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Wanda passes when a professional stock car driver offers to take the sheila for a ride.

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MDM NO.1 2005 / POSTAL ADDRESS: Mobitex Technology AB Theres Svenssons Gata 15, SE-417 80 Gothenburg, Sweden, e-mail info@mobitex.com, Internet: www.mobitex.com PUBLISHER: Andrew C Fitton. EDITOR: Ingrid Wallgren, tel: +46 31 350 20 40, e-mail ingrid.wallgren@mobitex.com. EDITORIAL CONSULTANTS: Alan Sheats, Bugli Company AB Stockholm, Sweden, e-mail alan.sheats@bugli.se. LAYOUT: Peter Menke, Citat and Madeleine Andersson, Mobitex Technology AB. COVER IMAGE: Vattenfall. MOBILE DATA MAGAZINE: is published under Swedish press law by Mobitex Technology AB in cooperation with The Bugli Company. The opinions expressed in Mobile Data Magazine are not necessarily those of Mobitex Technology AB. Mobile Data Magazine is distributed to the international telecommunications community in more than 50 countries.

New heights for Mobitex

Dear Readers,

Mobile Data Magazine is now back. Since our last issue, in which Mobitex Technology's new owners explained the rationales of buying the company, also Cingular Interactive, the world's largest Mobitex operator, has also changed owners and become independent. Velocita Wireless, as the new company is named, has identified as one of their key focus areas the rapidly growing market for M2M communications, which is also the theme for this issue.

Many Mobitex suppliers and operators believe that significant business opportunities can be created over the coming years. Mobitex is an ideal choice for many M2M applications and has taken an early lead in the M2M market. There are a number of new developments that make the case for Mobitex even more



compelling. First and foremost, hardware costs continue to decline, making the incremental cost of adding a wireless modem to a vending machine or a parking meter, for example, relatively insignificant. This trend will undoubtedly accelerate as products based on the new CMX 990 chip are introduced. From our technology article you can learn how new products facilitate the development of large-scale M2M applications. The power industry is the focus for two of our theme articles. In Sweden, Vattenfall and Graninge (part of Sydkraft/E.ON), two leading European energy companies, have been using Mobitex for more than a decade for remote monitoring and control of their power grids and continue to add more installations. In China, where Mobitex is viewed as a new technology, Mobitex Technology AB is working with its local partner Electric Power Technology to implement two pilot projects with tremendous potential. These pilot projects for local Chinese energy companies are strategically significant in several respects. Electric Power Technology has developed an innovative application for a prioritized market. The Mobitex networks that will be deployed to support this application will be privately owned and operated. In addition, collaboration is being established with the North China Electric Power University in Beijing that will significantly strengthen our presence in this important market.

As we describe in this issue, the Mobitex system is being enhanced in several ways to support private networks of varying sizes targeting government and enterprise customers. Network elements are also being simplified and redesigned in important respects to use more standard components and to support greater IP connectivity. In addition, a new pricing structure is being introduced that is better matched to smaller and simpler networks.

This issue of MDM will not be distributed as previously in a printed format. Instead, we have decided to publish the magazine on our website and to distribute it via e-mail. We encourage you to tell us what you think of this new distribution method. It is our hope that the new format will result in wider distribution and that you will feel free to forward the magazine to anyone who might be interested.

Inquire Wally

Mobitex Conference

August 29-30 2005

The Mobitex Conference to be held this year on August 29 to 30 at the

Hyatt Regency Hotel in Jersey City in the US is a much-anticipated event in the Mobitex community. This year's conference promises to be more exciting than ever.

The 2005 Mobitex Conference is being organized by the Mobitex Association and will be open to a much wider audience than previously, since the association now welcomes not only operators, but hardware and software suppliers, systems integrators and others with an interest in the technology. The conference is also being held just a short distance from the head offices of Velocita Wireless, the world's largest Mobitex operator.

Velocita Wireless is naturally inviting its business partners to participate in the conference and the exhibition that will be staged during the conference days. In recent months, Velocita has added a number of exciting new names to its already impressive list of partners. Several of these are naturally in the M2M market, but Mobitex business partners from all market segments will be represented at the conference.

As always, the annual Mobitex Conference not only offers an exciting program of presentations by leaders in the wireless data industry. The conference days and nights provide an opportunity to network with others in the Mobitex community and to share successful business cases and marketing strategies. Contacts established at the Mobitex Conference often open new business opportunities, making this one of the most valuable events of the year for participants.

So reserve August 29 and 30 in your calendars. Information about the conference is now available on the Mobitex Association's website. www.mobitex.org.

Mobitex Association

In the Spotlight: Mission Critical Data

MA Conference 2005



As described at the Mobitex conference that took place in Gothenburg last September, Mobitex Technology AB has significantly enhanced its product portfolio to meet the increased demand for dedicated private or semi-private networks, covering industrial areas and serving a defined group of users. Prioritized segments are, for example, emergency services, transport.

utility and M2M communication. By partnering with companies like Damovo, a new partner described on the next page, Mobitex Technology will be well equipped to offer new customers a robust and highly reliable network, backed by a range of support services.

The Mobitex Technology product portfolio is being enhanced and completely new products are being introduced. These include the new BRU1 Mobitex base station and the MSN node. The Mobitex BRU1 is a low cost single channel, low power radio base station. It is scalable in terms of number of subscriptions and provides coverage for up to 500 mobile terminals within a limited area

More <u> competitive</u> pricing

To ensure a competitive offering for small private networks, a new pricing structure is being introduced. Optimization of the key network elements allows hardware costs to be greatly reduced, while software licensing costs are being aligned to the number of users in a typical private network, resulting in a packaged offering that will make Mobitex even more attractive, not only in terms of such as office buildings, shops, workshops, theatres and sports arenas. The MSN node is the next generation switch for Mobitex networks. It works as a packet switching node for radio base stations and fixed terminals. It connects to the network control centre (NCC) and to other Mobitex switches directly via the Mobitex backbone. It offers flexible host connectivity via both x.25 and

IP networks.

"This is a new phase for Mobitex. Continuous improvements and new functionality will ensure that Mobitex will remain a leading-edge technology that is specifically designed to meet the requirements of business users," notes Andrew Fit-

ton, president at Mobitex Technology AB. "With the addition of the new compact BRU1 base station and the smaller MSN switch, we are further simplifying the network elements for use in small networks and optimizing them to interface seamlessly with standard IP components. Outstanding features will enable us to deliver wireless data network solutions highly suitable for mission-critical applications"

Mobitex enhanced for private networks



low investment costs, but also for costefficient operation.

Hardware prices are being reduced generally, with volume discounts for base stations and substantially reduced prices for switches. Software is being packaged and priced to reflect typical subscriber numbers in networks of varying sizes. These price reductions reflect continued optimization of key network elements and new designs that use open platforms.

The new pricing structure in combination with the enhanced product portfolio will mean more coverage and capacity per invested dollar. Not only will infrastructure costs be reduced by as much as 30 percent. Technology enhancements, such as increased IP connectivity and a wider range of base stations, will significantly reduce operating expenses (OpEx). "Advances in Mobitex technology make the new pricing structure possible and will provide a platform for expansion for existing and prospective operators," says Russell Backhouse, CEO of Mobitex Technology AB. "With these changes, we will be able to address new customs and will take this opportunity to send a message to the market that Mobitex represents the best value in wireless data technology."



Mobitex Technology recently announced a partnership with corporate communications specialist Damova do Brasil to strengthen the company's presence in the Brazilian market. Damovo is a global service enterprise offering corporate customers communication services of the highest quality. In Brazil alone, Damovo is responsible for implementation and maintenance of more than a million voice and data network gateways. The partnership will focus on segments that require critical information in real time. This includes banks, fund transfers, fleet management, traffic light control, parking machines and other M2M applications. Other target groups are police and ambulance services and government organizations.

"With Damovo, we can count on a partner with in-depth knowledge of the Brazilian market and expertise in implementing network services and projects. Our products will also make the Damovo portfolio more complete," says Flavio Bassi, who represents Mobitex Technology in Brazil.



Mobitex weathers the storm

On January 8, 2005, southern Sweden was hit by the worst storm in decades. Before it was over, 415,000 households were left without electricity. This massive power outage naturally also affected telephones and other communications networks. Fortunately, Mobitex weathered the storm and was always available to repair crews as they began the extensive task of restoring power. Communication needs were twofold during the repair work. First and foremost was the need to manage resources to ensure that power was restored as quickly and efficiently as possible. Of equal concern

was security, since many tasks could not be performed without adequate coordination.

"The Mobitex network provided excellent coverage and proved to be extremely robust during the storm and its aftermath," says Johnny Olsen, product manager at Mobitex operator Multicom Security. "These are factors that all companies and public authorities should take into consideration in procuring equipment for mobile communication. Everyone who has a need to communicate must in future put geographic coverage and robustness first."

New Mobitex office established in the US

In conjunction with the service contract with Velocita Wireless, Mobitex Technology is establishing an office in the US, in Fairfield, New Jersey. The US remains the largest Mobitex market, and the new office will enable Mobitex Technology to provide first-line support to Velocita and other customers in the US and Canada. In addition, the new office will manage sales in the entire North America region. "Both for Velocita and for Mobitex Technology, high operational stability is a key competence area," says Andrew Fitton, President of Mobitex Technology AB. "Our commitment to the US market will help Velocita maintain its position as the leading provider of secure wireless data services, solutions and support in the US."



Magnus Ericsson, president, Mobitex Technology Inc



Arnaldo Curvello, CEO of Damovo do Brasil, Artur Moraes Borges, operations & marketing director at Damovo do Brasil, Göran Rydén, global channel manager at Mobitex Technology and Flavio Bassi, Mobitex representative in Brazil

Introducing new partner: Damovo do Brasil

Mobile monitoring saves lives

BodyKom Series[™] is the name of a unique mobile monitoring system developed by the Swedish company Kiwok AB. Introduced recently at the Gothenburg Medicine Fair under the Remote Care concept, BodyKom uses sensors placed on the user's body to monitor health and react in critical or lifethreatening situations by sending data over the Mobitex network to the nearest medical facility. The unit receiving the alarm will also be informed of the patient's location, which is determined using GPS (Global Positioning System).



In practice this means that any illness that can be detected through sensors can also be handled wirelessly and an alarm sent to the nearest healthcare unit when either acute assistance or ongoing monitoring is needed. The registered patient data, sent in encrypted form, is stored directly in the patient's file and nowhere else along the way. Sensors are available for detecting various kinds of heart disease, blood pressure, diabetes, medication in blood and other data on the blood's content. The BodyKom Series[™] system is connected to existing applications for analysis at healthcare units and hospitals, which means that nurses and

doctors have access to the data in real time directly from their work stations. They can thus monitor the situation right from the beginning of the incident to the moment at which the patient arrives in their care.

Improving quality of life

BodyKom opens up new possibilities within home care and health care, as many patients who are granted sick leave on the basis of uncertain diagnoses can now stay at work under observation. Similarly, many elderly patients who suffer from common illnesses related to old age can be monitored in their homes.

It is well known that preventive measures are four to eight times less expensive than treating existing problems, which is why investments are made in preventive care. "The main aims of mobile monitoring projects are to improve the quality of life enjoyed by patients outside the hospital and to improve the effectiveness of money spent on health care," says John Quak, business manager for EMEA at HP's NonStop Enterprise Division. "By using new mobile communications technologies combined with central intelligence for handling care processes and patient data, HP and its partners can fulfil our dreams of tomorrow's care methods and processes in a practical and secure way."

BodyKom Series[™] provides an infrastructure with open interfaces, developed on the basis of industrial experience and using previously existing components, which have been modified somewhat to work together. The BodyKom Series[™] was developed by Kiwok owners Björn Söderberg and Anders Björlin in cooperation with no less than 15 business partners, including HP, WSI, B&M Systemutveckling and Mowic, one of the Swedish Mobitex operators.



The Radio Communications Agency of the Netherlands Ministry of Economic Affairs has pre-renewed to year-end 2014 RAM Mobile Data's licence for the frequencies it uses in its Mobitex network. Renewal allows RAM Mobile Data, to continue operating its Mobitex network until at least the end of 2014.

This is an important development for the many customers who conclude long-term contracts because of their investment and confidence in this technology. Customers like ANWB (Netherlands Automobile Association), the Connexion and Arriva bus companies, the cities of Rotterdam, Utrecht and The Hague and many taxi companies and vehicle fleet managers have recently renewed for several years their contracts for mobile data communication over the Mobitex network of RAM Mobile Data.

The Radio Communications Agency took into account in its decision the position the Mobitex network occupies in the Dutch telecommunications landscape and the network's economic importance. The network serves more than 1,000 customers and 30,000 business users.

Licence for RAM Mobile Data's Mobitex network



Web Positioning Service tool from B&M Systemutveckling used for BodyKom Series™

Transcomm powers TNT's MobileWorker initiative

Maximizing employee effectiveness and providing high levels of visibility of shipment information to customers.



TNT UK Limited, a global express and international mail services provider, is extending its use of Transcomm's Mobitex network in a contract valued at GBP 1.25 million over the next five years. Mobitex will be at the core of TNT's global MobileWorker initiative that aims to improve flexibility and provides the platform to extend the company's mobile working functionality outside of the core collection and delivery fleet into other key areas of the business.

As a result of extending its contract with Transcomm, TNT will be in a position to increase portable communications for its employees, capture images of consignments and transmit delivery information so customers can be kept continually updated through the TNT website. With its focus on continued efficiency and service enhancement, TNT has also secured Transcomm's expertise for a future initiative to develop an infrastructure that will allow employees to automatically move from Transcomm's Network, to the wireless RF network within its depots to ensure maximum efficiency.

As part of the initiative, TNT selected Airpack Gateway, Transcomm's middleware software solution, to support the hardware-independent nature of MobileWorker. Airpack Gateway will allow the benefits of TNT 's wireless data applications to be quickly extended across the Network to remote users, allowing real-time data to be sent and received securely across the Transcomm Network with guaranteed delivery regardless of the hardware involved. Importantly, Airpack Gateway will optimize how TNT 's data is sent across the Transcomm Network by selecting the most efficient route and reducing the company's air time network costs.

"Our global MobileWorker initiative is key to TNT 's continued efficiency and service to customers," says David Higgins, national information officer at TNT UK Limited. "The Transcomm service allows our employees to access our systems and submit information when they are away from a TNT site. This has maximized employee effectiveness and provided high levels of visibility of shipment information to our customers, ever since we started using the Transcomm Network in 1997. After a thorough review of our mobile data operations and the alternative options available to us, we were more than satisfied that extending our existing long term relationship with Transcomm would provide the best solution for TNT , and we look forward to continuing to work successfully together."

Networkcar never gets lost

Keeping tabs on a fleet of thousands of vehicles has become significantly easier for the US Marine Corps' Southwest Region Fleet Transport (SWRFT). Networkcar, a Reynolds and Reynolds company specializing in remote vehicle performance and location monitoring, is providing Networkfleet units for SWRFT vehicles at five locations in California, including the Marine Corps Air Station Miramar, San Diego Recruit Depot, Twenty-nine Palms Air/Ground Combat Center, Mountain Warfare Training Center and Camp Pendleton. Networkfleet collects detailed information directly from a vehicle's engine and location-based information from a GPS (Global Positioning System) receiver. This information is then transmitted wirelessly from the vehicle over the Mobitex network and made available online for monitoring such information as current location, fuel consumption, mileage, emission status and speed. "Velocita Wireless is honored to be able to help the Marines improve their fleet operations. Our ability to provide robust, reliable and highly secure wireless data connectivity for mission-critical applications such as the Networkfleet deployment with the U.S. Marine Corps speaks volumes about our capabilities within the M2M market," says Charles Nelson, president and CEO of Velocita Wireless. As part of the deployment, Velocita Wireless installed a new base station to extend coverage in the area in which the vehicles operate. This base station was installed at Camp Pendleton in San Diego.



OPTIMIZED F 0 R M 2 M

Taking advantage of emerging M2M opportunities

ALARMS. INDUSTRY: AUTOMATIC METER READING, ELECTRICAL POWER GENERATION, POWER DISTRIBUTION, GRID CONTROL, PROCESS EQUIPMENT, MEASUREMENTS. TRANSPORT: TRAFFIC CONTROL, PASSENGER INFORMATION, RETAIL: VENDING MACHINES, ATMs, EVENT KIOSKS. SECURITY: HVAC, ALARMS, FIRE, POLICE. INDUSTRY: AUTOMATIC METER READING, ELECTRICAL POWER GENERATION, POWER DISTRIBUTION, GRID CONTROL, PROCESS EQUIPMENT, MEASUREMENTS.

M2M applications have been generating considerable excitement in the Mobitex Industry lately.

Operators and suppliers alike forsee that M2M applications will fuel a new wave of growth that will dramatically change the industry. Velocita Wireless in the US and Transcomm in the UK are enhancing their offerings to take advantage of emerging opportunities in this market and are increasing their focus on specific M2M application segments. Velocita Wireless' own market research indicates that the market will be very substantial. By 2008, there may be more than 400 million M2M-enabled devices with a revenue potential for networked devices worth over USD 100 billion. More than 200 companies are known to be developing M2M solutions now.

Mobitex has unique strengths in the M2M arena as a data-only and totally reliable network that is designed for short and frequent data exchanges with very low latency. By leveraging these strengths many Mobitex suppliers and operators believe that significant business opportunities can be created over the coming years in specific application segments. Adding to Mobitex's strengths in the emerging M2M market is an open standard that has stimulated the development of a wide range of hardware and software components. Competition among hardware manufacturers in combination with new advances in chip design are also driving down prices for modems to the point where wireless connectivity is a viable option in an increasing number of M2M applications. The number of software components is even greater. These range from relatively simple connectivity products to complete, offthe-shelf applications for parking, for example. For custom applications, there are also many systems integrators with extensive experience of wireless data and M2M applications that are able to deliver complete solutions.

Defined target markets

Velocita Wireless has been particularly ambitious in charting the M2M market. With the help of Harbor Research, the US Mobitex operator has analyzed the market with respect to both devices and application areas or venues. Based on this analysis, Velocita Wireless has defined target markets and strategies and actively recruited solution partners to achieve its ambitious goals. The six venues identified as those with the greatest potential for wireless M2M applications are buildings, energy systems, industrial facilities, healthcare services, transportation and retailing. Several of these segments, such as transportation, are already established markets, and many of the wireless data applications in use today are not normally regarded strictly as M2M applications by Mobitex operators, although communication between machines may be included.

Within each of these segments, Velocita Wireless has identified a number of promising applications for which Mobitex offers compelling advantages. These include vending machines, which are featured in the Pepsi/TNS article in this issue, as well as alarm monitoring, HVAC control, parking meters, meter reading, asset tracking and outdoor lighting. Many of these are familiar applications in the Mobitex Industry, but with a new emphasis on M2M communications and steadily lower hardware prices, they will experience new growth.

Growing movement to wireless

Transcomm is taking a somewhat different approach. The UK Mobitex network was recently acquired by BT and integrated with the BT redcare group, which already had a thriving business in remote monitoring and CCTV transmission largely based on BT's fixed network. The Mobitex network was seen as a strategic acquisition to increase BT's business. "Although BT no longer owns a cellular network, we do see that there is a growing movement towards wireless communications," notes Kevin McNulty, CEO of Transcomm. "Traditionally, BT has used its own wireline technology, with some products using a GSM connection as a back-up. Now we will gradually introduce Mobitex."

One of Transcomm's focus areas, as BT redcare expands its services with Mobitex, will be business security and alarm monitoring. Transcomm will offer a BT-branded grade 3 security signal monitoring product for the UK market. This product will be offered in areas where BT redcare service is not currently available or customers do not have a BT line. This product may be exported to other markets as appropriate.

Growth potential in energy

As the articles in our theme section indicate, the energy sector is one of the application areas in which growth is expected to be substantial. In Sweden, Vattenfall and Graninge have been using Mobitex for many years to monitor and control critical aspects of their power networks.

In China, where Mobitex is regarded as a new technology, Electric Power Technology is implementing two pilot projects, each of which could grow to hundreds of base stations with thousands of measurement points and serve as a model for local energy companies throughout China.

In addition to the theme articles in this section, news items include several other successful M2M applications in other areas. These range from remote monitoring and control of parking meters, a well-established application in the Mobitex industry that continues to grown, to a new application for monitoring of patient data that significantly increases the quality of life and peace of mind for patients.

Network devices create new possibilities that we are only beginning to explore. Mobitex provides the key element of wireless connectivity that makes these applications possible. As the M2M market grows larger, Mobitex will thrive.

"

Market research indicates that the M2M market will be very substantial

ENERGY SOLUTIONS powering M2M growth in China

China has a voracious appetite for power. Sustaining the country's phenomenal growth and its emergence as a global manufacturer requires steadily increasing supplies of electricity. Major projects are underway on all fronts to provide new generating capacity. China is also purchasing increasing volumes of oil and natural gas for electricity generation. Still, demand threatens to outstrip supply, thus limiting future growth.

As important as finding new sources of energy may be for China's continued economic growth, it is equally vital that the existing power grid is operated as efficiently as possible. Power losses in the grid can easily equal the capacity of several new generation plants. It is also essential to ensure that electricity distribution system is as efficient as possible, that customers are charged fairly for the power that they consume and that consumption patterns are changed wherever possible to avoid excess usage during peak periods when demand is highest.

As can be expected for a country with a population of well over a billion, China's power grid is vast and extremely complex. The national grid is owned and operated by the State Grid Corporation of China, which consists of about half a dozen large regional grid companies. These regional companies in turn serve smaller power companies generally covering a single province.

The State Grid Corporation with its 728,000 employees is naturally able to devote considerable resources and expertise to operating the national grid, managing its assets and ensuring that power transmission in the high-voltage grids is as efficient as possible. The greatest inefficiencies also do not arise in these grids, but rather in local networks and in the distribution sub-stations and transformer stations where the highvoltage power is stepped down to lower voltages and distributed to customers.

"In China, the local power companies all want to own their own networks," observes Bell Qi, general manager of Electric Power Technology in Beijing, which has partnered with Mobitex Technology to bring Mobitex to the power distribution system. "This is also where we saw an opportunity to increase efficiency by automating power distribution."

Potental for thousands of measuring points

Electric Power Technology and Mobitex Technology are now implementing two pilot projects to evaluate Electric Power Technology's concept. Initially, each pilot installation will consist of about 100 measurement points served by three or four base stations. There is a potential for thousands of measurement points and hundreds of base stations in each city where the system is installed.

The Electric Power Technology system measures power and collects data at different points in the local network from distribution sub-stations out to smaller transformer stations and beyond. These readings make it possible to determine where power losses occur and analyze their causes. At each measurement point, readings are taken several times per hour, and the total amount of data to be transmitted may be as much as 100 kilobytes per day for locations at which data from several measurement points is concentrated before being sent over the Mobitex network.

In many cases, measurement equipment will be mounted on poles. One of the features of the Electric Power Technology system is that the company has been able to combine the unit used for collecting measurement data with the radio modern by using Mobitex Technology's M3080 OEM Mobitex modern and an onboard application (OBA), thus significantly reducing the cost of each measurement point.

Automated power distribution

Because power consumption is being monitored in near real time throughout the distribution network, it is possible to automate power distribution and dynamically reconfigure the network as consumption patterns change, thus increasing efficiency. The system naturally also meters consumption and provides the raw data for billing. "We see great potential in this system, not only for distribution automation, but also for remote meter reading and supporting electricity sales. So far, interest among local power companies has been substantial, and we are very excited about the future," says Bell Qi.

Mobitex is a relatively new technology in China that is still finding its place. At present, M2M applications for energy production and distribution systems are just one area in which Mobitex is being deployed, but its future in this area would seem bright. "We evaluated several alternatives for data communication, but in the end, Mobitex was the best choice for our application," emphasizes Bell Qi. "Mobitex offers proven and reliable technology at low cost. It can be deployed quickly and provides a large coverage area. These were compelling arguments."

A sign that Mobitex is gaining ground is that the partnership between Electric Power Technology and Mobitex Technology has attracted the attention of the North China Electric Power University in Beijing, which is the first choice among Chinese students for university studies in the field of electric power. Several employees of Electric Power Technology have experience as teachers or professors, and there is now considerable interest in establishing a test laboratory for Mobitex at the school.

"This represents a fantastic opportunity for Mobitex, and we will do everything we can to ensure that a test lab is created. We believe that Mobitex is the right technology for many M2M applications in the power industry, and we are proud to be working with such a foresighted and innovative partner as Electric Power Technology," concludes Dragi Atanasovski, business manager at Mobitex Technology.



Bell Qi, general manager at Electric Power Technology

"

Readings make it possible to determine where power losses occur and analyze their causes

"

Remote troubleshooting in

Extremeconditions

"Graninge quickly introduced Mobitex in its power operations for controlling connectors, circuit breakers and monitoring alarms" In a sparsely populated region like Northern Sweden, where weather conditions are harsh and temperatures can remain below -25° C for days on end, power outages are not only a relatively common occurrence. For families living in remote areas, they can be life-threatening. Vattenfall and Graninge, the power companies serving Northern Sweden, therefore need to be able to identify where a line is down as quickly as possible. Luckily, they have Mobitex.

Power quickly restored

When an outage occurs, power companies use a procedure called sectioning to localize the break. By using disconnectors to selectively switch out sections of the network, the portion of the network where a line is down can be isolated. This allows a repair team to be dispatched to the correct location almost immediately and power to be restored more quickly.

Both Vattenfall and Graninge, along with more than 100 other power companies in Sweden and Finland, work with the Finnish company Netcontrol, which develops, markets and supplies monitoring and control systems for energy production and distribution. In Vattenfall's case, Netcontrol has supplied equipment for controlling line disconnectors, small remote control stations and its entire communications network. For Graninge, Netcontrol has provided equipment for all network monitoring. In both cases, Netcontrol provided the Mobitex equipment, as well as the gateway between the Mobitex system and the control and monitoring system.

No interuption of operations

"Mobitex is gaining ground in the energy sector," says Lars-Gunnar Lif, regional manager for Sweden at Netcontrol. "The key factor for us and our customers in choosing Mobitex is its simplicity. With Mobitex, we only have to go out with some test equipment to check the level for the radio networks connections and after that mount the radio unit and the antenna. Once it is installed, it simply works."

Vattenfall and Graninge, which is now part of Sydkraft and its parent company E.ON, have been working with Mobitex for many years. In Graninge's case, Per Sundqvist, who was formally operations manager for Graninge's network in central Norrland, began working with Mobitex in the mid-1990s, when it was introduced in the company's forest operations for the collection of data for felling plans. Based on this experience, Graninge quickly introduced Mobitex in its power operations for controlling disconnectors, circuit breakers and monitoring various alarms. In some cases, Mobitex is also used for collecting analog measurements from the network. "Mobitex is extremely reliable and provides superb coverage," says Per Sundovist. "In the beginning, we ran tests and performed various control measurements, but we stopped doing that long ago. There has not been a single interruption of operations in ten years. Occasionally there may be temporary disturbances, but they are not noticed, since the traffic always gets through." Tage Nilsson, who is an engineer with Vattenfall has had similar experience. His company has been using Mobitex to control the power networks in northern Sweden since 1998 and is adding new areas all the time. This area offers some of Sweden's harshest weather conditions. "The network is excellent and provides very reliable communications," says Tage. "Many times it is our own equipment that does not work. Conditions can be extreme, and battery back-up for circuit breakers that require considerable power to operate can be a problem. Mobitex, on the other hand, is a solid performer."

Under severe conditions

The equipment most commonly used for sectioning in Northern Sweden is Netcontrol's M 2001 pole-mounted disconnector, which is a complete package that includes a motorized actuator, a modem, communications equipment, a remote control unit, heaters and a power supply with a battery backup. Once mounted, the unit will rarely need servicing. In Netcontrol's own tests conducted at the Tampere Institute of Technology, the unit continued to function even when the disconnector was covered with a 10 mm coating of ice and operating at a temperature of -50° C.

"Several customers including Graninge evaluated GSM and other alternatives for operation under these conditions but in the end chose Mobitex," reveals Netcontrol's Lars-Gunnar Lif. "In addition to issues of network coverage and reliability, it was difficult to find GSM equipment (radio network solution) with a dependable battery back-up. In a situation where a line goes down and the power is out, the battery back-up simply has to work. Otherwise the whole system is useless."



Pole-mounted disconnector from Netcontrol

Netcontrol is now in the process of expanding Vatttenfall's equipment and adding Mobitex installations in more locations. In this project, use of Mobitex in Netcontrol's monitoring and control systems will be expanded to include transformer stations and small power stations. More data will also be accommodated. Netcontrol considers communications to be central to its remote control and monitoring solutions and prides itself for its extensive expertise in communication protocols and systems.

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There has not been a single interruption of operations in ten years



More money with Cashless vending

Like all major brands, Pepsi manages every aspect of its branding and requires all suppliers to undergo rigorous trademark authorization consisting of lab testing and market research trials to ensure that the consumer experience is what Pepsi expects.

After more than five years of hard work and a USD 10 million investment, TNS recently won brand authorization from Pepsi and will be equipping some 10,000 vending machines for wireless credit-card processing across the US over the next year.



V ending machines are very nearly ubiquitous, at least in populated areas. Not surprisingly, the vending machine industry is dominated by Pepsi and CocaCola. Of some five million vending machines in the US, more than half are beverage vending machines, while the rest mostly sell snacks. There are estimated to be an additional three million beverage machines in Europe and an approximately equal number in the Asia Pacific region, bringing the total number of beverage vending machines in the world to about ten millions.

As can be expected, the vending industry, which is also called automatic retailing, is one with razor-thin margins. Even on a hot day with no other source of refreshment, people will resist paying a price for a soft drink from a vending machine that is significantly higher than in a retail store. Yet the vending machines that seem to be almost everywhere must be stocked and serviced and money collected, resulting in overhead costs that are significantly higher than in retail stores. Because they are so commonplace, few people think about the evolution of vending machines. The function of these large boxes about the size of a refrigerator is simply taken for granted. Inside there is a stock of refrigerated beverages in cans or bottles, one of which will be dispensed when the proper amount of money is inserted. Although the advertising on the outside of the machines may change to reflect the latest marketing campaigns, the basic principles on which beverage vending machines operate would not seem to have changed since the early 1920s when they were first introduced

About 25 years ago, automatic retailing faced a crisis when the price of a soft drink had risen to an amount that was not convenient to pay with coins. Margins were stuck at artificially low levels, thus limiting growth. The solution came with the dollar-bill validator, which revolutionized vending and fueled strong growth for many years. Today, however, automatic retailing is undergoing yet another revolution that promises to be even more dramatic.

Installs in just seconds

"Cashless vending is the greatest innovation in vending in more than 25 years," says John Powell, vice president of sales and marketing at Transaction Network Services (TNS), one of the world's leading providers of data communication services for transaction processing. After more than five years of hard work and a USD 10 million investment, TNS recently won brand authorization from Pepsi and will be equipping some 10,000 vending machines for wireless credit-card processing across the US over the next year. TNS also hopes to deploy its solution in Europe and Asia. Synapse cashless vending is a completely bundled solution offered by TNS that makes it easy for Pepsi bottlers and distributors to equip their vending machines. Installation takes just 15 minutes and involves mounting a combination card reader/dollar-bill validator that is compatible with virtually all existing Pepsi machines. The Mobitex modem is a separate unit that is mounted inside the

Cashless vending provides key value adds for bottlers

vending machine. There are no moving parts, and TNS uses the same cables and interfaces as found in legacy vending machines.

Achieving this status in which TNS is an exclusive supplier to Pepsi in the vending industry, took considerable dedication and effort. Like all major brands, Pepsi manages every aspect of its branding and requires all suppliers to undergo rigorous trademark authorization consisting of lab testing and market research trials to ensure that the consumer experience is what Pepsi expects. The equipment that TNS supplies to Pepsi bottlers is now trademark authorized, and TNS is the sole supplier for cashless vending.

Value adds for bottlers

"Cashless vending provides key value adds for bottlers," continues John Powell. "Initial field trials at convention centers, for example, show that creditcard usage ranges from 30 percent to as much as 50 percent for some machines. Credit card usage at other high-value locations such as hotels is only slightly lower." On average, the increase in sales was 22 percent in the first eight weeks. This was obviously a key factor in the decision to roll out 10,000 units. Other important concerns were reducing cash handling and improving logistics and reporting. The Mobitex solution supplied by TNS also provided some unexpected advantages. Because the machines employ wireless communications, they are more mobile, requiring only a power source. This is a major benefit in a convention center environment where up to 50 percent of all vending machines are moved. In this environment, a fixed dial-up connection is simply not an option.

Benefits with dynamic routing

As specialists in transaction processing, TNS has finetuned every aspect of system performance. Thanks to Mobitex, transaction times for credit-card validation are almost instantaneous, which is always a critical factor for sales. "We typically do approval of credit-card transactions in less than five seconds. There is no way people are going to stand waiting if the technology introduces any delay," notes Charles Nelson, president and CEO of Velocita Wireless, which provides wireless data communications via Mobitex for the cashless vending solution.

Another important point is that the transaction appears the same as a cash purchase for the bottler. "We don't try to force EFT type settlement on to the bottler," notes John Powell. "In effect, at the processing center, we translate credit-card settlement into cash-based transactions. TNS can also provide reconciliation of all transactions all the way back to the last time the vending machine was filled." The patented TNS system allows drivers to swipe a card telling the machine to reconcile its transactions so that TNS can report back to the bottler all credit-card and cash transactions Electronic meters are read inside the machine that count card and cash transactions, making the system fully accountable to the bottler. The report produced by the TNS system can be compared with the bottlers' own meter readings. In today's business world where new financial regulations such as the Sarbanes-Oxley Act are placing greater requirements on companies to audit all transactions, TNS thus provides a significant competitive advantage.

An intelligent vending machine cannot only track sales and report errors and malfunctions. Because all transactions are recorded, the system has the capability to determine what machines need servicing. This would allow bottlers to take route management to the next level of dynamic routing.

"Dynamic route management is still in its infancy," notes John Powell. At present, the data needed to monitor stocking of vending machines is not registered centrally, but rather recorded individually by drivers as they complete their routes. However, TNS is working actively with major bottlers to change the process.

"Now that bottlers are beginning to understand that cashless vending will significantly increase sales, we can move to the next level. With dynamic route management, costs can be reduced substantially in an industry with razor-thin margins. The potential is enormous," concludes John Powell.

designing a M2M wireless application

M2M applications appear deceptively simple to design and deploy. Because they involve communication between machines, many difficult design issues involving the user interface can be avoided. Machine-to-machine communication can also be simple, requiring no more than a few bytes of data representing a meter reading or temperature level. Furthermore, M2M applications can often use simple protocols for data transfer, unlike POS (point-of-sale) applications, for example, which may require handling complicated transaction protocols for electronic funds transfer.

The difficulties in M2M begin when applications are scaled up and thousands of devices need to be deployed. The logistical challenges of installing so many devices, many of them in remote locations, are considerable. In M2M applications for monitoring fire alarms or security systems, for example, there may be legal requirements regarding operational reliability, electrical safety, etc.

What initially begins as a few bytes of data for each device also suddenly becomes a large volume of constantly changing real-time data. At the same time, the dynamic picture of operations provided by a large number of networked devices opens a new dimension. Real-time data that was not previously available can be used in a wide range of applications controlling an electricity distribution network or routing a fleet of vehicles for stocking and servicing vending machines. Achieving the high degree of control over operations that M2M applications make possible, however, requires extensive integration with existing business systems. Finally, the business processes in many organizations can now be changed to handle more real-time information.

What at first glance may seem like a simple application thus poses challenges at every level. Fortunately, there are hardware and software components available at every level to simplify the task.

Easier hardware integration

First and foremost, there are a number of OEM modems available that are specifically designed for easy integration into existing equipment. Although Mobitex currently operates on three frequencies (400, 800 and 900 MHz), all modems are designed to meet the same specification, namely the Mobitex Interface Specification administered by the Mobitex Association. Mobitex modems are available for several frequencies. In addition, all of these modems have been verified and certified by one or more operators for use on their networks.

This is not to say that hardware integration is an easy task. There are critical design issues relating to RF-shielding, antennas and power consumption that must be addressed. To meet this design challenge, modem suppliers offer developer support for their products in these areas and may be able to provide design and verification services on a consultant basis for specific projects.

Application building blocks

The greatest challenge in developing most applications naturally lies in the software. Once again, Mobitex offers products and solutions that make the task significantly easier. Most Mobitex modem vendors also supply software and software development kits for their products that provide a high-level programming interface that hides the details of radio interface and native Mobitex protocols and makes the modem look like a standard communications device. Although X.25 has traditionally been the standard for Mobitex network communications, TCP/IP is widely supported in the network infrastructure and in products from most suppliers. For developers, this means that there is little need to learn new radio protocols and that they can be more productive using the tools and standards with which they are familiar.

For many simple M2M applications in such areas as remote monitoring and security, the latest generation of Mobitex modems offers an even more efficient solution. The Boomer III from Wavenet include considerable processing power and support for onboard applications (OBA). These effectively become embedded applications running on the modem itself which can poll a number of inputs representing power meters or sensors, for example, and send these readings over the Mobitex network to a host system. No data terminal equipment is required, because everything is included in the wireless module. Coding the application also becomes much simpler, since it is written in a high-level language such as C.

At an even higher level, the Dutch company HiTechnologies offers a number of products specifically designed for M2M applications. Perhaps the most interesting of these is the InfraLOGIC-100. This compact unit not only provides eight digital inputs, eight digital outputs, two analog inputs and an I2C interface. It has a built-in Mobitex modem and a BASIC interpreter for easy programming. A more powerful version of this product called the InfraLOGIC-200 Remote Access Web Server can be directly accessed over IP and is specifically designed to work with the company's iNode products for easy remote monitoring and control over the Internet.

Turnkey solutions

The data from the networked machines must naturally be processed by a host or back-end system. This is also often the development task that requires the most resources and the greatest investment, particularly when an M2M solution means that business processes will change. For these reasons, only large organizations deploying extensive M2M applications can handle systems integration without external help.

AVID Wireless and Sensor Logic are two systems integrators with broad experience of wireless data that have specialized in M2M applications. Both can provide all or part of a total solution based on customer requirements. In addition to its extensive expertise in systems integration and project management, AVID wireless provides its AVIDRapidTools, AVIDGateway and AVIDirector products for developers. AVIDRapidTools is a Java code generator with support for more than 190 devices that has been integrated with a proven methodology for rapid design. The AVIDGateway is a Java server application that interconnects all devices and objects, while AVIDirector is the hardware unit that can interconnect with sensors and control external equipment at a remote site. The AVIDirector comes in two versions with different I/O capabilities and is Java-based.

Sensor Logic, which describes itself as a telemetry service provider, takes a different approach. The company delivers a portal that handles the information from the remote units, such as the AVIDirector or InfraLOGIC-100 and makes the information accessible to a company's business processes. Sensor Logic has developed an architecture for M2M solutions based on layered functionality from communications and logging up to reporting, notification and control. A similar approach is applied in the "Non-Stop" servers from HP as mentioned in the BodyKom Series article in this issue.

As the cost of wireless devices comes down and the market expands, the business case for M2M solutions will become increasingly strong. Once deployed, there are many business operations in which an M2M application can deliver significant gains in efficiency and cost savings. The decision to move to an M2M solution will therefore often depend on the time and money required for development. However, while there may not be one single M2M solution that meets all business requirements, there is a wide variety of hardware, software, tools and services that can significantly reduce development time and cost for designing custom M2M solutions.

KEY FEATURES

Mobitex offers a number of key features for M2M applications:

Guaranteed delivery

No data it thrown away because of a busy network when the local ice hockey team won a match and everyone want to tell their friends.

Quick delivery of the data

The information is delivered within a few seconds. Essential for real-time systems.

Status message

Send a 8-bit micro message at very low cost and with shortest possible delivery time.

Positive Acknowledgement

Get a receipt when the information is delivered to the receiver.

Mobility

Supports mobility making it very suitable for transport and telematic applications
Flexible deployment

Mobitex systems can be deployed as small or large and private or public networks.



Workabout Pro sets new benchmark

Psion Teklogix has now introduced the Workabout Pro, a new ruggedized handheld device for Mobitex based on a Windows CE .NET platform that will set a new benchmark for entry-level handheld computers.

The Workabout Pro is available in two variants. Both models feature a backlit touch screen with 1/4 VGA (320 x 240 pixel) resolution, a 55-key keyboard and a variety of ports and jacks. The Workabout Pro M has a monochrome LCD display, 64 MB SDRAM and 64 MB flash memory, while the Workabout Pro C features a 65,000-color TFT display, 128 MB SDRAM and 64 MB flash memory and integrated Bluetooth communications. The handheld units weigh between 450 and 550 grams depending on options and measure 222 x 76 x 31 millimeters.

The Workabout Pro is extremely rugged and delivers the performance and durability required for mobile data collection in harsh environments in a user-friendly package. With an IP 54 rating and able to withstand repeated drops from over a meter, the unit's operating range is from -20° C to 50° C. Accessories include a number of docking stations with various charging and connection options, a vehicle cradle and charger, a pistol grip with trigger and various scanners for barcodes and RFID.

Adding to the Workabout Pro's versatility is a software development kit (SDK) for customization and a hardware development kit to support third-party peripherals. For Mobitex, the Workabout Pro features a fully integrated CNI modern. The Workabout Pro is now being launched on a broad scale by Transcomm in the UK, but with this range of impressive features, the new handheld computer from Psion Teklogix is sure to be a success in many other markets.

Immediate disaster recovery

When the government of the Australian state of New South Wales (NSW) chose Mobitex for its new Mobile Data Radio Service (MDRS) to supplement the Government Radio Network (GRN) used primarily for voice, the most stringent requirements were placed on the new network. The MDRS was built primarily for public safety services (fire, ambulance and police) and therefore classed by the NSW government as critical infrastructure that simply must not fail in case of a major disaster.

A Mobitex system is extremely robust and can be configured for strong redundancy as part of the standard network architecture. Redundancy features include overlapping network cells, duplicated links between sites on hot standby, duplicated network management components, such as switches and gateways, also on hot standby, and alternative network access via other carriers. For the NSW government, however, this extreme level of robustness was simply not enough for the critical infrastructure to be used by its public safety services.

In the NSW "what-if" scenarios, it was assumed that the entire network management center (NMC) could be lost, making communications and staff access to the NMC impossible. To address this worst-case scenario, the government decided to work with the principal supplier Technisyst and its partners ADT Wireless and Mobitex Technology to create a Disaster Recovery Center (DRC) that would be in a different geographic location and not housed in a government building. The DRC would function as an NMC for an alternative network. "The government demanded that the MDRS should be fully operational through the DRC in less than 10 minutes and that full network management could be restored within 24 hours," says Bill Delaney, CEO of Technisyst. "To accomplish this, we had to develop and deploy a disaster recovery solution based on a parallel and independent sub-network on an extremely tight schedule of just two months from the government's decision until the start of acceptance testing."

The solution involved configuring the Mobitex system to handle alternative paths to sites and switches and implementing a WAN link infrastructure to allow flexible rerouting. Among the more difficult challenges for Mobitex Technology were automatically selecting switch configurations, handling a redundant switch within the network, continuously updating the alternative NMC in the DRC and determining how to activate the alternative NMC.

"We are happy to report that the system was tested under all conceivable scenarios and that the customer is satisfied and feeling secure," says Bill Delaney. "The outcome actually exceeded the requirements. The entire DRC is constantly on hot standby. The operations cutover was accomplished in less than 30 seconds and full management cutover in less than 30 minutes, with both changes occurring completely transparently to end users."

"Technisyst and ADT Wireless did an outstanding job in exceeding the most stringent government requirements," says Per-Erik Sundström, account director for Australia at Mobitex Technology. "I am not aware of any wireless network in the world, regardless of technology, that is able to provide this level of robustness in disaster recovery."

REQUIREMENT ACTUAL PERFORMANCE

Fully operational in less than 10 minutes

Full network management restored within 24 hours

Fully operational in less than 30 seconds

Full network management restored in less than 30 minutes

Feature rich Chip to be released from CML

CML's eagerly anticipated CMX990 will be released this summer. In preparation, CML has 'Innovations,' a product overview catalogue that is available directly from CML. The CMX990 features many innovative intrinsic features that will reduce component count and save on final product cost. The CMX990 provides the majority of RF and IF functions, in both Tx and Rx paths, to form a



complete half-duplex data transceiver. All operating frequencies in the CMX990 are generated from one of the two onchip low-noise Integer-N synthesizers. One synthesizer is designed for the main RF channel-selecting local oscillator, with the second generating a local oscillator for mixing the Tx and Rx IF signals to/from baseband. On-chip dividers are also provided to allow flexibility in frequency planning depending on the Tx and Rx bands required. All dividers and synthesizers can be controlled by the host.

Many of the intrinsic features were discussed during the development stage with Mobitex Technology AB. Particular emphasis was placed on the optimization of cost, size and performance of modems based on the CMX990. Some of the more detailed features go a long way in reducing end-product cost, while allowing easy application design and, of course, uncompromised performance. Some of these thoughtful features include: These intrinsic features include on-board auxiliary DACs and ADCs. The DACs are

intended to provide a feedback loop for

the digital compensation of the crystal, thereby eliminating the cost of a TCXO. Power amplifier (PA) output monitoring can also be performed through the onboard ADCs. Both forward and reverse power monitoring is possible through additional on-board ADCs. In-fact, there are six auxiliary ADCs included on the CMX990 catering for a variety of needs. Two of the ADCs have flexible op-amps on the input to allow minimum external component count. It is also possible to use one of the CMX990's DACs to control the power output automatically. The RAMDAC feature allows a power ramp profile to be stored and automatically clocked-out to control power amplifier turn-on.

Additionally, the on-board DACs can be used for a range of other functions, such as pre-scaling and tuning of the VCO and filter tuning. Automatic Frequency Compensation (AFC) is possible by using of one of the DACs. The six on-board ADCs solve the needs of many application specific functions. Examples include a level input from water tanks, gas tanks and other volumetric sources, coin counters in parking meters or payment systems, vending machine stock level monitoring, sensors within alarms and 'current state' measurements in purely analogue applications are other areas that can feed in to the CMX990, further minimizing the need for extra components.

These are but a few of the CMX990's advanced and feature-rich capabilities. The closer you look at the CMX990, the more cost and performance saving benefits you will find.

Details are available on the CML website, which can be found at: www.cmlmicro.com

A full data-sheet can be downloaded via a simple registration form on the CML website

MAXON previews new DM230 modem

UK-based Maxon Europe Ltd. recently previewed the DM230, a rugged 10W modem suitable for vehicle mounting. Evolved from the universally successful DM200 product, the new modem features a wideband (405MHz to 465MHz) platform and integrated RS232 capability with GPS capability. Bluetooth connectivity will also follow as an option.



Over the past 22 years, Maxon has built up a strong pan-European distribution base with sustained growth in the professional TWR and Data markets, and its Mobitex products are widely used in many successful applications throughout Europe and in other parts of the world. The new DM230 is a much anticipated product that will continue this success.

release: enhanced TWMK

Korean manufacturer CNI (Communication Network Interactive) is now introducing an enhanced version of the Mobile Messenger TWMK.

The new version features an enhanced screen, and is now available in a new color and a more distinguish design and enhanced experience. It is available in the 900 MHz version.



Need for speed Taking the sheila for a ride

On a recent trip to Australia, I was privileged to be invited to follow the acceptance testing of the Mobitex network being rolled out by Technisyst for the government of New South Wales.

As can be expected, the New South Wales government placed a number of very stringent requirements on the service levels that it expected Technisyst to achieve in fulfilling the terms of its contract and thus receiving full payment for the services that it delivers. Among these requirements was that the Mobitex system should be capable of successfully executing handovers for moving vehicles traveling at speeds up to 160 kilometers per hour. The engineers were naturally confident that Mobitex could satisfy this requirement. Proving it during the acceptance testing, however, was a different story. As one Technisyst official put it, "We obviously did not want to be driving around the streets of Sydney at 160 kilometers per hour, particularly when our customer included the police. We needed a controlled environment for conducting the tests." The solution was to hire a race track outside Sydney for a day. The base stations were already in place, and a supercharged V8 stock car was equipped with a Mobitex terminal and various test equipment. A professional racing driver had also been hired to drive the car, but there was space for one passenger to witness the test.

As is often the case, I was the only female in an environment that seemed to be charged with testosterone. I suppose that was the reason why the Techisyst official responsible for the test asked the driver if he wanted to take the sheila for a ride. As a non-Aussie, I didn't immediately realize that he was referring to me, but I was certainly tempted. I knew that the adrenaline kick that I would get from racing around the track at such a furious speed would make this a vacation that I would never forget. However, the look on the face of the Technisyst technician who had spent most of the night configuring the equipment told me that there was one man who was going to be a very unhappy camper if I accepted this generous offer. I thus gracefully declined, saying that I preferred riding horses to racing cars.

Watching a car traveling at such a blinding speed pass by at close distance is probably more terrifying than actually riding in it. Once the requirement of 160 kilometers per hour was met, the men naturally wanted to put the pedal to the metal and see how much further they could go. What we witnessed as the car flashed by at a blinding speed was more than the shutter speed of my digital camera was able to handle. The Mobitex network was still performing flawlessly at 260 kilometers per hour when the men decided to call it a day. When the supercharged V8 stock car stopped at the test station, the Technisyst technician who climbed out was white as ghost and looked like he had had a near-death experience. "I think I'm going to stick to Need for Speed on my computer," said the technician as he raced for the nearest rest room.

www.mobitex.com