Putting Telematics in the Fast Lane

Wireless solutions for the next wave in mobile technology

By David McCartney, Wavecom, Inc.
Telematics combines wireless voice and data communications with in-vehicle navigation to deliver location-specific information, security and productivity-enhancing services for people on the move. Telematics continue to gain visibility with several big players from the telecommunication, electronics or automotive industries. Most car, and many leading wireless manufacturers are already on-board. Motorola has formed the Automotive Communications & Electronics Systems group (ACES) to enhance its focus on in-car telematics and communications products. Ericsson has joined with Europe's Magneti Marelli, a leading designer and developer of telematics systems, to develop in-car mobile Internet applications.

These telematics services are gaining more and more momentum with big IT players entering the field through partnerships with car manufacturers, such as IBM with Hyundai in Korea. Furthermore, GSM & CDMA operators are beginning to set up dedicated services and tariffs for fleet management: Rogers AT&T in Canada & Orange UK. Several GSM & CDMA carriers, application developers, telematics service providers, system developers and navigation data content vendors also have formed an industry consortium called the Mobile and Automotive Geographic Information Core (MAGIC) to develop and promote open industry technical standards for navigation, telematics and related location-based services across multiple networks, platforms and devices based on standard Internet service access protocols.

Under MAGIC, mobile handsets and computers, personal digital assistants (PDAs), in-vehicle positioning systems and other mobile devices will be able to deliver geographic data services. Other examples include:
&#149 Ford Europe has launched its Ford Fleet telematics asset management product aimed at light commercial fleets to larger fleets of over a thousand vehicles. It costs £499 to install each unit into a vehicle and then a further £9.99 a month for subscriptions to a basic service, the cost can go up depending on what services are required for the vehicle such as the stolen recovery option etc. (EyeForAuto 08/02/02)
&#149 Sony Ericsson Mobile Communications and Chapman Technologies will develop an in-vehicle services platform for the vehicle security and telematics, based on Sony Ericsson's CDMA 1X RTT module and Chapman's Safeguard Security Systems digital application. The platform will include CDMA communication, GPS positioning functionality and an automotive factory security interface linked to the

vehicle's control systems. The platform will be commercially available for OEM and aftermarket automotive and fleet applications by late fourth quarter 2002 and marketed through Chapman's direct sales channels. (AllNetDevices 08/07/02)
&#149 Tiger Telematics has agreed to a collaboration contract with the UK Mobile Operator, O2 UK. The contract enables Tiger to supply their advanced vehicle tracking systems to the rapidly expanding Telematics industry. (EyeForAuto 08/02/02)
&#149 Toyota Motor Corp. revealed its new service called "G-BOOK." The G-BOOK uses the special car navigation device jointly developed by Toyota, Matsushita and the communication module jointly developed by Toyota, Denso Corp. and KDDI Corp. The information will be distributed to users through CDMA 2000 1x standard by KDDI. (08/29/02 Asia biztech)

In addition, Bluetooth is gaining acceptance in telematics applications as a means of connecting a driver's mobile phone to an embedded hands-free kit. Audi cars will integrate Bluetooth to connect a handset to the vehicle's dashboard-embedded cellular module for communication and data transmission capabilities.

Target Market

In 2002, roughly 4.5 million of the 56 million automobiles produced globally had some form of telematics services installed in them. These services are projected to penetrate over half of the 60 million new vehicles produced by 2005. Forecasts for the telematics market predict a growth to $38 billion (or 47.7 million units) by 2007 from roughly $1.9 billion in 2001.

Figures

&#149 Number of vehicles fitted with telematics systems: from 75,550 in 2001 to 5.4M in 2009. (Frost & Sullivan study, EyeForAuto 11/19/02)
&#149 In 2010 more than 70% of autos sold in North America will have Telematics. (EyeForAuto 11/27/2002)

Market Overview

Services are at the heart of the telematics market and are expected to be prime revenue generators. The availability of value-added service is expected to drive the demand for hardware. Telematics services can be categorized as follows:
&#149 Safety and security: Accident and emergency assistance, roadside assistance, airbag deployment notification, vehicle tracking and personal information
&#149 Remote vehicle systems access: Remote diagnostics, remote door lock/unlock &#149 Navigation: Navigation assistance, traffic information, localization, point-of-interest information, and dynamic routing

&#149 Information and entertainment: News, weather, financial, sports; concierge services; music, movies and games
&#149 Productivity: Onboard computing, Internet access, mobile, and location-based commerce

Communication Services

Tomorrow's vehicles will be platforms for multiple RF devices, which will operate in multiple bands: GPS/GSM, DAB Cellular/PCS, AM/FM/TV/Diversity and satellite bands. Multiple operating bands:
&#149 Ku/Ka-band
&#149 GPS/GSM
&#149 DAB Cellular/PCS
&#149 AM/FM/TV/Diversity
&#149 RKE
&#149 S-band terrestrial & satellite
&#149 Ku/Ka-band
&#149 GPS/GSM
&#149 DAB Cellular/PCS
&#149 AM/FM/TV/Diversity

These new RF solutions are difficult to realize and the deployment of these multi-band systems define feasibility, cost, size, and the all-important power consumption. Engineering separate modules for each system is cost and power prohibitive. Integrated RF solutions are the key to this system because with multiple, independently operating RF systems come the worst headaches for an RF system designer: self-jamming, inter-modulation products, shielding requirements, tighter filtering requirements, etc. Multiple systems must work simultaneously and the cellular phone performance cannot be degraded.

Telematics is also a sector of the wireless industry in its infancy. Suppliers of wireless solutions to the auto industry are in need of an offering that will eliminate the need for multiple obtrusive antennas on vehicles. To date, this sector has been sadly under-serviced and has had difficulty in getting the attention of wireless companies with the proper electromagnetic capability to address and solve their problems.

Location Services

In-vehicle applications includes in-vehicle navigation and route information services, location-based information services (e.g. hotels, restaurants en route), breakdown service alert, emergency services alert, engine monitoring and diagnostics, remote services (e.g. door lock/unlock) and vehicle security (break-in, theft tracking). Where carphones form part of the hardware offering of a solutions manufacturer (i.e. where modules are used) these are included in this sector. But standard carphone kits made and sold by mobile handset manufacturers are excluded. These products are designed to improve the safety, security, comfort and route information of customers, and require location-based technology. Additionally, location services include fleet/freight/asset management and public safety applications.

Design Cycles

The auto segment is characterized by extremely long design cycles: two to four years. This demands technology that does not outdate itself. Why are modules of significant interest to telematics companies?

First, modules are not fashion items and do not have to be updated every few months with the very latest technologies and services. Most data applications required of them have been designed for the modules to carry out, and once they have been set up, they will not have to be updated for a few years. So they have a longer lifespan than handsets and terminals and do not lose their value so quickly.

Wavecom designs, manufactures and sells a range of fully certified GSM/GPRS and CDMA modules for integration into in-vehicle telematics solutions. Wavecom's WISMO &#151 short for Wireless Standard Module &#151 allows equipment makers to quickly add wireless capability (cellular) into their telematics solutions to support features such as an integrated, hands-free telephone or a navigational system.

Standardized wireless modules such as the WISMO Quik from Wavecom

enable the rapid, low-cost integration of GSM/GPRS and CDMA connectivity for voice and data-centric telematics applications.
Because WISMO supports both voice and data connectivity, it is ideal for in-vehicle systems that provide drivers with interactive information on traffic, itineraries, road-side assistance, emergency calls, real time logistics management and remote engine diagnostics. Development engineers in the automotive world are finding new ways to use GSM in connection with global positioning systems (GPS) in vehicles. One example is a security system for fleet owners. By using WISMO modules, a manufacturer could cut development time and expenses, enabling them to focus their resources on core areas like R&D and marketing and distribution channels.

What's Next?

Telematics is already well on its way to providing personalized travel information such as traffic updates, parking availability and airline status. Messaging capabilities include voice mail and e-mail retrieval, information services like sports, weather, stock market updates and Internet access and entertainment such as audio games, books, magazines and newspapers. Additional services are on their way: in-vehicle networking is just around the corner.

On the list are collision-avoidance, human/machine interface factors, data gathering and sharing, privacy issues &#151 creating an opt-in standard for the collection of personally identifiable traveler information and opt-out guidelines for collecting anonymous information &#151 and standards like developing ITS products and services that work anywhere in the country.

But carmakers' quest for strategic differentiation in the marketplace should result in some interesting new developments down the road. Everything is being considered, from priority traffic light treatment for vehicles that arrive first at an intersection to a universal vehicle identification system that allows drivers to zip through tollbooths anywhere in the country.

Regardless, telematics looks set to be the next wave of in-vehicle investment, with the potential return on investment tremendous. However, there is one major factor to consider &#151 the fact that the success of telematics systems extends beyond the vehicle itself to the surrounding transport infrastructure. Telematics is by its very nature a two-way science, with the link between vehicle and its surrounding environment the key to service success. The wireless GSM/GPRS link is therefore crucial &#151 but equally so is the supporting infrastructure, and a major investment is required here to make the potential benefits of telematics become a reality. Itineraries are only going to be as good as the maps that define them, emergency services will only be effective if the services themselves are available. Therefore perhaps the biggest potential offered by the telematics revolution is that of radically altering the way the automotive industry works. It's clear that an integrated approach is needed. But this also means looking not just at automotive culture, but transportation as a whole.

With growing debates over whether or not the vehicle is the best means of transferring people and goods from a to b in the light of increased congestion and ageing infrastructure, we also need to look at integration with other forms of transport. And only by governments, transportation providers, fleet companies, motorists, etc. all working together, will that approach be a success.

The issue of standards also needs to be considered. At present, with so many potential players involved in the market, we risk an in-vehicle 'betamax vs. vhs' debate, where some systems quickly become obsolete, and not necessarily for lack of technological advantage. Again, here the idea of a clear vision of the future is important - look at the massive digital TV investment, which is now running the risk of falling completely on its face in certain parts of the world.

We also need to think about a driver's actual abilities. It's all very well to build intelligent connectivity into vehicles, but this must not distract from the process of driving itself. Voice recognition and 'head up' display technologies are currently still in their infancy, but do give the potential to resolve some of the 'driver overload' issues. But much work still needs to be done.
The telematics revolution certainly will have a huge impact on transport infrastructure in the future, although as yet, the precise direction this future will take is uncertain. However, what IS sure is that wireless connectivity, between vehicle and controller, driver and vehicle, vehicle and infrastructure, and vehicle to vehicle, is going to be the key connecting factor.

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