GIS in Home Care Services– Mobile positioning in new areas

Author:
Ulf Hedlund
Lantmäteriet
POBox 3044
S – 902 03 Umeå
Sweden
Ulf.hedlund@lm.se

ABSTRACT

This paper presents how the Swedish National Mapping Agency, Lantmäteriet, have invented and patented a system for the local home care service. An introduction will be given about the system and its use. It will also demonstrate how the system has been used for the purpose of optimising transportation services for disabled and elderly.

Lantmäteriet has been working towards the municipalities and local authorities for many years presenting them with services and solutions for large- and small scale map production, GIS implementation and real property services. This has also included the provision of a Geographical Information tool to support the local rescue service in need of GI data and services in field situations. Lantmäteriet has also developed a system for keeping track of individuals or mobile units. The system is based on pre-definition of geographical areas or objects in combination with GSM-telephones and is today growing in popularity amongst professional users in Sweden as the system does not create any cost for the actual telephone call. This solution is used for the local home care service, for planning purposes and for verification and safety. A presentation will be made how the system operates in a field situation.

This paper also presents how the system has been complemented with GPS and used for the purpose of optimising transportation services for disabled and elderly.

Lantmäteriet – The National Land Survey of Sweden

Lantmäteriet, originating from 1628, is a Government agency. The task of Lantmäteriet is to contribute to an efficient and sustainable use of Sweden’s real property, land and water. Lantmäteriet has also the task to develop the service to exploit the potential of existing and new public and commercial markets by meeting the needs of our customers concerning geographic information and land information. The annual turnover amounts to approximately 1400 Million Swedish Kronor.

Ordered by the Government Lantmäteriet produce and maintain geographic information and land information. For these services Lantmäteriet have a Government core grant of 400 Million Swedish Kronor. Lantmäteriet has today more then 2000 staff members in total 130 offices. Our customers are state authorities and municipalities as well as private enterprises and private persons. Among the main customers are the National Rail Administration, the Swedish Armed Forces and the National Road Administration.

Lantmäteriet export its products and services through the state owned company Swedesurvey AB. At present Swedesurvey is active in 30 countries and has an approximate turnover of 100 million Swedish Kronor.
**Mobil positioning at low cost**

Lantmäteriet has also developed a system for keeping track of individuals and/or mobile units. The system has similar functionality as the rescue service system but is based on pre-definition of geographical areas or objects in combination with GSM-telephones. The system can be used with or without connection to GPS and Command and Control functionality, which makes it flexible and modular. The pre-defined areas or objects are defined by the user need of high-density representation of their area of interest.

In the case of being connected to a GPS, each individual or vehicle connected to the system will indicate its location, and only then, as soon as its leaving or entering zones. Location, in this case, represented by the identification connected to the zone entered. The solution reduces cost as it limits on-line communication.

Larger fleets of vehicles such as taxicabs primarily use the system and then in connection with GPS. GSM is used for communicating the area location of each individual vehicle. When the vehicle crosses an area border a telephone call is initiated and sent over the GSM network to a status server. The status server picks up the call and based on the information on which phone number the call is made from together with which number the call is made to, location is calculated and sent via ftp to the command and control centre.

Connection to wireless maps and off-board navigation is also possible with the system.

The concept of tracking vehicles by pre-defined zones is also applicable on long-distance fleets such as busses and trains. Instead of a mosaic of zones "pre-defended sectors" are placed along the route. As the Vehicle passes into a sector its position and status is automatically registered. Comparisons with timetables can be made and presented on the Internet or over the phone by automated voice recordings.

Fig. 1 Concept of pre-defined zones

Fig. 2 Status Sever Concept and Wireless Connection
The pre-defined zones can also be connected to geographical objects e.g. address, place name, fire-post, gate, etc. An example of this is the use of the system for the purpose of supporting home care services. The pre-defined objects are in this case given to the location of caretakers in need of home care. The system operates in its simplest form by using cellular phones only. Each staff member has a designated telephone number and pre-programmed numbers connected to each individual care taker and task. A home care member indicates their location and their status by phoning pre-designated numbers. This information is used for a variety of purposes e.g. time spent with each client, what sort of activities were undertaken, etc. information used for relatives, management and logistic purposes. If necessary, the information can be presented in command and control solution highlighting location and status of each active staff member.

Fig. 3 Home Care System

Summary

Lantmäteriet has used its knowledge about geographical information and tools, together with state of the art telecommunication methods, complemented with inventive thinking regarding location-based services and demands, to deliver a concept suitable for a variety of purposes and budgets. This paper has shown that navigating presence in Lantmäteriets concept can be accomplished by using cellular phones only without incurring any cost for the actual telephone call. As such, and in the context of an available and growing mobile telephone network infrastructure in many countries, the concept is applicable for the establishment of business providing the service presented.
Biography

Ulf Hedlund

- Born 1960 in Northern Sweden
- Wife and three children
- Cartographer, Surveyor and Constructional Engineer,
- Background in marketing and sales, production, research and development in the areas of small and large scale mapping, photogrammetry and aerial photography as well as product- and system development of GIS, LIS and e-commerce systems.
- Experience as manager, project manager and advisor nationally and internationally
- Today product and area manager at the National Land Survey of Sweden, Lantmäteriet