Global
Communications
Newsletter

July 2002

Farewell Message

By Nelson Fonseca, Editor

Dear All,

The *Global Communications Newsletter* (GCN) was conceived to disseminate regional telecommunications news from all over the world. It was part of ComSoc's globalization process, aimed to increase the participation of members from all corners of the world. Since its first issue, GCN has achieved its goal and has always enlarged its readership, being a popular ComSoc publication.

Besides making our members feel part of the Global Village, GCN also presents the potential to attract new members from industry, a current ComSoc goal.

I am retiring as Editor of the *Global Communications Newsletter*. I am pleased to announce Joan Garcia-Haro as the new GCN Editor. Joan will be assisted by Javier González-Castaño as Associate Editor and Jacob Baal-Schem as Editor of the Chapter Corner.

The success of GCN through all these years has been a direct consequence of ComSoc members' participation. I encourage you all to continue submitting articles on regional telecommunications and other topics covered by GCN.

During all these years I was fortunate to count on the support of many friends from the GCN community. I would like to express my gratitude to:

Hussein Mouftah and Mark Karol, my Directors of Magazines, for their friendly support and trust

Algirdas Pakstas, GCN Associate Editor, for his companionship

GCN Regional Correspondents, for their enthusiastic support

Joseph Milizzo, Cathy Kemelmacher, and Sue Lange of the ComSoc staff for carefully producing GCN

Andrzej Jajszczyk and G. S. Kuo for welcoming GCN in *IEEE Communications Magazine*

Andrzej Jajszczyk and Byeong Lee, previous GCN Editors, for their advice

Dr. Tom Plevyak, for his support as ComSoc President and for his interesting articles

Carole Swaim for her unconditional support.

Last but not least, ComSoc members from all over the world for submitting their articles and for their valuable suggestions

Thank you.
Nelson Fonseca

Mobile Parking Services: From Estonia to Norway

By Algirdas Pakstas

Mobile parking services are a new SMS-based system that was originally developed in Estonia and has been used since July 2000. This system is tremendously successful: currently more than 42 percent of parking fee payments are made via mobile phones. It was developed by the leading Estonian mobile communications operator AS EMT, and at the World Congress 2001 of the GSM Association was one of the four nominees in the category of most innovative product. It also won the title "Deed of the Year" from the Estonian Association of Information Technology and Telecommunications Companies.

The next step in the expansion of these services was launching a pilot system in Oslo, Norway, on April 10, 2002. This project is implemented by Mobile Payments Systems AS (mPay), which is a joint venture between Estonia's AS EMT and Norwegian mobile communications applications developer Scangit AS. The system will allow parking fees to be paid using VISA debit and credit cards over mobile phones. The financial part of the system is supported by VISA Norge AS and Sparebank 1.

Mobile parking services in Norway will be somewhat different from those already available in Estonia. In order to record the beginning of the parking process, the user will send an SMS short message to a dedicated service number, containing a unique ID number that is visible on the parking sticker, as well as the code of the parking zone in which the vehicle is located. The process will be monitored with a bar code reader connected to the mobile network, enabling the control procedures to be performed swiftly and efficiently. The SMS messages can be transferred by the Netcom and Telenor networks, which cover virtually all mobile phone users in Norway. In 2001, turnover from parking fees in Norway amounted to two billion NOK (ca. U.S.$350 million). Nationwide launch of this service is scheduled for summer 2002.

This article is based on materials published in Baltic IT&T Review*, no. 2, 2002.*

Galileo: The European Satellite Radio Navigation System

By Cristina Lopez-Bravo and Maria-Dolores Cano, Spain

Galileo is the European radio navigation satellite system that will provide a highly accurate global positioning service under civilian control. The first approach to the Galileo system came out in the early '90s in response to a European need to face future challenges. The development of the trans-European transport network (air, sea, and inland transport), where satellite radio navigation is a key element, requires the use of a certified, guaranteed position and speed report that only Galileo can provide. Likewise, recent developments in Global System for Mobile Communications (GSM) and Universal Mobile Telecommunications System (UMTS), the second and third cellular mobile telephony generations in Europe, have demonstrated the positive impact that next-generation technologies have on employment, industry, and the international influence of the European Union. The increasing range of positioning applications based on satellite radio navigation and the growing number of users are leading our economies to greater and greater dependence on this type of system. Thus, the European Union cannot afford to depend on non-European signals in fields that will become the main sectors of industry in the 21st century. Leaving aside transport and mobile communications, Galileo also leaves room for public service tasks such as custom and excise control, medicine, law enforcement, or humanitarian operations, which due to safety reasons cannot be at the mercy of strictly military systems such as GPS (United States) or GLONASS (Russia).

In February 1999 the European Commission presented an autonomous program on satellite radio navigation, known as Galileo. The emphasis on the strategic importance of this project made by the European Council led to the Resolution of July 19 to call the Commission to develop a system for civil and global use managed by civil authorities and offering both compatibility and significant added value in relation to the existing systems. In its communicate of November 2000, the Commission reaffirmed that satellite radio navigation is a key technology for the development of European economies, and that the deployment of European Union satellites is indispensable to safeguard independence. Once it was demonstrated that Galileo is cost effective and able to generate annual revenues up to €10,000 million, the European Union gave the green light to the project March 23rd 2002.

The Galileo project will be deployed in four phases: definition (1998–2002), already completed; development and validation (2002–2005), including the launch of the first experimental satellite in 2004; deployment phase (2006–2007), with construction and launch of satellites and installation of the complete ground segment; and commercial phase (2008 onward), including full operational capacity and maintenance. The system consists of: two control centers to be implemented on European ground to provide control of the satellites and perform the navigation mission management, 20 sensor stations and 15 uplink stations installed around the world for data exchange, and a constellation of 30 satellites (27 operational and 3 spare), positioned in three circular medium Earth orbit planes at an altitude of 23,616 km, and at an inclination of the orbital planes of 56° with reference to the equatorial plane. Each satellite contains a navigation payload and a search and rescue transponder. It also contains two onboard atomic clocks that calculate time within a few hundred microseconds per day, one based on the Rubidium atomic frequency standard (6 GHz) and the other using passive hydrogen maser (1.4 GHz). The European Space Agency has chosen these clocks because they are very stable after a few hours, and because their technology can fly onboard the Galileo satellites. However, if they were left to run indefinitely their accuracy would drift, so they are regularly synchronized with a network of even more stable ground-based reference clocks, based on the Cesium frequency standard.

Galileo provides five navigation signals, each one composed of one or two ranging codes and navigation data as well as — depending on the signal integrity — commercial, and search and rescue data. These five signals give Galileo users access to four categories of services: two of the signals (the open signals) provide the open and safety services. The open service, free of charge, gives users their exact position on the planet: latitude, longitude, and height with an error of at most 5 m. To achieve this, each receptor is connected to four satellites, three to get position and a fourth to get the exact time. The safety service provides search and rescue services. In this case the open signals could be encrypted to provide integrity data. The commercial service sends encrypted data over the open signals. It also provides access to a third navigation signal, to enable users to exploit three carrier phase ambiguity resolution techniques to improve accuracy. This implies that the commercial service is not free, but offers quality of service. Therefore, paying for a specific service cannot be seen as a disadvantage, since nowadays GPS is unable to provide this type of service. Perhaps it could do it in the future, but then it is not guaranteed that it will be free. The last two navigation signals provide the public regulated service that offers position and timing to specific users requiring high continuity of service. Access to this service is controlled.

Despite being a civil control navigation system, Galileo has considered global security concerns. Europe is completely conscious that misuse of Galileo services could be a threat to national/European security.

Galileo is a radio navigation satellite system under civilian control. Unlike GPS and GLONASS, which have been essentially designed for military use, this civil control gives Galileo the possibility of offering users a real public service that guarantees continuity, as well as real-time positioning accuracy down to the meter range, which is unprecedented for a publicly available system. On the other hand, GPS signals become unavailable in recent years on a planned or unplanned basis, sometimes without prior warning. On some occasions, like the conflicts in Kosovo or Afghanistan, GPS satellites were positioned to control movements of troops; as a consequence, transports all over the world suffered a reduction in their orientation capacity.

Despite being a civil control navigation system, Galileo has considered global security concerns. Europe is completely conscious that misuse of Galileo services could be a threat for "National/European" security. Therefore, different policies have been defined, concerning: security of infrastructure, security of the signal against jamming and spoofing and management of the potential keys used to access the service, security to guarantee a defined level of continuity, and global security, in order to prevent misuse of the signal in space, offering precise positioning capability to a potential hostile user. To meet these goals Galileo includes data encryption, systems of keys managed by European governments, spectral separation between

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Galileo: The European Satellite Radio Navigation System (cont'd)

the different navigation signals, and service denial capacity.

Another important aspect of Galileo is that it is being designed to be fully compatible with, but at the same time independent of, GPS, thus allowing users to buy a combined receiver that tracks any of the satellites (GPS/Galileo) in any combination, in order to increase the performance of their positioning and have redundancy for availability, integrity, and continuity. The easiest way to achieve this is to use the same central frequencies. The frequency plan is not definitive yet; it will be decided at the next World Radio Conference in 2003. Currently, the proposed solution is that GPS and Galileo will share the L1 and L5 bands. One might think that sharing the spectrum could lead to two interfering systems. Nevertheless, GPS/Galileo interference analysis shows that the degradation on GPS signals is below International Telecommunication Union (ITU) allowed interference levels.

Galileo improves GPS in some aspects; for example, by placing satellites in orbits at a greater inclination in respect to the equatorial plane than GPS (55° inclination), Galileo achieves better coverage at high latitudes (even up to 75°). This makes it particularly suitable for operation over northern Europe, an area not well covered by GPS or GLONASS. At the same time, thanks to the structure of the satellite constellation and ground-based control and management systems, Galileo provides a higher degree of precision than GPS, which has a constellation of 24 satellites in six orbital planes at 20,200 km. Galileo reduces the accuracy of differential GPS by a factor of 4 (raw GPS provides an horizontal accuracy of 100 m with a probability of 95 percent to civil users; differential GPS can improve it to 20 m, and Galileo to 5 m). It is also more reliable since, first, it includes an "integrity message" that informs users of a failure of any satellite within seconds. This makes it adequate for applications where safety is crucial, such as controlling trains, guiding cars, and landing aircraft. Second, the safety service will provide a signal to users requesting help, informing them that their situation has been detected and help is on the way. This late feature is considered a major upgrade over existing systems, which do not provide feedback to the user.

Allied with other new technologies such as GSM or UMTS, Galileo increases the potential to provide positioning information as well as to provide combined services at a very high level.

Regarding Galileo applications, although transport by road, rail, air, and sea are the examples most frequently quoted, satellite radio navigation is also increasingly interesting to fisheries and agriculture, oil prospecting, defense and civil protection activities, building and public works, social services (handicapped assistance), and other sectors such as financial, where it applies to determine the exact time of bank transactions. In the field of telecommunications, allied with other new technologies such as GSM or UMTS, Galileo increases the potential to provide positioning information as well as to provide combined services at a very high level.

To summarize, Galileo is not an "expensive" project since its estimated price of €3200 million is equivalent to that of 150 km of semi-urban motorway. Furthermore, due to the relevance global satellite radio navigation is going to achieve in the near future, Europe should not be out of this new technology; not

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IPA: Best Governmental Organization Preparing Workforce in Information Technology

By Hany D. Alsaialy, Saudi Arabia

Datamatix, a regional organization in the United Arab Emirates (UAE) recently awarded the Institute of Public Administration (IPA) its 6th Annual Middle East Governmental Award for Best Governmental Organizational Preparing Workforce in Information Technology. Dr. Abdulrahman Alshakawi, Director General of IPA, accepted the award during the January conference held this year in Dubai, UAE. Among the other awards presented were Appreciation Awards, E-Technology Awards, and a Lifetime Achievement Award to former U.S. Vice President Al Gore (http://www.meawards.com).

IPA is the leading training and consultation organization in the public sector in the Kingdom of Saudi Arabia (KSA), and the source of both intellectual and scientific research properties in the region. In the past year, IPA engaged — with the support of the Ministry of Finance and National Economy — in a plan to establish a distance learning center (DLC) in IPA headquarters in Riyadh, KSA. The DLC will be set up this year in conjunction with the World Bank Organization (WBO) in Washington, DC (http://www.worldbank.org). The DLC at IPA headquarters will be connected to the WBO network by a VSAT satellite link. Three additional DLCs will also be established in the cities of Riyadh, Dammam, and Jeddah by connecting all IPA branches to the headquarters in Riyadh. The

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Mr. Al Gore, H.E. Dr. Abdulrahman Al-Shakawi, and Mr. Mohammad Al Gergawi, CEO, Dubai Executive Office (left to right) after the presentation of the 6th Annual Middle East IT Award for Best Governmental Organization Preparing Workforce in Information Technology.

Report on ECUMN '02

Prosper Chemouil, France Telecom R&D, France; Annie Gravey, ENST Bretagne, France; and Pascal Lorenz, University of Alsace, France
ECUMN '02 Co-Chairs

The 2nd European Conference on Universal Multiservice Networks (ECUMN '02), jointly organized by Université de Haute-Alsace and by SEE, took place on 8–10 April 2002 in Colmar, France. It gathered approximately 60 participants originating from 15 different countries (see http://iutsun1.uha.fr/ECUMN02.html). The limited attendance allowed quite interactive discussion and interesting debates in a friendly atmosphere.

At this conference, 39 regular papers were presented during the nine sessions of the Technical Program. They covered a variety of research topics of current interest such as mobile networks, next-generation networks, active networks, multimedia, multicast, differentiated services, network design, routing, and performance.

In addition, the opening and closing sessions hosted one invited paper each as keynote speeches:

- "Presentation of the French Forum on Telecommunications Research (RNRT)," by Mathieu Weill, Ministry of Industry, France
- "Evolution of Optical Transport Networks," by Philippe Gravey, ENST Bretagne, France

Finally, three tutorials covering various aspects of network architecture were provided by leading experts as part of the full Technical Program:

- "IP Virtual Private Networks," by Marco Carugi, Telecom R&D, France
- "Next Generation Network Architecture for Unlimited Service Delivery," by Fernand Schroell and Bruno Valat, Siemens, France
- "Service Deployments Based on Soft Switch Architectures," by Xavier Voisin, Alcatel, France

The best papers were selected for consideration in a special issue of the French journal *Annals of Telecommunications*.

We are indebted to the organizations that sponsored this conference (Réseau National de la Recherche en Télécommunications, Ville de Colmar, Eurel, IEEE, and IST) as well as the companies that financially supported its venue (Cegetel, France Telecom R&D, Siemens). Together with the many individuals involved, they made this conference a reality. We would thus like to thank the Technical Program Committee members and reviewers, in the first place. Without their support that allowed us to define an attractive Technical Program, the organization of this conference would not have been possible. Next, we acknowledge the perfect logistical organization set up by the Local Organizing Committee in Colmar. Last but not least, we are grateful to the members of the Steering Committee who provided us with their help and guidance in all aspects of the organization of this conference.

Global Communications Newsletter
www.comsoc.org/pubs/gcn

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A publication of the
IEEE Communications Society

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only to be independent of a non-European monopoly under military control, like GPS, or provide more reliable services with guaranteed continuity and integrity, but also to give the European aeronautics industry a definitive impulse, since the Galileo system will create around 140,000 high-qualified jobs, and generate €10,000 million revenues per year.

To read further about Galileo:

- http://www.esa.int
- http://europa.eu.int/comm/energy_transport/en/gal_en.html
- "What Is Galileo?," April 2002, http://www.esa.int/export/esaSA/GGMX50NDC_navigation_0.html
- "Why Europe Needs Galileo?", March 2002, http://www.esa.int/export/esaSA/GGG0H750NDC_navigation_0.html
- "Who is involved in Galileo?", March 2002, http://www.esa.int/export/esaSA/GGG28850NDC_navigation_0.html
- "Market prospects and business opportunities", April 2002, http://www.esa.int/export/esaSA/GGGMN850NDC_navigation_0.html
- "The Galileo Frequency Structure and Signal Design," September 2001, http://europa.eu.int/comm/energy_transport/en/gal_en.html#3
- "High Level Mission Definition. Version 2.0", April 2002, http://europa.eu.int/comm/energy_transport/en/gal_en.html#3

INFORMATION TECHNOLOGY AWARD/*(Cont'd from page 3)*

IPA branch-to-headquarters connection will utilize local terrestrial communication infrastructure. IPA plans to further expand this service within the region after the completion of the project, to be able to serve as a local hub providing distance learning services to other countries in the Middle East and in the region. Updates on the status of the DLC project will be posted on IPA Web site at http://www.ipa.edu.sa.