by the unaffordable prices for historic atmospheric model data from the European Centre for Medium-Range Weather Forecasting. As a result, the researchers are not able to integrate the European data with freely available US data.⁴⁵

The potentially tragic real life consequences of the European commercialisation policy involving the failure to implement an open access policy as applied in this Asian example cited by Weiss are graphically described by James Boyle in his work the "Public Domain" in the following terms:

Every year the monsoon season kills hundreds and causes massive property damage in Southeast Asia. One set of monsoon rains alone killed 660 people in India and left 4.5 million homeless. Researchers seeking to predict the monsoon sought complete weather records from the United States and Europe so as to generate a model based on global weather patterns. The U.S. data was easily and cheaply available at the cost of reproduction. The researchers could not afford to pay the price asked by the European weather services, precluding the "ensemble" analysis they sought to do. Weiss asks rhetorically, "What is the economic and social harm to over 1 billion people from hampered research?" In the wake of the outpouring of sympathy for tsunami victims in the same region, this example seems somehow even more tragic. Will the pattern be repeated with seismicographic, cartographic, and satellite data? One hopes not.⁴⁶

On the basis of the operational outcomes of the European access policy as illustrated in this Asian case study,⁴⁷ the Academy recommended:

- Environmental information created by government agencies to serve a public purpose should be accessible to all. To facilitate further distribution, it should be made available at no more than the marginal cost of reproduction, and should be usable without restriction for all purposes.
- The practice of public funding for data collection and synthesis should continue, thereby focusing contributions of the private sector primarily on value-added distribution and specific observational systems.⁴⁸

⁴³ Ibid. At page 9 of his work Weiss refers to three recent examples from Switzerland, Germany and Finland as validating the Academy's view.

⁴⁴ At p 6.

⁴⁵ Goswami, et al "Association between quasi-biweekly oscillations and summer monsoon variabilities," Indian Meteorological Society (March 2001).

⁴⁶ James Boyle, *The Public Domain: Enclosing the Commons of the Mind*, Yale University Press, New Haven & London (2008) <http://thepublicdomain.org/thepublicdomain1.pdf>.

⁴⁷ This example is referred to by Peter Weiss, *Borders in Cyberspace: Conflicting Public Sector Information Policies and their Economic Impacts* (February 2002) p 5, available at http://www.weather.gov/sp/Borders_report.pdf

⁴⁸ Committee on Geophysical and Environmental Data, Board on Earth Sciences and Resources, Division on Earth and Life Studies, National Research Council, *Resolving conflicts arising from the privatisation of environmental data*, Washington, DC, National Academy Press, 2001.



“Connecting and Empowering All Americans through Technology and Innovation”, President Barack Obama (2008)

During the 2008 Presidential election campaign, (then) Senator Barack Obama issued a Technology and Innovation policy which stated:

Barack Obama understands the immense transformative power of technology and innovation and how they can improve the lives of all Americans. He sees that technology offers the tools to create real change in America. Obama’s forward-thinking 21st century technology and innovation policy starts by recognizing that we need to connect all citizens with each other to engage them more fully and directly in solving the problems that face us. In tandem with that goal, Barack Obama understands that we must use all available technologies and methods to open up the federal government, creating a new level of transparency to change the way business is conducted in Washington and giving Americans the chance to participate in government deliberations and decisionmaking in ways that were not possible only a few years ago. To achieve this vision, Barack Obama will encourage the deployment of the most modern communications infrastructure. In turn, that infrastructure can be used by government and business to reduce the costs of health care, help solve our energy crisis, create new jobs, and fuel our economic growth. And an Obama administration will ensure America remains competitive in the global economy.

.....

II. Create a Transparent and Connected Democracy

Open Up Government to its Citizens: The Bush Administration has been one of the most secretive, closed administrations in American history. Our nation’s progress has been stifled by a system corrupted by millions of lobbying dollars contributed to political campaigns, the revolving door between government and industry, and privileged access to inside information—all of which have led to policies that favor the few against the public interest. An Obama presidency will use cutting-edge technologies to reverse this dynamic, creating a new level of transparency, accountability and participation for America’s citizens. Technology-enabled citizen participation has already produced ideas driving Obama’s campaign and its vision for how technology can help connect government to its citizens and engage citizens in a democracy. Barack Obama will use the most current technological tools available to make government less beholden to special interest groups and lobbyists and

promote citizen participation in government decision-making. Obama will integrate citizens into the actual business of government by:

- Making government data available online in universally accessible formats to allow citizens to make use of that data to comment, derive value, and take action in their own communities. Greater access to environmental data, for example, will help citizens learn about pollution in their communities, provide information about local conditions back to government and empower people to protect themselves.
- Establishing pilot programs to open up government decision-making and involve the public in the work of agencies, not simply by soliciting opinions, but by tapping into the vast and distributed expertise of the American citizenry to help government make more informed decisions.
-
- Restoring the basic principle that government decisions should be based on the best-available, scientifically-valid evidence and not on the ideological predispositions of agency officials.
-
- Employing technologies, including blogs, wikis and social networking tools, to modernize internal, cross-agency, and public communication and information sharing to improve government decision-making.
- **Bring Government into the 21st Century:** Barack Obama will use technology to reform government and improve the exchange of information between the federal government and citizens while ensuring the security of our networks. Obama believes in the American people and in their intelligence, expertise, and ability and willingness to give and to give back to make government work better.

- Obama will appoint the nation's first Chief Technology Officer (CTO) to ensure that our government and all its agencies have the right infrastructure, policies and services for the 21st century. The CTO will ensure the safety of our networks and will lead an interagency effort, working with chief technology and chief information officers of each of the federal agencies, to ensure that they use best-in-class technologies and share best practices.
- The CTO will have a specific focus on transparency, by ensuring that each arm of the federal government makes its records open and accessible as the E-Government Act requires. The CTO will also focus on using new technologies to solicit and receive information back from citizens to improve the functioning of democratic government.⁴⁹

The platform statement issued by President Barack Obama and Vice President Joe Biden following the November 2008 election⁵⁰ states the intention of the Obama presidency to use information technology and the internet to facilitate participation and improve the exchange of information between government and citizens:

Create a Transparent and Connected Democracy

- **Open Up Government to its Citizens:** The Bush Administration has been one of the most secretive, closed administrations in American history. Our nation's progress has been stifled by a system corrupted by millions of lobbying dollars contributed to political campaigns, the revolving door between government and industry, and privileged access to inside information—all of which have led to policies that favor the few against the public interest. An Obama presidency will use cutting-edge technologies to reverse this dynamic, creating a new level of transparency, accountability and participation for America's citizens.
- **Bring Government into the 21st Century:** Barack Obama and Joe Biden will use technology to reform government and improve the exchange of information between the federal government and citizens while ensuring the security of our networks. Obama and Biden believe in the American people and in their intelligence, expertise, and ability and willingness to give and to give back to make government work better. Obama will appoint the nation's first Chief Technology Officer (CTO) to ensure that our government and all its agencies have the right infrastructure, policies and services for the 21st century. The CTO will ensure the safety of our networks and will lead an interagency effort, working with chief technology and chief information officers of each of the federal agencies, to ensure that they use best-in-class technologies and share best practices.⁵¹

“Presidential Memo for Transparency and Open Government”, President Obama (2009)

President Obama issued a Presidential Memo on *Transparency and Open Government*, on the first day of his incumbency (21 January 2009). The memorandum was directed to three senior government officers, calling on them to develop (within 120 days) recommendations for an Open Government Directive with the objective of making the government more transparent, participatory, and collaborative.⁵² The Directive is to be issued by the Director of the Office of Management and

⁴⁹ See http://www.barackobama.com/pdf/issues/technology/Fact_Sheet_Innovation_and_Technology.pdf.

⁵⁰ Note that on 15 August 2008 (before the 2008 Presidential election in November 2008) the Democratic National Committee released the party's platform which stated: “We will lift the veil of secret deals in Washington by publishing searchable, online information about federal grants, contracts, earmarks, loans, and lobbyist contacts with government officials. We will make government data available online and will have an online video archive of significant agency meetings.”

⁵¹ See http://www.barackobama.com/issues/technology/index_campaign.php#transparent-democracy accessed 17 September 2009.

⁵² See http://www.whitehouse.gov/the_press_office/TransparencyandOpenGovernment/.



Budget (OMB) instructing departments and agencies to take specific action to implement the open principles identified in the Presidential memorandum.⁵³

The memorandum states:

January 21, 2009

MEMORANDUM FOR THE HEADS OF EXECUTIVE DEPARTMENTS AND AGENCIES
SUBJECT: Transparency and Open Government

My Administration is committed to creating an unprecedented level of openness in Government. We will work together to ensure the public trust and establish a system of transparency, public participation, and collaboration. Openness will strengthen our democracy and promote efficiency and effectiveness in Government.

Government should be transparent. Transparency promotes accountability and provides information for citizens about what their Government is doing. Information maintained by the Federal Government is a national asset. My Administration will take appropriate action, consistent with law and policy, to disclose information rapidly in forms that the public can readily find and use. Executive departments and agencies should harness new technologies to put information about their operations and decisions online and readily available to the public. Executive departments and agencies should also solicit public feedback to identify information of greatest use to the public.

Government should be participatory. Public engagement enhances the Government's effectiveness and improves the quality of its decisions. Knowledge is widely dispersed in society, and public officials benefit from having access to that dispersed knowledge. Executive departments and agencies should offer Americans increased opportunities to participate in policymaking and to provide their Government with the benefits of their collective expertise and information. Executive departments and agencies should also solicit public input on how we can increase and improve opportunities for public participation in Government.

Government should be collaborative. Collaboration actively engages Americans in the work of their Government. Executive departments and agencies should use innovative tools, methods, and systems to cooperate among themselves, across all levels of Government, and with nonprofit organizations, businesses, and individuals in the private sector. Executive departments and agencies should solicit public feedback to assess and improve their level of collaboration and to identify new opportunities for cooperation.

I direct the Chief Technology Officer, in coordination with the Director of the Office of Management and Budget (OMB) and the Administrator of General Services, to coordinate the development by appropriate executive departments and agencies, within 120 days, of recommendations for an Open Government Directive, to be issued by the Director of OMB, that instructs executive departments and agencies to take specific actions implementing the principles set forth in this memorandum. The independent agencies should comply with the Open Government Directive.

This memorandum is not intended to, and does not, create any right or benefit, substantive or procedural, enforceable at law or in equity by a party against the United States, its departments, agencies, or entities, its officers, employees, or agents, or any other person.

This memorandum shall be published in the *Federal Register*.⁵⁴

⁵³ See http://blog.ostp.gov/2009/06/22/open-government-directive-phase-iii-drafting/#TB_inline?height=220&width=370&inlineId=tb_external.

⁵⁴ Available at <http://s3.amazonaws.com/propublica/assets/docs/transparencymemo.pdf>.



Environmental Protection Agency transparency initiatives (2009)

On 23 April 2009, in line with President Obama's Memo on *Transparency and Open Government*,⁵⁵ Environment Protection Agency (EPA) Administrator Lisa Jackson released a Memo to all EPA Employees entitled *Transparency in EPA's Operations*.⁵⁶ In her memo, Jackson reaffirms past-Administrator William Ruckelshaus' promise in 1983 that the EPA would operate "in a fishbowl", and outlines several broad principles on how the EPA's workforce could promote full public involvement and openness in all EPA affairs.

The EPA's recent transparency initiatives, among others, include:

- the early release of Toxics Release Inventory (TRI) data for 2008 released 18 August 2009 in a "raw" downloadable format, encouraging data users to study and analyze the data on their own;
- the public release of two sets of atrazine (a pesticide) data, one for ecological monitoring and one for drinking water monitoring; and
- the school air pollution monitoring program from early 2009, which results were made available online as they were collected.⁵⁷

OMB Watch⁵⁸ has applauded the EPA for "leading the way in transparency in the new Obama administration".⁵⁹ OMB Watch also considers that the EPA, which was shrouded in excessive secrecy and affected by politicized science under the Bush administration, is now making up for lost ground and breaking new ground in transparency and regulation.⁶⁰

"A Strategy for American Innovation: Driving Towards Sustainable Growth and Quality Jobs", Executive Office of the President (2009)

In September 2009, the Executive Office of the President released *A Strategy for American Innovation: Driving Towards Sustainable Growth and Quality Jobs*,⁶¹ outlining "critical areas where sensible, balanced government can lay the foundation for innovation that leads to quality jobs and shared prosperity".⁶² The strategy is divided into three parts:

1. Invest in the Building Blocks of American Innovation.
2. Promote Competitive Markets that Spur Productive Entrepreneurship.

⁵⁵ See http://www.whitehouse.gov/the_press_office/TransparencyandOpenGovernment/.

⁵⁶ See <http://blog.epa.gov/administrator/2009/04/24/memo-to-epa-employees-transparency-in-epas-operations/>.

⁵⁷ 'EPA Pushing Data Out to the Public', *OMB Watch*, 15 September 2009, available at <http://www.ombwatch.org/node/10390> accessed on 8 October 2009.

⁵⁸ OMB Watch is a non-profit research and advocacy organization formed in 1983 to increase government transparency and accountability and monitor the White House Office of Management and Budget (OMB): see http://www.ombwatch.org/about_us accessed on 8 October 2009.

⁵⁹ Brian Turnbaugh, 'EPA Keeps the Transparency Coming', *OMB Watch*, 2 October 2009, available at <http://www.ombwatch.org/node/10444> accessed on 8 October 2009.

⁶⁰ Ibid.

⁶¹ U.S. Government, Executive Office of the President, National Economic Council, Office of Science and Technology Policy, *A Strategy for American Innovation: Driving Towards Sustainable Growth and Quality Jobs*, September 2009, available at <http://www.whitehouse.gov/administration/eop/nec/StrategyforAmericanInnovation/> accessed on 24 September 2009.

⁶² Ibid, Executive Summary, p i.



3. Catalyze Breakthroughs for National Priorities.

In regards to the appropriate role of Government in creating a new foundation for innovation and growth, the strategy provides for a broad approach:

A modern, practical approach recognizes both the need for fundamental support and the hazards of overzealous government intervention. **The government should make sure individuals and businesses have the tools and support to take risks and innovate**, but should not dictate what risks they take.

We propose to strike a balance by investing in the building blocks that only the government can provide, setting an open and competitive environment for businesses and individuals to experiment and grow, and by providing extra catalysts to jumpstart innovation in sectors of national importance. In this way, we will harness the inherent ingenuity of the American people and a dynamic private sector to generate innovations that help ensure the next expansion is more solid, broad-based, and beneficial than previous ones.⁶³ [emphasis added]

Under part 2, i.e. Promote Competitive Markets that Spur Productive Entrepreneurship, the strategy refers to Data.gov as a method of encouraging high-growth and innovation-based entrepreneurship:

Stimulate entrepreneurship through increased access to government data. The Administration launched Data.gov, a one-stop shop for free access to data generated across all Federal agencies. By empowering the American people to find, use, and repackage data, Data.gov will give rise to new businesses (like the GPS and genomics industries that grew from increased access to public information) and empower entrepreneurs to evaluate opportunities.⁶⁴

Further, the strategy specifies that “innovation must occur within all levels of society, including the government and civil society”. Departments and agencies are encouraged to take advantage of the expertise and insight of people both inside and outside governments:

Make the government more transparent, participatory, and collaborative. On his first day in office, the President signed the Memorandum on Transparency and Open Government, thereby placing government accountability and civic engagement at the forefront of the Administration’s governing philosophy. The President’s Memorandum urged agencies to promote three principles for bringing innovation to government: transparency, participation, and collaboration. Transparency promotes accountability by providing citizens with information about what their Government is doing. Public participation in decision-making strengthens democracy and ensures that Government makes policies with the benefit of information that is widely dispersed in society. Collaboration improves the effectiveness of Government by encouraging cooperation and knowledge-sharing within the Federal Government, across levels of Government and between the Government and private institutions.

Promote Open Government. The Administration created the White House Open Government Initiative to coordinate Open Government policy, projects, and design technology platforms that foster openness across the Executive branch. The Initiative has achieved many important milestones, including:

- Publishing government data online to make it easy for anyone to remix and reuse, thus involving the American people in the development of public policy,
- Challenging thousands of Federal employees to propose ideas for slashing the time required to process veterans’ disability benefits,
- Releasing information on Executive branch personnel and salaries, and
- Launching the IT dashboard, a one-stop clearinghouse of information that allows anyone with a web browser to track government spending on technology and hold the government accountable.

⁶³ Ibid, p 7.

⁶⁴ Ibid, p 17.



“Hack, Mash & Peer: Crowdsourcing Government Transparency”, Jerry Brito (2007)

In the article *Hack, Mash & Peer: Crowdsourcing Government Transparency*,⁶⁵ published on SSRN in October 2007, Jerry Brito of the Mercatus Centre at George Mason University, Virginia, makes suggestions as to how government information can be published online so that it is most useful to citizens.

The author notes that the federal government make an overwhelming amount of data available each year. Laws ranging from the Administrative Procedure Act to the Paperwork Reduction Act require these disclosures in the name of transparency and accountability. However the data are often only nominally publicly available due to a variety of reasons including not being available in digital format, online, or in open standard or readily searchable formats.

The conclusion reached by the author, including recommendations, is that:

In order to hold government accountable for its actions, citizens must know what those actions are. To that end, they must insist that government act openly and transparently to the greatest extent possible. In the Twenty-First Century, this entails making its data available online and easy to access. If government data is made available online in useful and flexible formats, citizens will be able to utilize modern Internet tools to shed light on government activities. Such tools include mashups, which highlight hidden connections between different data sets, and crowdsourcing, which makes light work of sifting through mountains of data by focusing thousands of eyes on a particular set of data.

Today, however, the state of government's online offerings is very sad indeed. ... Government should be encouraged to release public information online in a structured, open, and searchable manner. To the extent that government does not modernize, however, we should hope that private third parties build unofficial databases and make these available in a useful form to the public.⁶⁶

“President Obama Names Vivek Kundra Chief Information Officer”, The White House (2009)

On 5 March 2009, President Barack Obama named Vivek Kundra the Federal Chief Information Officer (CIO) at the White House.⁶⁷ Vivek Kundra formerly served in Mayor Fenty's cabinet as the Chief Technology Officer (CTO) for the District of Columbia, responsible for technology operations and strategy for 86 agencies. He has been recognized among the top 25 CTO's in the country and as the 2008 IT Executive of the Year for his pioneering work to drive transparency, engage citizens and lower the cost of government operations. Kundra is also recognized for his leadership in public safety communications, cyber security and IT portfolio management.⁶⁸

According to President Obama:⁶⁹

⁶⁵ Jerry Brito, *Hack, Mash & Peer: Crowdsourcing Government Transparency*, Working paper 21 October 2007, available at <http://www.scribd.com/doc/3116299/Hack-Mash-Peer-Crowdsourcing-Government-Transparency-by-Jerry-Brito>. Extract available on SSRN at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1023485&rec=1&srcabs=1138083.

⁶⁶ Ibid, p 41.

⁶⁷ *President Obama Names Vivek Kundra Chief Information Officer*, The White House – Press Office, 5 March 2009, available at http://www.whitehouse.gov/the_press_office/President-Obama-Names-Vivek-Kundra-Chief-Information-Officer/ accessed on 13 August 2009.

⁶⁸ Ibid.

⁶⁹ Ibid.



Vivek Kundra will bring a depth of experience in the technology arena and a commitment to lowering the cost of government operations to this position. I have directed him to work to ensure that we are using the spirit of American innovation and the power of technology to improve performance and lower the cost of government operations. As Chief Information Officer, he will play a key role in making sure our government is running in the most secure, open, and efficient way possible.

“President Obama Names Chief Technology Officer”, The White House (2009)

On 18 April 2009, President Barack Obama announced that Aneesh Chopra, Virginia’s Secretary of Technology would serve as the Chief Technology Officer.⁷⁰ As Virginia’s Secretary of Technology, he leads the Commonwealth’s strategy to effectively leverage technology in government reform, to promote Virginia’s innovation agenda, and to foster technology-related economic development. In his role as Chief Technology Officer, Chopra will promote technological innovation to help the country meet its goals from job creation, to reducing health care costs, to protecting the homeland. Chopra, together with Chief Information Officer Vivek Kundra, will share the responsibility of “[giving] all Americans a government that is effective, efficient, and transparent”.⁷¹

The Office of the Chief Technology Officer (OCTO), District of Columbia government

The practices of the Office of the Chief Technology Officer (OCTO), District of Columbia government,⁷² which is the central information technology (IT) and telecommunications agency in the District of Columbia government demonstrate what was envisaged by the Presidential Memo for Transparency and Open Government issued on 21 January 2009 by President Obama.⁷³ Vivek Kundra who previously held the position of CTO for the District of Columbia was appointed by President Obama to the position of US CIO in early 2009. It is therefore perhaps not surprising that the system of ‘transparency, public participation, and collaboration’ envisaged in the Presidential Memo reflected in large part the structure and content of the OCTO website.⁷⁴

On the OCTO’s Data Catalog web portal,⁷⁵ citizens are provided with access to 275 datasets from multiple agencies in the District of Columbia. Citizens can view data on Google maps or they can obtain copies of data files by subscribing to a live data feed in Atom format or by directly downloading data files in XML, Text/CSV, KML or ESRI Shapefile formats.

The wording of the website reflects the sentiments expressed in the Presidential memo that “openness will strengthen our democracy and promote efficiency and effectiveness in Government”. The conditions of use applying to government data downloaded through the OCTO

⁷⁰ *Weekly Address: President Obama Discusses Efforts to Reform Spending, Government Waste; Names Chief Performance Officer and Chief Technology Officer*, The White House – Press Office, 18 April 2009, available at http://www.whitehouse.gov/the_press_office/Weekly-Address-President-Obama-Discusses-Efforts-to-Reform-Spending/ accessed on 13 August 2009.

⁷¹ Ibid.

⁷² See <http://data.octo.dc.gov/>.

⁷³ See http://octo.dc.gov/octo/cwp/view,a,3,q,579519,octoNav_GID,1641,octoNav,%7C32786%7C,.asp.

⁷⁴ Ibid.

⁷⁵ See http://data.octo.dc.gov/Main_DataCatalog.aspx?id=2.



website are the Terms of Use set out on the site, read together with the Terms and Conditions set out on the DC portal, DC.gov.⁷⁶

The Terms of Use for data provided through the OCTO Data Catalog are as follows:

By using data made available through this site the user agrees to all the conditions stated in the following paragraphs as well as the terms and conditions described under the District portal, DC.Gov.

A) RSS Feeds

RSS (Really Simple Syndication) service is a means by which the District of Columbia offers feeds of the District government agencies' data in XML format ("RSS Content") to visitors of DC.Gov. These Terms of Use govern any use of the RSS service and may be changed at any time, without notice by the District of Columbia.

Any intermediate page, splash page or other content between the RSS link and the applicable DC.Gov web page is prohibited.

Neither the District of Columbia Government nor the Office of the Chief Technology Officer (OCTO) makes any claims as to the completeness, accuracy or content of any data contained in this application; makes any representation of any kind, including, but not limited to, warranty of the accuracy or fitness for a particular use; nor are any such warranties to be implied or inferred with respect to the information or data furnished herein. The data is subject to change as modifications and updates are complete. It is understood that the information contained in the RSS feed is being used at one's own risk.

B) Source Data

Applications using data supplied by this site must perform the following:

1. Notify the District of Columbia via email;
2. Include the following disclaimers on their sites:

"The data made available here has been modified for use from its original source, which is the Government of the District of Columbia. Neither the District of Columbia Government nor the Office of the Chief Technology Officer (OCTO) makes any claims as to the completeness, accuracy or content of any data contained in this application; makes any representation of any kind, including, but not limited to, warranty of the accuracy or fitness for a particular use; nor are any such warranties to be implied or inferred with respect to the information or data furnished herein. The data is subject to change as modifications and updates are complete. It is understood that the information contained in the web feed is being used at one's own risk."

Right to Discontinue Feeds

The District of Columbia Government reserves the right to discontinue providing any or all of the RSS feeds at any time and to require the termination of any and all displaying, distributing or otherwise using any or all of the RSS feeds for any reason including, without limitation, your violation of any provision of these Terms of Use.⁷⁷

"Building the Digital Public Square", Vivek Kundra (2008)

Consistent with the open approach stated on the OCTO website the following statement by Vivek Kundra⁷⁸ addressing the digital public square initiative undertaken by the District of Columbia government appears on the dedicated website:

In ancient Athens—the model for the democracy envisioned by the framers of our Constitution—citizens met, face to face, in the agora—the public square—to conduct business, debate civic issues, and drive the decisions of government. Gone are the days of daily meetings at the agora. Today, citizens know government as red tape,

⁷⁶ See Terms of Use at <http://data.octo.dc.gov/TermsOfUse.aspx> and see also the DC portal terms and condition at http://dc.gov/terms.asp?portal_link=fc.

⁷⁷ Terms of Use at <http://data.octo.dc.gov/TermsOfUse.aspx> accessed 19 June 2009.

⁷⁸ Chief Technology Officer, District of Columbia Government.



long lines, and cold, distant bureaucracies. The reins of government have slipped from “we the people” to inaccessible government officials.

The District of Columbia, however, is at the forefront of a new era of governance, one in which technological advances now allow people from around the world unfettered access to their government. Through these advances, constituents can hold their government accountable from the privacy of their own homes. The District of Columbia is bringing people closer to government through collaborative technologies like wikis, data feeds, videos and dashboards. We’re throwing open DC’s warehouse of public data so that everyone—constituents, policymakers, and businesses—can meet in a new digital public square.

The District maintains vast stores of data on every aspect of government operations, from government contracts to crime statistics to economic development. We have organized this data into convenient catalogs and live data feeds and made them available to the general public at <http://data.octo.dc.gov>. Visitors to the site can find information on crime incidents by date, time of day, ward, block, or method; details on construction projects by location, type of construction, budget, completion date or status; data on registered vacant properties by ward, address, owner or tax assessment; or information on businesses, such as the locations of District establishments that hold liquor licenses. Mapping technology also allows users to view data geographically with a single click. Using an ordinary Web browser, anyone in the world can access this information.

When we first opened the doors to government data, people were quick to respond. Individuals and organizations are not only viewing our government data, but are actually improving upon our work by analyzing and repurposing the information in useful ways. One innovative DC resident took it upon herself to gather publicly-available government data on service requests, crimes, and building and public space permits to create a Web-based informational clearinghouse site that informs southeastern DC residents about local real estate development and the quality of government services. The Knight Foundation, a non-governmental organization, transformed District data into an online community news forum at EveryBlock.com. Here, visitors can plug in their zip code and find and exchange information about everything of interest in their neighborhoods—local businesses and reviews, real estate listings, crimes, road construction, city service requests, community meetings, and more. A private entrepreneur has assembled law enforcement data from the District and across the country into an online database, called “CrimeReports.” Visitors can get crime data and maps by address, zip, code, and type of crime and sign up for personalized crime alerts.

These are truly grassroots ventures. The democratization of government data has revealed an enormous appetite for civic participation. We are ushering in a new age of participatory democracy, one in which citizens are in the driver’s seat when they interact with government. Accessibility has never been greater, and this is just the beginning. In the last year, we published over 200 data feeds. During the coming year, we expect to double that.

Today, building the digital public square is not just appealing, it is imperative for every government, whether municipal, state, or national. We live in the information age. Nearly 1.5 billion people have access to the Internet—and they are using it in every way. There is a worldwide digital market for goods and services. For example, Amazon.com, founded just over a decade ago, now handles about 56 million transactions a year, and Ebay, founded at about the same time, now has over 275 million registered users. There are a growing number of global social and artistic networks. Facebook alone, founded just four years ago, now has over 60 million active users, and YouTube, a year younger, hosted 3 billion video views in a single month this year. We responded to these new communications trends by expanding DC Government’s presence onto Facebook and posting job listings and bid solicitations on YouTube under the “DC Government” channel. Leveraging consumer technology in this way allows us to reach wider audiences at no cost to taxpayers.

Until now, government has largely been absent in the trend towards worldwide exchange of information and services. Starting here in the District, we hope to demonstrate that government, too, can and must step fully into the digital arena. That is why the digital public square is now at the heart of our efforts to make government services more effective, accessible, and transparent. By ensuring that every citizen has a front row seat in the digital public square, we’ll continue to return government into the hands of “we, the people.”⁷⁹

⁷⁹ See <http://www.appsfordemocracy.org/building-the-digital-public-square/>. Vivek Kundra has recently been appointed by President Obama as US Chief Information Officer. For further on Kundra, see <http://www.washingtonpost.com/wp-dyn/content/article/2009/01/04/AR2009010401235.html>.



“Open Government Directive Consultations” Office of Science and Technology Policy, Executive Office of the President (2009)

The Presidential memorandum on *Transparency and Open Government*, issued on 21 January 2009, required the Chief Technology Officer, the Director of the Office of Management and Budget (OMB) and the Administrator of General Services to, within 120 days, coordinate the development by appropriate executive departments and agencies of recommendations for an Open Government Directive to be issued by the Director of OMB.⁸⁰

From the outset, the White House approached the crafting of these recommendations in an open fashion. The vision was to invert the policymaking process by enabling informed public dialogue to inform policymaking at the front end.⁸¹ Initially, development was driven via an intra-government wiki system (the MAX Federal Online Community),⁸² set up by the OMB. The following three-phase process invited people to:

1. Brainstorm—share ideas on how to make government more open, participatory and collaborative, discuss and vote on the ideas of others;
2. Discuss—dig deeper on the ideas and challenges identified during the Brainstorm phase; and
3. Draft—collaboratively craft constructive recommendations for an Open Government Directive.⁸³

Phase I of the public consultation on open government (“Brainstorm”)⁸⁴ ran from 21 to 28 May 2009 and elicited more than 900 ideas and 33,000 votes; Phase II (“Discussion”)⁸⁵ ran from 3 to 21 June 2009 and attracted more than 1,000 comments in response to 16 topics. Phase III (“Drafting”),⁸⁶ from 22 June to 6 July 2009, resulted in 305 draft recommendations from 375 authors, with 2,256 people voting on the drafts.

Phase I – Brainstorm

The National Academy of Public Administration (NAPA) (host of the first phase) conducted a summary analysis on the Open Government Brainstorm.⁸⁷ In relation to Transparency, it was found that the following general themes arose:

Make Data More Accessible

The general theme of how to make government data more accessible to the public is foundational to the notion of transparency. Specific ideas that emerged in this thematic area include:

- Create structured data that is easily consumable. e.g. require XML, pursue CRADA-like agreements, define principles for open-source data.

⁸⁰ See http://www.whitehouse.gov/the_press_office/TransparencyandOpenGovernment/.

⁸¹ National Academy of Public Administration, *Summary Analysis of the Open Government Brainstorm*, Memo from Lena Trudeau, Vice President of NAPA to Beth Noveck, Deputy Chief Technology Officer, 1 June 2009, at p 1, available at http://www.ostp.gov/galleries/opengov_inbox/NAPA_analysis.pdf accessed on 1 October 2009.

⁸² The MAX wiki at <http://max.omb.gov> can be accessed from US federal government addresses, .mil, .fed and .gov.us

⁸³ National Academy of Public Administration, *Summary Analysis of the Open Government Brainstorm*, Memo from Lena Trudeau, Vice President of NAPA to Beth Noveck, Deputy Chief Technology Officer, 1 June 2009, at p 1, available at http://www.ostp.gov/galleries/opengov_inbox/NAPA_analysis.pdf accessed on 1 October 2009.

⁸⁴ See “Open Government Dialogue” at <http://opengov.ideascale.com/> accessed 17 September 2009.

⁸⁵ See “Office of Science Technology & Policy Blog” at <http://blog.ostp.gov/> accessed 17 September 2009.

⁸⁶ See <http://www.mixedink.com/OpenGov/> accessed 17 September 2009.

⁸⁷ National Academy of Public Administration, *Summary Analysis of the Open Government Brainstorm*, Memo from Lena Trudeau, Vice President of NAPA to Beth Noveck, Deputy Chief Technology Officer, 1 June 2009, at p 1, available at http://www.ostp.gov/galleries/opengov_inbox/NAPA_analysis.pdf accessed on 1 October 2009.



- Bring government services online and make them reusable by the private sector; if citizens own the services they should be able to build on top of them. This requires a SOA approach The VA Loan Guaranty Service is also a good example.
- Ensure a CCO Creative Common copyright waiver for products created with data.gov contributions. There should be a way to allow non-government Open Source Transparency Projects to work for free for the government (right now, they cannot contribute).
-

Make Government More Open

Access to data is a necessary but not sufficient condition for transparency. Government must also ensure that the public understands the process by which policy is created, services are delivered and decisions are made. Specific ideas that emerged in this thematic area focused largely on performance measurement and accountability:

- Create a “MyGov.gov” customized RSS feed/alert system that reaches across all federal agencies; create a “Citizens Portal”.
-
- Government should communicate a governmentwide strategy for using social media tools to create a more effective and transparent government; agency CTOs should develop their own social media/Web 2.0 communication plans.⁸⁸

Phase III – Drafting

In Phase III, members of the public were invited to contribute proposals for recommendations within the three broad topics – transparency, collaboration and participation – identified in the Presidential Memo issued on 21 January 2009, and to vote on the best drafts on selected topics. This phase concluded in early July 2009.⁸⁹

The topic that generated most recommendations in Phase Three was transparency. The administration proposed five categories within this topic: transparency principles, transparency governance, open government operations, data transparency and information access.

A summary of the recommendations on data transparency and information access is provided on the OMB Watch website:

Data Transparency

Another category the administration wanted to address was data transparency. The quick launch of Data.gov, to provide greater access to raw data and online tools for tracking and analyzing the data, indicated the administration’s level of interest in this area. The government requested suggestions on how agencies should be directed to supply more data for Data.gov, and which data they should provide. The materials also asked for input on government-wide approaches to data and metadata that would ensure data transparency.

Data transparency received the least amount of input, with only seven recommendations submitted. The top-rated recommendation advocated for machine-readable data and metadata for three major types of public data – public reference data, public records, and public statistics. It came from the 21st Century Right-to-Know Recommendations. The second-ranked recommendation focused on tasks chief technology officers should pursue, including providing access to well defined bulk files, use of interactive and transparent Web 2.0 technologies, assessments of agencies’ capabilities, and surveying the high-priority information needs of users.

⁸⁸ National Academy of Public Administration, *Summary Analysis of the Open Government Brainstorm*, Memo from Lena Trudeau, Vice President of NAPA to Beth Noveck, Deputy Chief Technology Officer, 1 June 2009, p 3-4, available at http://www.ostp.gov/galleries/opengov_inbox/NAPA_analysis.pdf accessed on 1 October 2009.

⁸⁹ Michael Baldwin, *Data from Public Consultation on Open Government*, The White House – Blog, 7 August 2009, available at <http://www.whitehouse.gov/blog/Data-from-Public-Consultation-on-Open-Government/> accessed on 13 August 2009.



Other ideas submitted under this category included a recommendation that science.gov be re-envisioned as one-stop location for government scientific information that would help citizens identify government experts and would organize scientific activities by topic and geographic area. Another suggestion took inspiration from the popularity of Google Earth and recommended the creation of a Government Universe map with 6 galaxies – the Executive, Congressional, Judicial, States, Business Sectors, and Public Sector galaxies. Each galaxy would have its major components circling around it as stars, and users could drill down to access to government information in that area.

Information Access

The final transparency category for which the administration wanted specific recommendations was improving the government's ability to disclose information proactively. Processing requests made under the Freedom of Information Act (FOIA) can be a costly endeavor for many agencies, so the government has increasingly accepted proactive dissemination as a way to both serve the public interest and save costs. The administration requested input on translating the need for better policy and compliance into actionable recommendations.

This category received 15 proposals, of which the top-rated recommendation suggested modernizing the FOIA system by creating a centralized digital system to streamline the process and better comply with requirements under E-FOIA to post repeatedly requested materials online. The second-ranked recommendation focused on improving electronic records management in the government and establishing requirements that electronic records be maintained in a searchable form. The third-ranked proposal recommended launching an interagency effort to track online the interactions between government and lobbyists and others who wield monetary influence. All three recommendations came from the 21st Century Right-to-Know Recommendations.

Other suggestions in this category included increasing public access to the results of publicly funded research and establishing a standard format for FOIA archives. Another proposal advanced the idea of creating a global navigation (taxonomic) index to organize all governmental offices and information into a framework that would allow users to easily search and locate federal information.⁹⁰

Open Government Directive (2009)

Following an extensive public consultation and discussion process, the Obama administration officially released its Open Government directive⁹¹ on 8 December 2009, charging each federal agency with making high value data publicly available and with quickly coming up with formal open government plans.⁹² Broadly, the directive requires that:

- agencies adopt a presumption in favor of openness in regards to information;
- senior leader make certain that government information made available to the public conforms to OMB guidance on information quality;⁹³ and
- every agency or senior leader strive to incorporate a culture of Open Government into the ongoing work of the agency.

These broad-based directions are supported by specific task deadlines. For example:

⁹⁰ See OMB Watch website, *Phase Three of Open Government Directive Process Generates Recommendations*, 14 July 2009, at <http://www.ombwatch.org/node/10204>.

⁹¹ Available at <http://www.whitehouse.gov/open/documents/open-government-directive> accessed 22 January 2010. See also generally <http://www.whitehouse.gov/open>.

⁹² See Daniel Terdiman, 'White House unveils open government directive', *Geek Gestalt* (blog), CNET News, 8 December 2009 available at http://news.cnet.com/8301-13772_3-10411429-52.html accessed on 22 January 2010.

⁹³ Information Quality Act, Pub. L. No. 106-554, section 515; see also, "Guidelines for Ensuring and Maximizing the Quality, Objectivity, Utility, and Integrity of Information Disseminated by Federal Agencies" (67 FR 8452).



- each agency must identify and publish online in an open format at least three high-value data sets and register those sets via Data.gov within 45 days;
- within 120 days, each agency must develop and publish on its Open Government Webpage an Open Government Plan describing how it will improve transparency and integrate public participation and collaboration into its activities; and
- within 120 days, the Administrator of the Office of Information and Regulatory Affairs (OIRA) will review existing OMB policies to identify impediments to open government and to the use of new technologies.

Although there is some concern that the directive may be overtly ambitious and be difficult to implement, responses to its release have generally been positive, especially in relation to the detail of the open government plan each agency is directed to create.⁹⁴

“Web Mashups put Transparency to the Test”, Brian Robinson, Federal Computer Week (2010)

In the article, *Web Mashups put Transparency to the Test*,⁹⁵ Brian Robinson states that the next step in the government’s vision for a more open and accountable government is to enable people and interest groups to analyze or package the data in ways that make it more useful to others. Even though government agency data is increasingly being made available in standard Web formats such as Extensible Markup Language, “building a mashup is still harder than it needs to be, and the government could do more to help”.⁹⁶

The author predicts that once Semantic Web, or Web 3.0, technologies become more available, government and other data providers will use Semantic Web standards to add context and meaning to the data they post online. In the meantime however, three mashup examples are outlined to illustrate the possibilities that composite websites can offer and the challenges their creators face:

- This We Know⁹⁷ (a website which takes data from Data.gov and converts it into an RDF database, allowing the data to be organized and presented according to geographic communities);
- FedViewer.com⁹⁸ (provides an easy-to-digest graphic representation in the form of a temperature map of approximately 700 different factors affecting the U.S. economy); and
- Neighborhood Knowledge California⁹⁹ (which provides tools that allow potential homeowners and community grass-roots organizations throughout California to design maps, collate information and publish their own research on fair housing and fair lending laws).

⁹⁴ Daniel Terdiman, ‘White House unveils open government directive’, *Geek Gestalt* (blog), CNET News, 8 December 2009 available at http://news.cnet.com/8301-13772_3-10411429-52.html accessed on 22 January 2010.

⁹⁵ Brian Robinson, *Web Mashups put Transparency to the Test*, Federal Computer Week, 6 January 2010, available at <http://fcw.com/Articles/2010/01/11/FEAT-Mashups-test-transparency.aspx?Page=4> accessed on 27 January 2010.

⁹⁶ Ibid.

⁹⁷ See <http://www.thisweknow.org/>.

⁹⁸ See <http://www.fedviewer.com/>.

⁹⁹ See <http://nkca.ucla.edu/>.



“Workshop: E-Gov/Civic Engagement”, Federal Communications Commission, National Broadband Plan (2009)

Under the *Recovery and Reinvestment Act 2009*, the Federal Communications Commission (FCC) is authorised to create a National Broadband Plan, which “shall seek to ensure that all people of the United States have access to broadband capability and shall establish benchmarks for meeting that goal.”¹⁰⁰ Under the plan, the FCC holds workshops to promote an open dialogue between the FCC and key constituents on matters important to the plan.¹⁰¹ On 6 August 2009, the FCC held the E-Gov/Civic Engagement Workshop in order to evaluate how broadband can improve the performance of government specifically in terms of transparency and citizen participation and more generally in terms of effectiveness and efficiency.¹⁰² The workshop also considered the various ways all levels of government, including governments in other countries, have used broadband to improve its performance, and the consequential cost savings and strategic benefits to the communications infrastructure.¹⁰³

At the workshop, experts from inside and outside government (U.S. CIO Vivek Kundra; former Fort Wayne, Indiana, mayor Graham Richard; deputy U.S. CTO for open government Beth Noveck; the American Enterprise Institute's Norm Ornstein; Rutgers School of Law's Ellen Goodman, the Sunlight Foundation's John Wonderlich; Beth White of Chicago's bid to host the 2016 Olympic Games; and techPresident.com founder Andrew Rasiej) detailed examples of civic engagement via broadband Internet that dial-up (or no connectivity at all) makes difficult, if not impossible.¹⁰⁴

Examples cited by Vivek Kundra included the democratization of data via Facebook or Twitter communities, and more broadly the release of data through Data.gov and the innovative downstream uses of the data:

We [...] made sure that we democratized the data, so people could actually slice and dice and give us different views of risk across the board. We allowed people to actually take any of the projects they're interested in, if you're interested in public health or education or energy, you could embed those projects on Facebook or Twitter or on your own personal blogs. So we essentially created communities as a function of releasing that data and allowing the public to participate.

.....
Another area, thinking more broadly, is around democratizing data across the board. We embarked on an initiative called Data.gov that would release as much of the public data as possible, recognizing that there is information that's classified or sensitive in nature. As of now, we've got over 100,000 data feeds from every aspect of government operations, from how the FAA is looking at flights, the average times/delays across the country, to toxic release data from the EPA, to data from our health care system, Medicare and Medicaid. And what we're finding very quickly is that innovation is happening in the market as a result of democratizing this data.

Within 24 hours of launching this, the Sunlight Foundation actually launched a competition called Apps for America and issued over \$20,000 to anyone that would develop applications based on Data.gov. What we saw immediately were a number of applications that were created. An example is FlyOnTime.us, where an enterprising developer essentially took the data that the FAA had put out and created an application that would

¹⁰⁰ See <http://broadband.gov/> accessed on 24 September 2009.

¹⁰¹ Ibid.

¹⁰² See http://broadband.gov/ws_egov.html accessed 24 September 2009.

¹⁰³ Ibid.

¹⁰⁴ Nancy Scola, *National Broadband Workshop Reimagines 21st Century Citizenship*, techPresident, 6 August 2009, available at <http://techpresident.com/blog-entry/national-broadband-workshop-reimagines-21st-century-citizenship> accessed on 24 September 2009.



allow you and I to map out from one city to another the average delay times of flights so we could make a better decision where we want to book.¹⁰⁵

In terms of a strategic benefit, Norm Ornstein of the American Enterprise Institute considered broadband to be the upcoming public square in an extended republic such as the United States:

... as we look for those innovative ways of developing a public square, ways in which people can participate, can learn about ideas, can see that debate and have it enrich the process, the process of deliberation that is what our whole democracy, the Framers, built around, cannot work unless everybody has access to what is going to be the vehicle for the public square. And that vehicle is going to occur over broadband.¹⁰⁶

“The Freedom of Information Act Memo”, Office of the Attorney General (2009)

On 19 March 2009, Attorney General Eric Holder issued comprehensive new *Freedom of Information Act* (FOIA) guidelines directing all executive branch departments and agencies to apply a presumption of openness when administering the FOIA.¹⁰⁷ The new guidelines, announced in a memo to heads of executive departments and agencies,¹⁰⁸ builds on President Obama’s FOIA Memorandum¹⁰⁹ which instructed that “The Freedom of Information Act should be administered with a clear presumption: In the face of doubt, openness prevails”. It rescinds the guidelines issued on Oct. 12, 2001, by former Attorney General John Ashcroft.

According to Attorney General Holder:

By restoring the presumption of disclosure that is at the heart of the Freedom of Information Act, we are making a critical change that will restore the public’s ability to access information in a timely manner. The American people have the right to information about their government’s activities, and these new guidelines will ensure they are able to obtain that information under principles of openness and transparency.¹¹⁰

Regarding the practical application of the presumption, the FOIA guidelines state:

This presumption has two important implications.

First, an agency should not withhold information simply because it may do so legally. I strongly encourage agencies to make discretionary disclosures of information. An agency should not withhold records merely because it can demonstrate, as a technical matter, that the records fall within the scope of a FOIA exemption.

Second, whenever an agency determines that it cannot make full disclosure of a requested record, it must consider whether it can make partial disclosure. Agencies should always be mindful that the FOIA requires them to take reasonable steps to segregate and release nonexempt information.

.....

¹⁰⁵ *Workshop: E-Gov/Civic Engagement*, Federal Communications Commission, National Broadband Plan, 6 August 2009, Washington D.C., (Transcript) p 23-24, available at http://broadband.gov/docs/ws_01_egov_transcript.doc accessed 24 September 2009.

¹⁰⁶ *Ibid*, p 89.

¹⁰⁷ US Department of Justice, *Attorney General Issues New FOIA Guidelines to Favor Disclosure and Transparency*, 19 March 2009, available at <http://www.usdoj.gov/opa/pr/2009/March/09-ag-253.html> accessed on 13 August 2009.

¹⁰⁸ Attorney General, *Memorandum for the Heads of Executive Departments and Agencies on The Freedom of Information Act (FOIA)*, Office of the Attorney General, Washington D.C., 19 March 2009, available at <http://www.usdoj.gov/ag/foia-memo-march2009.pdf> accessed on 13 August 2009.

¹⁰⁹ See http://www.whitehouse.gov/the_press_office/TransparencyandOpenGovernment/.

¹¹⁰ US Department of Justice, *Attorney General Issues New FOIA Guidelines to Favor Disclosure and Transparency*, 19 March 2009, available at <http://www.usdoj.gov/opa/pr/2009/March/09-ag-253.html> accessed on 13 August 2009.



At the same time, the disclosure obligation under the FOIA is not absolute. The Act provides exemptions to protect, for example, national security, personal privacy, privileged records, and law enforcement interests. But as the President stated in his memorandum, "The Government should not keep information confidential merely because public officials might be embarrassed by disclosure, because errors and failures might be revealed, or because of speculative or abstract fears."¹¹¹

The guidelines also address the need for full accountability for the administration of the FOIA within each agency:

FOIA Is Everyone's Responsibility

I would like to emphasize that responsibility for effective FOIA administration belongs to all of us—it is not merely a task assigned to an agency's FOIA staff. We all must do our part to ensure open government. In recent reports to the Attorney General, agencies have noted that competing agency priorities and insufficient technological support have hindered their ability to implement fully the FOIA Improvement Plans that they prepared pursuant to Executive Order 13392 of December 14, 2005. To improve FOIA performance, agencies must address the key roles played by a broad spectrum of agency personnel who work with agency FOIA professionals in responding to requests.¹¹²

In accordance with the President's memorandum instruction that agencies "use modern technology to inform citizens what is known and done by their Government," the guidelines further requires agencies to work proactively and respond to requests promptly:

...agencies should readily and systematically post information online in advance of any public request. Providing more information online reduces the need for individualized requests and may help reduce existing backlogs. When information not previously disclosed is requested, agencies should make it a priority to respond in a timely manner. Timely disclosure of information is an essential component of transparency. Long delays should not be viewed as an inevitable and insurmountable consequence of high demand.¹¹³

"Technology Issues" update, US Government (2009)

In 2009, the Obama administration issued a Technology Issues update,¹¹⁴ which set out the progress of its efforts to create a more efficient government, and the guiding principles behind the steps taken:

TECHNOLOGY

"To help build a new foundation for the 21st century, we need to reform our government so that it is more efficient, more transparent, and more creative."

-President Obama, April 25, 2009

Progress

- The President issued a Presidential Memorandum to the heads of executive departments and agencies ordering them to compile recommendations for an open government directive on transparency, participation, and collaboration in government.

¹¹¹ See <http://www.usdoj.gov/ag/foia-memo-march2009.pdf> accessed on 10 September 2009.

¹¹² Ibid, p 2.

¹¹³ Ibid, p 3.

¹¹⁴ US Government, Technology Issues update at <http://www.whitehouse.gov/issues/technology/> accessed on 19 June 2009.



- The Recovery Act calls for a comprehensive plan for national broadband, and the FCC is developing a plan due in February, 2010. The Recovery Act also provides for \$7.2 billion for broadband internet access nationwide, including grants for rural broadband access, expanding computer center capacity, and sustainable broadband adoption initiatives.
- The President launched Recovery.gov, an unprecedented step to provide transparency and accountability through technology.
- The President issued an Executive Order to restore scientific integrity in government decision-making.
- The President answered questions at the first online town hall from the White House that were submitted and voted on transparently by the public at WhiteHouse.gov
- Established a central portal for Americans to find service opportunities.
- Building New Communities like Business.gov – enabling conversation and online collaboration between small business owners, government representatives and industry experts in discussion forums relevant to starting and managing a business.
- The President appointed the first ever Federal Chief Information Officer to provide management and oversight over federal IT spending and nominated the first ever Federal Chief Technology Officer to provide vision, strategy and direction for using technology to bring innovation to the American economy. They will work together to support innovation inside and outside the Federal Government.

Guiding Principles

Innovation in the Economy: Drive Economic Growth and Solve National Problems By Deploying a 21st Century Information Infrastructure

The President believes that modernized infrastructure is a necessary part of the foundation for long term economic stability and prosperity. That includes everything from a comprehensive national broadband plan, to new health care information technology, to a modernized electrical grid.

The President has also directed the National Security and Homeland Security Advisors to conduct an immediate review of the plan, programs, and activities underway throughout the government dedicated to cyber security. This 60-day interagency review will develop a strategic framework to ensure that U.S. Government cyber security initiatives are appropriately integrated, resourced and coordinated with Congress and the private sector.

....

Innovation in Public Administration: Creating an Open and Secure Government

Strategic federal IT investments will make Government more transparent and accountable. At the same time, Americans will know that these investments by their Government are being leveraged to produce maximum value, and that the security of information systems nationally, and the privacy of Americans, are being protected. Strategic investments in IT are at the heart of the efforts to make Government services more effective, accessible, and transparent.

Restoring a Culture of Accountability through Openness and Transparency of Government Operations and Information

Moving Toward Unprecedented Openness: Change the presumption under the Freedom of Information Act to favor voluntary disclosure of government information to the public.

Making Critical Government Information Available: Working to provide public access to information of public import and concern, such as the Department of Justice "torture" memos, the President's and Vice-President's tax returns, the public financial disclosure reports for White House personnel, and presidential records.¹¹⁵

¹¹⁵ Ibid.



National Science Foundation – Broader Impacts Criterion (2007)

Funding proposals submitted to the National Science Foundation (NSF) must address two aspects of the proposed research: the Intellectual Merit and the Broader Impacts of the proposal.¹¹⁶ The Broader Impacts Criterion is divided into five components:

- How well does the activity advance discovery and understanding while promoting teaching, training and learning?
- How well does the proposed activity broaden the participation of underrepresented groups (e.g., gender, ethnicity, disability, geographic, etc.)?
- To what extent will it enhance the infrastructure for research and education, such as facilities, instrumentation, networks and partnerships?
- **Will the results be disseminated broadly to enhance scientific and technological understanding?**
- What may be the benefits of the proposed activity to society?¹¹⁷ [emphasis added]

Although the Broader Impacts Criterion was meant to promote education, outreach, and benefits to society, it has led to some uncertainty as to how the criterion could be satisfied.¹¹⁸ In July 2007, the NSF provided guidance in the form of a document entitled *Merit Review Broader Impacts Criterion: Representative Activities*¹¹⁹ which provided a non-exhaustive list of example considerations which could be used in assessing the broader impacts of the proposed activity. The list is not intended to be exhaustive, but provides examples from which proposers can draw on in demonstrating the broader impacts of their projects.

Representative activities for broad dissemination of results to enhance scientific and technological understanding include:

- Make data available in a timely manner by means of databases, digital libraries, or other venues such as CD-ROMs;
- Publish in diverse media (e.g., non-technical literature, and websites, CD-ROMs, press kits) to reach broad audiences; and
- Present research and education results in formats useful to policy-makers, members of congress, industry, and broad audiences.¹²⁰

National Institutes of Health – Data Sharing Policy (2003, amended 2008)

The National Institutes of Health (NIH) has been dealing with issues of data access, intellectual property and licensing for many years. The NIH is the largest funder of basic biomedical research in

¹¹⁶ See <http://www.nsf.gov/bfa/dias/policy/meritreview/facts.jsp#1> accessed on 28 January 2010.

¹¹⁷ See http://www.nsf.gov/pubs/policydocs/pappguide/nsf10_1/gpg_3.jsp#IIIA2 accessed on 28 January 2010.

¹¹⁸ Ernie Tretkoff, *NSF's "Broader Impacts" Criterion Gets Mixed Reviews*, APS News, June 2007 (Volume 16, Number 6) available at <http://www.aps.org/publications/apsnews/200706/nsf.cfm> accessed on 28 January 2010.

¹¹⁹ National Science Foundation, *Merit Review Broader Impacts Criterion: Representative Activities*, July 2007, available at <http://www.nsf.gov/pubs/2002/nsf022/bicexamples.pdf> accessed on 29 January 2010. For links to Broader Impacts Criterion discussion and best practices, see <http://www.ndsciencehumanitiespolicy.org/workshop/links.php> accessed on 29 January 2010.

¹²⁰ *Ibid*, p 3. Note that in regards to computational research, it is suggested that the Broader Impacts Criterion could allow, encourage, or require data and code sharing plans as possible examples of broader impact: see Victoria Stodden's response to the *Policy Forum on Public Access to Federally Funded Research: Management* <http://blog.ostp.gov/2010/01/01/policy-forum-on-public-access-to-federally-funded-research-management/> accessed on 29 January 2010.



the world (spending US\$27 billion in the 2005 financial year).¹²¹ In February 2003 it published a data sharing policy, which remained in place until the end of 2007 when the policy was strengthened following the enactment of the *Consolidated Appropriations Act 2008*.¹²² The NIH believes that data sharing promotes many of its research goals and is viewed as particularly important for unique data that cannot be readily replicated.¹²³ Data sharing allows scientists to expedite the translation of research results into knowledge, products, and procedures to improve human health. NIH takes the view that all data should be considered for data sharing.

Prior to the enactment of the *Consolidated Appropriations Act 2008*, the NIH had a “voluntary” policy dating back to 2003, to facilitate data sharing. Under the 2003 policy, investigators submitting a research funding application to NIH for \$500,000 or more in any single year were expected to include a plan for sharing final research data for research purposes, or state why data sharing is not possible.¹²⁴ In Australia, the Australian Research Council adopted a very similar strategy to essentially require (without actually mandating) Australian researchers to deposit their research results and reports into an open access repository.

The NIH 2003 policy on data sharing applied to:

- the sharing of *final research data*¹²⁵ for research purposes; and
- basic research, clinical studies, surveys, and other types of research supported by NIH, with particular importance attached to the sharing of *unique data*¹²⁶ that cannot be readily replicated.

NIH uses the term “Restricted Data” to refer to datasets that cannot be distributed to the general public for various reasons including participant confidentiality concerns, third party licensing agreements or national security considerations.

Recognising the breadth and variety of science that NIH supports, neither the precise content for the data documentation nor the formatting, presentation, or transport mode for data is stipulated. NIH recognises that a sensible and practical approach in one field or one study may not be appropriate for others. NIH encourages members of multiple disciplines and their professional societies to

¹²¹ See <http://grants.nih.gov/grants/guide/notice-files/NOT-OD-08-033.html>.

¹²² See NIH, *Policy on Enhancing Public Access to Archived Publications Resulting from NIH-Funded Research*, 2005, at <http://grants.nih.gov/grants/guide/notice-files/NOT-OD-05-022.html>. For a comparison of the NIH Public Access Policy (2005-07) with the US Office of Education policy on copyright in funded research (1965-1970), see Jonathan Miller, *Publishers did not take the bait: A forgotten precursor to the NIH Public Access Policy*. A preliminary version of the paper was presented at the Florida Library Association Annual Conference, 23 April 2008, available at <http://www.ala.org/ala/mgrps/divs/acrl/publications/crljournal/preprints/Miller.pdf>.

¹²³ See http://grants.nih.gov/grants/policy/data_sharing/data_sharing_guidance.htm#enclave.

¹²⁴ This requirement is in place for all applications on or after 1 October 2003.

¹²⁵ “*Final research data*” is defined as: Recorded factual material commonly accepted in the scientific community as necessary to document, support, and validate research findings. This does not mean summary statistics or tables; rather, it means the data on which summary statistics and tables are based. For most studies, final research data will be a computerized dataset. For example, the final research data for a clinical study would include the computerized dataset upon which the accepted publication was based, not the underlying pathology reports and other clinical source documents. For some but not all scientific areas, the final dataset might include both raw data and derived variables, which would be described in the documentation associated with the dataset.

¹²⁶ “*Unique data*” is defined as: Data that cannot be readily replicated. Examples of studies producing unique data include: large surveys that are too expensive to replicate; studies of unique populations, such as centenarians; studies conducted at unique times, such as a natural disaster; studies of rare phenomena, such as rare metabolic diseases.

discuss data sharing, determine what standards and best practices should be proposed, and create a social environment that supports data sharing.

When applicants sign the face page of an NIH application, they are assuring compliance with policies and regulations governing research awards. NIH expects grantees to follow these rules in conducting the work described in the application. Where an application describes a data-sharing plan, the agency expects that plan to be enacted. Progress made with a data-sharing plan must be acknowledged in the progress report. In the final progress report, if not sooner, the grantee must state what steps have been taken with respect to the data-sharing plan. In the case of non-compliance (depending on its severity and duration), NIH can take various actions to protect the US Federal Government's interests in providing the funding. In some instances, NIH may make data sharing an explicit condition of subsequent awards.

NIH expects the timely release and sharing of data to be no later than the acceptance for publication of the main findings from the final dataset. The specific time will be influenced by the nature of the data collected. Data from small studies can be analyzed and submitted for publication relatively quickly. If data from large epidemiologic or longitudinal studies are collected over several discrete time periods or waves, it is reasonable to expect that the data would be released in waves as data become available or main findings from waves of the data are published. NIH recognizes that the investigators who collected the data have a legitimate interest in benefiting from their investment of time and effort. NIH continues to expect that the initial investigators may benefit from first and continuing use, but not from prolonged exclusive use.

On 11 January 2008, the NIH released its new policy to give effect to the requirements introduced in the *Consolidated Appropriations Act 2008*, mandating open access publication of all peer-reviewed publications produced from NIH-funded research projects.¹²⁷ The text of NIH's *Revised Policy on Enhancing Public Access to Archived Publications Resulting from NIH-Funded Research*, which took effect from 7 April 2008, is reproduced below.

Key Dates

Release Date: January 11, 2008

Effective Date: April 7, 2008

Issued by

National Institutes of Health (NIH), (<http://www.nih.gov/>)

Department of Health and Human Services

Action

Notice; Revised Policy Statement

Summary

In accordance with Division G, Title II, Section 218 of PL 110-161 (Consolidated Appropriations Act, 2008) the NIH voluntary Public Access Policy (NOT-OD-05-022) is now mandatory. The law states:

The Director of the National Institutes of Health shall require that all investigators funded by the NIH submit or have submitted for them to the National Library of Medicine's PubMed Central an electronic version of their final, peer-reviewed manuscripts upon acceptance for publication, to be made publicly available no later than 12 months after the official date of publication: Provided, that the NIH shall implement the public access policy in a manner consistent with copyright law.

¹²⁷ See <http://grants.nih.gov/grants/guide/notice-files/NOT-OD-08-033.html>.



Specifics

1. The NIH Public Access Policy applies to all peer-reviewed articles that arise, in whole or in part, from direct costs¹ funded by NIH, or from NIH staff, that are accepted for publication on or after April 7, 2008.
2. Institutions and investigators are responsible for ensuring that any publishing or copyright agreements concerning submitted articles fully comply with this Policy.
3. PubMed Central (PMC) is the NIH digital archive of full-text, peer-reviewed journal articles. Its content is publicly accessible and integrated with other databases (see: <http://www.pubmedcentral.nih.gov/>).
4. The final, peer-reviewed manuscript includes all graphics and supplemental materials that are associated with the article.
5. Beginning May 25, 2008, anyone submitting an application, proposal or progress report to the NIH must include the PMC or NIH Manuscript Submission reference number when citing applicable articles that arise from their NIH funded research. This policy includes applications submitted to the NIH for the May 25, 2008 due date and subsequent due dates.

Compliance

Compliance with this Policy is a statutory requirement and a term and condition of the grant award and cooperative agreement, in accordance with the *NIH Grants Policy Statement* For contracts, NIH includes this requirement in all R&D solicitations and awards under Section H, Special Contract Requirements, in accordance with the Uniform Contract Format.

Inquiries

Send questions concerning this Notice or other aspects of the NIH Public Access Policy to:

Office of Extramural Research

National Institutes of Health

1 Center Drive, Room 144

Bethesda, MD 20892-0152

Email: PublicAccess@nih.gov

Website: <http://publicaccess.nih.gov>

¹Costs that can be specifically identified with a particular project or activity. NIH Grants Policy Statement, Rev. 12/2003;

http://grants.nih.gov/grants/policy/nihgps_2003/NIHGPS_Part2.htm#_Toc54600040

Board on Research Data and Information, National Research Council

The National Research Council's Board on Research Data and Information (BRDI) was formed in response to a recognized need to develop better systems for keeping, managing and reusing the large amounts of research data and information being produced.¹²⁸ One of its purposes is to overcome the obstacles to data sharing and interoperability which are caused by the binding of data and information by discipline, organizations, policies and technologies.¹²⁹ In short, the BRDI seeks to further the President's agenda of "maximizing the power of technology" for our economy and society.¹³⁰

¹²⁸ See Board on Research Data and Information, Background at http://sites.nationalacademies.org/PGA/brdi/PGA_047619 accessed on 22 October 2009.

¹²⁹ Ibid.

¹³⁰ Ibid.



Acting through the NRC, BRDI focuses on the following tasks:

1. Address emerging issues in the management, policy, and use of research data and information at the national and international levels.
2. Through studies and reports of the NRC, provide independent and objective advice, reviews of programs, and assessment of priorities concerning research data and information activities and interests of its sponsors.
3. Encourage and facilitate collaboration across disciplines, sectors, and nations with regard to common interests in research data and information activities.
4. Monitor, assess, and contribute to the development of U.S. government and research community positions on research data and information programs and policies.
5. Initiate or respond to requests for consensus studies, workshops, conferences, and other activities within the Board's mission, and provide oversight for the activities performed under the Board's auspices.
6. Broadly disseminate and communicate the results of the Board's activities to its stakeholders and to the general public.¹³¹

On 24 September 2009, the BRDI held a public symposium on “Scientific Data for Evidence Based Policy and Decision Making” in the National Academy of Sciences Auditorium, Washington, DC. The symposium featured presentations by high-level Administration officials¹³² on the use of scientific data to inform policy and decision making in areas such as health and the environment. These presentations were then followed by a panel discussion of invited speakers and several Board members, providing an opportunity for audience interaction.¹³³

The BRDI held a further “Symposium on the Data Sharing Plans and on the Scientific Benefits of Data Sharing in GEOSS” on 16 November 2009 in the Woodrow Wilson International Center for Scholars, Washington, DC.¹³⁴ This symposium was intended to:

present the key elements of the draft Implementation Guidelines for the GEOSS Data Sharing Principles, provide an overview of the history and plans of the GEO Data Sharing Task Force, and highlight some of the positive outcomes from the sharing of environmental data for the progress of scientific research, focusing on several of the GEOSS societal benefit areas.¹³⁵

“Ensuring the Integrity, Accessibility and Stewardship of Research Data in the Digital Age”, Committee on Ensuring the Utility and Integrity of Research Data in a Digital Age, National Academy of Sciences (2009)

This report by the National Academy of Sciences, Committee on Ensuring the Utility and Integrity of Research Data in a Digital Age,¹³⁶ addresses the complex issues raised as digital technologies

¹³¹ <http://sites.nationalacademies.org/PGA/brdi/index.htm> accessed on 22 October 2009.

¹³² The speakers were Beth Noveck, Deputy Chief Technology Officer for Open Government, Office of Science and Technology Policy, Executive Office of the President; Vivek Kundra, Chief Information Officer, Office of Management and Budget, Executive Office of the President; Janet Woodcock, Director of the Center for Drug Evaluation and Research, Food and Drug Administration; and Peter Preuss, Director of the National Center for Environmental Assessment, Environmental Protection Agency. Slides and the audiocase of the symposium are available at http://sites.nationalacademies.org/PGA/brdi/PGA_052920 accessed on 22 October 2009.

¹³³ See http://sites.nationalacademies.org/PGA/brdi/PGA_052920 accessed on 22 October 2009.

¹³⁴ See http://sites.nationalacademies.org/PGA/brdi/PGA_054308 accessed on 15 February 2010.

¹³⁵ See Symposium on the Data Sharing Plans and on the Scientific Benefits of Data Sharing in GEOSS (draft announcement) available at http://www.earthobservations.org/meetings/20091116_dsp_draft_announcement.pdf accessed on 15 February 2010.

¹³⁶ Committee on Ensuring the Utility and Integrity of Research Data in a Digital Age, National Academy of Sciences, *Ensuring the Integrity, Accessibility, and Stewardship of Research Data in a Digital Age*, The National Academies



expand the power and reach of research. In particular, the authoring committee suggests a new approach to design and management of research project with respect to three issues – integrity, accessibility, and stewardship.

For each of these issues, the authoring committee has developed “a fundamental principle that applies in all fields of research regardless of the pace or nature of technological change”.¹³⁷

- Data Integrity Principle: Ensuring the integrity of research data is essential for advancing scientific, engineering, and medical knowledge and for maintaining public trust in the research enterprise. Although other stakeholders in the research enterprise have important roles to play, researchers themselves are ultimately responsible for ensuring the integrity of research data.
- Data Access and Sharing Principle: Research data, methods, and other information integral to publicly reported results should be publicly accessible.
- Data Stewardship Principle: Research data should be retained to serve future uses. Data that may have long-term value should be documented, referenced, and indexed so that others can find and use them accurately and appropriately.¹³⁸

These fundamental principles are in turn followed by 11 recommendations, four of which relate to the Data Access and Sharing Principle:

Recommendation 5: All researchers should make research data, methods, and other information integral to their publicly reported results publicly accessible in a timely manner to allow verification of published findings and to enable other researchers to build on published results, except in unusual cases in which there are compelling reasons for not releasing data. In these cases, researchers should explain in a publicly accessible manner why the data are being withheld from release.

Recommendation 6: In research fields that currently lack standards for sharing research data, such standards should be developed through a process that involves researchers, research institutions, research sponsors, professional societies, journals, representatives of other research fields, and representatives of public interest organizations, as appropriate for each particular field.

Recommendation 7: Research institutions, research sponsors, professional societies, and journals should promote the sharing of research data through such means as publication policies, public recognition of outstanding data-sharing efforts, and funding.

Recommendation 8: Research institutions should establish clear policies regarding the management of and access to research data and ensure that these policies are communicated to researchers. Institutional policies should cover the mutual responsibilities of researchers and the institution in cases in which access to data is requested or demanded by outside organizations or individuals.

In addition, the authoring committee reviewed the laws and policies relating to the ownership of research data and related products (specifically under the heads of copyright, database protections and licensing).¹³⁹ It considers that U.S. copyright law, which does not protect raw data and other facts,¹⁴⁰ serves as a basic framework “to support the open flow of research data”.¹⁴¹ On the other hand, digital technologies and the increased use of contracts and licensing are creating new

Press, Washington D.C., 2009, available at http://books.nap.edu/catalog.php?record_id=12615&utm_medium=email&utm_source=National%20Academies%20Press&utm_campaign=NAP+mail+new+11.24.09&utm_content=Downloader&utm_term accessed on 28 January 2010.

¹³⁷ Ibid, Summary, p 2.

¹³⁸ Ibid, Summary.

¹³⁹ Ibid, p 73.

¹⁴⁰ *Feist Publications, Inc. v Rural Telephone Service Co.* 499 U.S. 340 (1991), available at <http://laws.findlaw.com/us/499/340.html>.

¹⁴¹ Ibid, p 74.



approaches to commercializing the provision of data and data service.¹⁴² Nevertheless, the authoring committee concludes that an active commercial data-base market can coexist with an open access regime. It also emphasizes the importance of licensing in providing open access to data:

Although, as noted above, data are not subject to copyright protection, **uncertainties about what data users are legally allowed to do with them can inhibit sharing and reuse.** For example, it may not be clear whether a particular data collection is copyrightable or whether the creator intends to assert copyright.

The fact that copyright persists for many years—whether it is asserted or not—means that a database may need to be actively placed into the public domain in order for users to be certain that it is free from copyright restrictions and any type of reuse is permitted. Creative Commons and its offshoot, Science Commons, have developed a number of innovations in the area of licensing aimed at facilitating open dissemination, sharing, and use of a wide variety of information, including data. For example, Creative Commons recently launched its CC0 (“CCZero”) protocol that allows creators of copyrightable work, including database generators, to waive all rights they may have to a given work, to the extent possible in the applicable jurisdiction.¹⁴³ [emphasis added]

Proposed US Science Budget Increase (2010)

In spite of the economic downturn, President Obama still showed support for science research undertaken by research agencies including the National Science Foundation, National Institutes of Health and NASA, in his 2010 budget proposals.¹⁴⁴ However, as noted in the Editorial in the 3 February 2010 online issue of *Nature*, whilst researchers may be relieved at the proposed increases in the Presidential budget, there will be high expectations on the delivery of results and for accountability.¹⁴⁵ To this end, the Editorial observes that public research agencies can convince the nation that the president's trust is not misplaced by posting high-value data sets from their grantees on Data.gov, which would be entirely consistent with the Obama administration's open and accountable government policy initiatives.¹⁴⁶

Data.gov portal, US Government (2009)

In May 2009, the Data.gov portal was launched as part of the Obama administration's Open Government Initiative.¹⁴⁷ The portal provides access to datasets generated and held by the US federal government.¹⁴⁸ Data.gov enables US federal government datasets to be accessed from the “raw” data catalogue and mined using tools to which links are provided from the website. The “raw” data catalogue provides instant downloads of machine readable, platform-independent datasets which are available in a range of formats including XML, CSV/TXT, KML/KMZ, and Esri. Additional metadata for a dataset is provided when a user clicks on the name of the dataset.

¹⁴² Ibid.

¹⁴³ Ibid, p 76.

¹⁴⁴ Bob Grant, *Science scores in 2010 US budget*, The Scientist (blog), 7 May 2009, available at <http://www.the-scientist.com/blog/display/55681/> accessed on 8 February 2010. See further Philip Larson, *OSTP's Tom Kalil Discusses 2011 Budget on NPR's Science Friday*, OSTP Blog, 9 February 2010 at <http://www.whitehouse.gov/blog/2010/02/09/ostp-tom-kalil-science-friday> accessed on 11 February 2010.

¹⁴⁵ ‘Stand and Deliver’, *Nature* 463, 587-588 (4 February 2010) doi:10.1038/463587b, published online 3 February 2010 at <http://www.nature.com/nature/journal/v463/n7281/full/463587b.html> accessed on 8 February 2010.

¹⁴⁶ Ibid. See <http://www.data.gov>.

¹⁴⁷ See <http://www.data.gov>. The portal was developed by the Federal CIO Council as an interagency Federal initiative.

For more details see <http://www.data.gov/faq>.

¹⁴⁸ See <http://www.data.gov/about>.



The purpose of the website is to:

increase public access to high value, machine readable datasets generated by the Executive Branch of the Federal Government.¹⁴⁹

A clear goal of the initiative is to promote participatory democracy through greater engagement between government and its citizens. As the website states:

[p]ublic participation and collaboration will be one of the keys to the success of Data.gov. Data.gov enables the public to participate in government by providing downloadable Federal datasets to build applications, conduct analyses, and perform research.¹⁵⁰

When first launched, only 47 government databases were available, but further databases have been added on a daily basis.¹⁵¹ Within a couple of weeks of launch, the number of databases grew to almost 100. By January 2010, there were more than 168,000 datasets online.¹⁵²

Examples of extensive datasets that can be downloaded from Data.gov are the Landsat Satellite data¹⁵³ and the US Geological Survey (USGS) Oil and Gas Assessment Database¹⁵⁴ and the USGS Mineral Resource Data System which includes descriptions of mineral resources throughout the world.¹⁵⁵ Further, a wide range of new, high-value datasets has been uploaded by federal agencies in accordance with the Open Government Directive.¹⁵⁶ These new datasets cover information ranging from educational outcomes by the Department of Education¹⁵⁷ to medical services by the Department of Health and Human Services.¹⁵⁸

“Data.gov: Unlocking the Federal Filing Cabinets”, Saul Hansell, NY Times (2009)

This article, *Data.gov: Unlocking the Federal Filing Cabinets* by Saul Hansell of the New York Times,¹⁵⁹ highlights the significance of Data.gov as a catalog of various sets of data from government agencies. Unlike the publishing of information (which has been done on paper for centuries, and in electronic form for decades), the format of the information on Data.gov, as a first step, is primarily for machines:

¹⁴⁹ Ibid.

¹⁵⁰ Ibid.

¹⁵¹ For a comment on Data.gov upon launch, see A Madrigal, ‘Data.gov launches to mixed reviews’, *Wired*, 21 May 2009 at <http://www.wired.com/wiredscience/2009/05/datagov-launches-to-mixed-reviews/>.

¹⁵² Vivek Kundra, *They Gave Us The Beatles, We Gave Them Data.gov*, 21 January 2010, <http://www.whitehouse.gov/blog/2010/01/21/they-gave-us-beatles-we-gave-them-datagov> accessed on 27 January 2010.

¹⁵³ Land-surface images of the entire earth, each approximately 100mi. x 100mi., from 1972 to the present, in KMZ file format, available at <http://www.data.gov/details/93>.

¹⁵⁴ From 1995 to 2009, in Esri file format, available at <http://www.data.gov/details/94>.

¹⁵⁵ From 1996 on, in Esri file format, available at <http://www.data.gov/details/14>.

¹⁵⁶ Norm Eisen, *Another Milestone In Making Government More Accessible and Accountable*, 23 January 2010, available at <http://www.whitehouse.gov/blog/2010/01/22/another-milestone-making-government-more-accessible-and-accountable> accessed on 27 January 2010. The Open Government Directive is available at <http://www.whitehouse.gov/open/documents/open-government-directive>.

¹⁵⁷ See <http://www.data.gov/details/1616> and <http://www.data.gov/details/1617> accessed on 27 January 2010.

¹⁵⁸ See <http://www.data.gov/details/1470> accessed on 27 January 2010.

¹⁵⁹ Saul Hansell, ‘Data.gov: Unlocking the Federal Filing Cabinets’, *New York Times*, 22 May 2009, available at <http://bits.blogs.nytimes.com/2009/05/22/datagov-unlocking-the-federal-filing-cabinets/> accessed on 19 June 2009.



...the idea is to offer the data in one of several standardized formats, ranging from a simple text file that can be read by a spreadsheet program to the XML format widely used these days for the exchange of information between Web services. Other data is presented in formats that are meant to feed into mapping programs.

The value of this, of course, is that when information is made available this way, then anyone can analyze it or write a program to do so. The Sunlight Foundation is running a contest¹⁶⁰ to find the best applications that use this data.

In response to criticisms regarding the initial small number of data sets in comparison to the private website USGovXML.com,¹⁶¹ the author points out that:

...there is a difference between someone accumulating a list of data already published and the White House putting its weight behind an initiative to unlock government information in standard formats.

Further, the article outlines the simple usability of the data. For instance, some of the data sets have links to tools allowing users to draw tables and graphs. In addition, there is a good array of widgets which lets users put the latest available information right on their own website. In true Web 2.0 style, Data.gov also asks its users to rate each source of data, potentially helping other users find the very best statistics.

The author ends the article with his view on the main purpose of Data.gov:

I see it mainly as a way to tell bureaucrats that the information that they are collecting is actually meant for the public, not just the file cabinet, the Federal Register or some proprietary system of use only to industry experts.¹⁶²

Recovery.gov - Access to data related to Recovery Act spending (2009)

On 28 September 2009, the Recovery Accountability and Transparency Board launched its \$18 million redesign of Recovery.gov.¹⁶³ The site, meant to allow citizens to track the \$787 billion in stimulus spending, is currently just a new front-end for the existing USASpending.gov database that already reported federal contracts.¹⁶⁴

Recovery Accountability and Transparency Board Chairman, Earl Devaney promised the people raw data in an interview with Nextgov:

Our goal here is to provide the facts and the tools for the public to decide whether that is a good use of the public's money. We're going to put the facts and the tools up so that people can mash it up.¹⁶⁵

However, several shortcomings of the initiative have been raised. It appears that the site's effectiveness might be limited by a lack of public interest in the program and the Office of

¹⁶⁰ See <http://sunlightlabs.com/contests/appsforamerica2/> accessed on 10 September 2009.

¹⁶¹ See <http://www.usgovxml.com/> accessed on 10 September 2009.

¹⁶² Saul Hansell, 'Data.gov: Unlocking the Federal Filing Cabinets', *New York Times*, 22 May 2009, available at <http://bits.blogs.nytimes.com/2009/05/22/datagov-unlocking-the-federal-filing-cabinets/> accessed on 19 June 2009.

¹⁶³ See <http://www.recovery.gov/Pages/home.aspx> accessed 1 September 2009.

¹⁶⁴ Jerry Brito, 'Recovery.gov almost there, but not yet', *Surprisingly Free*, 30 September 2009, available at <http://surprisinglyfree.com/2009/09/30/recovery-gov-almost-there-but-not-yet/> accessed on 1 October 2009.

¹⁶⁵ Aliya Sternstein, 'Recovery.gov asks citizen developers for ways to improve site', *Nextgov*, 25 September 2009, available at http://www.nextgov.com/nextgov/ng_20090925_1696.php accessed on 1 October 2009.



Management and Budget's purported lax rules dictating how frequently and detailed the expenditures and jobs reports need to be.¹⁶⁶ Whilst the extensive amount of detail could be alienating to the average American, Andrew Rasiej, the New York-based founder of Personal Democracy Forum, noted that it is probably more significant that the federal government is attempting to share such information.¹⁶⁷ Despite its shortcomings, officials at the Seattle-based business intelligence firm Onvia, which created the unofficial stimulus-tracking site Recovery.org, applauded the effort, considering it to be part of “the next wave in the transparency movement, in general”.¹⁶⁸

The real test was said to come when stimulus-specific reports from recipients were included.¹⁶⁹ Since their release in October 2009,¹⁷⁰ the results of these recipient reports have been plagued with inaccuracies and complications, stemming from over-counting and under-counting.¹⁷¹ To address these problems, the Office of Management and Budget (OMB) reviewed its guidelines¹⁷² – instead of calculating a cumulative tally of jobs created and saved by the stimulus, Recovery.gov will post only a count of jobs in projects funded with stimulus money for each quarter (whether or not that person was in danger of losing his or her job).¹⁷³

In its defence, OMB spokesman Tom Gavin pointed out that the new guidance was a step in improving this reporting initiative that had never been tried before:

Many of those people who are being critical now of the revised approach are the same people who complained in October that the system was too complicated. Whether it's a cumulative look or a quarterly look, it will still provide an unparalleled level of detail about what's happening on the local level thanks to the Recovery Act.¹⁷⁴

Federal Register published in XML format (2009)

The Federal Register, described as the “newspaper of our democracy”, provides the most comprehensive overview of how federal agencies are dealing with various issues ranging from clean air and water to highway safety to science policy.¹⁷⁵ In line with President Obama's

¹⁶⁶ Aliya Sternstein, ‘New Recovery.gov's intent remains laudable, but execution still in question’, *Nextgov*, 29 September 2009, available at http://www.nextgov.com/nextgov/ng_20090929_5918.php?oref=topnews accessed on 1 October 2009.

¹⁶⁷ Ibid.

¹⁶⁸ Ibid.

¹⁶⁹ Ibid.

¹⁷⁰ See Christopher Flavelle, ‘Recovery.gov Releases First Batch of Stimulus Reports’, *ProPublica*, 15 October 2009, available at <http://www.propublica.org/ion/stimulus/item/recovery.gov-releases-first-batch-of-stimulus-reports-1015> accessed on 27 January 2010.

¹⁷¹ Michael Grabell, ‘White House Changes Stimulus Jobs Count’, *ProPublica*, 11 January 2010, available at <http://www.propublica.org/ion/stimulus/item/white-house-changes-stimulus-jobs-count-111> accessed on 27 January 2010.

¹⁷² Peter Orszag, Office of Management and Budget Director, *Memorandum for the Heads of Executive Departments and Agencies: Updated Guidance on the American Recovery and Reinvestment Act – Data Quality, Non-Reporting Recipients, and Reporting of Job Estimates*, 18 December 2009, available at http://www.whitehouse.gov/omb/assets/memoranda_fy2009/m09-18.pdf accessed on 27 January 2010.

¹⁷³ Michael Grabell, ‘White House Changes Stimulus Jobs Count’, *ProPublica*, 11 January 2010, available at <http://www.propublica.org/ion/stimulus/item/white-house-changes-stimulus-jobs-count-111> accessed on 27 January 2010.

¹⁷⁴ Ibid.

¹⁷⁵ Ray Mosley, *Federal Register 2.0: Opening a Window onto the Inner Workings of Government*, OSTP Blog, 5 October 2009, available at <http://blog.ostp.gov/2009/10/05/federal-register-20-opening-a-window-onto-the-inner-workings-of-government/> accessed on 27 January 2010.



Memorandum on Transparency and Open Government,¹⁷⁶ the National Archives released the Federal Register spanning 10 years (2000-2009) in Extensible Markup Language (XML) on various Federal Government web portals.¹⁷⁷

Release in XML format (a form of text that can be manipulated with digital applications) allows people to personalize the Federal Register's contents to match their particular interests via the development of new applications.¹⁷⁸ According to Ray Mosley, Director of the Federal Register, this advancement "paves the way for consumers, rather than Government officials to be in charge of deciding how to access critical information".¹⁷⁹ In contrast with the previous dense, detailed and chronologically organized format, it is anticipated that new software tools will proliferate and greatly enhance the Federal Register's readability and relevance to the public.¹⁸⁰

"A Call to Action for State Government: Guidance for Opening the Doors to State Data", NASCIO (2009)

In September 2009, the National Association of State Chief Information Officers (NASCIO) published a resource entitled *A Call to Action for State Government: Guidance for Opening the Doors to State Data*.¹⁸¹ The report encourages the states to follow suit in the steps of the Federal Government and its development of the data.gov portal, and to make available raw, machine-readable data.

The report puts forward a comprehensive list of benefits associated with the "democratization of data",¹⁸² guidance and best practice recommendations on how State Governments should proceed. As a first step, the report advises that State CIOs should make currently available datasets more available through a central portal (whether via the development of a separate data warehouse or via linked data techniques).¹⁸³ In addition, the report lists the Open Government Data Principles,¹⁸⁴ promotes the adoption of a standard metadata mode, and suggests which type of data which should or should not be shared.

¹⁷⁶ See http://www.whitehouse.gov/the_press_office/TransparencyandOpenGovernment/ accessed on 27 January 2010.

¹⁷⁷ The National Archives, *The White House, National Archives And Government Printing Office Achieve Open Government Milestone* (Press Release, 5 October 2009), available at <http://www.archives.gov/press/press-releases/2010/nr10-02.html> accessed on 27 January 2010.

¹⁷⁸ Ibid.

¹⁷⁹ Ibid.

¹⁸⁰ Ray Mosley, *Federal Register 2.0: Opening a Window onto the Inner Workings of Government*, OSTP Blog, 5 October 2009, available at <http://blog.ostp.gov/2009/10/05/federal-register-20-opening-a-window-onto-the-inner-workings-of-government/> accessed on 27 January 2010.

¹⁸¹ National Association of State Chief Information Officers (NASCIO), *A Call to Action for State Government: Guidance for Opening the Doors to State Data*, September 2009, available at <http://www.nascio.org/publications/documents/NASCIO-DataTransparency.pdf> accessed on 28 January 2010.

¹⁸² Ibid, p 3. For example, these benefits include:

- Greater government accountability, credibility and integrity;
- A more informed public; and
- Potentially new correlations and understanding that can lead to the identification of opportunities for government, business, academia and non-profits. This can be accomplished through mashups.

¹⁸³ Ibid, p 7.

¹⁸⁴ See <http://wiki.opengovdata.org/index.php?title=OpenDataPrinciples> accessed on 28 January 2010.



“Open Government Agenda Spills into States and Localities”, Robynn Sturm, Assistant Deputy Chief Technology Officer (2009)

In a White House blog entry entitled *Open Government Agenda Spills into States and Localities*,¹⁸⁵ Assistant Deputy Chief Technology Officer Robynn Sturm commends several states and cities for “increasing transparency and civic engagement” and “taking bold steps towards greater openness”. In particular, she summarises these efforts:

- New York State’s Empire 2.0¹⁸⁶ and NYC Big Apps;¹⁸⁷ and
- San Francisco’s DataSF.org.¹⁸⁸

In closing, she recognises the importance of these localised initiatives and invites responses to the Office of Science & Technology Blog on the issue:

States and cities have always served as a laboratory for democracy. The examples mentioned here are but a handful of open government initiatives cropping up across the country. If your town, county, state, or region is launching a new open government initiative or perfecting a successful model, we want to hear about it. We look forward to hearing your comments over at the OSTP blog.¹⁸⁹

“Mayor Bloomberg announces five technology initiatives to improve accessibility, transparency and accountability across City Government” Office of the Mayor, New York City (2009)

On 29 June 2009, Mayor Michael R. Bloomberg announced a series of technology initiatives designed to increase transparency and improve access to information about City services. Mayor Bloomberg stated that:

We’ve already made great strides increasing the accessibility of City data and transparency of City government, and these initiatives will use private sector technological innovation to bolster those efforts. Through NYC Big Apps, 311 Online and services offered by Skype, Twitter and Google, we’re working to provide public information to New Yorkers in as many ways as possible.¹⁹⁰

Federal Chief Technology Officer Aneesh Chopra praised NYC’s initiatives, stating:

¹⁸⁵ Robynn Sturm (Assistant Deputy Chief Technology Officer), *Open Government Agenda Spills into States and Localities*, The White House – Blog, 27 August 2009, available at <http://www.whitehouse.gov/blog/Open-Government-Agenda-Spills-into-States-and-Localities/>.

¹⁸⁶ See <http://www.cio.ny.gov/OFT/empire20.htm> accessed 17 September 2009.

¹⁸⁷ See http://nyc.gov/portal/site/nycgov/menuitem.c0935b9a57bb4ef3daf2f1c701c789a0/index.jsp?pageID=mayor_press_release&catID=1194&doc_name=http%3A%2F%2Fwww.nyc.gov%2Fhtml%2Fom%2Fhtml%2F2009a%2Fpr294-09.html&cc=unused1978&rc=1194&ndi=1 accessed 17 September 2009.

¹⁸⁸ See <http://datasf.org/> accessed 17 September 2009.

¹⁸⁹ See <http://blog.ostp.gov/2009/08/27/open-government-agenda-spills-into-states-and-localities/> accessed 17 September 2009.

¹⁹⁰ *Mayor Bloomberg announces five technology initiatives to improve accessibility, transparency and accountability across City Government*, Office of the Mayor, New York City, 29 June 2009, available at http://nyc.gov/portal/site/nycgov/menuitem.c0935b9a57bb4ef3daf2f1c701c789a0/index.jsp?pageID=mayor_press_release&catID=1194&doc_name=http%3A%2F%2Fwww.nyc.gov%2Fhtml%2Fom%2Fhtml%2F2009a%2Fpr294-09.html&cc=unused1978&rc=1194&ndi=1 accessed 17 September 2009.

We applaud New York City's leadership on delivering a more open and innovative government. These five announcements align well to President Obama's Open Government Initiative and reflect best practices worthy of replication to achieve excellence in public sector performance.¹⁹¹

Department of Information Technology and Telecommunications Commissioner Cosgrave acknowledged that:

Today's package of initiatives represents an historic stride in transparency - even for systems that have made accessibility commonplace. As successful as we have been in opening up City government to those it serves, **the key to technology deployment for any organization is to continue innovating.** As 311 and NYC.gov grow, the City needs to adapt and engage New Yorkers in utilizing the data it collects to keep fresh these enduring avenues of access.¹⁹² [emphasis added]

Mayor Bloomberg's press release sets out a summary of the five initiatives:

NYC Big Apps

Through the NYC Big Apps annual competition, the City will provide an array of data sets to encourage the public to develop applications that could benefit New Yorkers. Approximately 80 data sets from across 32 City agencies and commissions may be made available on NYC.gov, including such categories as citywide events, property records and sales information, recreational facility directories and restaurant inspection information. The City will invite the public to create innovative applications, and winners will be awarded a cash prize and marketing opportunities.

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311 Online

Mayor Bloomberg launched 311 Online, a one-stop, searchable web portal on NYC.gov for thousands of New York City services. Through the site, New Yorkers can obtain information, report problems, lodge complaints, check the status of previously-filed complaints and request City services - just as they can by calling 311. Users can browse through a directory of City services, search for available services by specific demographic or service type, and access quick links to featured services and top services. Keyword searches and advanced search options allow customers to navigate directly to the information. Users will be able to attach pictures, videos and audio files to their complaints and service requests.

311 Skype and Twitter Accounts

The Mayor announced 311 Skype and Twitter accounts. Through Skype - a software application that enables calls to be made over the Internet - people from around the world will be able to call 311 for free. The City will use Twitter - the free, social messaging service - to 'tweet' information regularly about such things as alternate side of the street parking status, schools closures and information about citywide events.

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Google Collaboration to Improve Site Content on NYC.gov

The Mayor also announced that the City is working with Google to use Google search patterns to better understand the usage of NYC.gov and ultimately improve site content. By analyzing trends for New York City-related searches made by Google users, the City will tailor content to user preferences and improve customer service.

New York State Empire 2.0 (2009)

¹⁹¹ Ibid.

¹⁹² Ibid.



On 5 June 2009, New York State Chief Information Officer (CIO)/Office for Technology (OFT) Dr. Melodie Mayberry-Stewart announced the launch of Empire 2.0 – a “social media networking initiative designed to promote government participation, increase collaboration and expand the state’s ability to share information with social media users”.¹⁹³ The Empire 2.0 strategy is described as:

...a roadmap for New York Executive Branch agencies to use Web 2.0, new media, and social collaborative tools and technologies to improve intergovernmental communications and encourage citizen involvement by initiating conversations to strengthen our communities and government. The Empire 2.0 strategy encourages New York State agencies to embrace these engaging technologies to interact with citizens, businesses, and employees with increased efficiency, collaboration, transparency, and openness.¹⁹⁴

The goals of Empire 2.0 are to:

- Promote open and transparent government for policy- and decision-making.
- Increase collaboration and participation by engaging New York State constituents through the use of innovative tools and new media technologies.
- Increase the awareness of government initiatives to the *Generation V* (virtual) community.¹⁹⁵

On the importance of social media networking to state agencies and to the flow of information to the public, the CIO stated that:

We believe the interactivity and personalization associated with next generation technology like social media networking and Web 2.0 tools will enable state agencies to bring communications to a new level. We must meet the needs of millions of people who spend their time on social media sites with personalized, interactive tools they have come to expect to get instantaneous information and to engage in our democracy.¹⁹⁶

Beth Noveck, Deputy CTO of the open government initiative at the Office of Science and Technology further elaborated on the process, stating:

If we have the platforms, if we have the technology, marry it to a process that allows people to contribute their ideas or expertise, and marry that to laws that say it is OK. The hope is we can lead to and create a more open government.¹⁹⁷

Ca.gov - State of California data portal (2009)

Similar to the Obama administration’s “Data.gov” initiative, the Californian Government has launched its own data portal which provides access to raw State data files, databases, geographic data, and other data resources.¹⁹⁸ State data files, which include data such as air quality statistics, demographics projections and twitter feeds, are available in a variety of formats such as CSV, XLS, KML, TXT, and XM.¹⁹⁹ In turn, the site links to 26 different state databases, ranging from California ballot measures to travel and tourism data. Geographical data is made available via

¹⁹³ New York State Chief Information Officer, New York State Office for Technology, *New York State Launches Empire 2.0*, 5 June 2009, available at http://www.cio.ny.gov/News/Press_web20.htm accessed 17 September 2009.

¹⁹⁴ Ibid.

¹⁹⁵ New York State Chief Information Officer/Office for Technology, *Empire 2.0: Suggested Practices for Social Networking*, available at http://www.cio.ny.gov/assets/documents/CIO-OFT_Business_Uses_of_Social_Networking_Quick_Card_Final.pdf accessed 17 September 2009.

¹⁹⁶ New York State Chief Information Officer, New York State Office for Technology, *New York State Launches Empire 2.0*, 5 June 2009, available at http://www.cio.ny.gov/News/Press_web20.htm accessed 17 September 2009.

¹⁹⁷ Ibid.

¹⁹⁸ See <http://www.ca.gov/data/default.html>.

¹⁹⁹ See http://www.ca.gov/data/state_data_files.html accessed on 26 June 2009.



various GIS shapefiles, Google maps as well as XML, KML and ZIP files.²⁰⁰ The top downloads from the website include demographics, health statistics, state contracts and traffic records.²⁰¹

The website makes it clear that the data files can be reused by citizens and organizations for their own web applications and mashups. The portal provides easy access by allowing subscription to various topics via RSS feed or email list.²⁰² Citizens are invited by the website to provide feedback and suggest additional datasets to be included.²⁰³

DataSF.org – City of San Francisco’s public data clearinghouse

Heavily inspired by President Obama’s January 21st memo on transparency and the City of Vancouver’s May 19th motion on “Open Data, Open Standards and Open Source”, the San Francisco Department of Technology and the Office of Economic and Workforce Development began the OpenSF project. One of the OpenSF project’s directives was that “all data created by the City of San Francisco must be readily and easily available to anyone in the world at no cost”, and under this third directive, the DataSF project was born.²⁰⁴

On 19 August 2009, San Francisco Mayor Gavin Newsom announced the beta launch of DataSF.org, a website designed as a clearinghouse of datasets from the City & County of San Francisco.²⁰⁵ DataSF.org is a centralized data repository that will give the public access to raw government data in machine readable formats.²⁰⁶ The initial phase of the web site includes more than 100 datasets, from a range of city departments, including Police, Public Works, and the Municipal Transportation Agency.²⁰⁷ For example, there are Police Department Crime Reporting Plots in the format of shapefiles,²⁰⁸ the Health Department’s restaurant inspection report and scoring system²⁰⁹ and even a list of street trees with the planting date, species, and location.²¹⁰

²⁰⁰ See http://www.ca.gov/data/geographic_data.html accessed on 26 June 2009.

²⁰¹ See <http://www.ca.gov/data/default.html> accessed on 26 June 2009.

²⁰² See http://www.ca.gov/multimedia_rss.html accessed on 26 June 2009. RSS or Really Simple Syndication is a format for delivering regularly changing Web content to users. The RSS feeds provide headlines and descriptions of content, along with links to the full articles.

²⁰³ See <http://www.ca.gov/data/default.html>.

²⁰⁴ See Kelly Pretzer (San Francisco, Office of Economic and Workforce Development), *DataSF: San Francisco on the Road to Openness, Gov 2.0 Expo, 9 August 2009*, available at <http://www.gov2expo.com/gov2expo2009/public/schedule/detail/10367> accessed on 3 September 2009.

²⁰⁵ See <http://datasf.org/>.

²⁰⁶ See Kelly Pretzer (San Francisco, Office of Economic and Workforce Development), *DataSF: San Francisco on the Road to Openness, Gov 2.0 Expo, 9 August 2009*, available at <http://www.gov2expo.com/gov2expo2009/public/schedule/detail/10367> accessed on 3 September 2009.

²⁰⁷ Xení Jardin, *City of San Francisco promises to "open its data" with DataSF.org*, Boing Boing, 19 August 2009, available at <http://www.boingboing.net/2009/08/19/city-of-san-francisc.html> accessed 3 September 2009.

²⁰⁸ See <http://datasf.org/story.php?title=sfpd-crime-reporting-plots-> accessed 3 September 2009.

²⁰⁹ See <http://datasf.org/story.php?title=restaurant-scores> accessed on 3 September 2009.

²¹⁰ See <http://datasf.org/story.php?title=street-tree-list> accessed on 3 September 2009.



“Open Data is Civic Capital Best Practices for ‘Open Government Data’”, Joshua Tauberer (2009)

In this “best practices guide for governments embracing the notion of ‘open data’”, Joshua Tauberer²¹¹ discusses “why open government data is beneficial to society, i.e. how it is civic capital, and what kinds of technological considerations must be made when making government data open.”²¹² The author begins by defining “open government data” as “public government information, such as government records, that is shared with the public digitally, over the Internet, in a way that promotes analysis and reuse.”

The document is then separated into three parts:

- Part one discusses how government data is civic capital, by way of examples.
- The subsequent section explains why technological choices can make data either more or less valuable to society, and how so-called "machine processable data" gives the public the most potential to put data to use.
- The last part of the document recommends priorities for government agencies with regard to data and outlines best practices at a technical level for making government data open. It is a synthesis of the many recommendations made by previous working groups and organizations.

In the first part of the document, headed “Open Data as Civic Capital”, the author emphasises the role of information as a crucial driving force in innovation. Further, “[g]overnments, as a major producer of information, are therefore in a strong position to spur innovation by promoting open government data”.²¹³ The author quotes U.S. National Weather Service (NWS) director of strategic planning and policy, Edward Johnson, who states that:

...the U.S. government actually gains more from the stimulation of economic activity by making all this information available, widely, easy to use, and inexpensively than we would gain if we were to charge for it.²¹⁴

Besides “a boon to a national economy”, the author is of the view that better governance is perhaps the most important component to open government data. Further, he elaborates that better governance comes in two ways, that is, firstly, basic civic education by keeping the public informed about workings of government, and secondly, by making the public more self-reliant, therefore reducing the need for government regulation. In regards to latter, it is suggested that:

...the more information the public has at its disposal to evaluate goods and services, the better functioning markets will be and the less need there will be for government interference. The expense of sharing, or even collecting, such information may outweigh the costs of regulation.

In the second part of the document, the author discusses why data format (and not just its subject) matters:

²¹¹ Joshua Tauberer (<http://razor.occams.info>) runs www.GovTrack.us, a non-government congressional transparency website.

²¹² Joshua Tauberer, *Open Data is Civic Capital: Best Practices for "Open Government Data"*, version 1.1, 20 July 2009, available at <http://razor.occams.info/pubdocs/opendataciviccapital.html> accessed 24 September 2009.

²¹³ See Sean Gorman, ‘Information as a Public Good’, *Intergovernmental Solutions Newsletter: Transparency and Open Government (Spring 2009)*, p1. 2009, GSA Office of Citizen Services and Communications, U.S.A. government, available at http://www.usaservices.gov/events_news/documents/Transparency_000.pdf accessed 24 September 2009.

²¹⁴ Joshua Tauberer, *Open Data is Civic Capital: Best Practices for "Open Government Data"*, version 1.1, 20 July 2009, available at <http://razor.occams.info/pubdocs/opendataciviccapital.html> accessed 24 September 2009.



Format determines the value of the resource and the extent to which the public can exploit it for analysis and reuse. This section makes two key points:

- Government information must be pro-actively published in a **machine-processable format** so that the public can sort, search, and transform the information to meet their needs.
- The choice of data format matters. Some data formats are particularly susceptible to **obsolescence**, unintended **technological limitations**, and patent **licensing restrictions**.

.....
In comparing a free-form report with a machine-processable table, the difference in value is immense. The former limits itself to being read. The latter opens up new possibilities for analysis, from helping the public to keep up with scheduled hearings or allowing them to perform oversight or educating their peers.

In addition, the author considers the risk of obsolescence which may prevent archival access to the information, and the importance of using non-proprietary, open formats to counteract that risk:

Reliance on a single vendor's tools and formats increases the likelihood of obsolescence. Though all formats are at risk, some formats are more susceptible than others. The Cornell University Library's Digital Preservation Management guide²¹⁵ notes that "proprietary, closed specifications" are the most at-risk for obsolescence. These formats are at risk because they are tied to a single product or company.

.....
The least at-risk formats are **non-proprietary, open formats**. These tend to promote a wide range of uses, backward and forward compatibility, and an independence from short-term commercial interests. "Open" here means freely available and public documentation of the standard exists that may be legally re-implemented by archivists to access otherwise lost records. These data formats are generally implemented in open source software, software that can be freely distributed and modified.

In summary, the author stresses the importance of data being disclosed in formats that:

- Do not rely on a single product or company to be used.
- Are fully documented.
- Maximize potential uses.
- Are freely available to the public without licensing, patent, or other restrictions.

In the final section headed "Best Practices", the author recommends an order of priorities as an incremental plan towards achieving best practices for Open Government Data:

1. Government agencies should first establish a basic public-facing website to meet critical and mandated needs.
2. The agency's policy regarding open data and web best practices should be established, for instance by the agency's Chief Information Officer, in consultation with the public.
3. Comprehensive bulk data access to public records maintained by the agency should be made available, e.g. with FTP. Providing the public with the agency's bulk public data ensures that the public has at least the necessary information to educate itself and perform its oversight role through searching, sorting, and transforming the information to suit its needs.
4. The agency website should then be expanded to provide searching functionality for all public records according to the needs of its visitors.
5. The last priority is for the agency to develop APIs and web services, which allow for third-parties to automatically search, retrieve, or submit information. The most basic aspects of searching and retrieving information will have already been satisfied by bulk data access.

In conclusion, the author recognises that whilst open government data is a valuable public resource, making government data open is no simple task:

²¹⁵ Cornell University Library. *Digital Preservation Management* (last complete revision December 2007) available at <http://www.icpsr.umich.edu/dpm/dpm-eng/introduction.html>, accessed 24 September 2009.



With the specific recommendations above for what makes government data open, plus a list of priorities and associated issues, it is clearly not possible to satisfy every constraint. Governments must weigh the advantages of open formats against the cost of providing data in multiple formats, and must weigh the concern of endorsement against popular demand and the state of a technological industry. The development of interoperability standards often comes at the cost of timeliness in the dissemination of the information. No government could make all data open in all of these respects.

Nevertheless, it is hoped that these principles are taken as a guide, offering a direction for higher standards at the intersection of technology, transparency, and government-funded innovation.

Frequently Asked Questions About Copyright – Issues Affecting the US Government” NASA, Defense Information Managers Group (CENDI) (2008)

This document in Frequently Asked Questions format explains the operation of copyright law in relation to US government materials and provides a general overview of practical aspects of copyright management.²¹⁶ It deals with US Government works, as well as works created under a federal contract or grant. It was prepared by the CENDI Copyright Task Group in response to a request from the task group members and CENDI principals.²¹⁷

Although in FAQ format, the document is not intended to provide particular guidance to any federal agency but is designed as an overview resource that could be used to educate librarians, information center staff, publications staff and agency authors about copyright. The document primarily addresses U.S. Copyright Law as provided at Title 17 of the United States Code (17 USC - Copyrights) and Title 37 of the Code of Federal Regulations, Chapter II (37 CFR, Chapter II - Copyright Office, Library of Congress).²¹⁸

Several of the FAQs addressed relate to the issue of copyright ownership by Federal, State and local government agencies. These include:

3.1.2 Is a U.S. Government work provided copyright protection?

In the United States, U.S. Government works are covered by 17 USC § 105. "Copyright protection ... is not available for any work of the United States Government, but the United States is not precluded from receiving and holding copyrights transferred to it by assignment, bequest, or otherwise." [Certain exceptions are then addressed]...

3.1.3 Does 17 USC §105 apply to works of State and Local Governments?

No, it applies only to federal government works. State and local governments may and often do claim copyright in their publications. It is their prerogative to set policies that may allow, require, restrict or prohibit claim of copyright on some or all works produced by their government units.....

²¹⁶ CENDI, *Frequently Asked Questions About Copyright – Issues Affecting the US Government*, Commerce, Energy, NASA, Defense Information Managers Group (CENDI), CENDI/2004-8, updated October 2008, available at <http://www.cendi.gov/publications/04-8copyright.html>.

²¹⁷ CENDI is an interagency working group of senior scientific and technical information (STI) managers from [13 U.S. federal agencies](#) which represents the major science agencies, the national libraries, and agencies involved in the dissemination and long-term management of scientific and technical information. The acronym CENDI stands for the Commerce, Energy, NASA, Defense Information Managers Group. These agencies' programs represent over 97% of the federal research and development budget. See <http://www.cendi.gov/>.

²¹⁸ Introductory comments on Purpose and Use of document, available at <http://www.cendi.gov/publications/04-8copyright.html>, accessed on 6 February 2009, with the material having been last revised on 8 October 2008.



3.1.5 Since U.S. Government works are not protected by copyright in the U.S., are all U.S. Government works publicly available without restriction in the U.S.?

No. The fact that U.S. Government works are not protected under the U.S. Copyright Law does not create a requirement that all U.S. Government works be made publicly available without restriction..... Federal laws and agency policies govern the public release of U.S. Government information.However, while the Government is not required to publicly disseminate all U.S. Government works, the Government does not restrict the use or distribution of most categories of U.S. Government works...

Despite the general policy of free and open information dissemination, there are exceptions based on a number of factors. Certain statutes (see Freedom of Information Act (FOIA) Exemptions) provide the Government with authority to restrict access to U.S. Government works, for example, for purposes of national security, export control, and the filing of patent applications. ..

Some agencies may have additional statutory authority to impose conditions for use.²¹⁹

B. Spatial information and the National Spatial Data Infrastructure (NSDI)

The National Spatial Data Infrastructure (NSDI)²²⁰ is a physical, organizational, and virtual network designed to enable the development and sharing of the US digital geographic information resources.²²¹ It has been described as “the technology, policies, criteria, standards and people necessary to promote geospatial data sharing throughout all levels of government, the private and non-profit sectors, and academia”. It provides a base of practices and relationships among data producers and users that facilitates data sharing and use. The NSDI was established with the aim of reducing duplication of effort among agencies, improving quality and reducing costs related to geographic information. As well as making geographic data more accessible to the public, the NSDI aims to increase the benefits of using available data and to establish partnerships among the government, academic and private sectors to increase data availability.

Numerous reports on the NSDI have been produced by the Federal Geographic Data Committee (FGDC).²²² They cover a range of topics including financing geographic information systems (GIS), assessing risks and security implications of publicly available geospatial information.

In 2005, the FGDC explained the NSDI as follows:

Why do we need geospatial data?

Government agencies and other organizations are frequently asked for quick responses to natural disasters, industrial accidents, environmental crises, and homeland security alerts. Much of the information needed to make sound decisions in such cases is based on geography. There is constant pressure to make wise decisions in a more cost effective and efficient manner. Accurate and current geospatial data are critical to these decisions.

How are geospatial data managed?

²¹⁹ <http://www.cendi.gov/publications/04-8copyright.html#312>.

²²⁰ See <http://www.fgdc.gov/nsdi/nsdi.html>.

²²¹ See GeoData.gov (US Federal, State and Local geographic data) at <http://gos2.geodata.gov/wps/portal/gos>.

²²² Available at www.fgdc.gov/library/whitepapers-reports/index.html.



Geographic information systems (GIS) that facilitate spatial analysis play an increasing role in decision making at all levels of government and in private industry. GIS analyses, in turn, depend on the availability, quality, and compatibility of digital geographic data. Development of these data is normally the highest cost factor in the use of technology to address today's problems. Billions of dollars are invested annually in producing geospatial data. Many of these data collection activities are redundant—data already exist but they are hard to find, frequently undocumented, and in incompatible formats.

.....
The NSDI will provide a base or structure of relationships among data producers and users that will facilitate data sharing. The increased ability to share data through common standards and networks will, in turn, serve as a stimulus for growth.

.....
Both the Executive Order [12906] and the recent OMB Circular [A-16] stress the importance of building partnerships to ensure effective development of the aforementioned efforts.

Building an effective NSDI will require a well-coordinated effort among Federal, tribal, State, local government, and academic institutions, as well as a broad array of private sector geographic, statistical, demographic, and other business information providers and users. Only through this cooperation will the NSDI become a reality.²²³

OMB Circular A-16 (as revised in 2002) explains the NSDI as follows:

The NSDI assures that spatial data from multiple sources (federal, state, local, and tribal governments, academia, and the private sector) are available and easily integrated to enhance the understanding of our physical and cultural world. The NSDI honors several key public values:

- Privacy and security of citizens' personal data and accuracy of statistical information on people, both in raw form and in derived information products.

Access for all citizens to spatial data, information, and interpretive products, in accordance with OMB Circular A-130.

- Protection of proprietary interests related to licensed information and data.
- Interoperability of federal information systems to enable the drawing of resources from multiple federal agencies and their partners.

The NSDI supports and advances the building of a Global Spatial Data Infrastructure, consistent with national security, national defense, national intelligence, and international trade requirements. International compatibility is an important aspect of the NSDI. Federal agencies will develop their international spatial data in compliance with international voluntary consensus standards, as defined by Circular A-119.²²⁴

The benefits of the NSDI are described as follows in OMB Circular A-16 (as revised in 2002):

Spatial data is a national capital asset. The NSDI facilitates efficient collection, sharing, and dissemination of spatial data among all levels of government institutions, as well as the public and private sectors, to address issues affecting the Nation's physical, economic, and social well-being. A coordinated approach for developing spatial data standards that apply to collecting, maintaining, distributing, using, and preservation of data will improve the quality of federal spatial data and reduce the cost of derivative products created by federal and non-federal users. Applications using spatial data that adhere to FGDC standards enable cost effective public and private policy development, management, and operations.

Implementation of [OMB Circular A-16] is essential to help federal agencies eliminate duplication, avoid redundant expenditures, reduce resources spent on unfunded mandates, accelerate the development of electronic government to meet the needs and expectations of citizens and agency programmatic mandates, and improve the efficiency and effectiveness of public management.

²²³ FGDC, *The National Spatial Data Infrastructure – Fact Sheet*, February 2005.

²²⁴ See http://www.whitehouse.gov/omb/circulars_a016_rev/#appe.



Many applications are dependent upon accurate spatial data. The benefits of the NSDI for these applications include creating a more secure Nation. Some examples include the analysis and management of utility infrastructures, transportation, energy, emergency management and response, natural resource management, weather and climate analysis, disaster recovery, homeland defense, law enforcement, protection planning, public health and other civilian or military strategic issues. The seamless spatial information needed for these applications can range from highly detailed local data, such as the nature of specific hazardous material stored in a particular room of a single building, to the various data needed for real-time projection of the probable effects of natural disasters.²²⁵

The NSDI concept has been further extended to Global SDI (GSDI) and regional SDIs. At each level, SDIs provide a means of accessing geographic information through an online directory and distributed clearinghouse based on consistent standards and policies for data sharing.

The NSDI is driven by the Federal Geographic Data Committee (FGDC),²²⁶ an interagency committee responsible for facilitating activities under Circular A-16 and implementation of the NSDI. It promotes the coordinated development, use, sharing, and dissemination of geospatial data on a national basis across the United States. The FGDC also plays a role in international spatial data infrastructure development. The FGDC was established by the Office of Management and Budget (OMB) under the 1990 revision of Circular A-16, *Coordination of Geographic Information and Related Spatial Data Activities*, and re-chartered in the August 2002 revision of Circular A-16.²²⁷ It is a 19-member interagency committee composed of representatives from the Executive Office of the President, and Cabinet level and independent Federal agencies. The Secretary of the Department of the Interior chairs the FGDC and the Deputy Director for Management, Office of Management and Budget, OMB, is the Vice-Chair. Numerous stakeholder organizations participate in FGDC activities representing the interests of state and local government, industry, and professional organizations. All US government agencies responsible for spatial data themes are required to be members of the FGDC. Since its inception, the FDGC has continued to develop and evolve its policy on public access to information with appropriate protections for the privacy and confidentiality of personal information in federal geospatial databases. OMB Circular A-16 encourages the FGDC to participate in building the Global Spatial Data Infrastructure (GSDI) along with its principal role in building the US NSDI.

The FGDC develops the NSDI through three major activities:

- establishment of a National Geospatial Data Clearinghouse, a distributed electronic network of data producers and users connected through the internet;
- development of standards for data documentation, collection and exchange, to enable data to be shared across organizational and jurisdictional boundaries on different hardware platforms and with many different software programs; and
- development of policies, procedures and partnerships to create a national digital geospatial data framework that would include important basic categories of data significant to a broad variety of users.

²²⁵ See http://www.whitehouse.gov/omb/circulars_a016_rev/#1.

²²⁶ See <http://www.fgdc.gov>.

²²⁷ See http://www.whitehouse.gov/omb/circulars_a016_rev/#1.



The components of the NSDI - data themes,²²⁸ metadata, the National Spatial Data Clearinghouse, standards and partnerships – are explained in the following terms in OMB Circular A-16 (as revised in 2002):²²⁹

(1) What are data themes?

Data themes are electronic records and coordinates for a topic or subject, such as elevation or vegetation. This Circular requires the development, maintenance, and dissemination of a standard core set of digital spatial information for the Nation that will serve as a foundation for users of geographic information. This set of data consists of themes of national significance (see Appendix E). Themes providing the core, most commonly used set of base data are known as framework data, specifically geodetic control, orthoimagery, elevation and bathymetry, transportation, hydrography, cadastral, and governmental units. Other themes of national significance are also an important part of the NSDI, and must be available to share with others. Additional data themes may be added with the approval of the FGDC.

NSDI data themes developed with appropriate metadata, using FGDC standards and served through the Clearinghouse, facilitate interoperability and information exchange across administrative boundaries.

(2) What are metadata?

Metadata are information about data and/or geospatial services, such as content, source, vintage, spatial scale, accuracy, projection, responsible party, contact phone number, method of collection, and other descriptions. Metadata are critical to document, preserve and protect agencies' spatial data assets. Reliable metadata, structured in a standardized manner, are essential to ensuring that geospatial data are used appropriately, and that any resulting analysis is credible. Metadata also can be used to facilitate the search and access of data sets or geospatial services within a Clearinghouse or data library. All spatial data collected or derived directly or indirectly using federal funds will have FGDC metadata.

(3) What is the National Spatial Data Clearinghouse?

The National Spatial Data Clearinghouse is an electronic service providing access to documented spatial data and metadata from distributed data sources. These sources include a network of data producers, managers, and users, linked through the Internet and other communications means, and accessible through a common interface. All spatial data collected by federal agencies or their agents, as described in section 5, will be made available through the Clearinghouse. Spatial data users will have access to the NSDI through the National Spatial Data Clearinghouse.

(4) What are standards?

Standards are common and repeated rules, conditions, guidelines or characteristics for data, and related processes, technology and organization. To broaden the global use of federal data and services, international standards and protocols must be used. NSDI is made possible by the universal use of standards and protocols for data development, documentation, exchange, and geospatial services.

(5) How are NSDI standards developed?

NSDI standards are developed and promulgated by the FGDC in accordance with OMB Circular A-119 using an established process determined by the FGDC with input from a broad range of data users and providers. Specifically, the FGDC adopts national and international standards in lieu of federal standards whenever possible and will restrict its standards development activities to areas of spatial data standardization not covered by other voluntary standards consensus bodies, as defined by OMB Circular A-119. Through active participation in voluntary consensus standards bodies, the FGDC works to link its standardization activities to the work of those standards bodies and thereby create an integrated suite of standards for the NSDI. No federal funds will be used directly or indirectly for the development of spatial data not complying with NSDI standards, as specified by FGDC.

²²⁸ For NSDI data themes, definitions and lead agencies, see Circular A-16, Appendix E at http://www.whitehouse.gov/omb/circulars_a016_rev/#appe.

²²⁹ See http://www.whitehouse.gov/omb/circulars_a016_rev/#1.



(6) What is the importance of collaborative partnerships?

Building an effective NSDI will require a well-coordinated effort among federal, tribal, state, local government, and academic institutions, as well as a broad array of private sector geographic, statistical, demographic, and other business information providers and users. Involving these stakeholders in the development of the NSDI will aid in meeting the needs of end-users.

Federal agencies will promote and fully utilize partnerships that promote cost-effective data collection, documentation, maintenance, distribution, and preservation strategies, and that leverage federal and other resources. New collaborative efforts and partnerships are encouraged.

(7) What are the federal activities and technology that support the NSDI?

Federal agencies and the FGDC carry out the activities required to implement their responsibilities as described in section 8 of this Circular. Agencies will provide or develop the required technology and services required to enable and provide access to NSDI data and information. The OMB will work with affected budget offices to provide appropriate resources in support of these activities.

The FGDC has developed NSDI standards, demonstration projects such as metadata, framework and clearinghouse development projects.

Federal government data is made available at the cost of dissemination or less. Most local and state government data is made available on the same basis, although some charge more than the cost of dissemination. Commercial data providers are encouraged to use the framework and policies of the NSDI, but their data does not form part of the NSDI. Also, there is a difference in pricing between government and commercial data which is priced by the individual corporation.

FGDC activities are administered through the FGDC Secretariat, hosted by the National Geospatial Programs Office (NGPO) of the US Geological Survey. The NGPO oversees other geospatial programs of national importance including The National Map and the Geospatial One-Stop activity.

“In support of open access for publicly held geographic information”, Harlan J Onsrud (1992)

In the article, *In support of open access for publicly held geographic information*,²³⁰ published in GIS Law in 1992, Onsrud addresses the main arguments in favour of open access to publicly held geographic information:

The Arguments in Support

A popular government, without popular information or the means of acquiring it, is but a prologue to a farce or a tragedy; or perhaps both. Knowledge will forever govern ignorance. And a people who mean to be their own governors, must arm themselves with the power knowledge gives. John Adams, Aug.4, 1822, words now inscribed to the left of the main entrance Library of Congress

The U.S. Freedom of Information Act (FOIA, USCS [[section]] 552) and the Open Records Laws of the individual states create a balance between the right of citizens to be informed about government activities and the need to maintain confidentiality of some government records. These laws generally support a broad policy of government disclosure. For instance, if information held by a federal agency is determined to be an agency

²³⁰ Harlan J Onsrud, ‘In support of open access for publicly held geographic information’, (1992) 1(2) *GIS Law*, pp 3-6; see also H J Onsrud, ‘Access to Geographic Information in the United States’, *Free accessibility of geo-information in the Netherlands, the United States, and the European Community*, Proceedings, Delft, Netherlands, 2 October 1998 at pp 33-41, available at <http://www.spatial.maine.edu/~onsrud/pubs/accesstoGI88.pdf> accessed on 15 April 2009.



record, the record must be disclosed to any person requesting it unless the record falls within one of nine narrowly drawn exceptions contained in the FOIA. The provisions for disclosure under the federal act, as well as under most state acts, are construed liberally by the courts whereas the exceptions are construed narrowly (Braverman 1981, p.754).

.....
Restricting access to public records goes against the plain letter language of most existing open records laws. Those who seek to change these laws must overcome the underlying policy arguments on which such laws are based, foremost of which is that open access keeps government accountable. In addition proponents of change will almost certainly encounter other credible policy arguments that favor free and unfettered access to public records.

For the sake of raising and exploring issues in support of the status quo of open records laws, arguments are constructed in support of the following proposition:

Allowing wholesale duplication of publicly held land records is good for the public welfare.

1. Government sanctioned monopolies are less efficient than private enterprise.
2. Cost recovery arrangements create bureaucratic overhead and legal disincentives to the sharing of geographic information.
3. All other rights in a democratic society extend from our ability to access information. Democracy can't function effectively unless people have ready access to government information in order to keep government accountable.

.....

Conclusions

The arguments presented above are but a sample of the arguments which can be raised in support of open access environments for publicly held geographic information. Note that of the arguments raised, none speaks against expanding access to government databases through on-line services and charging fees to support those services. This presumes, of course, that on-line users are free to duplicate the government housed GIS files. Note also from the discussion above that arguments may be more aptly framed by addressing specific cost recovery arrangements (for example, arguments relative to the creation of an "information utility" as opposed to an in-house local government GIS service).

The intent of this article has been to present advocacy arguments but not necessarily to take an advocacy stance on one side or the other of the "open access" versus "cost recovery" debate. Rather, its intent has been to raise issues. Local governments attempting to cover GIS costs through some mechanism other than general tax revenues should be prepared to address the issues raised in the article. Counter arguments to those presented do exist and it is up to local jurisdictions to convince themselves of the appropriateness of the policies and practices they choose to pursue in implementing GIS in their locality.

***“In Support of Cost Recovery for Publicly Held Geographic Information”,
Harlan J. Onsrud (1992)***

In the two part article, *In Support of Cost Recovery for Publicly Held Geographic Information*,²³¹ Harlan Onsrud describes three dominant approaches toward access and pricing of publicly held geographic information. The three approaches he identifies are: (1) distribute GIS data, products, and services free to requesters, (2) recover the marginal costs required to respond to citizen requests, and (3) recover more than the marginal costs, such as (a) the full cost of producing the agency's GIS data, products, and services; (b) some portion of that total cost; or (c) greater than the total cost. In the first part of the article, Onsrud presents advocacy arguments in favour of minimal restrictions on the access and use of government GIS databases, while in the second part he raises further issues and presents a “sampling of counter arguments”. The objective is to expose and explore options rather than seek to promote a particular view.

²³¹ H J Onsrud, ‘In Support of Cost Recovery for Publicly Held Geographic Information’, (1992) 1(2) *GIS Law*, pp 1-7, available at http://www.spatial.maine.edu/~onsrud/pubs/Cost_Recovery_for_GIS.html accessed on 19 June 2009.

Onsrud concludes as follows:

In this author's opinion, whether to use a cost recovery approach and in what form is largely a political decision. Studies by the academic community and experiences by the practitioner community may raise issues and provide guidance on the likely ramifications of following certain policies. However, it may matter little from a practical perspective whether a group of experts show through authoritative studies that following one particular cost recovery approach provides greater economic and social equity benefits than other approaches. Democracies allow citizens to select government officials who may choose to ignore the advice of experts. Citizens also have the right at the ballot box to make mistakes. Therefore, the initial critical issue in determining which cost recovery alternatives are practically feasible in a specific jurisdiction may be to answer the question of *who* has the power in that jurisdiction to make decisions - whether those decisions are considered by the experts to be rational or irrational.

If through the political process, citizens have been convinced that leaders advocating "for-profit government information operations" are appropriate, such practices are likely to be implemented. However, political realities do not negate the responsibility of citizens, practitioners, and researchers to continually question and investigate whether specific approaches provide greater or lesser economic and social equity benefits than others. In democracies, irrational governmental policies are inevitably exposed over time with the result that the system corrects itself. Whether the policies actually implemented by elected officials and government bureaucrats are successful or unsuccessful is a determination which again is ultimately made at the ballot box.

Counter arguments exist to any cost recovery stance government officials may take in implementing GIS in their locality. Local jurisdictions need to fully investigate options and then select cost recovery policies and practices appropriate to their circumstances.²³²

“Toward a coordinated spatial data infrastructure for the nation”, National Research Council (1993)

This book by the Mapping Science Committee (MSC) of the National Research Council (NRC)²³³ describes the National Spatial Data Infrastructure (NSDI) as being:

the means to assemble geographic information that describes the arrangement and attributes of features and phenomena on the Earth. The infrastructure includes the materials, technology, and people necessary to acquire, process, store, and distribute such information to meet a wide variety of needs.²³⁴

As this definition indicates the NSDI is more than the so-called “information superhighway” and more than hardware, software, and data. As this book outlines the NSDI is the public foundation on which a marketplace for spatial products will evolve.

The MSC draws attention to the fact that it is not its task to set about building or creating the NSDI as it in fact already exists. The MSC goes on to identify the NSDI’s components and characteristics, and assesses the efficiency with which it functions to meet national needs (from local to federal). Key issues are identified in Chapter 4, and the MSC makes a series of recommendations in Chapter 9 intended to make the NSDI “more useful, more economical, better coordinated, and robust”.²³⁵ The recommendations of the MSC are as follows:

²³² Ibid.

²³³ National Research Council (Mapping Science Committee, Board on Earth Sciences and Resources, Commission on Geosciences, Environment and Resources), *Toward a coordinated spatial data infrastructure for the nation*, Washington DC, National Academy Press, 1993.

²³⁴ Ibid, Executive Summary, p 2.

²³⁵ Ibid.



1. Effective national policies, strategies, and organizational structures need to be established at the federal level for the integration or national spatial data collection, use, and distribution.
2. The Federal Geographic Data Committee (FGDC), which operates under the aegis of the Office of Management and Budget (OMB), should continue to be the working body of the agencies to coordinate the interagency program as defined in OMB Circular A-16. However, the charter and programs of the FGDC need to be strengthened to:
 - expand the development and speed the creation and implementation of standards (content, quality, performance, and exchange), procedures, and specifications for spatially referenced digital data, and
 - create a series of incentives, particularly among federal agencies, that would maximize the sharing of spatial data and minimize the redundancy of spatial data collection.
3. Procedures should be established to foster ready access to information describing spatial data available within government and the private sector through existing networks, thereby providing online access by the public in the form of directories and catalogs.
4. A spatial data sharing program should be established to enrich national spatial data coverage, minimize redundant data collection at all levels, and create new opportunities for the use of spatial data throughout the nation. Specific funding and budgetary cross-cutting responsibilities of federal agencies should be identified by the OMB and the FGDC should coordinate the cross-cutting aspects of the program.²³⁶

The MSC's conclusions confirm the need for a more coordinated approach generally on information development and sharing if the US is to prosper in the global economy:

This country has a tradition of localized control in the public sector and a belief in the power of free market forces operating in the private sector to best serve the national interest. In an era of instantaneous nationwide and worldwide transmission of information, compartmentalization of spatial data collection and management may no longer make sense as it has in the past. *Survival in an increasingly global economy, dominated by ever larger private-public sector coalitions in countries outside the United States, may be possible only if commitments are made in this country to a national policy for increased information development and sharing.*²³⁷

“Executive Order 12906: Coordinating Geographic Data Acquisition and Access: The National Spatial Data Infrastructure” President Clinton (1994)

In the National Information Infrastructure (NII) initiative in 1993, the Clinton administration proposed the concept of the “Information Superhighway”, an advanced communications and information infrastructure. The National Spatial Data Infrastructure (NSDI) was regarded as central to the NII. Consequently, on 11 April 1994, President Clinton signed Executive Order 12906 which called for the establishment of the NSDI,²³⁸ to further accelerate spatial data sharing and standardisation. Executive Order 12906 called for the establishment of the NSDI, comprising the technologies, policies and people required to enable geospatial data to be shared throughout all levels of government, the private and non-profit sectors and the academic community. NSDI is defined in Executive Order 12906 as the:

²³⁶ Ibid, pp 5 and 6. The recommendations are dealt with in detail in Chapter 9.

²³⁷ Ibid, p 6.

²³⁸ Executive Order 12906, published in the April 13, 1994, edition of the Federal Register, Volume 59, Number 71, pp 17671-17674; and amended by Executive Order 13286, published in the March 5, 2003, edition of the Federal Register, Volume 68, Number 43, pp 10619-10633. For further information on the NSDI see http://www.fgdc.gov/nsdi/policyandplanning/executive_order and <http://www.archives.gov/federal-register/executive-orders/pdf/12906.pdf>.



...technology, policies, standards and human resources necessary to acquire, process, store, distribute and improve utilization of geospatial data.

Executive Order 12906 established executive branch leadership for the development of the NSDI. The NSDI was created to focus on the coordination of the acquisition of, and the provision of access to, geographical data for various strategic purposes including transportation, community development, agriculture, emergency response, environmental management, and information technology. Its aims included improved stewardship of natural resources and protection of the environment.

The Executive Order called for the development of a National Geospatial Data Clearinghouse, which is a distributed electronic network of geospatial data producers and users connected through the internet, spatial data standards, a National Geospatial Data Framework and partnerships for data acquisition.

Executive Order 12906 was amended by Executive Order 13286 issued by President George W Bush on 5 March 2008, in connection with the transfer of certain functions to the Secretary of Homeland Security.

Executive Order 12906 led to great interest in SDI, resulting in numerous research projects on SDIs, the need for SDIs, SDI components and techniques for standardising existing ad hoc spatial data related infrastructures.

“Should Local Governments Sell Local Spatial Databases through State Monopolies?”, Henry Perritt (1995)

In this paper presented at the Conference on Law and Information Policy for Spatial Databases in 1994,²³⁹ Henry Perritt advances the view that governments should not sell their datasets for more than the cost of dissemination. He argues that local governments should not establish monopolies to exploit their databases, but that they “should allow equal access to public spatial data, to enable the realization of the potential that new technology has to offer and to promote a variety of sources of public information.”²⁴⁰

“Guidelines to Encourage Cooperation in Development of the National Spatial Data Infrastructure”, Federal Geographic Data Committee (FGDC) (1996)

These guidelines²⁴¹ established policies and criteria for the FGDC and cooperating groups to cooperatively interact in activities and initiatives that further develop the NSDI. The FGDC forms

²³⁹ H H Perritt, *Should Local Governments Sell Local Spatial Databases through State Monopolies?*, Proceedings of the Conference on Law and Information Policy for Spatial Databases, Tempe, Arizona, October 1994, Harlan J Onsrud (ed), University of Maine, 1995 at pp 52-72.

²⁴⁰ From R Mason, *Developing Australian Spatial Data Policies – Existing Practices and Future Strategies*, PhD Thesis, School of Geomatic Engineering, University of New South Wales, 2000 at p 116.

²⁴¹ See <http://www.fgdc.gov/policyandplanning/Guidelines%20to%20Encourage%20Cooperation%20in%20Development%20of%20NSDI.doc>; see also *Framework Introduction and Guide*, FGDC, 1997 at <http://www.fgdc.gov/framework/handbook/index.html>.



cooperating groups on the basis of policies and procedures that enable all parties to participate in and contribute to the NSDI in their areas of strength and expertise.

As part of implementing these guidelines, the FGDC will notify new cooperating groups within a geographic area of the existence of previously identified groups. The FGDC's position is that cooperation among Federal, State, local, private, and academic sectors should be based on shared responsibilities, shared commitment, shared benefits and shared control aimed at improving the geospatial data delivery system. Examples of contributions recognized by the FGDC as having value include: establishing forums for communication, facilitating access to data, building framework and thematic data sets, developing educational and training programs, and fostering partnerships for data production and sharing.

The Guidelines set out the contributions and activities which cooperating groups and the FGDC are expected to undertake as part of the NSDI implementation process as follows:

To build a network of communication and support that facilitates the implementation of the NSDI the Cooperating Group will:

- Promote the use of FGDC-endorsed standards for geospatial data transfer, content, collection, and quality control among Cooperating Group members.
- Participate in the National Geospatial Data Clearinghouse.
- Coordinate data collection and sharing within the geographic area and for data categories of interest to the Group.
- Participate in the development of a National Geospatial Data Framework.
- Encourage participation among all levels of government, the private sector, academia and the not-for-profit sector.
- Actively participate in standards development, review and implementation.
- Represent the FGDC at meetings as appropriate and mutually beneficial.
- Participate in FGDC meetings and activities as appropriate, including an annual meeting with the FGDC Steering Committee.

To build a network of communication and support that facilitates the implementation of the NSDI the FGDC will:

- Provide "train-the-trainer" technical workshops to explain the origins, purpose, and strategies for implementation of FGDC-endorsed standards.
- Help the Cooperating Group use the National Geospatial Data Clearinghouse to locate sources of data, training and expertise.
- Link the Cooperating Group World Wide Web Home pages to the FGDC NSDI Internet World Wide Web Homepage.
- Offer qualified Cooperating Group members the opportunity to participate on Working Groups and Subcommittees, as appropriate.
- Regularly inform Cooperating Group members of FGDC-sponsored activities and initiatives.²⁴²

"A Strategy for the National Spatial Data Infrastructure", Federal Geographic Data Committee (FGDC) (1997)

This document²⁴³ updates and renews the 1994 Strategic Plan for the National Spatial Data Infrastructure (NSDI), having regard to rapid changes in today's world. The 1994 Strategic Plan contains the following vision statement:

²⁴²

See <http://www.fgdc.gov/policyandplanning/Guidelines%20to%20Encourage%20Cooperation%20in%20Development%20of%20NSDI.doc> at pp 1 and 2.



Current and accurate geospatial data will be readily available to contribute locally, nationally, and globally to economic growth, environmental quality and stability, and social progress.

This vision is affirmed in this 1997 update report.

The report provides a brief history of Executive Order 12906 from 1994 which resulted in the establishment of the NSDI:

A critical national need for improved means for finding and sharing geographic data was recognized by President Clinton in Executive Order 12906 of April 1994. This document called for the establishment of a coordinated National Spatial Data Infrastructure (NSDI) "to support public and private sector applications of geospatial data in such areas as transportation, community development, agriculture, emergency response, environmental management and information technology." The NSDI was seen as part of the evolving National Information Infrastructure which would provide citizen access to essential government information and thus strengthen the democratic process.

The executive order described activities that were to be undertaken by the federal government to promote data sharing among federal, state and local governments, citizens, private sector organizations, and academia. The purpose was to make accurate and timely geographic data readily available to support sound decisions over a geographic area, and to do so with minimum duplication of effort and at a reasonable cost. The Federal Geographic Data Committee, composed of 14 agencies that produce and use geographic data, was charged with coordinating the federal government's development of the NSDI. State, local, and tribal governments also have an integral role in the evolution of the NSDI.²⁴⁴

The report lists the major initiatives undertaken pursuant to Executive Order 12906 by federal agencies and by organizations outside the federal government to develop the NSDI:

- Creation of a distributed electronic network of data producers and users, known as the National Geospatial Data Clearinghouse.
- Development of standards for data documentation, collection, and exchange.
- Formulation of procedures and partnerships to create a national digital geospatial data framework that would include important basic categories of data significant to a broad variety of users.
- Development of new relationships that allow organizations and individuals from all sectors to work together to share geospatial data.²⁴⁵

The document indicates that in renewing the 1994 NSDI Strategic Plan the intention is:

Rather than listing specific tasks for different organizations, the new strategy has become the focus of a process through which broad community consensus was achieved on desirable goals and objectives. These goals and objectives will serve as a structure under which many organizations can work together. Each community will craft its own tactical plan to advance the goals and objectives. The strategy was reviewed by a number of organizations, culminating in an open meeting in Chicago in November, 1996.²⁴⁶

The document notes that the Executive Order 12906 stressed the need for partnerships and that no one organization can build the NSDI.²⁴⁷ In fact the NSDI can only be realised through co-operation among state, local, and tribal governments, the private sector, the academic community, and the federal government.

²⁴³ FGDC, *A Strategy for the NSDI*, FGDC Publication, April 1997 see <http://www.fgdc.gov/policyandplanning/A%20Strategy%20for%20the%20NSDI%201997.doc> accessed on 19 June 2009.

²⁴⁴ Ibid, p 4.

²⁴⁵ Ibid, pp 4-5.

²⁴⁶ Ibid, p 5.

²⁴⁷ Ibid, p 5.



In pursuit of the renewed NSDI strategy, the report sets out the following series of goals and related objectives:

Goal 1 - Increase the awareness and understanding of the vision, concepts, and benefits of the NSDI through outreach and education.

Objectives

1. Demonstrate the benefits of participation in the NSDI to existing and prospective participants.
2. Promote principles and practices of the NSDI through formal and informal education and training.
3. Identify and promote the attitudes and actions that help to develop the NSDI.

Goal 2 - Develop common solutions for discovery, access, and use of geospatial data in response to the needs of diverse communities.

Objectives

1. Continue to develop a seamless National Geospatial Data Clearinghouse.
2. Support the evolution of common means to describe geospatial data sets.
3. Support the development of tools that allow for easy exchange of applications, information, and results.
4. Research, develop, and implement architectures and technologies that enable data sharing.

Goal 3 - Use community-based approaches to develop and maintain common collections of geospatial data for sound decision-making.

Objectives

1. Continue to develop the National Geospatial Data Framework.
2. Provide additional geospatial data that citizens, governments, and industry need.
3. Promote common classification systems, content standards, data models, and other common models to facilitate data development, sharing, and use.
4. Provide mechanisms and incentives to incorporate multi-resolution data from many organizations into the NSDI.

Goal 4 - Build relationships among organizations to support the continuing development of the NSDI.

Objectives

1. Develop a process that allows stakeholder groups to define logical and complementary roles in support of the NSDI.
2. Build a network of organizations linked through commitment to common interests within the context of the NSDI.
3. Remove regulatory and administrative barriers to agreement formation.
4. Find new resources for data production, integration, and maintenance.
5. Identify and support the personal, institutional, and economic behaviors; technologies; policies and legal frameworks that promote the development of the NSDI.
6. Participate with the international geospatial data information community in the development of a global geospatial data infrastructure.²⁴⁸

“Geographic Information for the 21st Century: Building a Strategy for the Nation”, National Academy of Public Administration (NAPA) (1998)

This study *Geographic Information for the 21st Century: Building a Strategy for the Nation*,²⁴⁹ was requested by the American Congress on Surveying and Mapping (ACSM) and sponsored by four

²⁴⁸ Ibid, pp 6-9.

²⁴⁹ National Academy of Public Administration, *Geographic Information for the 21st Century: Building a Strategy for the Nation* (15 January 1998),



federal agencies involved in the technology and practice of surveying and mapping. This was at a time when Congress was seriously considering legislation to privatize federal mapping activities. The study was a compromise measure intended to provide a basis for future legislation.²⁵⁰

The study, prepared by a select NAPA panel, examined the spatial data operations of the requesting agencies (the Bureau of Land Management, the U.S. Geological Survey, the U.S. Forest Service, and the National Ocean Service) and the activities of the Federal Geographic Data Committee (FGDC). The FGDC was established in 1990 to coordinate various surveying, mapping and spatial data activities of federal agencies.

The report's most significant recommendation is that Congress create a new private, nonprofit structure, termed the National Spatial Data Council (NSDC), to serve as a forum for all organizations engaged in developing and maintaining geographic data. It further recommends the merging of some federal geographic information activities and that the NSDC guide the establishment and maintenance of a National Spatial Data Infrastructure (NSDI). The Infrastructure represents an emerging network of materials, technology, and the entities and individuals necessary to acquire, process, store, and distribute geographic data.

The goals of the NSDC identified in the Report would include the following:

- Provide a national forum for developing and maintaining the NSDI.
- Maintain state-of-the-art knowledge about advances in geographic information and related technologies.
- Ensure that goals set for the NSDI are actually carried out by serving as a catalyst for implementation.
- Build a comprehensive and user friendly clearinghouse of geographic information.
- Provide a forum for discussion by all parties on national standards with the possible assumption of responsibilities currently held by the Federal Geographic Data Committee.
- Provide training and education on the utility of and techniques for fostering the NSDI.

The study addressed congressional initiatives to abolish certain federal agencies that provide geographic information, to privatize such functions, and the devolution of those activities to the states. The NAPA panel found that the goals of the NSDI require intergovernmental coordination and cooperation stating it would be reckless to devolve or privatize major federal responsibilities. However, it did recommend to fully realize the potential of the NSDI and to increase efficiency, the National Geodetic Survey of the National Ocean Service be transferred to the U.S. Geological Survey and the creation of a new Geographic Data Service within the US Geological Survey.

The report emphasizes the need for better collaboration among all levels of government and the private sector by increasing multilateral partnerships. The panel authoring the Report identified geographic information technologies as being central to the measurement of global climate, forest health, natural disaster recovery and also fundamental to the nation's economy.

<http://71.4.192.38/NAPA/NAPAPubs.nsf/17bc036fe939efd685256951004e37f4/e0770f7de2cf486885256cad00500106?OpenDocument>. NAPA (headquartered in Washington, D.C.) is an independent, non-profit, nonpartisan organization chartered by Congress in 1967 to assist federal, state, and local governments improve performance.

²⁵⁰ For a detailed account of the background to the Report see <http://www.agiweb.org/hearings/napamap.html>.



“The Digital Earth: Understanding our Planet in the 21st Century”, Al Gore (1998)

In this landmark speech, then US Vice President Al Gore described the concept of Digital Earth: a three-dimensional virtual representation of the planet that is spatially referenced and interconnected with digital knowledge archives worldwide, with vast amounts of scientific, natural and cultural information about the Earth, its systems and human activities. As the GSDI would form the spatial information framework of Digital Earth, many countries were encouraged to develop NSDIs and/or regional SDIs.²⁵¹

The use of visualisation technology has been promoted by the International Symposium on Digital Earth (ISDE), a bi-annual conference series which commenced with an inaugural symposium in Beijing in November – December 1999.²⁵²

“Distributed geo-libraries: spatial information resource”, US Mapping Sciences Committee, National Research Council (1999)

This report²⁵³ presents the findings of the Workshop on Distributed Geolibraries: Spatial Information Resources, convened by the Mapping Science Committee of the National Research Council in June 1998.²⁵⁴ The report is a vision for distributed geolibraries, not a detailed blueprint. The report indicates that developing a distributed geolibrary involves a series of technical challenges as well as institutional and social issues, which are addressed relative to the vision.

A panel under the aegis of the Mapping Science Committee convened a workshop to explore the following topics:

- Development of a vision for geospatial data dissemination and access in 2010.
- Comparison of current efforts in digital library research, clearinghouse development, and other data distribution and search activities.
- Suggestion of short- and long-term research and development needed to achieve the vision.
- Identification of the policy and institutional issues, particularly for convergence of efforts to realize the vision.²⁵⁵

²⁵¹ Al Gore, *The Digital Earth: Understanding our Planet in the 21st Century*, 1998, see <http://www.digitalearth.gov/speech.html> and http://en.wikipedia.org/wiki/Digital_Earth.

²⁵² See http://www.isde-summit-2008.org/front_content.php?idcat=2; International Journal of Digital Earth at <http://www.informaworld.com/smpp/title~content=t777764757~tab=summary>.

²⁵³ National Research Council (Mapping Science Committee), *Distributed geo-libraries: spatial information resources*, Washington DC, National Academy Press, 1999. See http://books.nap.edu/openbook.php?record_id=9460&page=1.

²⁵⁴ The Report at page 7 describes a future distributed geolibrary as follows:

A distributed geolibrary is a vision for the future. It would permit users to quickly and easily obtain all existing information available about a place that is relevant to a defined need. It is modeled on the operations of a traditional library, updated to a digital networked world, and focused on something that has never been possible in the traditional library: the supply of information in response to a *geographically* defined need. It would integrate the resources of the Internet and the World Wide Web into a simple mechanism for searching and retrieving information relevant to a wide range of problems, including natural disasters, emergencies, community planning, and environmental quality. A geolibrary is a digital library filled with geoinformation—information associated with a distinct area or footprint on the Earth's surface—and for which the primary search mechanism is *place*. A geolibrary is distributed if its users, services, metadata, and information assets can be integrated among many distinct locations.

²⁵⁵ *Ibid*, p X.



Therefore the report can be understood as an updating of the MSC's concept of the NSDI in the era of the WWW.

Included in the panel's conclusions is the finding that:

If a distributed geolibrary in some form is not developed, a major opportunity made possible by recent developments in information technology will be lost. With a geolibrary the time needed to respond to emergencies could be reduced, as those responsible for dealing with emergencies would have vastly improved means to assemble needed information. And with distributed geolibraries the average citizen and stakeholder will have a greater opportunity to be better informed about many local and regional issues.²⁵⁶

“USA NSDI A progress report on a US National Survey on Geospatial Framework Data”, David L. Tulloch, Milo Robinson, Journal of Government Information (2000)

The Federal Geographic Data Committee (FGDC), in cooperation with the National States Geographic Information Council,²⁵⁷ undertook a 50-state survey to determine the extent and availability of geospatial framework data.²⁵⁸ Framework data is one of the four activity areas for the NSDI. The other three are the clearinghouse, standards and partnerships.

This article presents a progress report on the National Survey of Geospatial Framework. The geospatial framework consists of seven data themes forming the basis of geographic information. The data themes are Geodetic control data, Orthoimagery, Elevation data, Cadastral information, Transportation information, Hydrography data, and Governmental units information.

The NSDI covers the technologies, policies, and people necessary to promote geospatial data sharing throughout all levels of government, the private and non-profit sectors, and the academic community. One goal of the framework survey is to better document what various stakeholders are doing so that the benefits of the NSDI can be fully realized.²⁵⁹

The article describes the survey's methodology. The survey's primary objectives were:

- to assess existing coverage of framework data,
- to estimate financial investments being made, and
- to examine institutional activities currently taking place.²⁶⁰

Completion of this nationwide survey by over 5,000 potential producers of geospatial data also provides users with a new way of learning about relevant, publicly accessible data when they first

²⁵⁶ Ibid, p 90.

²⁵⁷ See <http://www.nsgic.org/about/index.cfm>. On its website the NSIG lists amongst its concerns: [the] creation of intelligent maps and databases that enable public and private decision makers to make better informed and timelier decisions in a wide array of governmental areas. NSGIC also supports the National Spatial Data Infrastructure (NSDI) as the technology, policies, criteria, standards and people necessary to promote geospatial data sharing throughout all levels of government, the private and non-profit sectors, and the academia.

²⁵⁸ David L. Tulloch, Milo Robinson Journal of Government Information 27 (2000) 285-298, http://www.sciencedirect.com/science?_ob=ArticleURL&_udi=B6VH2-40PXN8N-1&_user=62921&_rdoc=1&_fmt=&_orig=search&_sort=d&_view=c&_acct=C000005418&_version=1&_urlVersion=0&_userid=62921&md5=8b5f3520d69e6063f6f6e7d40962b646.

²⁵⁹ Ibid, p 286.

²⁶⁰ Ibid, p 290.



undertake projects with a spatial facet. Information gathered from the survey is intended to assist with the integration, coordination, and distribution of geographic information.

“National Spatial Data Infrastructure (NSDI) Phase 1 Report”, Federal Geographic Data Committee (FGDC) (2001)

As a result of the National Spatial Data Infrastructure (NSDI) not attracting the level of private sector participation anticipated when the NSDI was first established in 1994, a private sector trade association, the Spatial Technologies Industry Association (STIA) was funded to examine and report on ways to increase private sector participation.²⁶¹

In summary, this phase 1 project report:

- Reviews the authorities establishing the NSDI Initiative and the assumptions made at the outset by the public sector with respect to private sector participation in the NSDI;
- Examines and validates the low private sector participation in the NSDI to date and suggests reasons for the lack of private sector involvement;
- Identifies private sector drivers (motivators) to participation in the NSDI;
- Summarizes impediments to achieving the goal of the NSDI; and
- Offers subsequent activities to address the findings in this first phase report and to develop processes and programs supporting private sector growth in participation in the NSDI.²⁶²

From a recommendation by the National Performance Review completed in 1993, President Clinton, in 1994, directed the Executive Branch of the Federal government to develop, in cooperation with state, local, tribal governments, and the private sector, a coordinated national spatial data infrastructure.

The Executive Branch was directed by President Clinton to develop the NSDI in cooperation with the private sector to support public and private sector applications dependent on geospatial data in such areas as transportation, community development, agriculture, emergency response, environmental management, and information technology.

The Federal Geographic Data Committee (FGDC) in 1994 was tasked under Presidential Executive Order with championing the development of the National Spatial Data Infrastructure (NSDI), an effort at the Federal level to improve utilization of geospatial data. This undertaking envisaged participation and cooperation with state, local, tribal government, and the private sector. The NSDI was intended to support public and private sector applications dependent on geospatial data in such areas as transportation, community development, agriculture, emergency response, environmental management, and information technology.²⁶³

Since the NSDI initiative commenced, private sector consultation and advice has been sought to aid in the development and implementation of the objectives of the NSDI. In addition activities have been undertaken by the FGDC to accomplish the NSDI’s goals, including actively seeking private sector participation in NSDI activities.

²⁶¹ FGDC, *NSDI Phase 1 Report*, 26 November 2009, http://www.fgdc.gov/library/whitepapers-reports/sponsored-reports/stia/stia_sec_2.doc accessed on 19 June 2009.

²⁶² Ibid, p 2-5.

²⁶³ Ibid, p 2-6.



In the course of its analysis STIA discusses directly certain private sector concerns:

Some of the concerns of getting to an NSDI were recognized by the National Academy of Public Administration (NAPA) in its 1998 report, namely that the challenges of getting to a National Spatial Data Infrastructure (NSDI) were “daunting, complex, and time-consuming.”

This recognition is in part due to the Federal government’s jurisdictional issues – “neither FGDC nor any other central office or coordinating body can require any two or more agencies to work together, much less to consolidate any of their GI functions.”

In addition to federal jurisdictional issues, private sector data suppliers and users expressed skepticism on their part toward NSDI concepts. The NAPA study stated, “Most data suppliers and data users are skeptical of NSDI concepts or they do not see sufficient benefit to modifying their own practices for collecting and maintaining data, particularly if it is more costly to implement a federally endorsed standard.”

Notwithstanding identified obstacles, the FGDC has championed this effort.

The NSDI, under the auspices of the FGDC, holds out the promise, through its policies, standards, and activities, to establish more comprehensive, integrated, and available geospatial data than has ever existed.²⁶⁴

STIA provides certain reasons why in its view the anticipated private sector engagement did not materialise:

During the period 1994 - 2000, a pronounced growth occurred in private sector digital mapping and data collection, creating for the first time a healthy private sector mapping business community. While the private sector was addressing end-user needs in the marketplace, the expectations of the NSDI program for the private sector spatial technologies industry, as expressed in the National Performance Review, were unrealistic in terms of financial contribution and were not articulated clearly as to what was meant by private sector cooperation.²⁶⁵

The authors reason that, from a purely marketing perspective, in order to address the issue of private sector participation in the NSDI, that it is necessary to consider evolving market dynamics – producers and users – and to understand the private sector drivers of participation.

STIA consider that a robust and successful NSDI, focused on the needs of both the public and private sectors, is a critical national enabler which could contribute to significant economic expansion over the next decade.

The authors provide the following summary of their findings including their conclusions and actions to consider to increase private sector awareness and participation in the NSDI:

Drivers of Private Sector Participation in the NSDI

- Private sector participation in the NSDI must consider firms private sector drivers
- Economic: increased revenues and profits; decreased costs
- Competitive Advantage: uniqueness, security, and privacy
- Time-to-market: completeness, availability, ease of use
- Quality: accuracy and completeness
- Cultural: Expectations of geospatial providers and end-users²⁶⁶

Conclusions

²⁶⁴ Ibid, p 2-2.

²⁶⁵ Ibid, p 2-6.

²⁶⁶ Ibid, p 2-8.



- NSDI must address private sector interests and accommodate the private sector's role
- NSDI must complement the private sector's activities
- NSDI lacks a business plan focused on action not process
- Multiple NSDI and NSDI related activities at the Federal level confuse the private sector marketplace
- Knowledge of NSDI offerings and advantages to the private sector are lacking
- The NSDI must address demand factors in the marketplace – both public sector and private sector
- Security and availability of information needs to be improved
- NSDI must address scale and accuracy of data²⁶⁷

Recommendations

- Redefine the NSDI articulating public sector responsibilities and the private sector's role
- Evaluate the existing NSDI framework program and develop a plan for building and maintaining the framework layers
- Examine OMB oversight role to ensure federal programs sponsored by federal agencies do not overlap with the NSDI initiative
- FGDC needs to better understand private sector needs and how the public and private sectors can become complementary
- FGDC should refocus its efforts on coordinating federal spatial data activities with expanded liaison with the private sector
- Convene a private sector advisory group to tackle the higher level issues outlined in section 12.3
- Seek private sector consultations and input on NSDI initiatives such as the GeoData Alliance, Aurora Partnership, and the I Teams Initiative
- Develop outreach to private sector targeted toward specific industry sectors
- Establish a NSDI Private Sector Advocate
- Build and maintain a database of companies that make up the spatial technologies industry and end-user community to better understand their needs from the NSDI
- Use this database for marketing activities designed to increase awareness and participation²⁶⁸

“Geospatial Data Policy Study Project Report – Executive Summary”, KPMG Consulting (Garry Sears) for GeoConnections Canada Policy Advisory Node (2001)

In an international comparative study of geospatial data policies and practices in Canada, the US and Australia, KPMG Consulting commented on the different approaches taken by US and Canadian governments toward the funding of data collection and maintenance:

In the USA it is clear that it has been decided that data are seen as a public good and should be maintained by the Federal (or in some cases State) governments under what Canadians would call “A-Base funding”, or funding provided directly to the agencies for fulfilling their operational mandates.²⁶⁹

“Office of Management and Budget’s Circular A-16, Coordination of Geographic Information and Related Spatial Data Activities”, (OMB Circular A-16) (1953, revised 1967, 1990 and 2002)

²⁶⁷ Ibid.

²⁶⁸ Ibid, pp 2-8, 2-9.

²⁶⁹ KPMG Consulting (Garry Sears), *Geospatial Data Policy Study Project Report – Executive Summary*, prepared for GeoConnections Policy Advisory Node, March 2001 at p16.



Circular A-16 provides direction for US federal agencies that produce, maintain or use spatial data directly or indirectly in carrying out their functions. It establishes the FGDC and provides the bases for a coordinated approach to developing the National Spatial Data Infrastructure (NSDI). It was originally issued by the Bureau of the Budget (now the OMB) on 16 January 1953 and has been revised on three occasions (1967, 1990 and 2002). Appended to Circular A-16 were Exhibits dealing with procedures for programming and coordinating of federal Topographic Mapping Activities, National Atlas, Geodetic Control Surveys and International Boundaries. The background to Circular A-16 is explained in Appendix C, as follows:

The purpose of the 1953 Circular was "to insure (sic) that surveying and mapping activities may be directed toward meeting the needs of federal and state agencies and the general public, and will be performed expeditiously, without duplication of effort." The original Circular references Executive Order No. 9094, dated March 10, 1942. This Executive Order directs the Director of the Bureau of the Budget to coordinate and promote the improvement of surveying and mapping activities of the Government. Furthermore, it passes on functions carried out by the Federal Board of Surveys and Maps, established by Executive Order No. 3206, dated December 30, 1919. Thus, the OMB is directed to make recommendations to agencies and to the President regarding the coordination of all governmental map making and surveying. Executive Order No. 3206 superseded an Executive Order, dated August 10, 1906, that granted advisory power to the United States Geographic Board to review mapping projects to avoid duplication and to facilitate standardized mapping.²⁷⁰

The first revision of Circular A-16 in May 1967 saw the addition of a new section on Responsibility for Coordination. It outlined the responsibilities of three federal departments (the Department of the Interior, the Department of Commerce and the Department of State).

The second revision, issued on 19 October 1990, expanded Circular A-16 to include not only surveying and mapping but also related spatial data activities including geographically referenced digital data. The origins of the US National Spatial Data Infrastructure (NSDI) can be traced back to 1990 when the Federal Geographic Data Committee (FGDC) was set up in response to Circular A-16. The FGDC was tasked with coordinating the dissemination, sharing and development of surveying, mapping and other related spatial data.

Circular A-16 was revised again in 2002 to reflect changes in geographic information management and technology, further describe the components of the NSDI and assign agency roles and responsibilities for the development of the NSDI. The 2002 revision of Circular A-16 reaffirmed the government's commitment to building the NSDI and called for continued improvements in spatial data coordination and the use of geographical data. It is based on an integrated infrastructure system approach, to support multiple government services and electronic government. It names the Deputy Director for Management of OMB as Vice-Chair of the FGDC.

Extracts from the 2002 revision of Circular A-16 are reproduced below:

1. This revised Circular provides for improvements in coordination and use of spatial data. Spatial data refers to information about places or geography, and has traditionally been shown on maps. This Circular describes the effective and economical use and management of spatial data assets in the digital environment for the benefit of the government and the nation. The Circular affirms and describes the National Spatial Data Infrastructure (NSDI) as the technology, policies, standards, human resources, and related activities necessary to acquire, process, distribute, use, maintain, and preserve spatial data. The Circular describes the management and reporting requirements of Federal agencies in the acquisition, maintenance, distribution, use, and preservation of spatial data by the Federal Government. The Circular establishes the FGDC as the interagency coordinating body for NSDI-related activities, chaired by the Secretary of the Interior with the Deputy Director for Management, Office of Management and Budget (OMB) as Vice-Chair.

270 See http://www.whitehouse.gov/omb/circulars_a016_rev/#2b1.



.....

POLICY

5. Does this Circular apply to my agency?

This Circular applies to your agency if it collects, produces, acquires, maintains, distributes, uses, or preserves analog (e.g., paper maps) or digital spatial data to fulfill your mission, either directly or through a relationship with other organizations. Such organizations include, but are not limited to, State and local governments, tribes, academia, federal government business partners and contractors, and citizens.

6. What types of data activities does the Circular apply to?

(a) All spatial data and geographic information systems activities - financed directly or indirectly, in whole or in part, by federal funds.

(b) As examples, this Circular applies to, but is not limited to: The National Mapping Program, the National Spatial Reference System, the National Geologic Mapping Program, the National Wetlands Inventory, the National Cooperative Soil Survey Program, the National Public Land Survey System, Geographic Coordinate Database, the National Oceanic and Atmospheric Administration (NOAA) nautical charting and nautical data collection and information programs, the U.S. Army Corps of Engineers (USACE) inland waterway charting program, the Offshore Minerals Program, the NASA's Earth Science Enterprise, FEMA's Flood Plain Mapping program and other federal activities that involve national surveying, mapping, remote sensing, spatially referenced statistical data, and Global Positioning System (GPS). Additional spatial data programs may be added to this list at any time.

(c) Any activities that result in the geospatial representation of international boundaries other than those of the United States with Canada or Mexico, which are governed by international boundary commissions.

(d) Any future federal spatial data programs or activities that may be established, except as noted in section 7 below.

7. What types of data activities are exempt from this Circular?

The following spatial data activities may be exempt from provisions within this Circular, as determined by the appropriate official(s) noted below:

(1) Spatial data activities of tribal governments not paid for by federal funds, as specifically determined by the tribal governments.

(2) Classified national security-related spatial data activities of the Department of Defense, unless declassified by Executive Order 12951, as specifically determined by the Secretary of Defense; also those activities of the Department of Energy, as specifically determined by the Secretary of Energy.

(3) Intelligence spatial data activities, as specifically determined by the Director of the Central Intelligence Agency.

AGENCY RESPONSIBILITIES AND REPORTING REQUIREMENTS

8. What are the federal responsibilities?

(a) What are the general federal agency responsibilities?

In order to use federal resources wisely, and to build the NSDI, all agencies that collect, use, or disseminate geographic information and/or carry out related spatial data activities will, both internally and through their activities involving partners, grants, and contracts:

(1) Prepare, maintain, publish, and implement a strategy for advancing geographic information and related spatial data activities appropriate to their mission, in support of the NSDI Strategy. Annually



report to OMB on your achievements relative to you strategies, and include spatial data assets within Exhibit 300 submissions (see OMB Circular A-11, sec. 300).

(2) Collect, maintain, disseminate, and preserve spatial information such that the resulting data, information, or products can be readily shared with other federal agencies and non-federal users, and promote data integration between all sources. Ensure that data information products and other records created in spatial data activities are included on agency record schedules that have been approved by the National Archives and Records Administration. These activities will adhere to appropriate standards and be conducted in accordance with existing regulations.

(3) Allocate agency resources to fulfill the responsibilities of effective spatial data collection, production, and stewardship.

(4) Use FGDC data standards, FGDC Content Standards for Digital Geospatial Metadata, and other appropriate standards, documenting spatial data with the relevant metadata, and making metadata available online through a registered NSDI-compatible Clearinghouse node.

(5) Coordinate and work in partnership with federal, state, tribal and local government agencies, academia and the private sector to efficiently and cost-effectively collect, integrate, maintain, disseminate, and preserve spatial data, building upon local data wherever possible.

(6) Use spatial information to enhance electronic government initiatives, to make federal spatial information and services more useful to citizens, to enhance operations, to support decisionmaking, and to enhance reporting to the public and to the Congress.

(7) Protect personal privacy and maintain confidentiality fully consistent with federal policy and law.

(8) Support emergency response activities requiring spatial data in accordance with provisions of the Stafford Act and other governing legislation.

(9) Participate in determining, when applicable, whether data declassified pursuant to Executive Order 12951 can contribute to and become a part of the NSDI.

(10) Search all sources, including the National Spatial Data Clearinghouse, to determine if existing federal, state, local or private data meets agency needs before expending funds for data collection.

(11) Appoint a contact to coordinate with lead agencies for collection, acquisition, maintenance, or dissemination of the spatial data themes used by their organization.

(b) How does my agency report spatial data assets within the budget and performance review process?

Before the obligation of funds, ensure that all expenditures for spatial data and related systems activities financed directly or indirectly, in whole or in part, by federal funds are compliant with the standards and provisions of the FGDC. All Information Technology systems which process spatial data should identify planned investments for spatial data and compliance with FGDC standards within the Exhibit 300 capital asset and business plan submission (see OMB Circular A-11, sec. 300).

(c) What are the lead federal agencies for the NSDI data themes?

Certain federal agencies have lead responsibilities for coordinating the national coverage and stewardship of specific spatial data themes. The data themes in the NSDI, their description, and the responsible lead for each theme are listed in Appendix E. Lead agency responsibilities and new data themes may be added or altered by recommendation of the FGDC and concurrence by the OMB.

(d) What are the responsibilities of lead federal agencies for the NSDI data themes?

(1) Provide leadership and facilitate the development and implementation of needed FGDC standards, especially a data content standard for each data theme. Agencies will assess existing standards, identify anticipated or needed data standards, and develop a plan to originate and implement needed standards with relevant community and international practices in accordance with OMB Circular A-



119, consistent with or included in the plan described in section 8.d.(2) below.

(2) Provide leadership and facilitate the development and implementation of a plan for nationwide population of each data theme. Plans will include the development of partnership programs with States, Tribes, academia, the private sector, other federal agencies, and localities that meet the needs of users, address human and financial resource needs, identify needs for standards, metadata, and the Clearinghouse, and advance a timetable for the development of NSDI data themes.

(3) Under section 8.a of this Circular, will prepare goals that support the NSDI strategy and, as needed, collect and analyze information from users about their needs for spatial data, including these in strategies related to their theme responsibilities.

(4) Administratively:

(a) Designate a point of contact within the lead agency who will be responsible for development, maintenance, coordination, and dissemination of data using the National Spatial Data Clearinghouse;

(b) Provide a performance report, at least annually, that documents data theme activities and implementation status, including progress toward goals identified in 8.d.(1), 8.d.(2) and 8.d.(3) above.

(c) Publish maps or comparable graphics online showing the current extent and status of the spatial data themes for which they have the lead, and encourage all other sources of data for those same themes to provide access to their data through the Clearinghouse. Leads will coordinate with those in charge of the Clearinghouse and always use FGDC specified Web mapping conventions; and

(d) Identify and publish proven practices for the use and application of agency data sets.

(e) What are the FGDC responsibilities and reporting requirements?

The FGDC leads and supports the NSDI strategy, spatial data policy development, management, and operational decision making. The FGDC also aids geographic information system use, directs and facilitates national implementation of the system of Framework Data and other themes in the NSDI, implements the NSDI Clearinghouse, and advises federal and other spatial data users on their NSDI implementation responsibilities.

The FGDC will:

(a) Prepare and maintain a strategic plan for the development and implementation of the NSDI.

(b) Serve as the lead federal executive body charged with the leadership, development, implementation, and review of spatial data standards, the NSDI Clearinghouse network, and a plan for federal agencies responsible for the NSDI Framework and other data themes to collect and provide broad access to spatial data assets.

(c) Communicate with and foster communication among federal agencies and others concerning spatial data technology development, transfer, and exchange.

(d) Promote and guide cooperation and coordination among federal, state, tribal and local government agencies, academia and the private sector in the collection, production, sharing and use of spatial information, the implementation of the NSDI, and the identification of proven practices.

(e) Coordinate with international organizations having an interest in the National or Global Spatial Data Infrastructures.

(f) Provide and update at least annually:

(i) An online status summary for each data theme authored by the lead agencies, the FGDC, or other subcommittees, working groups, and advisory committees.

(ii) An online collection of periodic technical publications, management articles and reports related to the NSDI.

(iii) An online FGDC membership directory, including current subcommittee and working group memberships.

(g) Ensure consistency of the NSDI with national security, national defense, and emergency preparedness program policies regarding data accessibility.

(h) Support the development of electronic government with spatial data.

(i) Support and promote the infrastructure of networks, systems, services, and standards that provide a digital representation of the Earth to users for many applications.

(j) Through the Chair and Vice Chair, take actions where required to recommend appropriate additions, revisions, or deletions to this Circular.

9. How are differences settled among agencies?

Any major differences among agencies with respect to coordination or conduct of activities covered by this Circular that cannot be resolved by the FGDC leadership will be referred in writing by the head of any agency concerned to the Director of the OMB. Copies of such referrals will be provided to the Chair and Vice Chair of the FGDC and to the heads of those agencies directly involved or affected by the outcome of the decision.²⁷¹

“Report on a comparative analysis of NSDIs in Australia, Canada and the United States”, Ian Masser, GINIE (2002)

A key objective of the *Report on a comparative analysis of NSDIs in Australia, Canada and the United States*²⁷² was to compare European experience with spatial data infrastructures (SDI) to the rest of the world. This was undertaken by examining three of the leading nations in the field (Australia, Canada and the United States) with particular reference to the kinds of coordinating framework that have emerged outside Europe and the different approaches that have been adopted towards the phased implementation of SDIs.

The findings of this study highlight some of the ways in which thinking about SDIs has developed over the last five years in these countries with particular reference to the following criteria: objectives, coordinating bodies, resources, role of industrial organisations, data availability and the emergence of new types of organisation.

In the course of the comparative analysis in the report the following observation is made on the particular challenges presented by the highly decentralised US environment:

One of the most distinctive features of the United States is the large number of agencies involved in creating geographic information. As might be expected, given the federal structure of the US government, many important responsibilities for geographic information are dealt with at the state and local government level and there are wide variations between states in the way that these responsibilities are carried out. Particularly

²⁷¹ See http://www.whitehouse.gov/omb/circulars_a016_rev/#2b1 accessed 19 June 2009.

²⁷² Ian Masser, GINIE: Geographic Information Network in Europe, *Report on a comparative analysis of NSDI's in Australia, Canada and the United States*, October 2002, www.ec-gis.org/ginie/doc/SDIComparative_report_Final.pdf accessed on 5 June 2009.



important from this standpoint are land titles registration and land taxation matters that rest with local governments in each state. As a result over 80,000 agencies including 50 states, more than 3000 counties and 7000 cities are involved in some way with geographic information creation (see Masser, 1998 and GINIE, 2002).²⁷³

“Geographic Information Systems: Challenges to Effective Data Sharing” L D Koontz, United States General Accounting Office (2003)

This publication²⁷⁴ by the US General Accounting Office (GAO) records the highlights of testimony given by Linda Koontz²⁷⁵ to the Subcommittee on Technology, Information Policy, Intergovernmental Relations and the Census, Committee on Government Reform, House of Representatives and more broadly findings from GAO research.

It is noted that the US federal government has long been attempting to develop an integrated nationwide GIS network.

The statement indicates that GAO’s research included describing:

- The various federal government’s efforts to coordinate GIS activities,
- the long-standing challenges of adopting and implementing federal GIS standards, and
- the role of Geospatial One-Stop, a component of NSDI, which is aimed at promoting coordinated geospatial data collection and maintenance across all levels of government.

Geospatial One-Stop’s objectives include (1) deploying an Internet portal for one-stop access to geospatial data; (2) developing data standards; and (3) encouraging greater coordination among federal, state, and local agencies. While these objectives are important, Geospatial One-Stop has focused on more limited, near-term tasks.²⁷⁶

Linda Koontz made the statement before this subcommittee of the House of Representatives about GAO’s research objectives and supplemented her remarks with a document containing a list of federal agency initiatives, including Geospatial One-stop, all designed to coordinate GIS activities.

The statement contains a useful summary on the challenges to effective data sharing through establishing a single, coordinated, nationwide system of geospatial data:

In summary, a coordinated nationwide network of geographic information systems offers many opportunities to better serve the public, make government more efficient and effective, and reduce costs. As a sophisticated decision making tool, GIS provides the capability to strengthen national security, enhance law enforcement, increase public health, and protect the environment. However, to date, the potential of GIS has not been fully realized. While steps have been taken to improve the coordination of government GIS efforts, much more work still needs to be done to round out a comprehensive set of standards and to ensure that they are being broadly applied. Geospatial One-Stop, in particular, while addressing useful near-term tasks, has not focused on the need for a longer-term strategy for facing the challenges of implementing the NSDI.

²⁷³ Ibid, p 10.

²⁷⁴ L D Koontz, *Geographic Information Systems: Challenges to Effective Data Sharing*, United States General Accounting Office, 10 June 2003, available at <http://www.gao.gov/new.items/d03874t.pdf> and <http://www.gao.gov/htext/d03874t.html>.

²⁷⁵ Director Information Management Issues, US General Accounting Office (GAO).

²⁷⁶ L D Koontz, *Geographic Information Systems: Challenges to Effective Data Sharing*, p 11.



While it may be appropriate for many systems, especially at the state and local level, to retain non-standard approaches to geospatial data collection and analysis, priority should now be given to ensuring that the federal government promotes common GIS standards wherever practicable, facilitates participation by all stakeholders, and as a result reduces redundant systems and data collection efforts. Adoption of a core set of framework standards by the GIS community should lay the groundwork for achieving the goals of the NSDI. However, additional work may be needed. Existing draft standards may need revision to accommodate the needs of major federal agency users, and more extensive coordination efforts may be required to ensure broad adoption at all levels of government. Further, the effort is likely to require a continuing effort over an extended period of time, due to the fact that significant investments have already been made in existing non-standard systems, and the task of replacing those systems and migrating their data to new standards cannot be accomplished overnight. Nevertheless, we believe that until these challenges are addressed, the goal of a single, coordinated, nationwide system of geospatial data will remain out of reach.²⁷⁷

NSDI Future Directions Initiative: Towards a National Geospatial Strategy and Implementation Plan (2003)

In 2003 the Federal Geographic Data Committee (FGDC) Secretariat was charged by the FGDC Steering Committee to pursue the National Spatial Data Infrastructure (NSDI) Future Directions Initiative. The purpose of the initiative was *to craft a national geospatial strategy and implementation plan to further the development of the NSDI*. The Future Directions Planning Team was established in October 2003 and consisted of members from the FGDC Secretariat and the Consultation Group. Insights and ideas for the Future Directions Initiative were sought through extensive and varied consultation processes between December 2003 and April 2004.

The goals and objectives in this report²⁷⁸ emerged from these extensive processes. The following three key actions were consistently highlighted during consultations:

2. Forging Partnerships with Purpose - a governance structure which includes representatives of all stakeholder groups which shapes the NSDI's development,
3. Making Frameworks Real - nationally coordinated programs that include collection, documentation, access, and utilization of data are in place for generating framework data themes, and
4. Communicating the Message: the NSDI is recognized across the nation as the primary mechanism for assuring access to reliable geospatial data.²⁷⁹

These three actions, in turn, provide the structure for the goals, objectives and the strategic action plans within this initiative to make real progress towards the realisation of the NSDI.²⁸⁰

The report contains an NSDI vision statement for 2010, which represents a contemporary interpretation of the 1997 NSDI Strategic Plan.²⁸¹ Key factors referred to as being vital for ensuring the ongoing vitality of the NSDI include: a strong business case, accessibility of data and standards,

²⁷⁷ Ibid, pp 14 and 15.

²⁷⁸ NSDI Future Directions Planning Team (Commissioned by the Federal Geographic Data Committee), NSDI Future Directions Initiative: Towards a National Geospatial Strategy and Implementation Plan (15 June 2004, revised 30 June 2004) http://www.fgdc.gov/policyandplanning/future-directions/reports/FD_Final_Report.pdf. All documents for the NSDI Future Directions Initiative can be found at <http://www.fgdc.gov/policyandplanning/future-directions/reports/index.html>.

²⁷⁹ Ibid, Executive Summary, p 1.

²⁸⁰ Ibid, p 3.

²⁸¹ Ibid, p 6.



a clear statement of the interrelationship amongst participants, and an open, collaborative environment.²⁸²

“Open Data Consortium Model Policy for Governmental Geospatial Data”, Open Data Consortium (2003)

The Open Data Consortium project²⁸³ was established to develop a model policy for distributing governmental geospatial data, to provide a “de facto example” to guide public agencies. The model policy is being developed, on a consensus basis, with representatives from local government, the private sector, and state and federal agencies.

The policy recognizes the problems many agencies have in funding the operation and maintenance of their geodata stewardship. It encourages low-cost public access to data, while suggesting alternative methods of supporting GIS operations. The ODC project considers that there are many ways local agencies can avoid having to sell their public geospatial data. By being able to avoid selling data, the current pricing impediment evident in many current practices will be eliminated.

“Licensing Geographic Data and Services”, National Research Council of the National Academy of Sciences (2004)

In *Licensing Geographic Data and Services* (2004),²⁸⁴ the Committee on Licensing Geographic Data and Services of the Board on Earth Sciences and Resources in the Division of Earth and Life Studies of the National Research Council of the National Academies stated that government procurement guidelines for remotely sensed data (or any form of geographic data, for that matter) ought to explicitly promote a “get once, use many times” approach. In other words, procured geographic/remotely sensed data, which are useful across a range of applications and jurisdictions, ought to be acquired under open source licensing conditions and shared as common public sector information. The Committee stated that this approach is international best practice and has been found to offer significant advantages in public policy and overall economic development.

In this context of government procurement and in particular the general economic disadvantages of licensing, the Committee observed:

The principal economic disadvantage of obtaining data through licensing, rather than through outright purchase, is that the licensing restrictions limit the ability of an agency to distribute the data it has acquired in an economically efficient manner. Whereas efficiency in distribution requires that no user who is willing to pay at least the incremental cost of distribution is excluded, that may not be possible when there are limits on the ability of any agency to redistribute data that it has acquired from the private sector.

.....
Government can almost always avoid the deadweight loss associated with exclusionary pricing and inefficiencies in distribution of information by using methods to procure data that permit unrestricted redistribution and providing these data to any user willing to pay the marginal cost of reproduction. Avoiding inefficiencies in production is likely to be more difficult. . There is a broad consensus that governments should

²⁸² Ibid, p 5.

²⁸³ See <http://www.opendataconsortium.org>.

²⁸⁴ National Research Council of the National Academies (Committee on Licensing Geographic Data and Services, Board on Earth Sciences and Resources, Division on Earth and Life Studies), *Licensing Geographic Data and Services*, National Academies Press, Washington, 2004. Available for free download at http://www.nap.edu/catalog.php?record_id=11079 .



play a large role in the provision of geographic information, although the line between private and government provision remains contentious.²⁸⁵

The Committee further recommended a national commons in geographic information, using licences similar to the Creative Commons licences. The facility would make it easier for geographic data creators (including local to federal agencies) to document, license, and deliver their datasets to a common shared pool, and also would help the broader community to find, acquire, and use such data”.²⁸⁶

9.3.1 A National Commons in Geographic Information

Commercial, scientific, and nonprofit users rely heavily on public domain geographic information to create value-added resources. Such resources can be expanded by a National Commons in Geographic Information (hereinafter “National Commons”) that aids creation of public domain resources and open access content and makes them readily accessible.

The overarching goal of the National Commons is to create a broad and continually growing set of freely usable (i.e., no monetary charge for use) geographic data and products at local scales similar in effect to the public domain datasets and works created by federal agencies. To succeed, the commons could provide easy, effective, and integrated mechanisms that could, for example,

- enable any geographic dataset creator to construct a license that grants permission to use his or her data,
- enable novice creators to quickly generate accurate and substantive standardized metadata for a geographic data file,
- enable data contributors to take advantage of form liability disclaimers,
- embed identifiers automatically in any commons dataset so that any future user can link back and recover the detailed metadata and license conditions for the file,
- allow for deeper search capabilities of geographic data and metadata than are currently available, and
- provide a long-term archive for commons geographic datasets.

...

A National Commons in Geographic Information could allow any data creator to quickly construct a comprehensive, standard, and yet flexible license granting others permission to use the creator’s work. By analogy with the **Creative Commons license** process, creators might be offered license options to (1) allow public domain use for any purpose, (2) require attribution, (3) allow or disallow commercial uses, (4) allow or disallow modification of the work, and (5) allow modification as long as others use the identical license with their derivative works (commonly referred to as “share-alike” or “copyleft”). The commons license would also offer standard liability disclaimers—an important feature for utilitarian works such as geographic data upon which decisions are likely to be based.²⁸⁷ [emphasis added]

The committee also sets out possible operational characteristics of a National Commons facility.²⁸⁸

“State Model for Coordination of Geographic Information Technology”, National States Geographic Information Council & Stuart Davies (2004)

This report²⁸⁹ by the influential National States Geographic Information Council (NSGIC)²⁹⁰ endeavoured to identify the fundamental characteristics of effective statewide coordination of

²⁸⁵ Ibid, pp 149-150.

²⁸⁶ Ibid, p 215.

²⁸⁷ Ibid, pp 214-215.

²⁸⁸ Ibid, pp 216-217.

²⁸⁹ National States Geographic Information Council & Stuart Davies, *State Model for Coordination of Geographic Information Technology* (22 May 2004), http://www.nsgic.org/states/statemodel_git.pdf

²⁹⁰ See <http://www.nsgic.org/about/index.cfm>. On its website NSGIC describes itself as:

an organization committed to efficient and effective government through the prudent adoption of geospatial information technologies (GIT). Members of NSGIC include senior state geographic information system (GIS) managers and



Geographic Information Technology (GIT). In 2002, the NSGIC began to concentrate on the level of coordination between state and federal governments. The report records that recently each state has wrestled with responding to requests for information (i.e., Homeland Security, National Map, TIGER Modernization, etc.) and the need to coordinate these requests at both the state and local government level. The failure always to share information collected to best advantage or to minimize the scope of the next information gathering initiative was identified as being the most disturbing practice. States need to establish strong coordination efforts to minimize costs and impact on existing efforts and to ensure that opportunities are fully exploited to benefit all levels of government. To better support interaction and coordination, NSGIC identified fundamental characteristics of effective statewide coordination of GIT.

One of the outcomes of the work was a list of critical factors for measuring performance objectives and the criteria needed for an effective statewide GIT coordination program. These critical factors were intended as guidelines to be considered in the development and administration of any statewide GIT coordination. These factors were endorsed by the NSGIC Board and Membership and sent to each NSGIC state representative for a self-assessment. State representatives provided their responses to NSGIC in late 2003. This information has been compiled in this report.

One of the conclusions in the report was that:

As a nation, we are performing at higher degree of GIT coordination than previously thought. More than half of the states are satisfying over six of the nine model criteria. Increasing the number of positive responses to the coordination model is well within our grasp. The federal government appears to be coordinating through the appropriate statewide coordinating bodies and there is significant coordination occurring between state and local government, academia and the private sector.²⁹¹

“The 1994 Plan for the National Spatial Data Infrastructure: Building the Foundation of an Information based Society”, Federal Geographic Data Committee (FGDC) (2004)

*The 1994 Plan for the National Spatial Data Infrastructure: Building the Foundation of an Information based Society*²⁹² addressed a variety of activities to be carried out by the Federal Geographic Data Committee (FGDC), by federal, state, and local government agencies, and by members of the non-public sectors to fully develop the National Spatial Data Infrastructure (NSDI).

The FGDC’s description of the NSDI is:

...an umbrella under which organizations and technology interact to foster more efficient use, management, and production of geospatial data.²⁹³

coordinators. Other members include representatives from federal agencies, local government, the private sector, academia and other professional organizations. A rich and diverse group, the NSGIC membership includes nationally and internationally recognized experts in geospatial information technologies, data creation and management as well as information technology policy.

²⁹¹ National States Geographic Information Council & Stuart Davies, *State Model for Coordination of Geographic Information Technology* (22 May 2004), p 6.

²⁹² Federal Geographic Data Committee, *The 1994 Plan for the National Spatial Data Infrastructure: Building the Foundation of an Information based Society* (March 1994) p 1, <http://www.fgdc.gov/policyandplanning/NSDI%20Strategy%201994.pdf>.

²⁹³ Ibid. See also Federal Geographic Data Committee, *Framework Introduction and Guide*, Appendix A: Terminology, available at <http://www.fgdc.gov/framework/handbook/appendixA> accessed on 1 October 2009.

Part of the background set out in the document describes how in the federal government the Office of Management and Budget (OMB) created the FGDC, through Circular A-16, and charged it with the responsibility to coordinate various surveying, mapping and spatial data activities of federal agencies to meet the needs of the Nation. FGDC's responsibilities also extend to coordinating geospatial data related activities with state and local levels of government and the non-public sector.²⁹⁴

As the document indicates, a short time previously the Clinton Administration had identified creation of the National Spatial Data Infrastructure (NSDI) as one of the initiatives necessary to "reinvent government".²⁹⁵

In this document the FGDC identifies the major components of the NSDI under development and the strategies needed to build the NSDI. The key actions under way are described in general terms as developing and implementing standards for framework and thematic data; implementing standards for geospatial documentation and transfer: establishing procedures to use electronic networks to search for, access, and use geospatial data; and cooperating in the development of state and regional councils and private sector agreements to accomplish these actions.²⁹⁶

As the report rightly indicates ultimately the success or otherwise of the NSDI will depend on the ability to build and maintain partnerships among the federal, state and local levels of government, and the private sector.²⁹⁷

"Future Directions-governance of the National Spatial Data Infrastructure: final draft of the NSDI Future Directions Governance Action Team", Federal Geographic Data Committee (FGDC) (2005)

This final draft is referred to in the National Academies Press publication "Successful Response Starts with a Map: Improving Geospatial Support for Disaster Management (2007)".²⁹⁸

The study report provides an overview of the nation's sharing and use of geospatial information and the development of the NSDI.

The report identified collaboration problems involving the various levels of government and with other sectors and the need to resolve this issue as a priority:

geospatial data and information have been identified as valuable assets in conducting the business of government. In the post-9/11 era, there is a heightened appreciation of the importance of geospatial data to support homeland security needs and other critical requirements. There is a clear sense of urgency that the problems associated with intergovernmental and intersector collaboration in geospatial data production, access, and sharing need to be resolved in a timely and comprehensive manner.²⁹⁹

²⁹⁴ Ibid, p 3.

²⁹⁵ Ibid, p 4. The document notes at page 4 that that President Clinton is expected to sign an Executive Minute in the near future to foster the development of the NSDI.

²⁹⁶ Ibid, Executive Summary, p 1.

²⁹⁷ Ibid.

²⁹⁸ National Research Council of the National Academies, *Successful Response Starts with a Map: Improving Geospatial Support for Disaster Management*, National Academies Press, Washington DC, http://books.nap.edu/openbook.php?record_id=11793&page=R1.

²⁹⁹ Ibid, p 93.



Widespread agreement on the need for an effective governance structure on a national basis involving the various government and non-government sectors was identified by the Action Team together with the need for secure funding and “political support”:

[there was comprehensive agreement that] the NSDI requires strong national leadership, that all sectors should be represented in the leadership and governance process, that stable funding and political support are required, and that an effective NSDI requires a clear national strategy to complete and maintain the framework layers. The team found a broad consensus that a strong and renewed national focus is needed to drive our country toward the production of highly accessible, accurate, and reliable geospatial data. The team believed that a national approach, incorporating all sectors, is necessary to accelerate the production of geospatial data for the NSDI and to ensure its ongoing maintenance. The increasing ubiquity of geospatial data and tools lends urgency to the need for current, complete, accurate, and nationally consistent data. The study team recommended the establishment of a new governance structure to provide national leadership in the development of the NSDI, with participation from multiple sectors.³⁰⁰

“The Public Sector, the Private Sector and Data Products in the US”, Joanne Gabrynowicz (2006)

In 2006, Joanne Gabrynowicz, Director of the National Center for Remote Sensing, Air, and Space Law at the UM (University of Mississippi) School of Law³⁰¹ delivered a presentation entitled “The Public Sector, the Private Sector and Data Products in the US”³⁰² to the National Remote Sensing Agency at Hyderabad, India. Considering data issues in the context of the *US Land Remote Sensing Policy Act*, Gabrynowicz made the point that the data access spectrum stretches between the public sector (generally providing unenhanced data) and the private sector (providing value added data). She notes that:

[w]hat [data] is appropriate for government to provide and what is appropriate for the private sector to provide has changed over time.³⁰³

Gabrynowicz expresses the view that with significant technological capabilities and competencies now evident in the private sector, government should focus upon maintaining core competencies relevant to the inherently government roles of providing access to and archiving data rather than embarking on value adding activities. Such activities are more appropriately left to the private sector to undertake.

³⁰⁰ Ibid, pp 93 and 94.

³⁰¹ See <http://www.spacelaw.olemiss.edu>. The National Center for Remote Sensing, Air and Space Law addresses and conducts research, education and outreach activities related to the legal aspects of applying remote sensing, air, and space technologies to human activities. Space, remote sensing and aviation subjects that the Center addresses include, among others:

- Data Policies
- Privacy
- International Law
- Use of Imagery as Legal Evidence
- Intellectual Property
- Liability
- Environmental Issues
- Licensing.

³⁰² See http://www.spacelaw.olemiss.edu/activitiesandevents/2006/Public_Private_and_Data_Products.pdf accessed 5 June 2009.

³⁰³ Ibid.



“Libraries as distributors of geospatial data: data management policies as tools for managing partnerships”, G Steinhart, University of Illinois (2006).

This article³⁰⁴ describes how libraries may be used as effective distributors of geo-spatial data. It examines the background of open access to geo-spatial data in the US administrative environment, the benefits of utilising unique capacity of libraries as partners in data-distribution.

The article states that some of the benefits of sharing or distributing data may include:

- enhancing interorganization activities by sharing information
- enabling the reuse of geospatial data by other organizations and resulting cost savings
- improving and correcting errors in data in response to feedback from users
- fulfilling public data distribution requirements
- developing competencies in and promoting data and metadata standards.

The article also considers related issues such as liability for sharing, intellectual property rights, and data and meta-data management in addition to elements of data sharing and distribution agreements. The article concludes with a case study in the development of a data management policy for the Cornell University Geospatial Information Repository.

“Open Geography: new tools and new initiatives”, Steve Cisler (2007)

The article, *Open Geography: new tools and new initiatives*,³⁰⁵ by Steve Cisler of the Centre for Science, Technology and Society at Santa Clara University in California, identifies a variety of open access tools and initiatives in geospatial IT applications and briefly outlines the Open Geospatial Consortium’s activities.

The author states:

The United States has benefitted in many ways from having public data sets that are freely used by scholars, commercial firms, consultants, and the public. An example of this is the TIGER system (Topologically Integrated Geographic Encoding and Referencing system <http://www.census.gov/geo/www/tiger/>) Many countries do not, and one British Geospatial expert estimated that the closed nature of their system has cost them one billion pounds in lost business. The data belongs to the Crown, not the people! The European Union has tried to harmonize a bundle of restrictive national policies and has come to a compromise on INSPIRE a new data set to be used for environmental work. It will allow public access but allow restrictions on commercial use and certain citizen access. Generally local jurisdictions restrict and try to resell the data, sometimes at outrageous prices. There is an excellent 2005 summary of national policies, “Fee or Free” (www.gita.org/resources/whitepapers/Free_or_fee.pdf).³⁰⁶

³⁰⁴ G Steinhart, ‘Libraries as distributors of geospatial data: data management policies as tools for managing partnerships’, *Library Trends*, Vol 55, No. 2, Fall 2006, University of Illinois, available at <http://ecommons.library.cornell.edu/handle/1813/3562>.

³⁰⁵ Steve Cisler, *Open Geography: new tools and new initiatives*, Center for Science Technology and Society, Santa Clara University, USA, 2007, available at <http://www.iapad.org/publications/ppgis/OpenGeo.pdf>.

³⁰⁶ Ibid, p 2 (citing *Fee or Free –The Governmental Data Ownership Debate* – GITA White Paper (August 2005) available at www.gita.org/resources/whitepapers/Free_or_fee.pdf). The GITA White Paper contains details of government data sales in Australia, Brazil, Canada, India, Japan, the United Kingdom, and the United States. The details were provided by GITA affiliates from around the world.



“National Land Parcel Data: A Vision for the Future”, National Research Council of the National Academy of Sciences (Mapping Science Committee), (2007)

The report, *Land Parcel Databases: A National Vision*,³⁰⁷ by the National Research Council (NRC) was prepared at the request of five organisations (the Bureau of Land Management, the Federal Geographic Data Committee (FGDC), the Department of Homeland Security, the Census Bureau, and the Environmental Systems Research Institute) to re-assess the vision for land parcel data, as set out in the highly regarded 1980 NRC report entitled *Need for a Multipurpose Cadastre*.

The primary audience being addressed in the report is made clear by David J. Cowen, the Chair of the NRC Study Committee that prepared the report:

[The Report] is intended for those organizations that create and use land parcel data, and in particular those U.S. government agencies that play a role in coordinating and funding national land parcel data and other related themes of the National Spatial Data Infrastructure.³⁰⁸

The NRC formulates nine recommendations designed to establish a partnership-focused framework as the first practical step towards a US national land parcel data program. The report summarises the NRC’s research work and the present operational environment in the following terms:

This study argues that nationally integrated land parcel data are necessary, timely, technically feasible, and affordable. The 1980 NRC study of land parcels was visionary when it laid out a multilevel intergovernmental partnership that would provide parcel data across the country. At the same time, the report was overly optimistic about the ability of 1980 vintage technology to deal with millions of parcels. Today, with our current infrastructure of geospatial technologies and standards, along with web-based technologies, it actually is technically and economically feasible to implement such a vision. Establishment of the NSDI and associated geospatial data policies suggests that the question does not appear to be whether the federal government has the need, resources, or authority to implement a national parcel data program, but rather whether it has the motivation and incentives to confront difficult institutional and financial obstacles. This report has laid out a set of recommendations to establish the framework necessary for intergovernmental coordination and funding. The committee hopes that establishing this framework will be the first step in moving forward with a national land parcel data program.³⁰⁹

“Management of Intellectual Property Use Licensing in a Commons of Geographic Data” (White Paper), Marilyn Lutz and Harlan J. Onsrud, Commons of Geographic Data project (2008)

The purpose of the Commons of Geographic Data (CGD) project was to address and automate intellectual property rights and licensing management in a simple way for both non-specialist contributors of data and users.³¹⁰ The project identified the most appropriate licensing schemes for data in the CGD context.

³⁰⁷ National Research Council of the National Academy of Sciences (Mapping Science Committee), *National Land Parcel Data: A Vision for the Future*, National Academies Press, Washington (2007), available at http://books.nap.edu/openbook.php?record_id=11978&page=155 accessed 5 June 2009.

³⁰⁸ Ibid, Preface, p xii, available at http://books.nap.edu/openbook.php?record_id=11978&page=R12 accessed 5 June 2009.

³⁰⁹ Ibid, Executive Summary, p 7.

³¹⁰ See <http://geodatacommons.umaine.edu/about.php?about=wpapers;> see also <http://www.spatial.maine.edu/~onsrud/gsd/USA.pdf>.



The CGD White Paper stated:

A Commons of Geographic Data is a commons environment in which those who own spatially related “invisible” or “partially visible” digital data, i.e., data that is not currently accessible to others, e.g., because it is only stored on local hard drives or servers, may choose to contribute that data to a commons environment so that others may have access to it via the Web. Such data may be generated, for example, by high school or college science classes, non-profit organizations, individual researchers, graduate students doing theses or dissertations, and even local businesses. A digital commons environment, in the simplest terms, is one in which users of materials “located” in the commons do not have to seek prior permission for use from owners of the materials, as long as the users respect whatever conditions the owner has placed on use of the materials. In the area of Intellectual Property management, contributors and users alike require clarity about usage rights of data that resides in a Commons of Geographic Data.³¹¹

A recurring theme in the geo-spatial data literature concerns liability for damage incurred as a result of the use of the data. The White Paper examined this issue in context with Creative Commons licensing and digital methods of bringing liability limitations to the attention of users:

Geographic data poses potential for liability claims that most data does not. A road on a map which appears to show a bridge over a chasm when one is not present could be claimed to lead a user to literally drive off a cliff. For this reason, it is important to, as much as legally possible, limit a contributor’s liability for use of his or her contributed data. Otherwise, many contributors would be unwilling to make their data available.

.....

Normally, Creative Commons licenses are attached to a work and it is the responsibility of the user to consult the license before using the work. In the case of the CGD, however, in order to ensure that a user understands and accepts the limitation on liability contained in the license, the CGD system will present the license and highlight the section on liability, and then require the user to agree before a file can be downloaded. This extra step will ensure that the user is put on notice of limitations on the contributor’s liability and agrees to it, and that the contributor can have reasonable confidence that his or her contribution will not come back to haunt the contributor.

.....

Summary

The goal of the Commons of Geographic Data is to make heretofore invisible or only partially visible spatially-related data available for others to use in a commons environment. After researching the options for placing licensing conditions on copyrightable data in the U.S., we have concluded that the overall goals of the CGD, in combination with legitimate concerns of potential contributors, will best be served if the CGD offers contributors only the three license options described in the previous section. To offer more options, for the reasons outlined above, would risk immersing both contributors and users in “The Fog of Copyleft.”³¹²

“The Commons of Geographic Data (CGD) - Final Report”, Harlan J. Onsrud (2007)

In the Final Report,³¹³ Onsrud concluded that a Creative Commons “BY” licence was the most appropriate for a Commons of Geographic Data (CGD), identified the core elements of the ISO 19115 “Geographic Information - Meta data” standard and conceptually designed ways to make the inputting of those elements reasonably easy for potential contributors who have no knowledge of, or experience with, the standard.

³¹¹ Ibid, p 1.

³¹² Ibid, p 6-7.

³¹³ Harlan J. Onsrud, *The Commons of Geographic Data - Final Report* (2007), The University of Maine, Orono, Maine. Available at <http://geodatacommons.umaine.edu/wpapers/CGD%20final%20report.pdf>



The project identified 22 core fields for CGD metadata and conceptually designed an input mechanism in which the system will populate 15 of those fields without user intervention. The report describes the functionality necessary to convert user-submitted natural language keywords to standards-based terms.

“The Earth Observer”, NASA (2008)

In August 2008, NASA announced in *The Earth Observer* that, as from February 2009, all government data from the Landsat series of Earth Observation Satellites will be made available over the internet, free of charge.³¹⁴

As required by P.L. 102-555, this Data Policy Plan is designed to achieve the following:

- Ensure that unenhanced data are available to all users at the cost of fulfilling user requests;
- Ensure timely and dependable delivery of unenhanced data to the full spectrum of civilian, national security, commercial, and foreign users and the National Satellite Land Remote Sensing Data Archive (NSLRSDA);
- Ensure that the United States retains ownership of all unenhanced data generated by Landsat 7;
- Support the development of the commercial market for remote sensing data;
- Ensure that the provision of commercial value-added services based on remote sensing data remains exclusively the function of the private sector; and
- To the extent possible, ensure that the data distribution system for Landsat 7 is compatible with the Earth Observing System Data and Information System (EOSDIS).

The fundamental concept in the Landsat 7 data distribution policy is non-exclusivity. ¼ Access to Level OR data will be provided on a non-discriminatory basis to any requester within the technical limitations of the system. Although the USG retains ownership and all rights to the Level OR data, there will be no restrictions imposed by the USG on subsequent use, sale, or redistribution of data from Landsat 7.

Consistent with P.L. 102-555, Landsat data will be provided to all requesters on a non-discriminatory basis at the "cost of fulfilling user requests" (COFUR). COFUR is defined in P.L. 102-555 as "the incremental costs associated with providing product generation, reproduction, and distribution of unenhanced data in response to user requests and shall not include any acquisition, amortization, or depreciation of capital assets originally paid for by the United States Government or other costs not specifically attributable to fulfilling user requests."

“Strategic Framework for the NSDI: The States’ Perspective on Advancing the National Spatial Data Infrastructure”, National States Geographic Information Council (NSGIC), (2008)

³¹⁴ NASA, *The Earth Observer*, Washington DC, 2008, Vol 20, Issue 3, at p 3. See US Landsat 7 Data Policy Data Policy Plan, established by USGS and NOAA, October, 1994, http://www.codata.org/data_access/policies.html#Landsat%207.



The *Strategic Framework for the NSDI: The States' Perspective on Advancing the National Spatial Data Infrastructure* sets out the views of the National States Geographic Information Council (NSGIC) on the actions that should be taken nationally to build the National Spatial Data Infrastructure (NSDI).³¹⁵

As the report observes, the NSDI was initiated by Presidential Executive Order fifteen years ago, but to date remains incomplete. The NSGIC considers that government agencies must be encouraged to work together to fully implement the NSDI. The report sets out the following summary of the NSGIC's strategic recommendations:

1. Refresh and fully implement the 'Fifty States Initiative'
2. Establish an NSDI governance structure with equitable participation and responsibility for all sectors
3. Develop a 'For the Nation Initiative' implementation strategy to create nation-wide, authoritative core data
4. Define a national funding approach that compels adherence to NSDI requirements
5. Develop a strategic communication and advocacy agenda that all participants can use
6. Articulate a technology strategy based on proven technology, and standard designs and data models.

In short, this document is designed to refocus nationwide efforts to complete the development of the NSDI after 15 years and to develop appropriate processes to maintain its data content. As the document records:

The purpose of the NSDI is to provide accurate and reliable data for decisions regarding the health, safety and welfare, security, and prosperity of our citizens.³¹⁶

The unified vision for the NSDI is that it will be:

a collaborative environment in which all government agencies that collect, manage, or use geospatial data do so in a way that facilitates data integration, sharing and access.

The guiding principles to provide a foundation for achieving this unified vision are expressed as follows:

1. Business drivers will guide NSDI development
2. Data are a primary orientation of the NSDI
 - Build data once, use them many times
 - Data stewardship is essential
 - Data recognized as authoritative should form the foundation of the NSDI
 - **Core datasets are freely available and readily accessible**
3. Broad-based coordination and collaboration is critical
 - Partnerships are the key mechanism for NSDI development
 - All levels of government will be fully involved
 - The costs of implementing NSDI will be shared by all levels of government³¹⁷

One of the significant recommendations involving action by the federal and state governments is that as the Office of Management and Budget Circular A-16 is being implemented its relationship to 50+ Statewide Spatial Data Infrastructures (SSDIs) must be fully implemented and maintained at all

³¹⁵ See Strategic Framework for the NSDI, released on 10 October 2008, at <http://www.nsgic.org/index.cfm>. See also <http://www.nsgic.org/about/index.cfm> for its membership details which:

include senior state geographic information system (GIS) managers and coordinators. Other members include representatives from federal agencies, local government, the private sector, academia and other professional organizations. A rich and diverse group, the NSGIC membership includes nationally and internationally recognized experts in geospatial information technologies, data creation and management as well as information technology policy.

³¹⁶ Ibid, p 1.

³¹⁷ Ibid.



times. The recommendations extend to refreshing and enhancing the 50 States Initiative to more closely reflect the SSDI approach including performance measures, the development of criteria and requirements for interstate coordination to ensure a national approach, and assistance to other spatial sectors to develop NSDI participation guidelines.³¹⁸

15 years experience has shown that it will not be possible to build the NSDI without utilising and taking advantage of the everyday activities of all levels of government. This must entail putting into operation effective statewide coordination processes and mechanisms.³¹⁹

The NSGIC's strategic recommendations extend to the Federal Geographic Data Committee (FGDC) and all federal agencies and the various ways in which they can assist putting into place effective Statewide Spatial Data Infrastructures (SSDIs).³²⁰

Having regard to the considerable diversity across the states the NSGIC recognises that a significant challenge is bringing consistency and parity to all fifty states. Reflecting the lack of engagement by the private sector in the NSDI, the NSGIC observes that:

The entire geospatial community must also be able to “buy in” to the strategies being developed and be willing to support their implementation.³²¹

The importance of a sound NSDI governance structure is identified by the NSGIC which supports the implementation of the FGDC's “Future Directions” Report to establish an NSDI governance structure which includes a national geospatial coordinating council, fifty statewide coordination councils, the national stakeholders group, and the Federal Geographic Data Committee.

Importantly the NSGIC states that in order to accelerate the building of the NSDI priority needs to be given to the core data layers with a realistic implementation pathway being set, in turn, for each of these. The report identifies *Imagery for the Nation* as being the first of such initiatives, with significant progress having been made to date.³²²

The remaining NSGIC recommendations relate to appropriate strategies around a national NSDI funding model, communication about and advocacy for the NSDI, and a collaborative effort to develop and implement a national technology strategy.³²³

“The Changing Geospatial Landscape”, National Geospatial Advisory Committee (NGAC) (2009)

In January 2009, the National Geospatial Advisory Committee (NGAC)³²⁴ published a short report, *The Changing Geospatial Landscape*,³²⁵ which describes and considers the significance of recent innovations in digital spatial technology and practice.

³¹⁸ Ibid, p 2.

³¹⁹ Ibid.

³²⁰ Ibid, p 3.

³²¹ Ibid.

³²² Ibid.

³²³ Ibid, p 4.

³²⁴ See <http://www.fgdc.gov/ngac>.

³²⁵ National Geospatial Advisory Committee, *The Changing Geospatial Landscape*, January 2009, available at <http://www.fgdc.gov/ngac/NGAC%20Report%20-%20The%20Changing%20Geospatial%20Landscape.pdf>.



The NGAC was established by the Secretary of the Interior in January 2008 to provide advice and recommendations related to the management of Federal and national geospatial programs. This diverse committee is comprised of 28 experts from all levels of government, academia and the private sector.

The NGAC reports to the Chair of the Federal Geographic Data Committee (Secretary of the Interior or designee). The scope and objectives of the NGAC are described in the NGAC Charter:

The Committee will provide advice and recommendations related to management of Federal and national geospatial programs, the development of the National Spatial Data Infrastructure, and the implementation of Office of Management and Budget Circular A-16 and Executive Order 12906. The Committee will review and comment upon geospatial policy and management issues and will provide a forum to convey views representative of non-federal stakeholders in the geospatial community.

In this white paper the NGAC intends:

...to describe the changes and advancements the community has witnessed over the past three-plus decades and to set a context from which in part we will base our future deliberations. While this paper is not meant to be all-inclusive in chronicling the growth of the industry, we do believe it captures the major milestones and identifies several of the major issues that lie ahead.³²⁶

After setting out these major changes and upheavals in digital spatial technology and practice, from the internet to detailed digital mapping and to global positioning systems to Google and Microsoft and many others, the NGAC forms the firm view that the role of government has shifted during this period from being a data producer to coordinator, partnership facilitator, and manager. There are important consequences and challenges arising from this change, including a shift from relevant data generally being in the public domain to a more proprietary or commercial focused approach.

In this context of these dramatic changes the Committee states that:

The relative shifts in data production from the federal government to the private sector and state and local government call for new forms of partnership. Furthermore, the hodgepodge of existing data sharing agreements are stifling productivity and are a serious impediment to use even in times of emergency. There is an urgent need to re-examine the relationships between data providers and users to establish a fair and equitable geospatial data marketplace that serves the full range of applications. When the federal government was the primary data provider, regulations required data to be placed in the public domain. This policy jump-started a new marketplace and led to the adoption of GIS capabilities across public and commercial sectors. However, these arrangements are very different when data assets are controlled by private companies or local governments.

Insistence on database ownership is an expensive policy. When the Census Bureau was updating the street networks to prepare for the 2010 Census, it could not take advantage of the existing commercial data from Navteq or TeleAtlas; therefore, the government spent hundreds of millions of dollars to develop a duplicate version of street centerlines. The Bureau which pioneered the field has attempted to assemble street network data collected from more than 4,000 local governments. They found that data often did not exist, was incompatible or was unavailable because of local licensing policies. Similarly, the federal government's need for tax parcel information has proven a costly venture. Critical information about the use, value and ownership of property is needed by FEMA, the Forest Service, and HUD, for emergency preparedness or response at times of hurricanes or wildfires – or even to monitor the current foreclosure problems. Unfortunately, no arrangements have been made for the federal government to acquire the detailed property-related data that it needs to make responsive decisions. Ironically, private companies such as the online real estate service Zillow are often better prepared than the federal government to support these critical decisions.³²⁷

³²⁶ Ibid, Preface, p 2.

³²⁷ Ibid, p 12.



In considering how government policy needs to respond to these dramatic changes, the NGAC records that:

...the National Research Council, which oversees the Mapping Science Committee, has conducted numerous studies identifying trends and recommending changes that would improve efficiency and coordination of geographic information. State governments have also emerged as an increasingly important source of intermediate level geographic information coordination.

As early as 1989, several state GIS managers convened as the National States Geographic Information Council (NSGIC) to establish a forum for coordinating GIS projects and government investments. This group provided an early indication of the existence of duplicative efforts and the potential of redundant government activities. NSGIC is one of the most active proponents of spatial data infrastructure projects and almost every state now has a state GIS coordinator. NSGIC has an active agenda and is working closely with the FGDC for new initiatives.³²⁸

The white paper records through various significant examples over the 30 or so year period under review how nearly all the data, technology and applications seen today in the US can be traced to innovative policies and government practices of the past. The NSGIC strongly considers that similarly innovative policies are now required to keep abreast of the transformative changes which have taken place.

The NSGIC sets out its clear views on how the Federal government, through new practices, appropriate recognition of various stakeholders, updated spatial data policies to support a robust spatial data infrastructure, and coordinated investment, can best respond to the present major challenges:

Government-based geographic information providers can no longer think of themselves as a player outside of or immune from the community of private sector, state, local or even public stakeholders. In many cases these stakeholders have embraced technology and processes which have rapidly outpaced anything the federal government can provide. At a minimum, what is needed is a commitment to improved spatial data, recognition of the place of multiple stakeholders in this brave new world, and coordinated investment.

...[despite the various fascinating applications developed]...the greatest value of the spatial data infrastructure still lies in illuminating complex policy problems. If we as a country are sincere about resolving universal concerns such as global warming, sea level rise, and affordable health care, the Federal government needs to adopt innovative policies supporting a dynamic and robust spatial data infrastructure, an initiative that was promised more than 15 years ago. The members of the National Geospatial Advisory Committee look forward to working with the Obama Administration and the geospatial community in formulating recommendations on

³²⁸ Ibid. The project *Imagery for the Nation* is described at pages 12 and 13 of the report as being a good example of these types of new initiatives in the following terms:

[*Imagery for the Nation*] is a model for new partnerships in which the federal government provides partial funding to acquire high-resolution digital imagery collected by commercial data providers, with the option for state and local governments to “buy-up” for higher-resolution data. This data will be placed in the public domain and will be freely available to all sources including commercial entities such as Google and Microsoft who will use this data to fuel their product and service offerings to the marketplace.

For more details on the NSGIC see <http://www.nsgic.org/about/index.cfm>. On its website the NSGIC list its goal as: provid[ing] a unified voice on geographic information and technology issues, advocates State interests, and supports its membership in their statewide initiatives. The Council actively promotes prudent geospatial information integration and systems development. NSGIC reviews legislative and agency actions, promotes positive legislative actions, and provides advice to public and private decision-makers. NSGIC members are actively involved in the coordination and application of geospatial technologies in their States. They are often at the forefront of GIS and information technology innovation. Many are top-level managers who recommend specific hardware and software purchases or define GIS procurement policies for their jurisdiction. These State GIS coordinators exert a great deal of influence on geospatial policies and resource development in their States.

the adoption and or revision of spatial data policies and programs that can empower better decision-making through geography at all levels of government and in private enterprise.³²⁹

“The Evolution of Geospatial Technology Calls for Changes in Geospatial Research, Education and Government Management”, Prof. Mike Jackson, David Schell and Prof. D.R. Fraser Taylor (2009)

In the article *The Evolution of Geospatial Technology Calls for Changes in Geospatial Research, Education and Government Management*,³³⁰ the authors recognise the full potential of evolving geospatial technology “the geospatial technology revolution” to break down traditional barriers between the various academic disciplines and lead to genuine geospatial interoperability which will greatly benefit of humanity. The core question posed by the authors is expressed in the following passage:

Just as the significance of the Web could not be widely appreciated until the necessary Web standards had been in place for a few years, we believe that all the domains of geospatial technology and application are about to experience a remarkable transformation due to global adoption of open standard geospatial Web service interfaces and encodings. The rich “network effects” made possible by chained Web services, GRID computing, sensor webs, geospatial semantics, and online catalogs for data, services and schemas hold great promise, but there is no guarantee that this promise will be fulfilled. The question is, can we find the institutional will - in academia and government - to make changes that enable societies around the world to make the most of these new tools?³³¹

Whilst considering how best to bring about necessary reforms in geospatial research practices, traditional academic disciplines and government management practices to date, the authors address the issue of open access to geospatial data. The potential for greater levels of reuse under an open access model is identified as a key benefit or enabler, provided consistent information management processes are adopted. The authors state:

3. Open Access to Geospatial Data

Academics and those who fund their research should be acutely interested in the proposition that geospatial data developed for scientific purposes can be, in a Web environment, a resource whose value increases with the number of researchers who use it. Geography has always been interdisciplinary and GIS has always been a tool for combining data from different sources. All geodata refers to some aspect of the same Earth. If researchers properly document, archive and publish their data and methodologies using available Web technologies, standards and best practices, many benefits accrue...³³²

The significance of recent senior appointments made by the Obama administration for the advancement of open access principles for government across the traditional disciplines is noted as follows:

Geospatial academics worldwide ought to note also the significance to the research community taken by the recently installed Obama administration in the US, which has resulted in the appointment as co-chairs of the President's Council of Advisors on Science and Technology Harold Varmus, co-founder of the Public Library

³²⁹ National Geospatial Advisory Committee, *The Changing Geospatial Landscape*, January 2009, available at <http://www.fgdc.gov/ngac/NGAC%20Report%20-%20The%20Changing%20Geospatial%20Landscape.pdf>, p 13.

³³⁰ Prof. Mike Jackson, David Schell and Prof. D.R. Fraser Taylor, ‘*The Evolution of Geospatial Technology Calls for Changes in Geospatial Research, Education and Government Management*’, *Directions Magazine* (6 April 2009) http://www.directionsmag.com/article.php?article_id=3092 accessed 5 June 2009.

³³¹ Ibid.

³³² Ibid.



of Science and former director of the US-NIH, and Eric Lander, a lead researcher in the Human Genome Project and founding director of the Broad Institute (a joint MIT and Harvard institute which addresses the effectiveness of "a new, collaborative model of science focused on transforming medicine)". Varmus is one of the most high-profile advocates of Open Access and the role of government in providing open access, and both the Human Genome Project and the Broad Institute are practitioners of open data. *In this context, is it not then obvious and provocative to consider the potential importance to geospatial information science of recognizing the GEOSS (Global Earth Observation System of Systems), within the US federal government as well as the world scientific community, to be an initiative that is similar to and as important as the Human Genome project?*³³³ [emphasis added]

On the need for a new approach in educational practices the authors express their views on how the challenges may be effectively addressed:

4. Academia can accelerate and guide geospatial technology evolution.

The authors support a movement toward Open Access in all the sciences that produce and use geospatial data. But in addition to Open Access, the authors seek a concerted global effort to study and evolve interoperability to make geospatial data and services a more important part of the rapidly evolving ICT environment, which is to say, to build a better connection between the real world and the digital world...

.....

The authors believe that new research centers must be created and existing mathematics, computer science, geography and human factor departments must create new subspecialties or new programs to explore and invent new information systems focused on terrestrial features and phenomena, space, and time. Computer science per se is too abstract to subsume the work we describe. The new discipline needs to be anchored to geodesy, positioning and location-aware technology, and it needs to co-evolve with the open standards framework for geospatial interoperability. The new discipline is a discipline for the study and advancement of processing that is bound to the physical and social environment that we live our daily lives in.³³⁴

As part of the necessary overall reform agenda the authors express the view that the current allocation of public administration responsibilities does not best address pressing present needs:

In 1990, the FGDC, with its symbolic positioning as the focus for US Federal Government geospatial processing, was housed in the US Department of the Interior (DOI). Nineteen years later, after years of technology development and experience with the realities of coordinating the government's vastly diverse spatial information management requirements across nearly all departmental boundaries, it seems relevant to re-examine the organizational positioning of this vital function. Such a re-examination is particularly urgent in light of geoprocessing's increased relevance to comprehensive, multidisciplinary government programs, and of equal importance, in recognition of the increasingly integral definition of standards-based "Interoperability Science" as distinct from the compilation of discipline-specific data repositories.

This is not just a US issue [but rather an issue for all governments worldwide].³³⁵

*“GIS goes vertical, with integration across state, local and federal lines”,
Patrick Marshall, Government Computer News (2009)*

This Government Computer News article entitled *GIS goes vertical, with integration across state, local, federal lines*³³⁶ describes how “GIS applications and the data they deliver are increasingly

³³³ Ibid.

³³⁴ Ibid.

³³⁵ Ibid.

³³⁶ Patrick Marshall, *GIS goes vertical, with integration across state, local and federal lines*, Government Computer News, 10 August 2009, available at <http://gcn.com/articles/2009/08/10/gis-integration-state-local-federal.aspx> accessed on 13 August 2009.

being linked thanks to informal information-sharing efforts at local and state agencies and more formal, federally funded programs”.

This is an important development because:

...most GIS applications developed during the past decade were created in isolation from one another. Because developers created the applications with different programming tools and the applications tap different geospatial engines and databases, it has often been difficult or impossible for one agency to access data collected by another agency.³³⁷

According David Boyd, director of the Command, Control and Interoperability Division at the Homeland Security Department’s Science and Technology Directorate, the goal is:

...the interoperability of all of the communications mechanisms, whether it is voice, digital or what, so that you can share the information you have to allow emergency managers to make the right kinds of decisions quickly in order to try to save lives and protect property.³³⁸

For example, Virtual Alabama (according to the author – “one of the most visible and farthest reaching state GIS efforts”):

...uses Google Earth as its visualization engine and delivers data and query tools to more than 1,200 state and local officials, such as county sheriffs, assessors, firefighters and health care providers.

Virtual Alabama delivers an array of data, such as geocoded imagery of properties statewide and the locations of gas stations, power lines, schools and other points of interest. The system even handles video feeds from highways and public facilities. In a major storm, agencies can monitor traffic flow on evacuation routes, search for open shelters, evaluate property and infrastructure damage, and locate stranded survivors.³³⁹

In addition, the author outlines integration efforts such as the Gulf Coast states’ working groups, Inside Idaho and Missouri Spatial Data Information Service (MSDIS) (the latter two being recipients of the Federal Geographic Data Committee (FGDC) grants to further integrate the state’s GIS program with federal programs). In terms of federal integrators, the largest efforts to integrate GIS data are said to come from two federal agencies: the U.S. Geological Survey (USGS) and DHS. The USGS, the lead agency in mapping the country, launched the National Map program in 2001 to integrate local and state mapping efforts. DHS, another major player in national GIS efforts, plans to build on the efforts in the Gulf Coast states toward a Virtual USA. According to David Boyd, their goal in Virtual USA is to:

...get away from the way we had developed discrete applications, discrete solutions. These often by themselves became stovepipes. They became part of the problem. Now we want to talk about how do we integrate all of these things and how do we make sure all of these things can communicate with each other.³⁴⁰

Lastly, the article covers the main obstacle to national integration – ensuring the active participation of local and regional agencies. According to the author, the ways to ensure participation may vary from one region to another. For example, in Alabama, county sheriffs were shown how Virtual Alabama could help them manage crime data and respond to emergencies. They were also offered free access as long as Virtual Alabama got their counties’ data. In Missouri however, where there were too many counties to be able to work with effectively, it was found that offering free GIS training to regional planning commissions was an effective incentive.

³³⁷ Ibid.

³³⁸ Ibid.

³³⁹ Ibid.

³⁴⁰ Ibid.



According to Boyd, governance is the most difficult problem at every level of government. “Governance implicates the two hardest issues – that is, who is in charge and who pays.” He continued:

One of the keys to making this work is the communities have to be comfortable that they can protect their own resources, their own assets. The states separately want to be able to control access to this information. And there are, of course, fundamental privacy issues that have to be addressed to make sure that we always comply with the laws.³⁴¹

Topologically Integrated Geographic Encoding and Referencing system (TIGER), US Census Bureau

The following historical account of the development of the US Census Bureau’s TIGER³⁴² appears in the 2009 white paper by the National Geospatial Advisory Committee.³⁴³

The detailed street maps that support Web-based mapping applications and in-car navigation systems can be traced to the innovations made by the Census Bureau approximately forty years ago. Since the initial creation of digital street maps, designed to support the 1970 Decennial Census, the street map data industry has evolved into two multibillion-dollar European companies.

The initial experiments were expanded in the mid 1980s when the Census Bureau teamed up with the US Geological Survey to generate the first nationwide digital street map with address ranges. This became the TIGERsystem that supported the 1990 Census and forever changed the way we interact with maps.

Today the US Census Bureau makes extracts of selected geographic and cartographic information from its strategically important MAF/TIGER[®] (Master Address File / Topologically Integrated Geographic Encoding and Referencing) database available in the form of TIGER/Line[®] Shapefiles.

Some of the key features of the latest suite of the Census Bureau’s TIGER/Line[®] Shapefiles are as follows:

- TIGER/Line[®] Shapefiles are spatial extracts from the Census Bureau's MAF/TIGER database, containing features such as roads, railroads, rivers, as well as legal and statistical geographic areas.
- TIGER/Line[®] Shapefiles are made available to the public for no charge and are typically used to provide the digital map base for a Geographic Information System or for mapping software.
- TIGER/Line[®] Shapefiles are designed for use with geographic information system (GIS) software. The TIGER/Line[®] Shapefiles do not include demographic data, but they contain geographic entity codes that can be linked to the Census Bureau’s demographic data, available on American FactFinder.³⁴⁴

³⁴¹ Ibid.

³⁴² US Census Bureau, *TIGER[®], TIGER/Line[®] and TIGER[®]-Related Products*, <http://www.census.gov/geo/www/tiger/>, accessed on 3 April 2009. Also see 2008 TIGER/Line[®] Shapefiles Main Page (released December 8, 2008) <http://www.census.gov/geo/www/tiger/tgrshp2008/tgrshp2008.html>.

³⁴³ National Geospatial Advisory Committee, *The Changing Geospatial Landscape*, January 2009. Available at <http://www.fgdc.gov/ngac/NGAC%20Report%20-%20The%20Changing%20Geospatial%20Landscape.pdf>, accessed on 3 April 2009.

³⁴⁴ Ibid.



The Bureau's website contains a frequently asked questions (FAQ) section to inform users about various aspects of the files and their history.³⁴⁵ For example, the answer to question 26 explains that whilst the shapefiles do not contain demographic data users may download demographic data separately and then if they wish incorporate it into the shapefiles. The Census Bureau demographic data is available through American FactFinder.

The following are extracts from the account on the 2008 TIGER/Line Shapefiles appearing on the Bureau's website:

The MAF/TIGER database was developed at the Census Bureau to support a variety of geographic programs and operations including functions such as mapping, geocoding, and geographic reference files that are used in decennial and economic censuses and sample survey programs. ... information about ... the name, the type of feature, address ranges, and the geographic relationship to other features, also are included.

The 2008 TIGER/Line Shapefiles contain current geographic areas (boundaries of governmental units as of January 1, 2008), Census 2000 vintage geography, and Economic Census geography. The shapefiles also contain some additional feature updates reported in the Boundary and Annexation Survey (BAS). All counties have now been realigned as a result of the MAF/TIGER Accuracy Improvement Project (MTAIP) and are included in the 2008 TIGER/Line Shapefiles. ...

The TIGER/Line Shapefiles contain attribute data only and do not include mapping software. They are designed for use with geographic information system (GIS) software.³⁴⁶

The FAQ sections indicates that whilst the TIGER/Line Shapefiles may be freely reproduced as they are not protected by copyright under US copyright law, TIGER[®] and TIGER/Line[®] are registered trademarks of the U.S. Census Bureau and must be respected.³⁴⁷

The TIGER/Line Shapefiles are available for downloading.³⁴⁸

C. Other (non-spatial) public sector information

"Long-lived Digital Data Collections: Enabling Research and Education in the 21st Century", National Science Board, National Science Foundation (2005)

³⁴⁵ See <http://www.census.gov/geo/www/tiger/faq.html>, accessed on 3 April 2009.

³⁴⁶ See <http://www.census.gov/geo/www/tiger/tgrshp2008/tgrshp2008.html>, accessed on 3 April 2009.

³⁴⁷ See <http://www.census.gov/geo/www/tiger/faq.html>, accessed on 3 April 2009. The answer to question 38 is as follows:

38. Are the TIGER/Line Shapefiles copyrighted? Can I reproduce them?

By law, Title 17 U.S.C., Section 105, copyright protection is not available for any work of the United States Government. Thus, the Government is precluded from copyrighting its publications. Consequently, you are free to reproduce census materials as you see fit. However, TIGER[®] and TIGER/Line[®] are registered trademarks of the U.S. Census Bureau; ZCTA[™] is also a trademark of the U.S. Census Bureau. As such, these names cannot be used as or within the proprietary product names of any commercial product including or otherwise relevant to U.S. Census Bureau data, and may only be used to refer to the nature of such product. The U.S. Census Bureau requests that any repackaging of the TIGER/Line Shapefile data (and documentation) and other files accompanying it for distribution include a conspicuously placed statement to this effect on the product's cover, the first page of the website, or elsewhere of comparable visibility. Further, U.S. Census Bureau trademarks, when used in reference to the nature of the product, should be accompanied by the [®] (registered) symbol or [™] symbol.

³⁴⁸ Ibid. See the answer to question 39. Downloads are via <http://www2.census.gov/cgi-bin/shapefiles/national-files>, accessed on 3 April 2009.



This report³⁴⁹ provides the findings and recommendations arising from analysis by the National Science Board (the Board) and its Long-lived Data Collections Task Force of the policy issues relevant to long-lived digital data collections.

The Board recognizes the growing importance of these digital data collections for research and education, their potential for broadening participation in research at all levels, the ever increasing National Science Foundation investment in creating and maintaining the collections, and the rapid multiplication of collections with a potential for decades of curation.

The report identifies that the weakness of National Science Foundation (NSF) strategies and policies governing long-lived data collections is that they have been developed incrementally and have not been considered collectively. Given the proliferation of these collections, the complexity of managing them, and their cost, action is imperative. The National Science Board declares its concern about the current situation. Prompt and effective action will ensure that researchers and educators derive even higher value from these collections.³⁵⁰

Appendix C – Current Policies on Data Sharing and Archiving³⁵¹ provides examples from the diverse set of existing policies in place at NSF and in other agencies, and identifies where there appears to be simply a lack of an adequate policy or indeed a lack of an appropriate level of consistency across different policies.

The analysis in this Appendix contains various observations on the diverse policies which range in the scope, specificity and terms across scientific sectors and Federal agencies:

- Overall NSF policy is quite general, and does not address requirements for archiving (or sunseting) data, requirements for metadata, or enforcement of policy.
- Some NSF programs have detailed data policies; others do not.
- Policies vary considerably in whether or not they require archiving of data or just sharing.
- Data policies are well established and stable for observational earth science data. This may arise in part because of the existence of a well-established system of world data centers that provide archives for data.
- Data policies are newer and evolving in the life sciences. Publication policies have an important influence on data practices in these fields. NIH policy is a recent addition to this field.
- Human subjects provisions and proprietary data concerns are major elements of data policies in the life and social sciences.³⁵²

“Overview of US Federal Government Information Policy”, Nancy E Weiss and Paul Uhlir (2008)

In the presentation, *Overview of US Federal Government Information Policy*,³⁵³ Nancy E Weiss of the US Institute of Museum and Library Services (Washington DC) and Paul Uhlir of the US National Academies (Washington DC) summarise the main arguments for placing government-generated information in the public domain and describe countervailing policies and practices that may limit access to and reuse of government information:

³⁴⁹ National Science Board, *Long-lived Digital Data Collections: Enabling Research and Education in the 21st Century*, National Science Foundation, <http://www.nsf.gov/pubs/2005/nsb0540/nsb0540.pdf>, accessed on 3 April 2009.

³⁵⁰ Ibid, p 12.

³⁵¹ Ibid, p 57.

³⁵² Ibid, p 71.

³⁵³ Presented at OECD Working Party on Information Economy workshop on public sector information, Paris, 4 – 5 February 2008, at <http://www.oecd.org/dataoecd/28/0/40047022.pdf>, accessed on 3 April 2009.



Compelling reasons for placing government-generated information in the public domain or under open access conditions:

- A government entity needs no legal incentives from exclusive property rights to create information. Both the activities that the government undertakes and the information produced by it in the course of those activities are a public good.
- The public has already paid for the production of the information. Free and open access is the most appropriate way to disseminate online.
- Transparency of governance is undermined by restricting citizens from access to and use of public data and information. Rights of freedom of expression are compromised by restrictions on re-dissemination of public information.
- Numerous economic and non-economic positive externalities—especially through network effects—can be realized on an exponential basis through the open dissemination of public-domain data and information on the internet.

Countervailing policies and practices that may limit the free and unrestricted access to and use of government information:

- Statutory exemptions to public-domain access and use based on specific national security concerns, the need to protect personal privacy, and to respect confidential information (plus other exemptions to Freedom of Information Acts).
- Government agencies generally protect the proprietary rights in information originating from the private sector that are made available for government use, unless expressly exempted.
- Government agencies may not be allowed to compete directly with the private sector in providing information products and services, outside their legislative mandate.
- Government-generated information is not necessarily provided free, even if there are no restrictions on reuse. Any charges, however, may pose an insurmountable barrier to access by the most disadvantaged potential users.³⁵⁴

“Government Data and the Invisible Hand”, Ed Felten et al, Yale Journal of Law and Technology (2009)

*Government Data and the Invisible Hand*³⁵⁵ by Ed Felten, David Robinson, Harlan Yu and Bill Zeller discusses how to use information technology to make government more transparent. The authors make specific suggestions about how to make this happen. The introduction to the paper states:

If the next Presidential administration really wants to embrace the potential of Internet-enabled government transparency, it should follow a counter-intuitive but ultimately compelling strategy: *reduce* the federal role in presenting important government information to citizens. Today, government bodies consider their own websites to be a higher priority than technical infrastructures that open up their data for others to use. We argue that this understanding is a mistake. It would be preferable for government to understand providing reusable data, rather than providing websites, as the core of its online publishing responsibility.

³⁵⁴ Ibid, pp 12-13.

³⁵⁵ Ed Felten et al, ‘Government Data and the Invisible Hand’, (2009) 11 *Yale Journal of Law and Technology* 160. Available at <http://www.yjolt.org/11/fall/robinson-160>. This paper was referred to by the UK Power of Information Taskforce in its final report published in March 2009, see <http://poit.cabinetoffice.gov.uk/poit/wp-content/uploads/2009/03/poit-report-final-doc.doc>.



In the current Presidential cycle, all three candidates have indicated that they think the federal government could make better use of the Internet. Barack Obama's platform explicitly endorses "making government data available online in universally accessible formats." Hillary Clinton, meanwhile, remarked that she wants to see much more government information online. John McCain, although expressing excitement about the Internet, has allowed that he would like to delegate the issue, possible to a vice-president.

But the situation to which these candidates are responding – the wide gap between the exciting uses of Internet technology by private parties, on the one hand, and the government's lagging technical infrastructure on the other – is not new. The federal government has shown itself consistently unable to keep pace with the fast-evolving power of the Internet.

In order for public data to benefit from the same innovation and dynamism that characterize private parties' use of the Internet, the federal government must reimagine its role as an information provider. Rather than struggling, as it currently does, to design sites that meet each end-user need, it should **focus on creating a simple, reliable and publicly accessible infrastructure that "exposes" the underlying data.** Private actors, either nonprofit or commercial, are better suited to deliver government information to citizens and can constantly create and reshape the tools individuals use to find and leverage public data. The best way to ensure that the government allows private parties to compete on equal terms in the provision of government data is to **require that federal websites themselves use the same open systems for accessing the underlying data as they make available to the public at large.**

Our approach follows the engineering principle of separating data from interaction, which is commonly used in constructing websites. Government must provide data, but we argue that websites that provide interactive access for the public can best be built by private parties. This approach is especially important given recent advances in interaction, which go far beyond merely offering data for viewing, to offer services such as advanced search, automated content analysis, cross-indexing with other data sources, and data visualization tools. These tools are promising but it is far from obvious how best to combine them to maximize the public value of government data. Given this uncertainty, the best policy is not to hope government will choose the one best way, but to rely on private parties with their vibrant marketplace of engineering ideas to discover what works.³⁵⁶

The authors argue that when providing data on the Internet, the federal government's core objective should be to build open infrastructures that enable citizens to make their own uses of the data. If, upon achieving that objective, government takes the additional step of developing finished sites that rely on the data, that too would be genuine progress according to the authors. Their proposal would reverse the current government policy of regarding government websites themselves as the primary vehicle for the distribution of public data, and open infrastructures for sharing the data as a worthy but nevertheless secondary objective.³⁵⁷

After reviewing various government website initiatives and private sector innovation, and arguments counter to their views the authors include in their conclusion the following observations including the likely sporadic nature only of any possible revitalisation in government websites following the election then in prospect:

The federal government's current web presence falls far short of what is possible. The energy and opportunity for change that comes with a new President could easily lead to an episodic upgrading of government web sites, a sudden shift after which sites will continue to drift out of date. If the administration instead steps forward and adopts the grassroots model we suggest, then the federal government's Internet presence will be permanently improved—citizen access to government data will keep pace with technology's progress indefinitely into the future.³⁵⁸

³⁵⁶ Ibid, pp 160-161.

³⁵⁷ Ibid, p 173.

³⁵⁸ Ibid, p 175.



“Harnessing the Power of Digital Data for Science and Society”, Report of the Interagency Working Group on Digital Data to the Committee on Science of the National Science and Technology Council (2009)

The report by the Interagency Working Group on Digital Data to the Committee of the National Science and Technology Council Committee (IWGDD), *Harnessing the Power of Digital Data for Science and Society*,³⁵⁹ provides a set of first principles that guide a vision, strategy, tactical goals, and implementation plans for the federal government, acting as both leader and partner, to work with all sectors of US society to provide for reliable and effective digital data preservation and access.³⁶⁰ The strategic plan developed by IWGDD is a strategically important step in addressing the digital data preservation and access needs of the US science and engineering research and education sectors.³⁶¹ The agency took into account the contributions of representatives from 22 federal agencies in preparing the report.

The vision of the IWGDD is of “a digital scientific data universe in which data creation, collection, documentation, analysis, preservation, and dissemination can be appropriately, reliably, and readily managed. This will enhance the return on our nation's research and development investment by ensuring that digital data realize their full potential as catalysts for progress in our global information society”.³⁶²

The IWGDD’s strategy for realising this vision is described as:

Create a comprehensive framework of transparent, evolvable, extensible policies and management and organizational structures that provide reliable, effective access to the full spectrum of public digital scientific data. Such a framework will serve as a driving force for American leadership in science and in a competitive, global information society.³⁶³

The report sets out in its Introduction details of the scientific revolution in the 21st century brought about through an imposing array of new digital technologies. The report notes that “In this world the power of digital information to catalyse progress is limited only by the power of the human mind”.³⁶⁴ The key characteristics of the current digital data environment are identified to be as follows:

- the products of science and the starting point for new research are increasingly digital and increasingly “born-digital”;
- exploding volumes and rising demand for data use are driven by the rapid pace of digital technology innovations;
- all sectors of society are stakeholders in digital preservation and access; and

³⁵⁹ *Harnessing the Power of Digital Data for Science and Society*, Report of the Interagency Working Group on Digital Data to the Committee on Science of the National Science and Technology Council (January 2009) http://www.nitrd.gov/about/Harnessing_Power_Web.pdf accessed on 5 June 2009.

³⁶⁰ See the commendation, dated January 14, 2009, by the Director, Office of Science and Technology Policy, Executive Office of the President, which accompanies the Report.

³⁶¹ For the purposes of the report, digital data are defined as “any information that can be stored digitally and accessed electronically, with a focus specifically on data used by the federal government to address national needs or derived from research and development funded by the federal government”. See http://www.nitrd.gov/about/Harnessing_Power_Web.pdf at page 3, footnote 2.

³⁶² *Harnessing the Power of Digital Data for Science and Society*, Executive Summary, p 1.

³⁶³ *Ibid*, p 2.

³⁶⁴ *Ibid*, p 1.



- a comprehensive framework for cooperation and coordination to manage the risks to preservation of digital data is missing.³⁶⁵

A set of guiding principles were developed by the Working Group following its analysis of the current digital scientific data landscape. The principles are based on the expertise of the members of the Working Group, supplemented by contributions from outside experts and documentation from several major studies of the challenges and opportunities presented by a fully digital world. These guiding principles are:

- science is global and thrives in the digital dimensions;
- digital scientific data are national and global assets;
- not all digital scientific data need to be preserved and not all preserved data need to be preserved indefinitely;
- communities of practice are an essential feature of the digital landscape;
- preservation of digital scientific data is both a government and private sector responsibility and benefits society as a whole;
- long-term preservation, access, and interoperability require management of the full data life cycle; and
- dynamic strategies are required.³⁶⁶

The report makes it clear that the strategic framework, recommendations, and goals presented are based strongly on these guiding principles.

To pursue the strategy of realising its vision of the digital data scientific universe, as set out above, the IWGDD recommends that:

- a National Science and Technology Council (NSTC) Subcommittee for digital scientific data preservation, access, and interoperability be created;
- appropriate departments and agencies lay the foundations for agency digital scientific data policy and make the policy publicly available; and
- agencies promote a data management planning process for projects that generate preservation data.³⁶⁷

The Working Group indicates that if these three recommendations are implemented together in a coordinated manner they can reform and redesign the digital scientific data landscape. In operational terms the IWGDD considers that, through the strength of the National Science and Technology Council (NSTC) environment, it will be able to pursue goals requiring broad cooperation and coordination whilst at the same time enabling federal agencies to pursue their missions and empower their respective communities of practice. The goals targeted by these recommendations are:

- to be both leader and partner;
- to maximize digital data access and utility;
- to implement rational, cost-efficient planning and management processes;
- to empower the current generation while preparing the next;
- to support global capability; and
- to enable communities of practice.³⁶⁸

The report identifies the following key elements as necessary to ensure that the recommendations of the IWGDD work together for maximum operational impact:

³⁶⁵ Ibid.

³⁶⁶ Ibid, pp 10-12.

³⁶⁷ Ibid, pp 14-15.

³⁶⁸ Ibid, pp 16-19.



- Subcommittee responsibilities should include topics requiring broad coordination, such as extended national and international coordination; education and workforce development; interoperability; data systems implementation and deployment; and data assurance, quality, discovery, and dissemination.
- In laying appropriate policy foundations, agencies should consider all components of a comprehensive agency data policy, such as preservation and access guidelines; assignment of responsibilities; information about specialized data policies; provisions for cooperation, coordination and partnerships; and means for updates and revisions.
- The components of data management plans should identify the types of data and their expected impact; specify relevant standards; and outline provisions for protection, access, and continuing preservation.³⁶⁹

On the particular issue of how data management plans, identified in third of the key elements above, might appropriately address the issue of access the report states:

Access. Description of plans for providing access to data. This should include a description and rationale for any restrictions on who may access the data under what conditions and a timeline for providing access. This should also include a description of the resources and capabilities (equipment, connections, systems, expertise, etc.) needed to meet anticipated requests. These resources and capabilities should be appropriate for the projected usage, addressing any special requirements such as those associated with streaming video or audio, movement of massive data sets, etc.³⁷⁰

Legal and policy position

The following useful summary of the US legal and policy position (and its impact) in relation to digital scientific data produced by federal agencies or federally funded work appears in an early part of the Report dealing with the “Current Data Landscape”:

The elements of [the legal and policy] landscape that are most relevant to this document are as follows:

- *The Paperwork Reduction Act* (44 USC 35) has as one of its key purposes to “ensure the greatest possible public benefit from and maximize the utility of information created, collected, maintained, used, shared and disseminated by or for the federal government.”
- *The Office of Management and Budget (OMB) Circular A-130* specifies that “The open and efficient exchange of scientific and technical government information ... fosters excellence in scientific research and effective use of federal research and development funds.”
- *The 1991 Supreme Court ruling in Feist Publications, Inc. v. Rural Telephone Service Co.* (499 U.S. 340) establishes that “facts do not owe their origin to an act of authorship, they are not original, and thus are not copyrightable.”
- *Copyright law* (17 USC 105) provides that “Copyright protection under this title is not available for any work of the United States Government.”
- *The Freedom of Information Act (FOIA; 5 USC 552)* provides for public access to the records of the federal government.

This legal and policy landscape produces a climate of equitable access while protecting appropriate intellectual property rights. This provides a dynamic, healthy environment for basic and applied research, enabling the United States to continue as a leader in discovery and innovation in the information age. It also drives a robust commercial information sector. The FY2000 federal investment in public sector information was estimated at

³⁶⁹ Executive Summary, p 2. Full details in the Report are at pp 21-24.

³⁷⁰ Op cit, p 24.



\$14.9B.9 The commercial information sector that relies on this investment generated estimated annual sales of \$641B, employing 3.2 million people.³⁷¹

Implementation of the Report's recommendations would very greatly advance the right digital environment in which "[d]ata are not consumed by the ideas and innovations they spark but are an endless fuel for creativity. A few bits, well found, can drive a giant leap of creativity".³⁷²

"Overview of US Federal Government Information Policy", Nancy Weiss (2009)

In the *Overview of US Federal Government Information Policy*,³⁷³ Nancy Weiss of the United States Institute of Museum and Library Services takes a high level view of the long history of US information policy from the time of the Founding Fathers to the present day. The Founding Fathers addressed information policy and access issues in drafting the US Constitution. Central to their vision of the new US democracy was that citizens should be enabled to actively participate in their own governance through the provision of ready access to information and educational skills.

In this context the Weiss cites the words of James Madison, one of the Founding Fathers:

a popular government without popular information or the means of acquiring it, is but a prologue to a farce, or a tragedy, or both.

Weiss refers to numerous federal laws that govern access to US government information, ranging from a right to information under the Freedom of Information Act, to the right to know what is going on in government, with the Sunshine in Government Act, to the US Copyright Act and many others. As the author observes the US Federal government information policy is distilled in the document described as Office of Management and Budget Circular A-130, which identifies various general principles to be applied by government agencies to access to, and the exchange of, government information.³⁷⁴

Circular A-130 also contains policies designed to avoid restrictive practices such as exclusive access arrangements or the charging of fees or royalties on the reuse, resale, or dissemination of public sector information. The Circular encourages agencies to calculate use fees or charges at the marginal cost of dissemination, which means in practice that information available online may be accessed and used without incurring any fee or charge.

In addition to information produced by agencies, Weiss refers to the case of access to government funded information. Initially in 2003, the US National Institutes of Health (NIH) implemented a data sharing policy under which any recipient of grant funding in excess of \$500,000 in a year was

³⁷¹ Ibid, p 7.

³⁷² Op cit, Executive Summary, p 1.

³⁷³ US National Committee for CODATA, Board on Research Data and Information, in collaboration with the Working Party on the Information Economy, Organisation for Economic Co-operation and Development, *The Socioeconomic Effects of Public Sector Information on Digital Networks – Toward a Better Understanding of Different Access and Reuse Policies*, National Academies Press, Washington, 2009, Chapter 2, pp 3-6, available at http://www.nap.edu/catalog.php?record_id=12687 accessed on 30 June 2009. The article is based on the presentation available at <http://www.oecd.org/dataoecd/28/0/40047022.pdf>, accessed on 3 April 2009.

³⁷⁴ Ibid, p 21.



required to prepare and submit a data share plan indicating how the public investment in research data would be distributed generally to the public. This policy evolved to where researchers were requested, but not directed, to provide an electronic copy of the final manuscript developed from the publicly funded research into “PubMed Central”, a central repository of NIH. In 2007 this evolved further again when Congress enacted legislation which requires researchers to lodge a copy of articles from NIH funded research in PubMed Central within 12 months after the official publication date.³⁷⁵

Weiss sees these U.S. access and use policy developments as directly reflecting the spirit evident in the famous statement of another Founding Father, Thomas Jefferson, that “information is the currency of democracy”.

Weiss usefully summarises the US policy position in the following terms:

U.S. policy embodies a default rule of open availability and reuse of public sector information to maximise the government’s public investment in producing that information. Government information is generally in the public domain, thereby recognizing the public’s right to access and reuse government information. U.S. policy promotes disseminating government information at no more than marginal costs, and balancing the many different interests in adopting any new laws without limiting the public’s access to public sector information.³⁷⁶

Weiss can also see how the present U.S. policy position on access and use is in accord with the following statement by John Quincy Adams, the sixth president of the United States (1825-1829):

Among the first, perhaps the very first instrument for improvement of the condition of the governed, is knowledge, and to the acquisition of much of the knowledge adapted to the wants, the comforts, and the enjoyments of human life public institutions and seminaries of learning are essential.³⁷⁷

D. Non-government organisations

“Open Government Data Principles”, Public.Resource.org (2007)

As an indication of the growing interest among members of the public (particularly in the information technology community), in December 2007 Tim O’Reilly of O’Reilly Media and Carl Malamud of Public.Resource.Org convened a group of “30 people interested in open government” with the objective of “devis[ing] a list of 10 principles of open government”.³⁷⁸

The convenors observed:

The Internet is the public space of the modern world, and through it governments now have the opportunity to better understand the needs of their citizens and citizens may participate more fully in their government. Information becomes more valuable as it is shared, less valuable as it is hoarded. Open data promotes increased civil discourse, improved public welfare, and a more efficient use of public resources.

³⁷⁵ Division G, Title II, Section 218 of Public Law 110-161 (Consolidated Appropriations Act, 2008); NIH Guide Notice for Public Access (January 11, 2008), see <http://publicaccess.nih.gov/policy.htm>.

³⁷⁶ Nancy Weiss, *Overview of US Federal Government Information Policy*, p 25.

³⁷⁷ See http://www.oecd.org/document/48/0,3343,en_2649_34223_40046832_1_1_1_1,00.html. See the joint presentation by Weiss N and Uhlir P, “Overview of US Federal Government Information Policy” at the US CODATA – OECD Workshop 04 January 2008, in which the statement by John Quincy Adams is cited.

³⁷⁸ See http://public.resource.org/open_government_meeting.html, accessed on 3 April 2009.



The group formulated a set of eight principles which, if embraced by governments, would enable them to “become more effective, transparent, and relevant to our lives”. Under the Open Government Data Principles, Government data is considered open if it is made public in a way that complies with the following principles:

1. Complete

All public data is made available. Public data is data that is not subject to valid privacy, security or privilege limitations

2. Primary

Data is as collected at the source, with the highest possible level of granularity, not in aggregate or modified forms.

3. Timely

Data is made available as quickly as necessary to preserve the value of the data.

4. Accessible

Data is available to the widest range of users for the widest range of purposes.

5. Machine processable

Data is reasonably structured to allow automated processing.

6. Non-discriminatory

Data is available to anyone, with no requirement of registration.

7. Non-proprietary

Data is available in a format over which no entity has exclusive control.

8. License-free

Data is not subject to any copyright, patent, trademark or trade secret regulation. Reasonable privacy, security and privilege restrictions may be allowed.

Compliance must be reviewable.

Definitions

“public” means:

The Open Government Data principles do not address what data should be public and open. Privacy, security, and other concerns may legally (and rightly) prevent data sets from being shared with the public. Rather, these principles specify the conditions public data should meet to be considered “open.”

“data” means:

Electronically stored information or recordings. Examples include documents, databases of contracts, transcripts of hearings, and audio/visual recordings of events.

While non-electronic information resources, such as physical artifacts, are not subject to the Open Government Data principles, it is always encouraged that such resources be made available electronically to the extent feasible.

“reviewable” means:

A contact person must be designated to respond to people trying to use the data.

A contact person must be designated to respond to complaints about violations of the principles.

An administrative or judicial court must have the jurisdiction to review whether the agency has applied these principles appropriately.³⁷⁹

³⁷⁹ See http://public.resource.org/8_principles.html, accessed on 3 April 2009.

“Atlanta Declaration and Plan of Action for the Advancement of the Right of Access to Information”, International Conference on the Right to Information (2008)

On 26 March 2008, participants in the International Conference on the Right to Information released the Atlanta Declaration and Plan of Action for the Advancement of the Right of Access to Information.³⁸⁰ The conference, held 27-29 February 2008, brought together more than 125 representatives of government, civil society, media, private sector, international financial institutions, donors, and academics from 40 countries at The Carter Center in Atlanta, Georgia.³⁸¹

The assembled conference acknowledges in the preamble of the declaration that:

...the right of access to information is a foundation for citizen participation, good governance, public administration efficiency, accountability and efforts to combat corruption, media and investigative journalism, human development, social inclusion, and the realization of other socio-economic and civil-political rights;³⁸²

The declaration then sets out the conference’s findings, which include:

2. A lack of access to information disproportionately affects the poor, women and other vulnerable and marginalized people, and as such the right should be guaranteed to all sectors of society.
3. The right of access to information is fundamental to human dignity, equity and peace with justice.
4. Transparency is a necessary and powerful instrument for promoting human and state security.
5. New technology offers a great potential for facilitating access to information, yet factors that limit access and data management practices have prevented many from benefiting from its full potential.³⁸³

Further to these findings, the declaration sets out 7 key principles, including the following:

1. Access to information is a fundamental human right.
2. All states should enact legislation to give effect to the right of access to information.
.....
6. States and international organizations should ensure a system of implementation that provides for:
 - a. The equitable exercise of the right of access to information;
 - b. Training of all public officials on the practice and application of the right;
 - c. Public education and training to empower persons to make full use of the right;
 - d. Allocation of necessary resources to ensure efficient and timely administration;
 - e. Strengthening of information management to facilitate access to information;
 - f. Regular monitoring and reporting on operation of the law; and
 - g. Review of the operation and compliance with the law, by legislative and key oversight bodies.³⁸⁴

³⁸⁰ Atlanta Declaration and Plan of Action for the Advancement of the Right of Access to Information, International Conference on the right to Public Information, Atlanta Georgia, 27-29 February 2008, available at http://www.cartercenter.org/resources/pdfs/peace/americas/ati_atlanta_declaration_en.pdf accessed on 13 August 2009.

³⁸¹ *Declaration to Advance the Right of Access to Public Information Worldwide Released Today*, The Carter Centre – Press Releases, 26 March 2008, available at http://www.cartercenter.org/news/pr/ati_declaration.html accessed on 10 September 2009.

³⁸² See http://www.cartercenter.org/resources/pdfs/peace/americas/ati_atlanta_declaration_en.pdf accessed on 10 September 2009.

³⁸³ Ibid.

³⁸⁴ Ibid.



“Americas Regional Findings and Plan of Action for the Advancement of the Right of Access to Information”, Americas Regional Conference on the Right of Access to Information (2009)

Following on from the International Conference on the Right to Public Information held in February 2008, the Carter Center hosted the Americas Regional Conference on the Right of Access to Information in Lima, Peru³⁸⁵ from 28-30 April 2009 in collaboration with the Organization of American States (OAS),³⁸⁶ the Andean Commission of Jurists,³⁸⁷ and the Knight Center for Journalism in the Americas.³⁸⁸ The conference was part of former US President Jimmy Carter’s South American trip centred on promoting access to information in the region.³⁸⁹ The conference featured over 100 participants from government, civil society, and media outlets from 20 different countries.

On May 21, 2009, the Carter Center released the final version of the *Americas Regional Findings and Plan of Action for the Advancement of the Right of Access to Information*,³⁹⁰ which incorporated the substantive comments from dozens of participants.³⁹¹ The document begins in its Preamble by endorsing and reiterating principles of the Atlanta Declaration of 2008 that:

...the right of access to information is a fundamental human right, universal, indivisible, interdependent and interrelated with the full-range of rights, and necessary for the fight against corruption, improved development, increased security, and good governance as well as being related to health, education, quality of life, and other essential rights;

In its findings, the conference participants further assert that in the Americas:

1. The greatest challenges to the right of access to information are a lack of implementation and enforcement, backsliding in the more developed systems, and an absence of widespread use of the existing legislation and mechanisms.
2. The diversity of the region necessitates diversity in responses. The particular political, social, economic and cultural circumstances require that the people of each country determine the access to information system that best suits their needs. Nevertheless, it is both desirable and feasible that the countries in the region share their access to information experiences and work together to promote the right of access to information.
-
6. States have a special obligation to disclose information pertaining to human rights violations or corruption. This is all the more important in the Americas regional context of past state-sponsored or approved human rights violations and the more recent “global war on terror,” whereby systematic torture and other cruel, inhuman and degrading treatment has been allowed to flourish under the veil of state secrets.
7. Increasing government capacity and strengthening administrative practices to respond to requests and make information proactively available will help support the realization of the right of access to information and can serve to raise confidence in the system, which may further foster demand.
-
9. Although technology can assist access to information, it is not a panacea. States use of websites and new technologies is but one avenue for dissemination rather than a substitute for meaningful access to

³⁸⁵ See http://www.cartercenter.org/peace/americas/ati_conference/2009/index.html accessed on 10 September 2009.

³⁸⁶ See <http://www.trustfortheamericas.org/>.

³⁸⁷ See <http://www.cajpe.org.pe/>.

³⁸⁸ See <http://knightcenter.utexas.edu/blog/?q=en/node/3786>.

³⁸⁹ See *Jimmy Carter Presses for Greater Access to Information in the Americas*, Freedominfo.org – FOI News, available at <http://freedominfo.org/news/20090508.htm> accessed on 13 August 2009.

³⁹⁰ Available at http://www.cartercenter.org/peace/americas/ati_conference/2009/findings-plan-of-action.html accessed on 10 September 2009.

³⁹¹ See http://www.cartercenter.org/peace/americas/ati_conference/2009/index.html accessed 10 September 2009.



information whereby all persons have the right to seek and receive information regardless of the medium.

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12. The practice of secrecy across a range of non-state and multinational actors, in particular systemically significant entities such as extractive, telecommunications, pharmaceutical and agro-chemical industries as well as the banking and financial sectors, may cause harm to fundamental human rights and have negative impacts on sustainable livelihoods.
-
14. Civil society groups should lead by example and strive to be as transparent as possible. However, in seeking additional transparency there are acknowledged risks to groups operating in environments where threats to the security of their organizations, staff, and supporters exist. As such, calls for greater transparency in this sector must be accompanied by a vigorous opposition to any attempt to use access to information laws as a guise for political persecution or discrimination.

To give effect to the Atlanta Declaration and the Americas Regional Findings, the conference participants further call upon regional and international communities, states in the Americas region and civil societies, and corporate and professional organizations to assume various responsibilities pursuant to its regional plan of action, for example:

4. All regional intergovernmental organizations and international and regional financial institutions should ensure internal transparency policies and mechanisms that;
- a) Provide clear and simple processes by which to request information;
 - b) Have limited exceptions to disclosure regimes;
 - c) Include independent appeals processes;
 - d) Mandate proactive disclosure of information; and
 - e) Promote transparency to member States and contractors.
-
9. States should ensure that all public policies and regulations are created and function consistent with the principles of maximum disclosure and transparency, and that all branches of government and public agencies perform according to these tenets.
-
24. Non-state actors should urge States to comply with relevant constitutional provisions, multilateral and bilateral donor agreements, and obligations made as signatories to international and regional treaties, resolutions and declarations.
-
26. Civil society organizations, including non-governmental organizations and labor unions, should lead by example and as a best practice should proactively publish and disseminate, via website and annual reports, details as to public funds received and the use of those specific funds.

E. Other publications: science data, scholarly works or geospatial information, including economic and pricing issues

There is a growing body of literature in the US on access to information and its impact on innovation. Through the US literature, whether general³⁹² or addressing specific kinds of information (e.g. science data, academic publications or geospatial information) there is strong support for open access with pricing (if any) at no more than the cost of distribution.³⁹³

³⁹² For example, books by Professor Henry Chesbrough of the University of California at Berkeley – “Open Innovation” and “Open Business Models”, which were discussed in *The Economist*, *The love-in*, 11 October 2007 at http://www.economist.com/surveys/displaystory.cfm?story_id=9928227, accessed on 3 April 2009.

³⁹³ See for example Charles Bailey’s Open Access Bibliography at <http://www.digital-scholarship.org/oab/oab.htm> and generally, the Digital Scholarship website at <http://www.digital-scholarship.org/> accessed on 25 January 2010.



“Information Rules: A Strategic Guide to the Network Economy”, Carl Shapiro and Hal Varian (1999)

This book³⁹⁴ provides a clear exposition of current economic thinking on the value of information.

“Technology changes. Economic laws do not...”³⁹⁵

The authors explain that economists often say the production of an information good involves high fixed costs but low marginal costs. The costs of producing the first copy of information may be substantial, but the cost of additional copies is negligible. For example a 10 or 20 percent markup on unit cost makes no sense when the unit costs are zero. Goods should be priced according to consumer value, not according to production cost. The value of intellectual property should be maximised, not the terms and conditions that maximise the protection.³⁹⁶

“The Role of Government in a Digital Age”, Joseph Stiglitz, Peter Orszag and Jonathan Orszag (2000)

One of the most influential economic studies on government information in the digital online environment is the 2000 report by Joseph Stiglitz, Peter Orszag and Jonathan Orszag, *The Role of Government in a Digital Age*.³⁹⁷ In this study, commissioned by the United States Computer and Communications Industry Association (CCIA), Stiglitz et al examine the appropriate role of governments in the online and information environment. The report was intended to provide a blueprint for policymakers in determining the proper role for government’s on-line offerings. In January 2009, Peter Orszag was appointed by President Obama as Director of the Office of Management and Budget, which is responsible for implementing the US federal government’s information access policy set.³⁹⁸

The study sets out principles to guide government involvement, based on a recognition that while governments have a role to play, it should not extend too far into downstream value-adding activities. Stiglitz et al proposed the following principles to guide governmental activity in the online environment:

- “Green Light”

Principle 1: Providing public data and information is a proper governmental role

Principle 2: Improving the efficiency with which governmental services are provided is a proper governmental role

Principle 3: The support of basic research is a proper governmental role

³⁹⁴ Carl Shapiro and Hal R. Varian, *Information Rules: A Strategic Guide to the Network Economy*, Harvard Business School Press, Boston (1999).

³⁹⁵ Ibid, at pp 1–2.

³⁹⁶ Ibid, at p 5.

³⁹⁷ Available at http://archive.epinet.org/real_media/010111/materials/stiglitz.pdf. For comment, see http://findarticles.com/p/articles/mi_m0IGM/is_11_7/ai_76813664.

³⁹⁸ See Peter Orszag’s biography on Wikipedia at http://en.wikipedia.org/wiki/Peter_Orszag; see also the article in the New Yorker on Orszag’s role in the Obama administration: Ryan Lizza, *Money Talks: Can Peter Orszag keep the President’s political goals economically viable?*, The New Yorker, 4 May 2009, at http://www.newyorker.com/reporting/2009/05/04/090504fa_fact_lizza?currentPage=all accessed on 25 January 2010.

- “Yellow Light”

Principle 4: The government should exercise caution in adding specialised value to public data and information

Principle 5: The government should only provide private goods, even if private-sector firms are not providing them, under limited circumstances

Principle 6: The government should only provide a service online if private provision with regulation or appropriate taxation would not be more efficient

Principle 7: The government should ensure that mechanisms exist to protect privacy, security, and consumer protection online

Principle 8: The government should promote network externalities only with great deliberation and care

Principle 9: The government should be allowed to maintain proprietary information or exercise rights under patents and/or copyrights only under special conditions (including national security)

- “Red Light”

Principle 10: The government should exercise substantial caution in entering markets in which private-sector firms are active

Principle 11: The government (including government corporations) should generally not aim to maximise net revenues or take actions that would reduce competition

Principle 12: The government should only be allowed to provide goods or services for which appropriate privacy and conflict-of-interest protections have been erected.³⁹⁹

These principles are relevant to policies applicable to the generation of, value adding to, provision of access to, and the distribution and pricing of public sector data, including geospatial data.

This document begins by examining the impact of information technology on the economy, business and government, and is followed by an explanation of the theory of governments’ role and current government policy (as at 2000). Part 2 of the text explores the principles for government provision of goods and services in a digital economy and it breaks these principles into three distinct segments and includes:

- “Green Light” activities, which the government should undertake with little concern;
- “Yellow Light” activities, which the government should undertake with caution; and
- “Red Light” activities, which the government should generally not undertake.⁴⁰⁰

The report concludes by applying the principles in five case studies, including the Department of Labor’s on-line job market information system, the United States Postal Service eBillPay program, private-sector dissemination of legal information, on-line tax preparation software, and a fee-based search engine from the National Technical Information Service.

³⁹⁹ Ibid, Executive Summary, p 5.

⁴⁰⁰ Ibid, p 50.



“A Contractually Reconstructed Research Commons for Scientific Data in a Highly Protectionist Intellectual Property Environment”, J H Reichman and Paul F Uhlir (2003)

In the influential article, “A Contractually Reconstructed Research Commons for Scientific Data in a Highly Protectionist Intellectual Property Environment”⁴⁰¹ published in 2003, Professor Jerome Reichman and Paul Uhlir consider the importance of public domain data in fostering scientific research. Freedom of inquiry, the open availability of scientific data, and full disclosure of results through publication are identified as the critical pillars supporting basic research, which both domestic law and the core values of public science have long upheld.⁴⁰²

Their analysis highlights just how difficult it is to define or draw clear boundaries for the concept of the public domain which is often somewhat taken for granted, with its operation not being fully understood. In the course of the article the authors set about trying to define the boundaries of the concept with greater precision,⁴⁰³ describe how the public domain operates, and then evaluate its supporting infrastructure, both legal and normative.

Recent technological innovations and in particular digital networking are considered by the authors to present major potential problems for the continued effective operation of open access⁴⁰⁴ and the public domain for scientific research data.

The authors describe how rapid advances in digital technologies and networks over the past two decades have fundamentally altered and enhanced the ways that data can be produced, disseminated, managed, and used in science and in all other spheres of human endeavour. Major scientific fields are entirely data-driven, such as bioinformatics in molecular biology and the observational environmental sciences. In this way research increasingly depends on easy access to and use of data resources.⁴⁰⁵

In this new technological environment challenges to the ongoing existence of the public domain are identified. The authors note that as a result of the advances with digital networks the traditional

⁴⁰¹ J H Reichman and P F Uhlir, ‘A Contractually Reconstructed Research Commons for Scientific Data in a Highly Protectionist Intellectual Property Environment’, (2003) 66 *Law and Contemporary Problems*, pp 315-462, available at <http://www.law.duke.edu/journals/lcp/downloads/LCP66DWinterSpring2003P315.pdf> accessed on 3 April 2009.

⁴⁰² *Ibid*, p 317.

⁴⁰³ *Ibid*, pp 318-319. The term “public domain” is defined to mean:
information as sources and types of data and information whose uses are not restricted by statutory intellectual property (“IP”) laws and other legal regimes and that are accordingly available to the public for use without authorization. For analytical purposes, information in the public domain, including scientific data and information, may be divided into three major categories:

- (1) Information that is not subject to protection under exclusive IP rights.
- (2) Information that qualifies as protectable subject matter under some IP regime, but that is contractually designated as unprotected (for example, is transferred or donated to a public archive or data center, or is made available directly to the public, with no rights reserved). Typically, such material consists of scientific data collections.
- (3) Information that becomes available under statutorily created immunities and exceptions, which is also important in this context although it does not constitute public domain information per se.

⁴⁰⁴ *Ibid*, p 319. “Open access” may be defined as proprietary information that is made openly and freely available on the Internet or through other media by the rights holder but that retains some or all of the exclusive property rights that are granted under statutory IP laws. Open access may be provided by all types of public and private sector sources. Of course, public domain information may be provided freely through open access as well. By no means is all public domain information freely available, however, even though once accessed, it may be used without restriction. This article focuses primarily on scientific and technical (“S&T”) data in the public domain available through open access.

⁴⁰⁵ *Ibid*, p 318.



methods by which scientific data is shared have fundamentally changed. Also, the potential for open access to deliver scientific advancement and benefits for the commercial sector have been increased.

The second new challenge described is the increasing combination of economic, legal, and technical pressures which may place the continued operation of the public domain for scientific data in jeopardy.

The research shows that the increasing pressures on universities to commercialise research results tends to reduce the preparedness to share and exchange both data and research tools.⁴⁰⁶

The investigations conducted by the authors show that the foundations of the policy of open access to public research data are, somewhat unexpectedly, not particularly strong and in fact quite vulnerable both on legal and practice grounds. In order to meet effectively these challenges the authors propose that government science policy be updated to support a contractually reconstructed research commons model to support open access.

The authors conclude:

We believe that science policy stands at a critical threshold. If nothing is done to address the challenges we identify, the [unravelling] of the sharing ethos that already characterizes what we have termed the zone of informal data exchanges between individual scientists will spread to universities, and a trading mentality will further contaminate inter-university exchanges of data.

If, instead, science policy takes timely action to address these problems, the benefits could be spectacular, given the new opportunities for scientific collaboration that digital networks make possible. If government-funded data at the university level do enter a contractually reconstructed research commons along the lines we advocate, it would put considerable pressure on single scientists and laboratories to conform their own data exchange practices to the broader normative and regulatory ethos by means of suitable contractual templates. The formulation of these templates could, in turn, make it possible to link up the highly distributed databases of cutting-edge disciplines into “networks of nodes.” On this scenario, the research commons—instead of shrinking and becoming increasingly dysfunctional—could yield positive externalities and network effects that exceeded anything that the scientific community had previously experienced.⁴⁰⁷

“The Access Principle: The Case for Open Access to Research and Scholarship” John Willinsky (2005)

In this book,⁴⁰⁸ Willinsky makes the case for open access to research, on two principal grounds. Firstly, Willinsky deals with the practical matters of digitizing scholarly journals, from the perspective of scholarly associations, copyright law, publishing economics, journal design, and journal indexing. Secondly, the author considers some of scholarly publishing’s broader themes, such as open access, supports extending the research capacities of developing nations, increasing public rights of access to knowledge, and furthering the policy and political contributions of research.

Willinsky points out that open access can play a powerful facilitating role across the full range of scholarly endeavours whether those of a university based researcher working in state of the art

⁴⁰⁶ Ibid, p 461.

⁴⁰⁷ Ibid, p 462.

⁴⁰⁸ John Willinsky, *The Access Principle: The Case for Open Access to Research and Scholarship*, MIT Press, 2005. Available at <http://mitpress.mit.edu/catalog/item/default.asp?type=2&tid=10611>.



research facilities or a science teacher at an underprivileged high school struggling to identify and access resource materials for student instruction purposes.

The access principle advocated by Willinsky is that the commitment to the value and quality of scholarly work carries with it the responsibility to circulate that work as widely as possible. In the online and digital environment, this responsibility to circulate as widely as possible includes exploring new publishing technologies and economic models to enhance access to scholarly work.

“Advancing Knowledge and the Knowledge Economy”, Brian Kahin and Dominique Foray (eds) (2006)

In *Advancing Knowledge and the Knowledge Economy*⁴⁰⁹ a collection of papers edited by Brian Kahin⁴¹⁰ and Dominique Foray,⁴¹¹ expert authors from North America and Europe look at the transformation of knowledge in the global economy in light of the rapid changes in information technology, the resulting explosion in the amount of data, the recognition of intangibles as sources of value and liability and the increasingly blurred distinction between private and public knowledge.

In chapter 1, “Prospects for Knowledge Policy” Brian Kahin refers to the "Innovate America" report of the National Innovation Initiative, Council on Competitiveness (Dec 2004) pp 15, 44 which regards IP as both open and proprietary. A section of the report entitled “Proprietary and Public Domain Intellectual Property” speaks of “intellectual property” as a knowledge asset that can be private or public, observing:

the evolution of the innovation enterprise—the trend toward user co-creation, the need for interoperability in complex IT networks and revolutionary advances in understanding about human biological networks—is putting pressure on traditional IP models and strategies.

More explicitly:

From an intellectual property perspective, open and proprietary IP models should not be seen as mutually exclusive; rather the IP framework must enable both approaches. Because collaborative innovation is relatively new, however, the structure and processes to accommodate ownership, openness and access are evolving. New creative models are emerging across sectors.

Particularly notable chapters in this publication include:

- **"Open and Collaborative" Biomedical Research Theory and Evidence**
Arti K. Rai (Ch 22 - pg 391)

⁴⁰⁹ Brian Kahin and Dominique Foray, *Advancing Knowledge and the Knowledge Economy*, MIT Press, 2006, available at <http://mitpress.mit.edu/catalog/item/default.asp?type=2&tid=11009>.

⁴¹⁰ Brian Kahin is Senior Fellow at the Computer & Communications Industry Association in Washington, DC. He is also Research Investigator and Adjunct Professor at the University of Michigan School of Information and a special advisor to the Provost's Office. He is a coeditor of *Transforming Enterprise* (MIT Press, 2004) and many other books.

⁴¹¹ Dominique Foray holds the Chair in Economics and Management of Innovation and is Director of the College of Management of Technology at École Polytechnique Fédérale de Lausanne. He is the author of *The Economics of Knowledge* (MIT Press, 2004).



- **Toward a Cyberinfrastructure for Enhanced Scientific Collaboration
Proving Its "Soft" Foundations May Be the Hardest Part**
Paul A. David (Ch 24 - pg 431)
- Blurred Boundaries
Tensions Between Open Scientific Resources and Commercial Exploitation of
Knowledge in Biomedical Research
Iain M. Cockburn (ch 20 - pg 351)
- The Economics of Technology Sharing
Open Source and Beyond
Josh Lerner and Jean Tirole (Ch 21 - pg 369)
- Democratizing Innovation
The Evolving Phenomenon of User Innovation
Eric von Hippel (Ch 15 - pg 237)
- Critical Tensions in the Evolution of Open Source Software
Brian Fitzgerald (Ch 23 - pg 415)

“Big Opportunities in Access to ‘Small Science’ Data”, Harlan Onsrud and James Campbell, Data Science Journal (2007)

This article⁴¹² observes that many of the initiatives currently under way to make scientific data accessible to other scientists and in some instances the public have tended to be discipline-specific and focussed on “big science” rather than “small science” research work. The authors argue that data generated through “small science”, and “besides science”, which refers to data collected by those who are not usually seen as professional academic or institutional scientific researchers, constitute a potentially valuable source for further scientific endeavours, despite presently going largely unnoticed. The authors express the view that it is possible to design an infrastructure for a multi-discipline distributed commons environment which addresses the five core issues of licensing, metadata generation, provenance tracking, archiving, and peer evaluation, that will allow scientists and others who wish to do so to make their data available for use by others, without requiring users to seek prior permission for use as long as any conditions placed upon use of the data are adhered to.

By addressing the five issues and by making it simple for contributors to contribute and users to use data sets such infrastructure would facilitate realising the potential of data which currently may go largely unexplored.

“Open Science and Licensing”, Business|Bytes|Genes|Molecules BLOG (11 August 2007)

⁴¹² Harlan Onsrud and James Campbell, ‘Big Opportunities in Access to “Small Science” Data’, *Data Science Journal*, Volume 6, (17 June 2007), available at http://www.jstage.jst.go.jp/article/dsj/6/0/OD58/_pdf and <http://www.spatial.maine.edu/icfs/Onsrud-Campbell%20Paper.pdf> accessed 19 June 2009.



This blog entry⁴¹³ explores how Creative Commons licensing may be relevant to open research data, such as protein information structure, in addition to the clearer examples of picture and word documents. The author indicates there clearly is a need for a licence for open data and cites Science Commons as an initiative exploring these issues. The concept that creative commons licences are relevant to open data is directly relevant to the public sector and geospatial fields.

“The Wealth of Networks: How Social Production Transforms Markets and Freedom”, Yochai Benkler (2007)

In *The Wealth of Networks*⁴¹⁴, Harvard University law professor Yochai Benkler examines the current state of “commons-based peer production”, and considers the potential future impact of this emerging modality of production. In chapter 9, “Justice and Development”, the potential of non-proprietary commons-based strategies is explored in the software,⁴¹⁵ scientific publication,⁴¹⁶ biomedical research⁴¹⁷ and agricultural innovation sectors.⁴¹⁸

In the context of how enhanced access policy reform for public sector information represents a powerful means of reducing barriers to human development the author observes:

[f]rom a more substantive perspective, information and innovation are central components of all aspects of a rich meaning of human development. Information and innovation are central to human health—in the production and use of both food and medicines. They are central to human learning and the development of the knowledge any individual needs to make life richer. And they are, and have for more than fifty years been known to be, central to growth of material welfare. Along all three of these dimensions, the emergence of a substantial sector of nonmarket production that is not based on exclusivity and does not require exclusion to feed its own engine contributes to global human development. The same economic characteristics that make exclusive rights in information a tool that imposes barriers to access in advanced economies make these rights a form of tax on technological latecomers. What most poor and middle-income countries lack is not human creativity, but access to the basic tools of innovation. The cost of the material requirements of innovation and information production is declining rapidly in many domains, as more can be done with ever-cheaper computers and communications systems. **But exclusive rights in existing innovation tools and information resources remain a significant barrier to innovation, education, and the use of information-embedded tools and goods in low- and middle-income countries. As new strategies for the production of information and knowledge are making their outputs available freely for use and continuing innovation by everyone everywhere, the networked information economy can begin to contribute significantly to improvements in human development.**⁴¹⁹ [emphasis added]

The author expresses the view that with the recent emergence of new strategies for the production of information and knowledge which make their outputs available freely for ongoing use by everyone everywhere, the networked information economy can begin to contribute significantly to the further improvement in human development on a global basis. In this context of open access and reuse, Benkler includes in his final (conclusions) chapter the following outline of the impact of “nonmarket, non-proprietary production” models of knowledge, information, and their beneficial implementations:

⁴¹³ Deepak Singh, Open Science and Licensing, *Business/Bytes/Genes/Molecules*, 11 August 2007, <http://mndoci.com/blog/2007/08/11/open-science-and-licensing/>.

⁴¹⁴ Yochai Benkler, *The Wealth of Networks: How Social Production Transforms Markets and Freedom*, Yale University Press, 2006. Available at http://www.jus.uio.no/sisu/the_wealth_of_networks.yochai_benkler/.

⁴¹⁵ Ibid, p 575.

⁴¹⁶ Ibid, p 579.

⁴¹⁷ Ibid, p 611.

⁴¹⁸ Ibid, p 588.

⁴¹⁹ Ibid, p 821.



Culture and knowledge, broadly conceived, form the basic frame of reference through which we come to understand ourselves and others in the world. For any liberal political theory – any theory that begins with a focus on individuals and their freedom to be the authors of their own lives in connection with others – the basic questions of how individuals and communities come to know and evaluate are central to the project of characterizing the normative value of institutional, social, and political systems. Independently, in the context of an information- and innovation-centric economy, the basic components of human development also depend on how we produce information and innovation, and how we disseminate its implementations. The emergence of a substantial role for nonproprietary production offers discrete strategies to improve human development around the globe. Productivity in the information economy can be sustained without the kinds of exclusivity that have made it difficult for knowledge, information, and their beneficial implementations to diffuse beyond the circles of the wealthiest nations and social groups. We can provide a detailed and specific account of why the emergence of nonmarket, nonproprietary production to a more significant role than it had in the industrial information economy could offer improvements in the domains of both freedom and justice, without sacrificing – indeed, while improving – productivity.⁴²⁰

*“Harnessing Information for the Next Generation of Environmental Law”,
University of Texas (2008)*

On February 1-2, 2008, leading scholars in the fields of environmental law, administrative law, risk assessment, science and sociology gathered in Austin for the annual Texas Law Review symposium entitled, *Harnessing the Power of Information for the Next Generation of Environmental Law*.⁴²¹ The Symposium highlighted technological and scholarly developments in information technology and regulation and evaluated the implications of these developments for the future of environmental regulation.

The two articles of most relevance in the present context are “Bottlenecks and Baselines: Tackling Information Deficits in Environmental Regulation”⁴²² by Bradley C. Karkkainen, in the part addressing the collection and construction of information, and “Information Access – Surveying the Current Legal Landscape of Federal Right-to-Know Laws”⁴²³ by David C. Vladeck, in the part dealing with access and dissemination of Information.

Douglas Kysar and James Salzman, in the Foreword, observe that:

just as the government’s collection of information about impacts on the natural world serves a vital function in ensuring the effectiveness of its regulatory efforts, the public’s collection of information about the government serves the function of ensuring that legitimacy, credibility, and, ultimately, the effectiveness of the regulatory regime. Encapsulated in the powerful phrase “the public’s right to know”, and embodied in statutes such as the Freedom of Information Act (FOIA) or treaties such as the Aarhus Convention, a right of access to government information is considered to be an essential prong of good governance.⁴²⁴

⁴²⁰ Ibid, p 816.

⁴²¹ See http://www.utexas.edu/law/journals/tlr/assets/current/symposium_brochure.pdf and http://www.utexas.edu/law/publications/blog/2007-2008_blog.html#TLR867TableofContents. The articles are available at <http://www.utexas.edu/law/journals/tlr/archives/volume86/issue7> and http://www.heinonline.org.ezp01.library.qut.edu.au/HOL/Page?handle=hein_journals/tlr86&id=1&size=2&collection=journals&index=journals/tlr accessed 19 June 2009.

⁴²² Bradley C. Karkkainen, ‘Bottlenecks and Baselines: Tackling Information Deficits in Environmental Regulation’ (2008) 86 *Texas Law Review* 1409, available at <http://www.utexas.edu/law/journals/tlr/assets/archive/v86/issue7/karkkainen.pdf> accessed on 19 June 2009.

⁴²³ David C. Vladeck, ‘Information Access—Surveying the Current Legal Landscape of Federal Right-to-Know Laws’, (2008) 86 *Texas Law Review* 1787, available at <http://www.utexas.edu/law/journals/tlr/assets/archive/v86/issue7/vladeck.pdf> accessed on 19 June 2009.

⁴²⁴ Douglas A. Kysar & James Salzman, ‘Foreword: Making Sense of Information for Environmental Protection’



David Vladeck's article "Information Access- Surveying the Current Legal Landscape of Federal Right-to-Know Laws"⁴²⁵ discusses the use of FOIA to extract information from government officials. The article sets out in detail the development of FOIA and impediments that have increasingly obstructed public access to government information. The author observes that even where the obstacles presented are based on "security concerns", especially following the War on Terror after the 9/11 horrors or the need to protect the secrecy of confidential business information, any benefits need to be weighed against the costs of leaving government less accountable. As Vladeck observes it is worth recalling that environmental information in the former Soviet Union was classified as a state secret with criminal sanctions applying to any individual who failed to respect that confidentiality.

Harvard University Law School – Open Access mandate (2008)

In May 2008, the faculty of Harvard Law School unanimously voted to adopt an open access mandate⁴²⁶ which requires each staff member's academic journal articles be made available in an open access repository:

The Faculty of the Harvard Law School is committed to disseminating the fruits of its research and scholarship as widely as possible. In keeping with that commitment, the Faculty adopts the following policy: Each Faculty member grants to the President and Fellows of Harvard College permission to make available his or her scholarly articles and to exercise the copyright in those articles. More specifically, each Faculty member grants to the President and Fellows a nonexclusive, irrevocable, worldwide license to exercise any and all rights under copyright relating to each of his or her scholarly articles, in any medium, and to authorize others to do the same, provided that the articles are not sold for a profit. The policy will apply to all scholarly articles authored or co-authored while the person is a member of the Faculty except for any articles completed before the adoption of this policy and any articles for which the Faculty member entered into an incompatible licensing or assignment agreement before the adoption of this policy. The Dean or the Dean's designate will waive application of the policy to a particular article upon written request by a Faculty member explaining the need.

Each Faculty member will provide an electronic copy of the final version of the article at no charge to the appropriate representative of the Provost's Office in an appropriate format (such as PDF) specified by the Provost's Office no later than the date of its publication. The Provost's Office may make the article available to the public in an open-access repository.

The Office of the Dean will be responsible for interpreting this policy, resolving disputes concerning its interpretation and application, and recommending changes to the Faculty from time to time. The policy will be reviewed after three years and a report presented to the Faculty.⁴²⁷

Harvard University Faculty of Arts and Sciences – Open Access mandate (2008)

(2008) 86 *Texas Law Review* 1347, 1369 available at <http://www.utexas.edu/law/journals/tlr/assets/archive/v86/issue7/introduction.pdf> accessed 19 June 2009.

⁴²⁵ David C. Vladeck, 'Information Access—Surveying the Current Legal Landscape of Federal Right-to-Know Laws', (2008) 86 *Texas Law Review* 1787, available at <http://www.utexas.edu/law/journals/tlr/assets/archive/v86/issue7/vladeck.pdf> accessed on 19 June 2009.

⁴²⁶ Available at <http://cyber.law.harvard.edu/node/4289>.

⁴²⁷ See http://www.law.harvard.edu/news/2008/05/07_openaccess.php.



On 12 February 2008, Harvard University's Faculty of Arts and Sciences voted to adopt an open access mandate,⁴²⁸ as follows:

The Faculty of Arts and Sciences of Harvard University is committed to disseminating the fruits of its research and scholarship as widely as possible. In keeping with that commitment, the Faculty adopts the following policy: Each Faculty member grants to the President and Fellows of Harvard College permission to make available his or her scholarly articles and to exercise the copyright in those articles. In legal terms, the permission granted by each Faculty member is a nonexclusive, irrevocable, paid-up, worldwide license to exercise any and all rights under copyright relating to each of his or her scholarly articles, in any medium, and to authorize others to do the same, provided that the articles are not sold for a profit. The policy will apply to all scholarly articles written while the person is a member of the Faculty except for any articles completed before the adoption of this policy and any articles for which the Faculty member entered into an incompatible licensing or assignment agreement before the adoption of this policy. The Dean or the Dean's designate will waive application of the policy for a particular article upon written request by a Faculty member explaining the need.

To assist the University in distributing the articles, each Faculty member will provide an electronic copy of the final version of the article at no charge to the appropriate representative of the Provost's Office in an appropriate format (such as PDF) specified by the Provost's Office. The Provost's Office may make the article available to the public in an open-access repository.

The Office of the Dean will be responsible for interpreting this policy, resolving disputes concerning its interpretation and application, and recommending changes to the Faculty from time to time. The policy will be reviewed after three years and a report presented to the Faculty.

Subsequently, the Kennedy School of Government, MIT, the Stanford School of Education and Harvard's Graduate School of Education (GSE) also endorsed open access policies. An article published in the Harvard Crimson on 20 June 2009 reported that the GSE had voted overwhelmingly in favour of making their scholarly articles available to the public free of charge.⁴²⁹

Under the new policy, faculty articles will now be circulated through the online Digital Access to Scholarship at Harvard [DASH] repository now being developed by the Office for Scholarly Communication. Though currently in testing stages and available only within the University, the database is expected to be opened to the general public by late summer or early fall. Faculty members will have the option of blocking public access to articles they write.

"The Public Domain: enclosing the commons of the mind", James Boyle (2008)

⁴²⁸ Available at http://www.fas.harvard.edu/~secfas/February_2008_Agenda.pdf. See also <http://www.eprints.org/openaccess/policy/signup/fullinfo.php?inst=Harvard%20University%20Faculty%20of%20Arts%20and%20Sciences>.

⁴²⁹ Niha S Jain, *Ed School Faculty Endorse Open Access*, Harvard Crimson, 20 June 2009 at <http://www.thecrimson.com/article.aspx?ref=528505>.



In *The Public Domain: enclosing the commons of the mind* (2008),⁴³⁰ well-known intellectual property law scholar James Boyle compares US and European approaches towards access and pricing of public sector information, with a particular focus on weather data. He comments:

Take weather data. The United States makes complete weather data available to all at the cost of reproduction. If the superb government Web sites and data feeds are insufficient, for the cost of a box of blank DVDs you can have the entire history of weather records across the continental United States. European countries, by contrast, typically claim government copyright over weather data and often require the payment of substantial fees. Which approach is better? I have been studying the issue for fifteen years, and if I had to suggest a single article it would be the magisterial study by Peter Weiss called “Borders in Cyberspace,” published by the National Academies of Science. Weiss shows that the U.S. approach generates far more social wealth. True, the information is initially provided for free, but a thriving private weather industry has sprung up which takes the publicly funded data as its raw material and then adds value to it. The U.S. weather risk management industry, for example, is more than ten times bigger than the European one, employing more people, producing more valuable products, generating more social wealth. Another study estimates that Europe invests 9.5 billion Euros in weather data and gets approximately 68 billion back in economic value—in everything from more efficient farming and construction decisions to better holiday planning—a sevenfold multiplier. The United States, by contrast, invests twice as much—19 billion—but gets back a return of 750 billion Euros, a thirty-nine-fold multiplier.

Some readers may not thrill to this way of looking at things because it smacks of private corporations getting a “free ride” on the public purse – social wealth be damned. But the benefits of open data policies go further. Every year the monsoon season kills hundreds and causes massive property damage in Southeast Asia. One set of monsoon rains alone killed 660 people in India and left 4.5 million homeless. Researchers seeking to predict the monsoon sought complete weather records from the United States and Europe so as to generate a model based on global weather patterns. The U.S. data was easily and cheaply available at the cost of reproduction. The researchers could not afford to pay the price asked by the European weather services, precluding the “ensemble” analysis they sought to do. Weiss asks rhetorically, “What is the economic and social harm to over 1 billion people from hampered research?” In the wake of the outpouring of sympathy for tsunami victims in the same region, this example seems somehow even more tragic. Will the pattern be repeated with seismographic, arctographic, and satellite data? One hopes not.

The European attitude may be changing. Competition policy has already been a powerful force in pushing countries to rethink their attitudes to government data. The European Directive on the Reuse of Public Sector Information takes large strides in the right direction, as do studies by the Organization for Economic Cooperation and Development (OECD) and several national initiatives.[footnote 9] Unfortunately, though, most of these follow the same pattern. An initially strong draft is watered down and the utterly crucial question of whether data should be provided at the marginal cost of reproduction is fudged or avoided. This is a shame. Again, if we really believed in evidence-based policy making, the debate would be very different.⁴³¹

⁴³⁰ James Boyle, *The Public Domain: enclosing the commons of the mind*, Yale University Press, 2008, available for download at <http://www.thepublicdomain.org/>. See also James Boyle, special editor (Winter/Spring 2003), *The Public Domain: Collected Papers*, 66, Numbers 1 & 2, Law and Contemporary Problems, Duke University Law School, available at <http://www.law.duke.edu/journals/lcp/lcptoc66winterspring2003.htm>; and *Public Information wants to be free*, 24 February 2005 at <http://www.ft.com/cms/s/2/cd58c216-8663-11d9-8075-00000e2511c8.html>.

⁴³¹ *Ibid*, pp 221-222; also see notes to pages 208–221 (at p 282):

Publicly Generated Information

Access to public, or state generated, data is not simply a matter of economic efficiency: Wouter Hins and Dirk Voorhoof, “Access to State-Held Information as a Fundamental Right under the European Convention on Human Rights,” *European Constitutional Law Review* 3 (2007), 114–126. But in efficiency terms, it does seem to present some clear benefits: Peter Weiss, “Borders in Cyberspace: Conflicting Government Information Policies and their Economic Impacts,” in *Open Access and the Public Domain in Digital Data and Information for Science: Proceedings of an International Symposium* (Washington, D.C.: National Academies Press, 2004), 69–73. The issues of publicly generated information are particularly pressing in geospatial data—which can be vital for academic research and economic development: Bastiaan van Loenen and Harlan Onsrud, “Geographic Data for Academic Research: Assessing Access Policies,” *Cartography and Geographic Information Science* 31 (2004): 3–17. It is an issue that is gaining attention in Europe: “Directive 2003/98/EC of the European Parliament and of the Council of 17 November 2003 on the Re-use of Public Sector Information,” *Official Journal of the European Union* 46 (31.12.2003) 90–96 (L 345). However, there is a long way to go.



“Framing Rules: Breaking the Information Bottleneck”, Bradley Karkkainen (2008)

In the article *Framing Rules: Breaking the Information Bottleneck*,⁴³² the author notes that “establishing and enforcing detailed, prescriptive regulatory standards is an extremely information-intensive enterprise” which “places extreme information demands on regulatory agencies”.⁴³³ Therefore in his view, this presents a barrier to addressing environmental problems, which he terms the “information bottleneck” in environmental regulation.

Consequently, the author:

attempts to develop "framing rules" for environmental problem-identification and problem-solving by **inducing the production and disclosure of information that otherwise would be unavailable or difficult to obtain**, or by altering the parties' incentives to act cooperatively in environmental problem-solving, rather than strategically attempting to thwart it.⁴³⁴ [emphasis added]

The “framing rules” are intended to achieve desirable outcomes in accordance with six basic principles which, in the author’s opinion, “should inform a reorientation of environmental regulation for the next century”. These basic principles include the following:

- 3) We should provide centralized mechanisms for the collection, distillation, analysis, and evaluation of this locally produced data and information, and create mechanisms for its efficient dissemination and diffusion.
- 4) In addition to centralized data and information collection, we should identify categories of information that are best *produced* centrally due to economies of scale associated with concentrated expertise, and assign responsibility to centralized agencies to conduct or oversee that research.
- 5) We should structure incentives to maximize the participation of the not-for-profit sector, especially universities and other not-for-profit research organizations, in environmental problem-solving.
- 6) We should structure all of this in a way that provides maximum incentives, both positive and negative, for the parties best situated to produce the relevant information to do so.⁴³⁵

The author then provides several example applications of the “framing rules”, such as:

- The National Environmental Policy Act of 1969;
- The Environmental Protection Agency’s Toxics Release Inventory;
- California’s Proposition 65 – the Safe Drinking Water and Toxic Enforcement Act of 1986; and
- The European Union’s Registration, Evaluation, Authorization, and Restriction of Chemical Substances (REACH).⁴³⁶

Subsequently, the author considers the forward application of these “framing rules” to the tackling of climate change issues.⁴³⁷ Finally, the author acknowledges that the mechanisms he has described

⁴³² Bradley C Karkkainen, ‘Framing Rules: Breaking the Information Bottleneck’, *NYU Environmental Law Journal*, Vol. 17, No. 1, 2008, available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1367262&download=yes accessed on 10 February 2010.

⁴³³ *Ibid*, p 79.

⁴³⁴ *Ibid*, p 84. See also article abstract on SSRN at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1367262&download=yes accessed on 10 February 2010.

⁴³⁵ *Ibid*, pp 83-84.

⁴³⁶ *Ibid*, pp 84-98.



are works-in-progress, and that “there is also further conceptual work to be done to devise a second-generation of framing rule approaches that more fully capture the potential of the model sketched out here.”⁴³⁸

*“Enabling Reproducible Research: Open Licensing for Scientific Innovation”,
Victoria Stodden (2009)*

In the article, *Enabling Reproducible Research: Open Licensing for Scientific Innovation*,⁴³⁹ Victoria Stodden⁴⁴⁰ advocates the implementation of the Reproducible Research Standard (RRS) to full computational research compendia, including code and data.

The RRS aims to realign the Intellectual Property framework faced by computational researchers with longstanding scientific norms by utilizing existing open licences that permit the free use of licensed work in accordance with the licence terms.⁴⁴¹

In short, Stodden argues that using the RRS on all components of computational scholarship will encourage reproducible scientific investigation, facilitate greater collaboration, and promote engagement of the larger community in scientific learning and discovery.⁴⁴²

⁴³⁷ Ibid, pp 98-105.

⁴³⁸ Ibid, p 106. Note Professor Bradley Karkkainen’s ongoing work which addresses the importance of open access to information in the field of environmental regulation:

- *Information as Environmental Regulation: TRI and Performance Benchmarking, Precursor to a New Paradigm?*, 89 Georgetown L.J. 257 (2001); reprinted in 32 Land Use & Envt. L. Rev. (2002); also reprinted in Environmental Law (The International Library of Essays in Law and Legal Theory 2d Series, Peter S. Menell ed., 2002) available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=224157;
- *Transboundary Ecosystem Governance: Beyond Sovereignty?*, in Public Participation and Governance in International Watershed Management (Carl Bruch et al. eds., forthcoming 2004); and
- *Post-Sovereign Environmental Governance: The Collaborative Problem-Solving Model*, Proceedings of the 2001 Berlin Conference on Human Dimensions of Global Environmental Change, "Global Environmental Change and the Nation State," PIK Report No. 80, Potsdam Institute for Climate Change Research 206 (Frank Biermann et al. eds., 2002).

For more see <http://www.law.umn.edu/facultyprofiles/karkkainenb.html#vvE8jlcQRvjulaadTfuUH15A> accessed on 10 February 2010.

⁴³⁹ Victoria Stodden, ‘Enabling Reproducible Research: Open Licensing for Scientific Innovation’, *International Journal of Communications Law & Policy* (Winter 2009) 13 available at http://www.ijclp.net/issue_13.html accessed on 27 January 2010. See also Stodden’s comment on the Office of Science and Technology Blog, Policy Forum on Public Access to Federally Funded Research: Management at <http://blog.ostp.gov/2010/01/01/policy-forum-on-public-access-to-federally-funded-research-management/> accessed on 27 January 2010.

⁴⁴⁰ Victoria Stodden is a Postdoctoral Associate in Law and a Kauffman Fellow in Law at the Information Society Project at Yale Law School. See <http://www.stanford.edu/~vcs/> accessed on 29 January 2010.

⁴⁴¹ Ibid, p 13.

⁴⁴² Ibid, p 25. For more literature on Reproducible Research, see <http://www.stanford.edu/~vcs/Conferences/RoundtableNov212009/References.html> accessed on 29 January 2010.



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Abbreviations and Acronyms

ACSM	American Congress on Surveying and Mapping
API	Application programming interface
BAS	Boundary Annexation Survey
BRDI	National Research Council's Board on Research Data and Information
BY	Attribution
CC	Creative Commons
CCIA	Computer and Communications Industry Association
CENDI	Commerce, Energy, NASA, Defense Information Managers Group
CFR	Code of Federal Regulations
CGD	Commons Geographic Data
CIO	Chief Information Officer
CODATA	Committee on Data for Science and Technology
COFUR	cost of fulfilling user requests
CSV	comma-separated values
CTO	Chief Technology Officer
DC	District of Columbia
DG	Directorate General
DHS	Department of Homeland Security
EFOIA	Electronic Freedom of Information Act
EOSDIS	Earth Observing System Data and Information System
EPA	Environmental Protection Agency
ESRI	Environmental Systems Research Institute
EU	European Union
FCC	Federal Communications Commission
FEMA	Federal Emergency Management Agency
FGDC	Federal Geographic Data Committee
FTP	File Transfer Protocol
FOIA/ FOI Act	Freedom of Information Act
GAO	General Accounting Office
GILS	Government Information Locator Services
GINIE	Geographic Information Network in Europe
GIS	Geographic Information Systems
GIT	Geographic Information Technology
GITA	Geospatial Information & Technology Association
GSDI	Global Spatial Data Infrastructure
HUD	U.S. Department of Housing and Urban Development
INSPIRE	Infrastructure for Spatial Information in Europe
ISDE	International Symposium on Digital Earth
ISO	International Organization of Standardization
IT	Information Technology
IWGDD	Interagency Working Group on Digital Data
KML/KMZ	Keyhole Markup Language/ compressed Keyhole Markup Language files

MAF	Master Address File
MSC	Mapping Science Committee
MSDIS	Missouri Spatial Data Information Service
MTAIP	MAF/TIGER Accuracy Improvement Project
NAPA	National Academy of Public Administration
NASA	National Aeronautics and Space Administration
NASCIO	National Association of State Chief Information Officers
NGAC	National Geospatial Advisory Committee
NGPO	National Geospatial Programs Office
NIH	National Institutes of Health
NII	National Information Infrastructure
NIST	National Institute for Standards and Technology
NOAA	National Oceanic and Atmospheric Administration
NRC	National Research Council
NSDI	National Spatial Data Infrastructure
NSF	National Science Foundation
NSGIC	National States Geographic Information Council
NSLRDA	National Satellite Land Remote Sensing Data Archive
NSTC	National Science and Technology Council
NWS	National Weather Service
NYC	New York City
OAS	Organization of American States
OCTO	Office of the Chief Technology Officer
ODC	Open Data Consortium
OECD	Organization for Economic Co-operation and Development
OFT	Office for Technology
OMB	Office of Management and Budget
OSTP	Office of Science and Technology Policy
OSDM	Office of Spatial Data Management
PRA	Paperwork Reduction Act
REACH	European Union's Registration, Evaluation, Authorization, and Restriction of Chemical Substances
RRS	Reproducible Research Standard
SDI	Spatial Data Infrastructure
SSDI	Statewide Spatial Data Infrastructure
STI	Scientific and Technical Information
STIA	Spatial Technologies Industry Association
TIGER	Topologically Integrated Geographic Encoding and Referencing
TRI	Toxics Release Inventory
TXT	Text files
UK	United Kingdom
UM	University of Mississippi
US	United States
USC	United States Code
USGS	U.S. Geological Survey
WMO	World Meteorological Organization
XM	Extended Module
XML	Extensible Markup Language

ZCTA	ZIP Code Tabulation Area
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