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Distribution of Online Cartographic Products in Australia

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Introduction

1 It has been stated that the Internet is the most powerful communication medium in the world, . The Internet is changing the way ideas are communicated and provides a new medium for the exchange of geospatial information. The distribution or dissemination and trade of geospatial data sets is part of this process, particularly as mapping becomes increasingly digital.

2 The technology required to provide online map transaction services is available, yet we are still constrained by issues including difficulties with image viewing and privacy. A review of the technology affecting the distribution of geospatial data sets through the Internet and the envisaged trends for the future comprise the central part of this paper. Additionally, two case studies have been selected to further illustrate the complex issues associated with mapping online.

3 The case studies described correspond to research undertaken within the Department of Geomatics at the University of Melbourne. The first outlines work by the Department on improving digital cadastral databases, including making data available on the Internet. The second is part of a research project that introduces trial Geographic Information Systems (GIS) technology within the health sector in Australia. In this project, the Internet has been adopted for the purpose of delivering the final GIS product made for a General Medical Practice setting.

Mapping on the Internet

4 In recent years stores of hardcopy maps have found themselves being replaced by the digital equivalent. The advantages of digital mapping will not be discussed here, however they can be found elsewhere, such as in Robinson et al. (1984) and Bosque et al. (1994). Digital data processing has simultaneously developed along with digital hardware and storage technologies, yet it could be considered that the ability to transfer digital data has always been possible, due to computer networking.

5 The Internet has been established at least for as long as the hardware required for GIS. However the focus of its use has only reached catalyst intensity in the last few years with the advent of the WWW, which uses the Internet as its backbone. With this intensity has come increased commercial attention, resulting in a range of software that provides online mapping applications, some of which are reviewed in Limp (1997).

6 Due to advances in Internet technology, the dissemination of mapping products has become within the domain of most with an Internet connection, rather than only those with industry knowledge, as in previous times. Many applications are producing data intended for a variety of audiences, as with the interaction that the WWW can provide, the intended audience can now interact with data servers and create personal mapping products according to individual needs. This can be fraught with problems, if a largely cartographically uneducated public begin making their own maps. As a result, the potential exists for the generation of maps, which are misrepresentative, of poor quality or inappropriate for their intended use. To their credit however, many online mapping services limit user freedom in respect to map generation, particularly in map viewing implementations.

7 More broadly the limitations of the WWW itself are well documented, with the two main concerns being network security and bandwidth. Other problems related to networking GIS are discussed in Li (1996) and Wang (1997). Fundamental problems exist in the lack of vector display in ordinary Web pages, as web browsers are restricted to GIF and JPEG raster image

display. Additionally, network transmission speeds have interfered with the size of mapping products, which can usually be transferred electronically. It has been observed that some mapping companies provide a cataloguing or preview service for mapping products with the view to later provide the much larger digital products in some other medium, for example on a CD-ROM .

8 Other concerns with the interfacing required for the user of the Web Browser has been addressed by new technologies such as Java . Java and similar technologies allows for the provision of complex display and functionality required for non trivial mapping applications with improved user friendliness. Appropriate browser plugins such as the AutoDesk plugin also provide some of the necessary functionality. This technology enables the provision of an interactive interface and display components to Web pages, a capability which had been lacking in a static Web page environment.

9 As work with online commerce continues, the ability to provide commercial products over the WWW should become more attractive. Concerns about security, particularly in regards to online monetary transactions, will subside as more secure procedures are devised and implemented. A great deal has been achieved in the area of transmission encryption and user verification that allows for secure commercial transactions to take place. More about these security technologies can be found in Verisign Inc. (1997), Netscape Communications Corporation (1997), and others in a similar position within the IT industry.

Cartographic Examples Using WWW

10 Land Victoria and The Department of Geomatics (The University of Melbourne) - Diffusion of Cadastral Data Through the Internet

11 Land Victoria is an agency within the Victorian State Government of Australia. Amongst other roles it is responsible for the cadastral map, which is maintained under contract by the private sector. The cadastral map or the State Digital Map Base (SDMB) was digitised from hardcopy maps in the mid to late eighties. Like many other digital cadastral databases (DCDBs), the Victorian DCDB suffered errors in accuracy derived from paper maps and lacked topology information. Despite these limitations, the data was sold to commercial interests. These commercial entities were also sold licenses to meet their subsequent requirements. In many cases this data was used as a geographic foundation within detailed GIS .

12 The recent political climate in Victoria has been one of economic rationalism within many Government sectors , and a revenue return was deemed necessary on many Government services. The streamlined distribution of data has been a goal of Land Victoria, with the introduction of Unique Feature Identifier (UFI) update methods replacing old block file update methods (which was not attractive to customers who value added their datasets).

13 The provision of a WWW based distribution service has enabled the purchase of data online. The WWW service includes data viewers with a functionality to view geospatial data and subsequently purchase the data online. The distribution of data is, by the most part, an efficient method, which includs a CD-ROM for large datasets and email or floppy disk for smaller datasets. It is also possible to download some datasets in a variety of digital formats through the WWW browser .

14 Since 1996 the Department of Geomatics, in conjunction with Land Victoria have an agreement, which involves research in geospatial issues of importance for both State Government and the University. Amongst other projects, Land Victoria is currently supporting initiatives aimed to greater utilise the possibilities presented by the WWW in the area of digital data transactions. One of these initiatives allows relevant persons (licensed surveyors) to submit, update and upgrade data online to the relevant authority so as to upgrade and update the SDMB online electronically. This concept encompasses many problems and ideas in the form of legal digital lodgement of cadastral map data and the institutional issues that this

presents. As an example, a view of an application developed at the Department of Geomatics is shown in Figure 1. This application allows users to view and submit data online to a data custodian.

15 The primary reason for this work lies with the current trends on digital map data acquisition. The subsequent use of hardcopy mapping between data collection and placement into the SDBM is inefficient. A complete digital transaction preserves the original accuracy of the initial data collection by eliminating unnecessary map digitisation. The useage of the WWW and Internet allows the use of complete digital mapping products and data by providing an available, universally accepted and deployed networking technology (Falzon and Williamson, 1998).

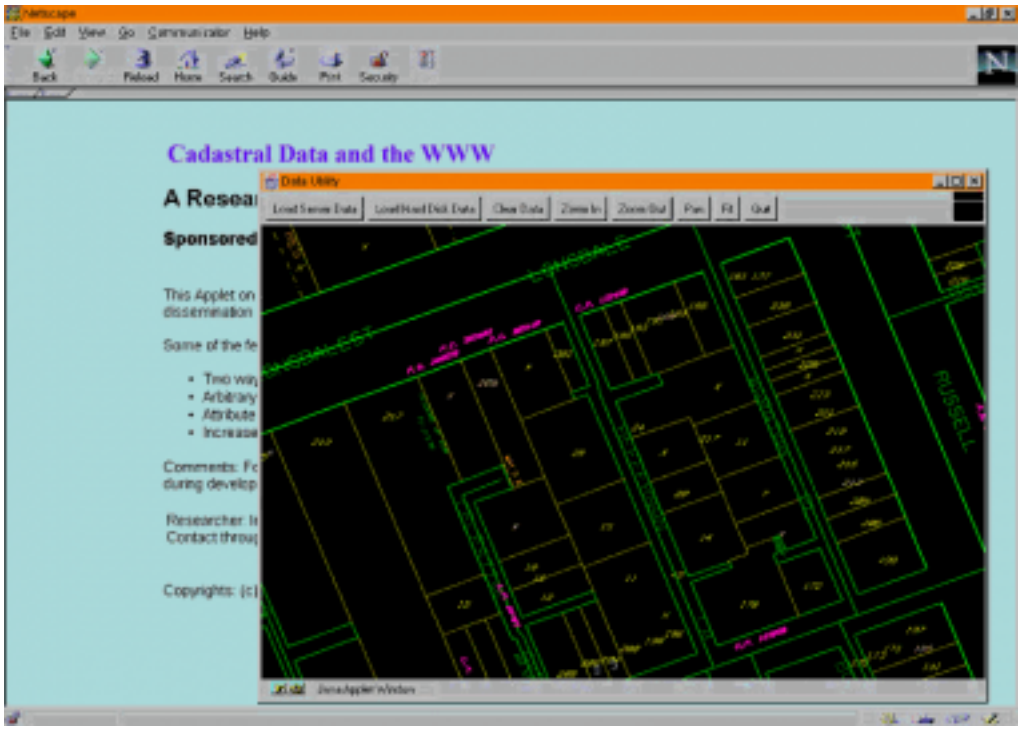

Figure 1 : The University of Melbourne is working on providing DCDB data update and upgrade mechanisms through the WWW

GIS for Health - GIS for a General Practice Project

16 As the Internet continues to grow in popularity, so to does the scope of its health-related applications. The ever increasing number of health related web sites are intended for the purposes of providing, amongst other uses, professional education, community service needs, patient discussion groups as well as being repositories of specialised knowledge.

17 The use of the Internet as a marketing tool in other industries is well-documented . Widespread marketing and advertising of health-related products and services via the Internet is also abundant .

18 Health researchers and planners are amongst those attempting to maximise the benefits of the Internet. There is a recognised need for information systems to provide access to detailed, current and action-oriented information in order to successfully tackle public health problems , and also for this information to be made available at a local, state, national and international level. The emphasis of this paper is not on the delivery of health services per se through the Internet, but on the use of this tool to improve both the planning and delivery of health services.

19 As GIS is still a relatively new technology for the health sector, the initial requirements of GIS for the General Practice project were to inform and educate key stakeholders. They originate from the health sector involved with this project, namely state and national health departments

and pilot Divisions of General Practice themselves, about the capabilities and limitations of GIS.

20 Since 1993, general medical practices in Australia have been organised into 'Divisions ´ or groups of doctors within a particular geographic location. This is to enable general practitioners to work collectively other and with the wider health care system, to improve the quality and continuity of health care at the local level, and to collaborate more effectively with preventive health care, (Commonwealth Dept. Health & Family Services, 1996). The research project we refer to is based at a Divisional level.

21 The information needs of two Divisions were then established, relative to the scope of the project and the useful application of the final GIS product. Relevant data was obtained routinely from collected federal, state, regional and local databases where available. This was primarily demographic and health data with geospatial variables. Victoria´s digital map bases were obtained from Land Victoria and demographic data from the Australian Bureau of Statistics (ABS). Priority was given to data which was aligned to the health priorities of the two Divisions, such as the immunisation uptake rates for children under five years as per the national immunisation schedule. Gaps in data availability were partially redressed through questionnaires administered to each practice location. These questionnaires collected information on the size of the practice, other services which may be co-located, peak service times, and other relevant data such as distance patients travel to see their doctor.

22 Figure 2 Illustrates the model adopted to integrate the data bases selected for the pilot GIS. The data bases have been grouped into routinely and specifically collected data. The model is also based on the thematic character of the data, that is, whether it is geospatial, health or demographic. All these data bases have been integrated into the system through common GIS operations such as tabular linking and address geocoding.

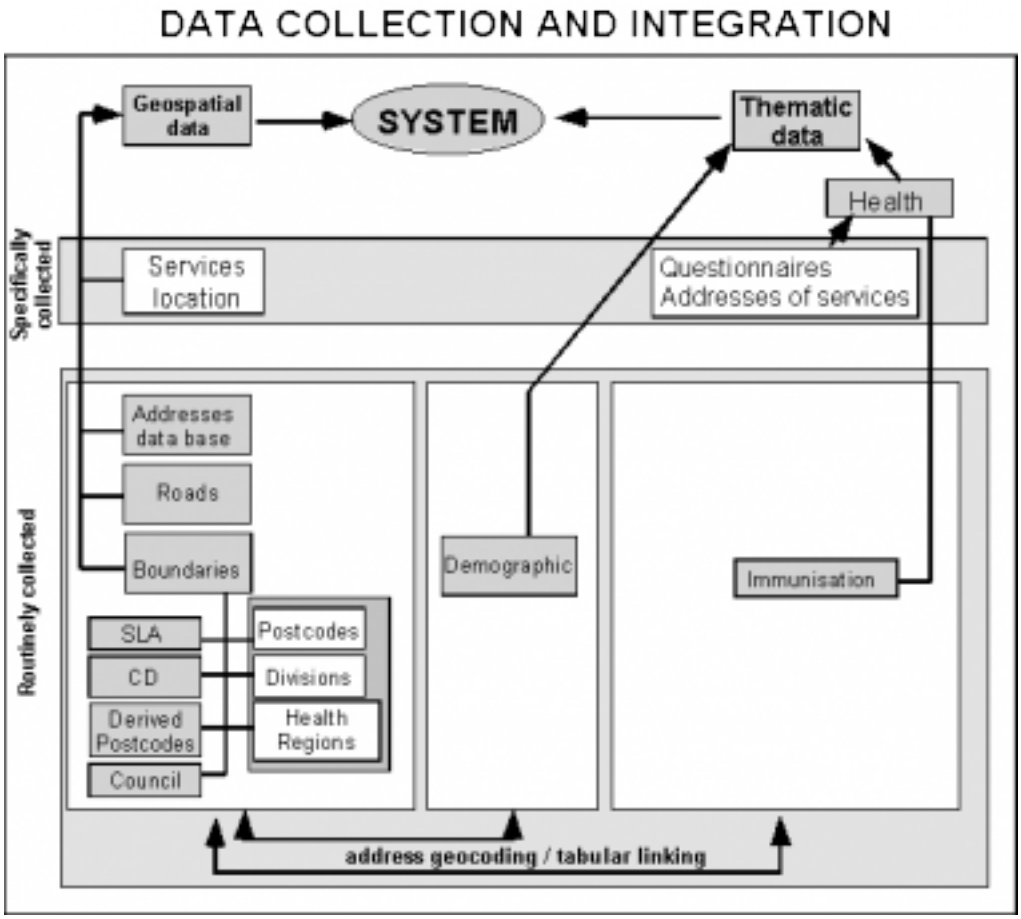

Figure 2 : Model adopted for the integration of data sets. * SLA (Statistical Local Area), CD (Collector District) and Derived Postcodes are administrative boundaries used by the Australian Bureau of Statistics

23 The server for the implemented system is located at the Department of Geomatics, University of Melbourne. I If this methodology is extended to the Divisional sector or the wider health sector, health administration agencies will need to consider the issue of providing a server with the required storage capacity.

24 It is important to remember that this was a pilot project. The GIS prototype available on the WWW has the capability to be expanded and is not intended to be a static product. It is an open system that can be easily updated and enlarged with additional layers or additional variables in the existing layers to perform functions required by the user.

25 After considering the range of methods available for distributing the GIS, the Internet was the preferred choice. The project uses the GIS software ArcExplorer, provided by ESRI . Whilst this package does not include the full analytical capabilities of other GIS packages, it is a good starting point to perform queries and obtain good quality display, which are the two more common operations desired by the pilot Divisions.

26 In addition to the common reasons to use the Internet, the reasons for adopting it in include :

- there are no sophisticated hardware requirements to run ArcExplorer,
- the Divisions participating in the trial already had access to the Internet,
- the use of the Internet is in line with the Victorian government policy Strategic Plan Victoria 21, which requires all government services to be online by the year 2005 ; and
- user-friendly software, since information technologies have only recently been introduced into the health sector in Australia.

27 The availability of the system for the Divisions will permit many uses of the data to address specific planning and service issues. For example, identifying peak service periods and estimating doctor/patient ratio, or for other more strategic queries throughout a calendar year.

28 In future, the implemented system will be downloaded by the Divisions from : http://www.sli.unimelb.edu.au/gdv/gdv_health.html . Presently, this web site includes basic information on the aims of the project. It is expected to be fully implemented by the end of March 1998. At that time, users will find :

- information related to the achievements of the project,
- publications and references,
- a description of the implemented data sets,
- instructions to download ArcExplorer from ESRI´s web page and how to use it ; and
- a few examples of possible queries and display of data made available by the whole system.

29 Authorised accounts, for users within the Divisions, will be provided with a password, allowing them to download the data sets for their own use, with ArcExplorer. The reason for this restriction is due to the confidential nature of some data sets.

30 Figure 3 shows the collection of data sets included in the system for one of the Pilot Divisions of General Practice.

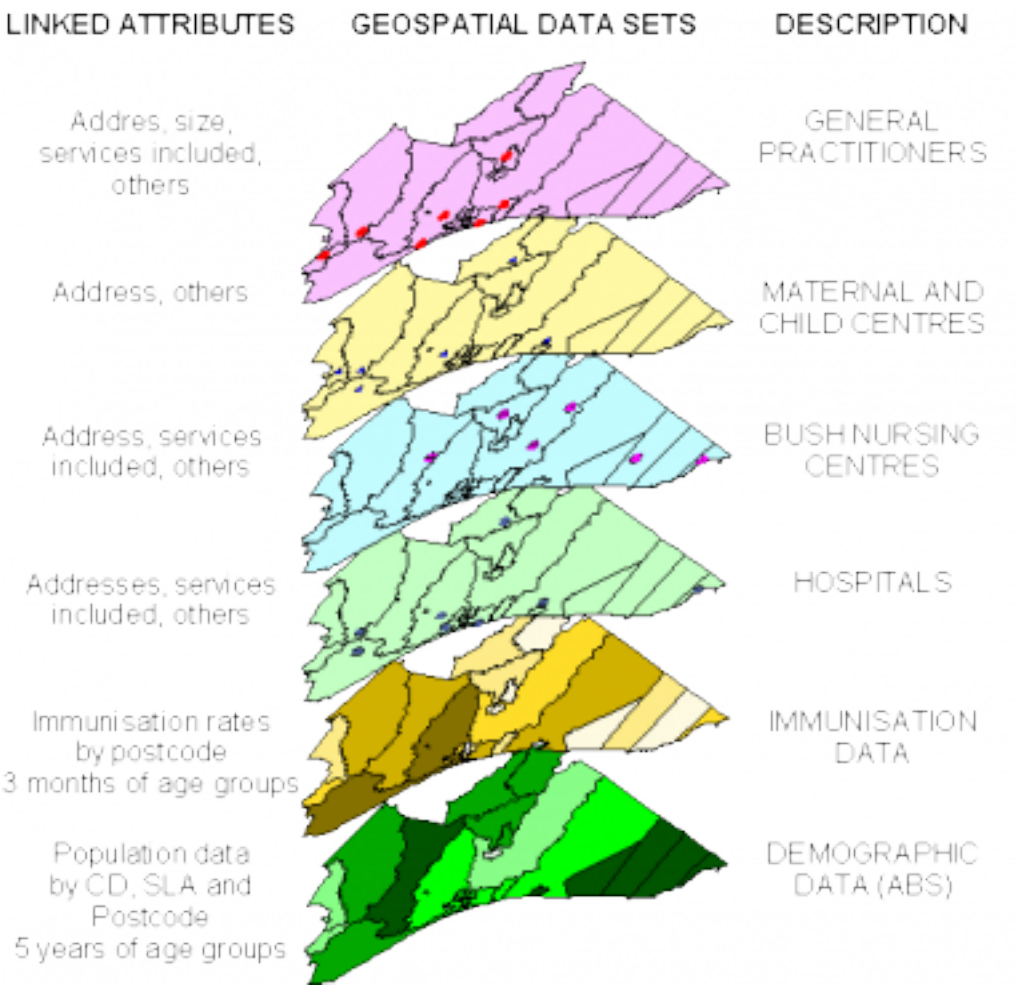

Figure 3 : Data sets collected and included in the GIS prototype for East Gippsland (Victoria, Australia) Division of General Practice.

31 An example of the system use by the Divisions is presented in Figure 4. In this case, the system responds to a query regarding the effective full time medical staff of the practices included in the North West Melbourne Division. The friendly environment developed for ESRI in ArcExplorer and the intuitive way to formulate queries was much appreciated by future divisional users during the presentation of the prototype in late February.

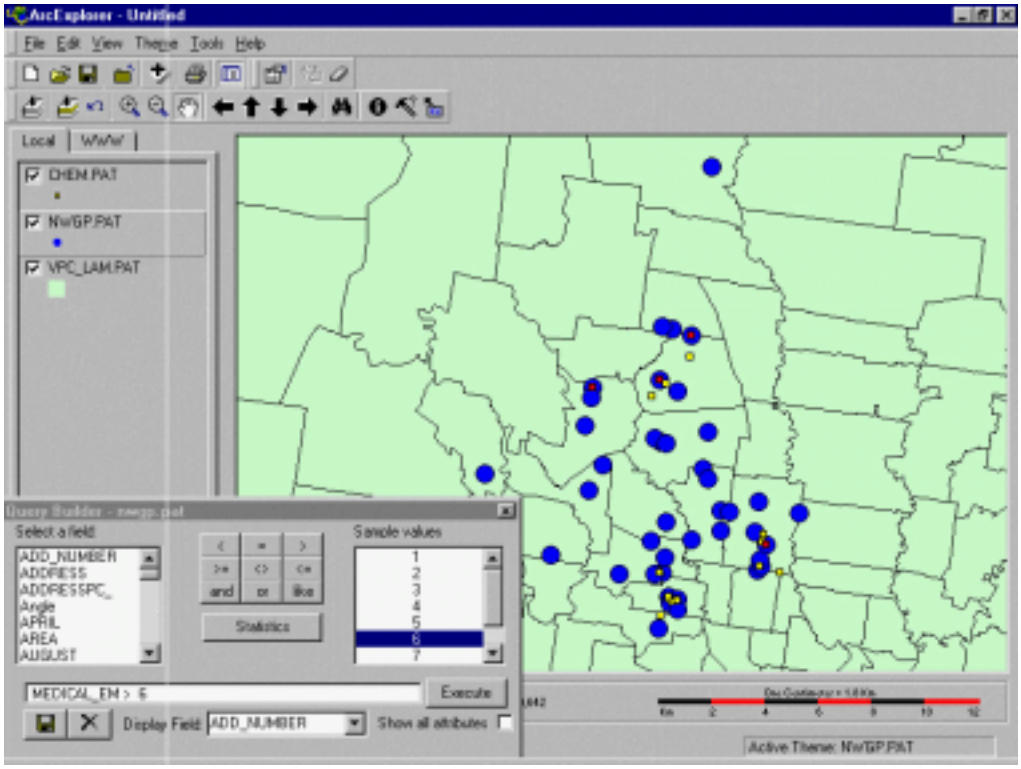

Figure 4 : Example of a normal query and display using ArcExplorer and the available data of the project

32 This research has highlighted numerous constraints in the development of a GIS for use in the health sector. One of these is the inability to publish sensitive, patient identifying data. Even with authorised users and online access restrictions, there are still data privacy issues.

33 Widespread differences in data collection methods, data quality and data access have been identified by the research. The issues and ethics involved in the protection of the privacy of individuals require particular consideration, as health information is very sensitive.

34 Other issues identified are not exclusive to this field of research, such as updating data, custodianship, security and the speed of obtaining data through the Internet. This pilot study can serve as a starting point for further research into these specific and generic problems.

Online Sites

35 An indicative list of online mapping services is listed below.

- The University of Iowa maintains a comprehensive list of online mapping resources at ; http://www.cgrer.uiowa.edu/servers/servers_geodata.html,
- Land Victoria provides viewing access to all their cadastral map base data ; http://www.gdv.vic.gov.au/online/viewers/viewers.htm,
- The Land Information Centre within the Surveyor General´s Department in the Australian State of New South Wales, produces an online service for their cadastral and other mapping information, which will be available imminently, http://www.lic.gov.au/LIC/prod_serv/lic_data_online.html,
- New Brunswick Geographic Information Corporation provides an online service to their topographic, cadastral mapping and attribute data (such as land title and valuation data). It is available by subscription only, at ; http://inter.gov.nb.ca/nbgic/index.htm,
- ESRI maintains a site that showcases GIS data on the WWW using ESRI products. One online service has an earthquake monitoring at ; http://www.esri.com/base/data/online/earthquake/index.html

- The Southern California Earthquake Centre has a very comprehensive site showing near real time seismic event activity and other information at ; http://www.scec.org/

Conclusion

36 The Internet and the WWW in particular have provided new avenues in distributing data and information to the community. However, there are issues surrounding the Internet that affect its adoption by data providers including the number of people who will not have access to the Internet in the immediate future.

37 With the use of this digital network arises sensitive issues, such as privacy, which must be addressed carefully. The use of techniques such as encryption or subscriber only access in such cases is one example of using appropriate techniques to address some of the most relevant concerns. The provision for secure electronic commerce on the WWW is also an issue. The technology required to provide online mapping is available, however in many cases is yet to fully mature. This limited technology is another of the problems affecting the immediate proliferation of applications on the WWW.

38 The two case studies presented demonstrate the adoption of the Internet in two very different cartographic applications. In both cases, it is clear that advantages arise from adopting these communication tools instead of, or in conjunction with, traditional methods. Nevertheless there are some problems in using online cartography which require further attention ;

- Educating people in cartographic principles. In order to advance the use of the Internet for cartographic purposes, consideration needs to be given to the integration of the instruction of Cartography and GIS into curricula, through geography programs, geomatics and computer science courses. Without appropriate mapping education, there is an increasing risk for cartographic science as people without cartographic knowledge become capable of producing maps. This can lead to serious misinterpretations of data.
- Pricing, charging and selling policies and procedures for the products delivered through the Internet. Privacy, access to information, and misuse or abuse of information can pose problems for the community. Recent advances in electronic commerce provide some solutions to these problems but they must be implemented appropriately.
- Online mapping data providers need to assess privacy issues, the capabilities of their users, and other constraints in addition to the usual technical problems associated with going online.

39 Before online mapping becomes a well-established practice, these issues need careful planning and thought.

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Bibliographie

Autodesk Inc. (1997). Autodesk MapGuide. http://www.mapguide.com/index.htm

Bertazzon, S. and Waters, N. (1996). The Use of GIS Applications on the Internet for Marketing Tourist Destinations. GIS/LIS '96, Denver, Colorado.

Black, J. (1997). Disseminating Geodata through Internet and Intranets. GIM International. May 1997. 11 (5). pp 6-7.

Bosque, J., Escobar, F., Garcia, E. and Salado, M. (1994). Sistemas de Información Geográfica : Prácticas con PC ARC/INFO e IDRISI. Madrid, Ra-Ma.

Buckley, R. (1997). Views From The Web. GIS Europe. April 1997. pp 30-32.

Department of Geomatics (1997). Health GIS Project Information. http://www.sli.unimelb.edu.au/gdv/gdv_health.html

ESRI (1998). ESRI Web Site. http://www.esri.com

Falzon, K., and Williamson, I.P. (1998). Digital Lodgement of Cadastral Survey Data in Victoria. Proceedings of the 39th Australian Surveyors Congress, Launceston, Tasmania, 8-13 November 1998, pp. 339-355.

Friede, A. and Ory, H. (1993). CDCWONDER : A Comprehensive On-Line Public Health Information System of the Centers for Disease Control and Prevention. American Journal of Public Health. 83 (9). pp 1289-1294.

Multimedia Victoria (1997). Strategic Plan Victoria 21. Melbourne, Multimedia Victoria.

Land Victoria (1998). Online Data Viewers. http://www.gdv.vic.gov.au/online/viewers/viewers.htm

Land Victoria (1998). The State Digital Map Base - Cadastral (SDMB-C). http://www.dce.vic.gov.au/property/maps/cadastre.htm

Li, B. (1996). Issues in Designing Distributed Geographic Information Systems. GIS/LIS '96, Denver, Colorado.

Limp, W. F. (1997). Weave Maps Across The Web. GIS World. September 1997. 10 (9). pp 46-55. http://www.geoplace.com/gw/

Netscape Communications Corporation (1997). Netscape Security Solutions. http://home.netscape.com/assist/security/content.html

Robinson, A., Sale, R., Morrison, J. and Muehrcke, P. (1984). Elements of Cartography. New York, John Wiley & Sons.

Sonnenberg, F. (1997). Health Information on the Internet : Opportunities and Pitfalls. Archives of Internal Medicine. 27/1/97. 7 (2). pp 151-152.

Strand, E. J. (1997). Java Creates New Channels for GIS Information. GIS World. May 1997. pp 28-29. http://www.geoplace.com/gw/

Verisign Inc (1997). Digital IDs Introduction. http://digitalid.verisign.com/id_intro.htm

Wang, L. (1997). Network-Oriented GIS : Integrating GIS with the Internet. URISA '97, Toronto, Canada.

Williamson, I. P., Chan, T. O. and Effenberg, W. W. (1997). Economic Rationalism in Managing Spatial Data Infrastructure - The Australian Experience. Proceedings of URISA '97, Toronto, Canada.

http://www.sli.unimelb.edu.au/research/publications/IPW/ERMSDI.htm

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Abstract / Résumé

The Internet has revolutionised the many ways electronic data is distributed, stored and presented. The Internet and the World Wide Web (WWW) in particular have introduced new methods for the cartographic community to display and distribute map information. In conjunction with a wider audience, the Internet and WWW are presenting new commercial opportunities. The technical limitations for the current implementation of the Internet are slowing the process, yet are being rapidly rectified by the IT industry. This paper aims to highlight some of these problems, along with a brief appraisal of the mapping industry on the WWW. Two examples of organisations utilising the WWW for distributing their data are also discussed.
Keywords : GIS, Australia, health, internet, cadastral databases, Victoria, data dissemination

Internet a ouvert de nombreuses possibilités d'utilisation des données informatiques. En ce qui concerne la communauté des cartographes, Internet et le World Wide Web apportent des manières nouvelles de présenter et de diffuser l'information sur les cartes. Avec une audience plus large, de nouvelles opportunités commerciales surgissent. Les contraintes techniques dans l'exécution d'Internet ralentissent ce processus, mais elles-mêmes sont rapidement rectifiées par le développement des nouvelles technologies. Quelques-uns de ces problèmes sont brièvement passés en revue, ainsi qu'une courte estimation de l'industrie cartographique sur le Web. Deux exemples d'organisations qui utilisent le Web pour diffuser leurs données sont aussi discutés.
Mots clés : SIG, santé, Australie, base de données, internet, cadastre, Victoria
thématique : géographie