

Internet Maps for the Community in Hong Kong

Winnie SHIU, Hong Kong SAR, China

Key words: geoinformation, e-governance.

SUMMARY

With the availability of digital maps and the growing popularity of the Internet, the combination of the two brings a new dimension to the digital maps for a multitude of possible usages that reach down to an enormous users' base. In Hong Kong, since 1996 the whole region has been covered with large scale topographic maps with all the basic Geographical Information System (GIS) elements built in. These include the topological structure of objects, interrelated graphical features with textual attributes, as well as some commonly used location identifiers, and more importantly, the maps are updated as soon as changes take place.

The first initiative was taken in 1996 to develop a Computerised Map Enquiry System for Tourists using the digital maps of the Survey and Mapping Office (SMO) of Lands Department, the Government of the HKSAR. This was aimed at facilitating tourists visiting Hong Kong to find relevant information, such as, hotels, transportation, scenic spots, and shopping, etc. When this was proven to be technically feasible and was seen to implement the e-government initiatives, the green light was given by the policy bureau to introduce the Mapping Information Services through the Internet Project by way of revenue tender. The successful tenderers are required to establish websites using SMO's digital maps and adding different commercial and community information for free access by the public. That was also proved to be a success.

Since then a more flexible scheme, the Internet Map Permittee Service has been devised, where digital maps for different applications on the Internet are supplied to meet various clients' operational requirements.

There are some specific issues worth mentioning regarding the use of digital maps on the Internet as follows:

- the way of calculating the fees, including data, maintenance, usage and royalty charges;
- the presentation of value added map information on the Internet, and
- the protection of Government copyright of the digital maps.

The Internet will enable the dissemination of map information as well as other location based information of community interest and business nature to all sectors of the community whether in the office, in the school, at home and even outdoor, and at very high speed and great convenience too. Internet Maps will bring tremendous benefits to the community, social and economical. It does call for greater co-operation between the public and private sectors for further exploitation of this exciting hybrid of location based information and communication technology.

Some successful examples related to the handling of the property information and future development of applications for the buying, selling and leasing of properties will be illustrated in the presentation.

Internet Maps for the Community in Hong Kong

Winnie SHIU, Hong Kong SAR, China

1. SUMMARY

With the availability of digital maps and the growing popularity of the Internet, the combination of the two brings a new dimension to the digital maps for a multitude of possible usages that reach down to an enormous users' base. In Hong Kong, since 1996 the whole region has been covered with large scale topographic maps with all the basic Geographical Information System (GIS) elements built in. These include the topological structure of objects, interrelated graphical features with textual attributes, as well as some commonly used location identifiers, and more importantly, the maps are updated as soon as changes take place.

The first initiative was taken in 1996 to develop a Computerised Map Enquiry System for Tourists using the digital maps of the Survey and Mapping Office (SMO) of Lands Department, the Government of the HKSAR. This was aimed at facilitating tourists visiting Hong Kong to find relevant information, such as, hotels, transportation, scenic spots, and shopping, etc. When this was proven to be technically feasible and was seen to implement the e-government initiatives, the green light was given by the policy bureau to introduce the Mapping Information Services through the Internet Project by way of revenue tender. The successful tenderers are required to establish websites using SMO's digital maps and adding different commercial and community information for free access by the public. That was also proved to be a success.

Since then a more flexible scheme, the Internet Map Permittee Service has been devised, where digital maps for different applications on the Internet are supplied to meet various clients' operational requirements.

There are some specific issues worth mentioning regarding the use of digital maps on the Internet as follows:

- the way of calculating the fees, including data, maintenance, usage and royalty charges;
- the presentation of value added map information on the Internet, and
- the protection of Government copyright of the digital maps.

The Internet will enable the dissemination of map information as well as other location based information of community interest and business nature to all sectors of the community whether in the office, in the school, at home and even outdoor, and at very high speed and great convenience too. Internet Maps will bring tremendous benefits to the community, social and economical. It does call for greater co-operation between the public and private sectors for further exploitation of this exciting hybrid of location based information and communication technology.

Some successful examples related to the handling of the property information and future development of applications for the buying, selling and leasing of properties will be illustrated in the presentation.

2. TRADITIONAL HARDCOPY MAPS

Maps have long been regarded as indispensable information in a community, for public administration, for commerce and business, for studies and even daily activities of the general public. Indeed, maps have been taken for grant and no one would ever doubt their usefulness.

However, traditional maps on hardcopy form are fragile, difficult to handle and bulky, and require enormous storage space. Updating the paper maps requires partial or complete redrawing of a large number of reprographics that is time consuming, labour intensive and costly. Map users have to bear with using maps containing outdated information until the next revised version comes out in often several years time. Because of the physical constraints of paper maps - such as paper size, only two dimensional presentations, and limitation of colour and symbols - map features have to be generalized or symbolized and they are often congested and difficult to interpret. Map information though precious yet cannot be portrayed adequately and its benefits cannot be reaped to fuller extent.

3. DIGITAL MAPS

Only until the 1990's, with the advent of GIS technology, map information has a complete face lift and entered into a new era. It is no longer bound by the map production scale and physical size of paper, that is, display and printing of maps can be at a variety of scales basing on one map base. The map features can be updated one by one as they are changed and input into the database for instant use. The various map features are topologically structured and relevant textual attributes can be attached to them, thereby enabling the selective search for required features and supporting polygon overlay analysis of map features and attached attributes. Hardcopies can be printed on demand as and when required, thereby avoiding printing and stocking large quantity of printed maps which may become obsolete and wasted in time. Perhaps the greatest breakthrough of digital maps is the versatility in storage and dissemination methods and that really unleashes the enormous potential of map information for unlimited applications.

4. HONG KONG SITUATION

Hong Kong has a land area of just over 1,100 km² but with a high population of 6.8 million. Most people live in the urban areas around the harbour and in the new towns. Maps have been relied upon as the basic essential information for the administration of and use by the community. In Hong Kong, the maps are produced and maintained by the Survey and Mapping Office (SMO) of the Lands Department, the Government of the Hong Kong Special Administrative Region. The large scale topographic map at scale 1:1,000 and with a total number of some 3,000 sheets covering the whole region had been converted from hard copy into digital form in mid 90's. While designing the digital map base very stringent specification had been laid down, on one hand to fully exploit the GIS functionalities and on the other to create a geographical database that would facilitate the building up progressively a comprehensive geographical database for Hong Kong.

The topographic maps show almost all noticeable natural and artificial features on ground, e.g. roads, footpaths, buildings, temporary structures, lamp posts, fire hydrants, cuttings and slopes, trees, contours lines at 2 metres interval, etc. All these features are captured and input to an accuracy of better than quarter of a metre, and all types of features are separately coded and layered in the database. They are also topologically structured, such as, buildings and land parcels are closed polygons, road lines and contour lines are continuous and with respective names and values. Attributes are attached to the map features thereby enabling the searching for and analysis of relevant features and attributes for answering various 'what if' questions. Several commonly used location identifiers are also built in too, such as, house number, building name, road name and junction, land parcel number.

More importantly, the map base is up-dated instantly as changes take place. Unlike the paper maps which are revised on a cyclic programme, normally a couple of years, while substantial

changes have been accumulated, but with the digital map base, change to any individual feature no matter big or small, e.g. a new road or a new lamp post, can be input into the database soon after having been surveyed in the field and ready for use instantly. In the case of Hong Kong, the target is to update any map features, namely to delete the old features and input the new ones, within three months of such changes. That is particularly importantly in order to maintain the currency and reliability of the digital maps which are widely used within the Government and in the private sector.

By now, a wide range of smaller scale topographic maps and thematic maps are being compiled and published from this basic map base. Many government departments and private utility companies are relying on this map information for their respective operations and even using this as a reference base to record their own facilities information, such as, cable, drain, pipe, town planning layout, etc. Indeed, the digital maps of the SMO are serving many useful applications and gaining high regards as being accurate, up-to-date and comprehensive. It is also realized that the potential of these digital maps is tremendous and effort is being made to explore new applications.

5. DIGITAL MAPS FOR INTERNET APPLICATIONS

With the advent of Internet technology and its growing popularity, the idea of using Internet for the efficient dissemination of map information and other location based information on websites was first conceived in the mid 90's.

5.1 Computerised Map Enquiry System for Tourists (CMEST)

The first initiative was taken in 1996 to develop the CMEST using the 1:10,000 digital maps of the SMO. This was aimed at facilitating tourists visiting Hong Kong to find relevant information, such as, hotels, transportation, scenic spots, and shopping, etc. Due to the non-availability of commonly used Internet browser and the limited communication bandwidth at that time, the System had to make use of a commercial plug-in CAD software so that the maps could be viewed effectively. This had inevitably caused a certain degree of inconvenience to users, however, the concept of delivering map information through the Internet was proven to be technically feasible and welcome by the public. With the rising demand for utilising maps as the search engine and the availability of commonly used Internet browser in late 1990s, this System was then gradually replaced by another Internet map application - the Mapping Information Services through the Internet Project.

5.2 Mapping Information Services through the Internet (MISI) Project

In 1997, the Task Force on Exploiting Internet Technology established by the Government endorsed to implement a pilot project for the delivery of Mapping Information Services through the Internet by way of revenue tender. The project provided an electronic free guide map service through the Internet for the public to search for locations such as streets and buildings, transport information, demographic data and public service facilities.

The partnership with the private sector approach was adopted and two business partners were selected through an open tendering system to implement the project in 1999. The term of the contract was three years, and could be renewed for another 3 years under the same terms and conditions. Basically, the Government would supply digital map data and other public services information to the partners, whereas the partners would provide hardware, software and human resources to develop the value-added map information and to disseminate such via the Internet. The proposed value added information from the partners would include property sites, shops, restaurants, hotels, entertainment locations, scenic spots, etc. They would also promote the

on-line map advertising services by displaying banners or location indicators on the maps. In return the Government would receive the guarantee fees proposed by the partners plus a sharing of the gross revenue generated from the on-line advertising services. A small percentage of the shared revenue would be used as improvement fund to enhance the contents of the websites.

The two websites, namely *www.centamap.com* (Centamap) and *www.ypmap.com* (Ypmap) were established in late 1999. Both websites have different innovation but they have to deliver community information supplied by SMO to the public as well as their respective own information. The popularity of the websites is evident from the continuous increase of page view of map and the positive feedback from users. The average number of page view of map has been increasing from 0.1 million to 4 million per month in the four year period.

At the outset of the project, the Government expected that the project could generate revenue from on-line advertising. Despite the increasing popularity gained by the two websites, both partners expressed difficulty in selling advertising products and services because the business operators generally were of the view that the web advertising was still in its infancy, its effectiveness could hardly be comparable with that of the traditional media channels like television and newspaper. Besides, the terms and conditions would not allow them to negotiate charges with individual customers, which being a common practice in the commercial sector, nor to provide exclusive advertising service to any companies even though such would generate more revenue, therefore would have posed restrictions and inflexibility for them to sell the advertising services.

The rationale for laying down such terms is to maintain the openness and fairness of the advertising services provided under the MISI project. In fact, the Government is totally relying on the initiatives and expertise of the partners to market and sell the advertising services. However, the partners might have different emphasis in exploiting the websites. They might only want to use the websites for promoting the company image or enhancing its own business, therefore would not put much effort and resources in soliciting advertisements in their websites.

During the first contract, Centamap itself bought the advertisement service for displaying the property listing and showing the locations of all its branch offices on the map. It has managed to solicit one customer for purchasing 150 advertising logos on the map pages. The situation with Ypmap has not been better.

The first MISI contract was completed in 2003 and both partners have continued to deliver the free guide map service to the public in two different approaches. Ypmap renewed the contract with the same terms and conditions, whilst Centamap has chosen to join the Internet Map Permittee Scheme for 3 years. It is likely that Ypmap will continue their service by joining the IMP Scheme upon its expiry in 2005.

5.3 Internet Map Permittee (IMP) Scheme

The implementation of the MISI project has prompted the business sector to be more aware of the potential of digital maps for diversified applications. To meet the anticipated increasing demand for digital maps and to enable the permittees to have the flexibility in looking for more business opportunities such as redistributing the tailored-made map information to third party, the Government has launched the IMP Scheme in 2001.

Each permittee is required to pay an upfront cost for purchasing the relevant digital maps and is committed to pay the Annual Licence Fees and Update Charge so that the most up-to-date

maps are used together with his own value added information for displaying on the websites. There are other recurrent costs required consisting of Permit Fee which is based on the number of sheets of digital maps displayed on the website, and the Royalty which is based on the number of page view of maps accessed by the users and the number of location indicators created for on-line advertisement. Apart from Centamap being one of the permittees that delivers free guide map service as well as its own property information, there are other applications including the selection of convenient stores for picking up goods ordered through the Internet, location search using 3G phone and PDA, and display of entertainment events and locations, etc.

6. ISSUES ON SUPPLYING DIGITAL MAPS FOR INTERNET APPLICATIONS

In light of experience gained with the above projects, there are several specific issues that worth particular mentioning and further deliberation.

6.1 Fees and Charges

The first issue is regarding the setting of fees and charges for selling the maps and subsequent updating, usages and the royalty. Currently, all the digital maps are charged on a per sheet basis and are different for various series. The charge is more or less based on handling the data purchased, such as, converting to the data into a format and copying it to the media as required by the customer. There is no discount for bulk purchase and therefore customer is not attracted to purchase more maps unless absolutely necessary. In view of the substantial cost involved, customer does tend to purchase maps at smaller scale hence less number of sheets or few layers of map features at lower cost and at a result the map information displayed on his web pages will not be complete or clear enough therefore will not totally fit for his particular applications.

After the initial purchase the customer has to renew the licence to use the maps annually though at a nominal fee, the main reason for this being to keep the customer aware of the digital maps in his possession so as not to inadvertently copy any of these to others without seeking SMO's permission. Because once the digital maps are downloaded in the customer's system it would be difficult to keep track of its usage and whereabouts and indeed individual sheets and features can be copied easily. Some customers would view this arrangement as unnecessary and troublesome.

The customer can purchase the subsequently updated version of purchased maps at a lower price but there is no discount rate for more frequent purchase of updates within certain time, say a year. In fact, customer should be encouraged to update his purchased maps as frequently as possible, and ideally to have direct access to the SMO's map database for the latest information and that will save a lot of time and effort in data handling and dissemination.

There is another charge that is based on the usage of the maps on the Website. The charge can be according to the number of location indicators shown on the maps or number of actual page view of maps made by the viewers. The customer can choose the charging method that best fits his applications and mode of operation. For this charge there is a descending charging scale so as to encourage the customer to promote his websites thereby increasing the revenue to the Government.

6.2 Presentation of Value Added Map Information

Since the maps from the SMO are being used and acknowledged in the website and are accessible by the general public, therefore, the other information added on by the customer should be acceptable from the public point of view and should be approved by the SMO so as

not to cause any embarrassment to the Government. This will be one of the conditions when supplying the digital maps.

The map information is already very abundant and with further information from the customer added on top will make the various types of information difficult to view on the monitor. Some cartographic input will be necessary, such as, modifying or generalizing some of the features, designing new symbol, pattern or colour and even the general layout of the page view. If the customer can discuss with the SMO about his intended applications some technical advice can be provided, such as, which map series is to be purchased, which features are to be modified or generalized and how new information is to be placed and presented so as to distinctly show the essential information and to provide comfortable viewing.

6.3 Government Copyright of the Digital Maps

The Government still owns the copyright of the digital maps supplied to the customer. Whilst steps are taken to ensure that the customer purchasing the maps is fully aware of the copyright issue as stipulated in the purchasing agreement and subsequent annual renewal licence and his compliance can be verified at his site or traceable, there is immense difficulty in preventing outside viewers to download any map page. Once on the website anyone can download the displayed maps with no trace at all of their origin. However, the damage may not be that alarming because the displayed maps are in raster format, usually covering only small areas and of small actual size, and the contents are designed for particularly purpose, therefore the usefulness of such copied maps for other purpose is rather limited, not to mention the tremendous effort in assembling the copied maps for any practical use. If the price of the digital maps from the SMO is not that prohibitive or indeed set at a value for money level the infringement of copyright may not arise at all. That being the situation, much policing and prosecuting effort can be avoided and the digital maps sale can be further promoted.

7. CONCLUSIONS

The Internet technology will enable the dissemination of location based information, including map information, community information, transport information, business information, and so on, to a vast users' base - whether at work, study or home; indoor or outdoor – and at ultra high speed too. For example, business operators can better plan their business by analyzing the demographic data and business opportunity; consumers can search for shopping and recreation information with great ease, and car drivers and commuters can plan the best routes, in terms of time, cost or convenience.

Furthermore, as more websites containing location based information of community interest and education nature are established, and the Internet service is penetrating further into schools and families, the members of the public would have more information about and hence a better appreciation of their surrounding environment and nearby facilities thereby elevating their sense of belonging and concern for the community. It is anticipated that the Internet Maps will bring tremendous benefits to the community, social and economical.

In order to further exploit this exciting hybrid of location based information and communication technology it does require the SMO to further enrich the geographical information and the website operators to develop more informative websites to satisfy the needs of both the business sector and the consumers.

BIOGRAPHICAL NOTES

Winnie Shiu. Fellow of the Hong Kong Institute of Surveyors. Senior Land Surveyor/Mapping Information Services, Survey and Mapping Office, Lands Department, The Government of the Hong Kong Special Administrative Region

CONTACTS

Winnie Shiu, Fellow of the Hong Kong Institute of Surveyors
Senior Land Surveyor/Mapping Information Services
Survey and Mapping Office
Lands Department
The Government of the Hong Kong Special Administrative Region
HONG KONG SAR, CHINA
Tel. + 852 2231 3443
Fax + 852 2877 8520
Email: wshiu@hkis.org.hk