

# WIRELESS MAPPING AND GUIDANCE SERVICES

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## INTRODUCTION

The Internet has enabled the re-packaging of maps into more service-based applications, which have interactivity and customisation as their core function. Such services will ultimately deliver guidance and navigation solutions not previously possible with paper based mediums.

However, the fact that online mapping services are now technically feasible does not mean that they will be successfully adopted. In fact, one of the greatest barriers to date has been the fact that most online services are delivered to PC browsers that are inherently desk-bound. A simple and compelling feature of a paper map is the fact that it can be truly mobile, travelling and assisting the user 'in the field' where it is most valued.

## PUSH INNOVATION

Market analysts often describe two broad forms of innovation, 'push' and 'pull'. Since the advent of the printing press, advancements in cartography have been somewhat gradual and driven mostly by changing user requirements. This form of 'pull' advancement occurs at a measured pace and usually does not promote fundamental changes to the way maps are produced. Fundamental change occurs typically with push innovation and over the past decades cartographers have witnessed two such innovations. The first was the introduction of computer technology and the changes in mapping sciences brought about by digital intervention are well documented. The second fundamental push innovation is only just beginning and is broadly defined as wireless technology.

## WIRELESS TECHNOLOGY

Recent advances in mobile technology have enabled purpose-built Internet browsers to be integrated within mobile devices. Wireless Application Protocol (WAP), and other similar standards, have now effectively removed the last remaining barrier to multimedia mapping and thus allow interactive mapping and guidance services to be delivered to users whilst in the field. However, there remain several further challenges requiring resolution before wireless mapping services are widely adopted:

### Device Issues:

- **Generic Devices:** Until recently, users wishing to benefit from interactive mapping and guidance needed to purchase expensive purpose-built devices (i.e. car-navigation systems). Wireless Internet browsers can now be installed in so-called generic devices (i.e. Personal Digital Assistants (PDAs) or mobile phones) enabling interactive mapping and guidance to be realised without additional hardware expense. However, the adoption of such devices is still not commonplace although aggressive take-up rates suggest that by 2003 there will be more Internet enabled wireless connections than fixed Internet connections.
- **Rich-media Capabilities:** Maps are visually demanding and require rich graphic capabilities in order to adequately communicate complex spatial properties. Most

mobile devices available today have limited monochrome displays, which do not lend themselves readily to displaying cartographic images. Recent advancements in LCD screen technology have ensured that 256 colour displays with higher resolution are now readily available (*imode* mobile phones with full colour screens are commonly used in Japan) and soon Java will be embedded in these devices ensuring a greater range of multimedia opportunities. Graphic standards, such as Scaleable Vector Graphics (SVG), also promise to bring further functional improvements. Nevertheless, there will always be a wide and varied range of client devices with differing graphic capabilities and so the challenge for wireless mapping services will be to deliver consistent solutions across multiple devices.



Figure 1: An example of a WAP enabled Internet phone displaying a map (Motorola L-Series)

- **Positioning:** The ability of a handset to derive its position (either through the mobile network or an embedded GPS) is certain to drive the adoption of wireless mapping services. User expectations must be managed carefully as the position, particularly when using network-based calculations, will be far from accurate. Privacy issues will also be critical.
- **Voice Delivery:** Recent developments in speech technology have meant that guidance solutions can now be delivered from voice-servers to standard cellular phones and thus enable navigation solutions even when devices have no graphic capability.

#### Communication Issues:

- **Open Standards:** As with most Internet Protocol (IP) based technologies, wireless technology will benefit from the development of open standards. The efforts of the WAP Forum in developing a communication standard that is open and can be delivered across restricted wireless bandwidth to multiple devices cannot be underestimated. Even with the eventual development of 3<sup>rd</sup> Generation (3G) networks, where capacity issues will ensure that the theoretically possible 2MB/sec transmission rates are rarely realised, bandwidth will always be limited. Thus, efficient and highly compressed protocols such as WAP are certain to be the industry standard for many years to come and will provide a solid development base from which cartographers will be able to develop future mapping services.
- **Packet Switching:** In most developed countries, the next wireless communication advancement will be the widespread availability of packet switched networks (i.e. General Packet Radio Service – GPRS). Packet switching will enable devices to have a continuous Internet connection and therefore be immediately accessible when

needed. Packet switching will also enable an efficient billing structure, which will enable users to subscribe to only those services, which they find of value. It will be in the interests of the wireless portal providers to ensure that such services are not cost prohibitive and that they are accessible to the greater population.

#### Service Issues:

- **User Benefit:** Wireless online mapping services will not be widely adopted until the user can appreciate relevant, tangible benefits. Services should not be positioned as a substitute to paper maps. Rather, services should be designed to deliver results previously not possible with paper mediums and which utilise the interactive and real-time nature of the Internet. Such applications could include notifying a user where the closest and cheapest petrol station is located and then delivering instructions of how to navigate there or displaying real time traffic congestion information on a simple, easy to read map. Personalisation of such services will also be key.
- **M-Commerce:** Location is a key factor behind most consumer and business purchasing decisions. Once effective mobile payment (M-Commerce) platforms are commonplace, mapping services will provide an effective intermediary to many online transactions. Again, whether it is finding and booking the closest car park space or receiving a permitted discount coupon as you drive past your favourite fast food store, user considerations will be fundamental in effecting the take up of wireless mapping services.

### WEBRASKA MOBILE TECHNOLOGIES

One organisation early to recognise the importance of geographic content within the wireless domain is Webraska Mobile Technologies (<http://www.webraska.com/>).

Established in July of 1998, Webraska has developed personal navigation services which will assist users to understand their geographic context by providing Internet-based real-time personal navigation services, traffic information and maps to wireless devices.

### PERSONAL NAVIGATION SERVICES

Webraska provides wireless carriers and their partners with a range of value-added services and applications that answer real-time mobility and location-based needs. While they are mobile, wireless subscribers receive answers to questions such as “Where am I?” “How do I get to my destination by car, public transport or on foot?”, “Where is the nearest parking space?”, “What is the shortest route?” and “Can you guide me safely to my destination?”.



Figure 2: Webraska Personal Navigation Service

During a recent survey, when over 1,000 mobile Internet users were polled on their service preferences, 49% said they would want e-mail, 39% want driving directions, 34% want weather information and only 12% want general news updates (Jupiter Services).

Webraska's applications can be delivered across numerous communication protocols and standards (WAP, HTML, CHTML and SMS) to ensure that location information is available through any device. Through turnkey services and/or a fully supported API (Application Program Interface), mobile operators and their partners can add routing, mapping, ranking, geocoding and spatial searching to their existing applications.

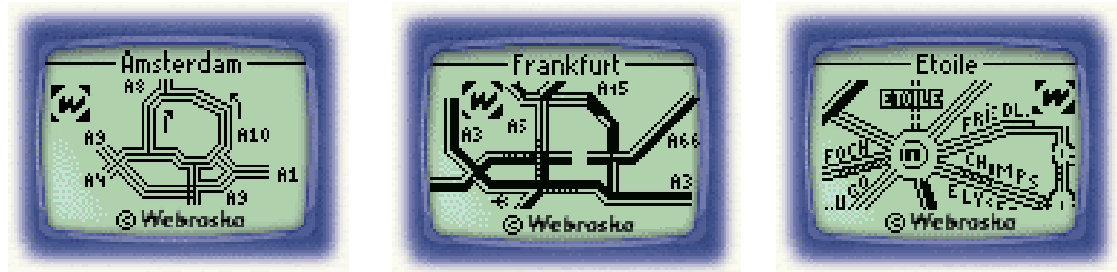


Figure 3: Webraska's real time traffic map service shown on a Nokia 7110 WAP phone.

Webraska's services are commercially available via numerous mobile operators including SFR in France, KPN in the Netherlands, Proximus in Belgium and Airtel in Spain. Where they have been launched, Webraska's services rate among the top three most used services within a mobile Internet portal.

Webraska recently opened offices in Tokyo, Singapore and Melbourne and will establish the company as the leading regional provider of wireless mapping and guidance services.

#### CONCLUSION

Recent advances in mobile technology have enabled purpose-built Internet browsers to be integrated within mobile devices. It is now possible to deliver cost effective interactive mapping and guidance to users whilst in the field. This offers a range of real-time location based information that is not possible through hardcopy mediums.