



Karlsruhe is gearing up. Information that reaches its destination.

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Informative

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Since 1992 the companies of the Karlsruher Verkehrsverbund (KVV), the Karlsruhe-based regional Transport and Tariff Association, rely on INIT's telematics systems. Thus, they not only control the traffic situation in the city of Karlsruhe, but also provide their customers with real-time passenger information. In order to be able to manage operations efficiently outside city borders too, the local public transport providers Verkehrsbetriebe Karlsruhe (VBK) and Albtal-Verkehrs-

Gesellschaft (AVG) have contracted INIT to upgrade their telematics system.

Central to this modernization is the timely and automatic data provision of the vehicles, as well as the flawless location tracking and control of all vehicles across the region. In this way, passengers can be informed even more reliably about the arrival times of buses and trams, as well as of interruptions of services, both at stops and via the Internet.

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Dear transportation professional,

In order to bring out the best in your Intermodal Transport Control System (ITCS) a number of prerequisites need to be fulfilled. Basically, a system is only as good as the quality of its data. Our story on network data collection will show you how easy it is to significantly improve the GPS information and the distances between the stops your system is based on.

But communication is also an elementary part of all telematic systems. Only when directions given by the dispatchers really

reach the vehicles, and hence the drivers, and when the tracking system possesses the exact vehicle locations, an ITCS can prove its full capability. For a long time communication was one of the most challenging tasks of an ITCS, but nowadays modern communication standards like UMTS offer the possibility to integrate even vehicles serving rural areas that so far have been out of reach of Private Mobile Radio Systems.

Read more about the intelligent communication concept we will install in Karlsruhe in the project report. We are very proud to have been awarded the upgrade of the ITS system in our hometown and are looking forward to improving not only the efficiency of the fleet management but also the quality of real-time passenger information for our fellow citizens.

Enjoy the read!



> **Achim Becker**,
Chief Operating Officer,
Telematic Software and Services

Achim Becker

Automatic route surveys with MOBILEsurvey... ...or How Mr Halt made the world a little better.



> A system is only as good as the quality of its data!

It's a warm summer morning. The weekend is over and Mr Halt is getting ready to go to the office. He works for the local public transport company and as usual makes his way to work by tram. On the tram he can relax a little, ahead of a busy week.

Today Mr Halt is looking out of the window, lost in his thoughts, and he enjoys the view of the summer flowers and colourful bushes along the way. Every morning Mr Halt's journey takes him past ten stops. Of course, he knows the way like the back of his hand. The regular "<bing!>" followed by the announcement "Next stop — Gravel Hill". And a little while after the tram has left this stop: "<bing!> Next stop — Wood Green".

Only one "<bing!>" is regularly missing on this route: the stop at the zoo is not announced. Every morning Mr Halt notices this deficiency—and every morning he tries to ignore the nagging feeling that it is he himself who could actually remedy this situation. Mr Halt knows very well where the problem lies: the "Zoo" stop was moved some time ago.

However, neither the new route distance nor the position was added to the scheduling data. But to start a whole new measuring trip just for the one stop...? And to organize a GPS receiver or a suitably equipped vehicle and all this to make one special trip...? Each time Mr Halt thinks he really ought to do this, the motivation just doesn't last long enough for him to actually start the whole process once he has made it to his desk.

The tram is approaching the stop at the zoo. As usual the speaker announces—well, nothing. The tram stops briefly and continues its journey. A few rows to the front Mr Halt can hear a child's voice: "Mum, that was the zoo!" A woman abruptly rises from her seat and looks out the window with an unhappy expression, "Oh, d—". Hurriedly, she collects her things and ushers the child towards the exit. They leave the tram at the next stop and set off on their way back.

Mr Halt's conscience pricks him. "Right, that's enough", he thinks. Surely, the effort can't be that great.

And anyway, had not his boss only recently mentioned this new software that can calculate routes and positions automatically? Wasn't it called "**MOBILEsurvey**"? Well, we shall see...

On arriving at the office Mr Halt gathers the first bits of information. So he had remembered correctly: yes, he can use **MOBILEsurvey** to measure the new route and position—and what's more, he can do this **WITHOUT** even having to leave the office! He can't quite believe it.

Ok, let's check this out... Mr Halt finds out that each individual tram collects and provides all necessary data required by **MOBILEsurvey** without any extra effort. The same data is also used for statistical evaluations. So instead of going on the street to do the measuring, Mr Halt just needs to find the vehicles that have recently driven this route.

He can immediately identify a number of vehicles. **MOBILEsurvey** can process the data from several vehicles at the same time and can thus calculate a mean value to achieve a more reliable result. Mr Halt has thus already done the largest part of the job.

MOBILEsurvey now calculates the mean values for stop positions and also the mean values for distances. Distances are directly transmitted via the odometer-pulse information on-board the vehicle. Thus, they correspond exactly to the values the on-board computer will receive via the vehicle positioning system during operation.

The end is in sight. Mr Halt just has to assign the calculated positions to the scheduled stops. So, first "Gravel Hill", then "Wood Green" must be assigned—followed by the "Zoo" stop. Since **MOBILEsurvey** supports this assignment process based on known stops and with the integrated GIS (Geographic

Information System), this step only takes a smidgen... there, all done. Mr Halt can now view the result. The new calculated distance to the “Zoo” stop is 371 m. Currently logged by the scheduling system (this information is displayed as well) are 750 m. And the GPS information of the stop is similarly out.

No surprise then that the announcement wasn't played any longer, Mr Halt muses. Some of his colleagues are sneaking a peak at Mr Halt's work in passing. One of them stops to take a closer look: “Hey, that was really quick 'n' easy. Let's check out line 8. I'm taking this each morning and the stop at “Springbank Way” is announced way too late each time.” No sooner said than done. Mr Halt and his colleague decide to check more lines this week and to enter the results in the timetable

currently being prepared for the following Monday.

Busy with work, time flies and the week passes by. The dedicated colleagues manage to locate and correct a few more “slip-ups” in the timetable.

On the following Monday Mr Halt is on his way to work taking the usual route. But he is wide awake today, all the while waiting for “his” announcement to come. The tram has just passed “Gravel Hill” and “Wood Green”.

Next to Mr Halt sits a little girl with her grandmother. They are obviously on an outing, their picnic hamper is bulging with provisions. “Gra'ma, when do we get off?” asks the girl. At this moment the speaker awakens: “<bing> Next stop – Zoo.”

“Now we have to get off”, the old lady smiles at her granddaughter. Mr Halt smiles too. “Yes indeed, now they have to get off”, he thinks to himself. Mr Halt is very content – tram rides can be so enjoyable.

Story by Andrea Graeser

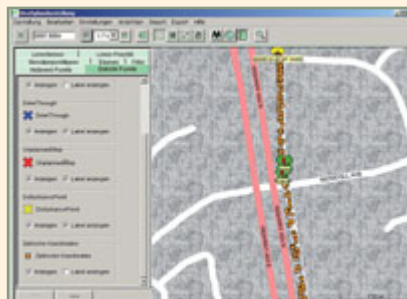
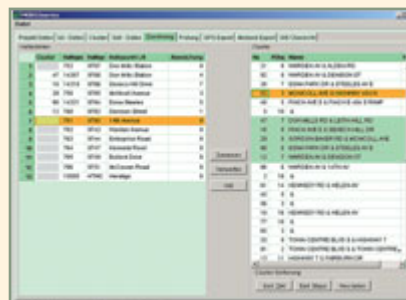
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Technical Information

MOBILEsurvey not only supports transport companies in improving stop positions and routes, but also in the complete capture of new lines, individual stop positions and routes.

Using data from real-time operation and averaging based on a stock of collected data achieves a high quality of accuracy of the calculated values. All values can be verified using the integrated GIS. Reliable assignment to scheduled stops and correctly measured distances between the stops is therefore guaranteed.

The quality of the data provided directly influences the quality of the vehicle location system. So improve your system – **MOBILEsurvey** will assist you with this task!



> **The seamless connection** of a Geographic Information System allows the continuous visual monitoring of all data.

PIDscreen – The passenger information sign with TFT display.

High-end technology for stop displays.



> The PIDscreen brings colour to stops. And, if you want, even videos in DVD quality.

Real-time passenger information is a central part of the service offered by transport companies today, since reliable and convenient passenger information influences the impression customers form of the quality of a service. Until recently line-based LED displays or LED matrix displays were used to inform passengers about the destination, line number and arrival time of the next service, now the development of advanced TFT-display technology allows the construction of large-size stop displays with video capability.

INIT has made full use of these latest advances to create the new **PIDscreen** TFT displays for outdoor use. The new technology allows displaying all kinds of character sets, such as Arabic, Chinese, Japanese or Greek letters, as well as pictures, pictograms, maps, animations, and even videos in DVD quality. Thus, INIT's **PIDscreen**

opens up entirely new possibilities for the information of passengers at stops.

Robust design for maximum reliability.

The 37" colour TFT display features a high resolution of over a million pixels. Thanks to the integrated brightness sensor the background lighting automatically adapts to the ambient light conditions, thus ensuring excellent legibility. This is further enhanced by the coated 6 mm antiglare safety glass screen which—like the stainless steel housing—is weather- and vandalism-proof. Several temperature sensors and an efficient cooling system protect the display from over-heating.

The **PIDscreen** is controlled by a high-performance single-board computer featuring a number of interfaces with a purely digital

connection to the display. To ensure optimum reliability, the Windows® XP Embedded operating system as well as the applications are stored on a CompactFlash card. Memory cards of 512 MB are sufficient to guarantee basic functionality of the RTPI display. If additional storage of multimedia data is required cards with higher capacity of up to 8 GB are available that can provide high-quality video streams for several hours.

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Karlsruhe – famous for innovative ideas for public transport.

A large-scale regional service area requires an intelligent communication concept.

Not only are telematics systems from Karlsruhe internationally sought after, the Karlsruhe-based public transport provider VBK also achieved worldwide fame with its tram train concept which became known as the “Karlsruhe model”. The model is as simple as it is impressive: the introduction of dual-mode light-rail vehicles means that the trams can use the heavy-rail tracks in the surrounding metropolitan area as well.

This enabled the VBK and the AVG to extend their services far into the surrounding Karlsruhe area and the neighbouring regions. The success of this concept is based on the fact that passengers can reach Karlsruhe’s inner city without having to change trains. This convenient way of travelling was, and still is, the major reason for the monumental success and the ongoing extension of the system.

In the meantime, the trackage of the Karlsruhe tram train now exceeds 500 km and connects even the small town of Eutingen im Gäu 100 km from Karlsruhe in the southern Black Forest with Karlsruhe’s public transport system. The longest route, however, is the three-hour journey from Achern near Strasbourg to Öhringen east of Heilbronn (approx 150 km).

Still, the extension of the service area also poses some special challenges, because the PMR system

currently only covers Karlsruhe and not the surrounding area. This means, as far as the Intermodal Transport Control System (ITCS) is concerned regional light-rail trains disappear into “the dark”, i.e. they are positioned according to schedule, and this causes problems with the accuracy of real-time passenger information. The light-rail vehicles only reappear, i.e. can be reached via data radio and are visible to the ITCS and passenger information system, when they leave the railway system and rejoin the inner-city tram network.

An intelligent communication concept.

At the heart of the current system update is therefore the implementation of an intelligent communication concept. Data radio within the Karlsruhe city area will still be based on the existing PMR system. When the vehicles leave the radio coverage in the future they will keep in touch with the control centre via UMTS (or GPRS as fallback level). Thus staff at the Karlsruhe control centre can keep track of all vehicles across the region and faster react to any interruptions of services.

Since the current positions of the vehicles will then be available in the system, the dynamic passenger information system **MOBILE-STOPinfo** will be able to provide reliable forecasts of the actual

departure times at all stops. This will allow to expand the provision of real-time information to cover the region. It is planned to double the number of passenger information signs.

Due to the size of the KVV’s service area vehicles do not regularly return to their depots but are distributed across a number of parking facilities. Therefore, a flexible solution had to be found for the fully automated provision and collection of data. The best technological and cost-effective solution is to use the planned UMTS/GPRS connection for the upload of data and in return the download of operational data for further processing. Thus, the new **COPILOTpc** vehicle IT platform will handle the data management for some third-party systems as well.

Upgrading central control and vehicles.

While the control of the operational status is currently managed from two control centres; the new Intermodal Transport Control System **MOBILE-ITCS** will make it possible to manage the entire service from the new depot which is currently under construction, thus centralizing and optimizing the management of services. The upgrade also includes the functional extension, as well as the successive fitting of the 70 buses and 260 trams and light-rail vehicles with the latest generation of on-board computers, the **COPILOTpc**. Not only does this new vehicle IT platform allow the handling of all the demanding tasks in the **Regio-ITCS**, it also provides comfortable information and support for the drivers via the **TOUCHit** touchscreen-controlled driver terminal.



> Transfer-free urban-rural interconnection is the key to success of the Karlsruhe model.

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Pilot phase successfully completed.

Trent Barton equips its entire fleet with INIT's e-ticketing system to further improve service quality.



> **EVENDsmart: Ticket printer and on-board computer in a single box.**

For more than 15 years INIT ticketing solutions have been successfully in use around the world. Due to the continuous development of its ticketing systems INIT can offer one of the most advanced product portfolios on the market today and—beyond that—integrate innovative marketing concepts such as “best price guarantee” into its electronic ticket management.

At the start of 2007 the British bus operator Trent Barton decided in favour of a high-performance fare management system from INIT. As part of a pilot project the buses of their “Rainbow 4” line were equipped with **EVENDsmart** ticket printers with on-board computer functionality, as well as the **PROXmobil** customer terminal. The smartcard-based ticketing system, which in Nottingham operates under the brand name “MANGO”, is based on a check-in/check-out concept.

A convincing concept.

“MANGO” is equally popular with bus drivers and passengers. The ticket printer for the sale of classic paper tickets can be comfortably operated via touchscreen and keyboard, and customers who own a smartcard can now simply and conveniently buy a

ticket “in passing”, that is just by moving their card past the proximity reader which is integrated into the **EVENDsmart**. This will debit their card with the maximum ticket price. On leaving the bus they move their smartcard past the **PROXmobil** customer terminal which is installed close to the exit. The system now automatically calculates the price for the actual journey and credits the customer's account with the difference—this is calculated based on the daily best price.

As a consequence drivers are not only pleased about the considerably reduced amount of cash that needs to be handled, but especially about speedier boarding at stops, since the reduced boarding time makes it easier for drivers to stick to their schedule.

Trent Barton starts rollout.

Following a successful pilot phase on its “Rainbow 4” bus line, Trent Barton has now decided to equip its entire fleet, i.e. an additional 254 buses with the **EVENDsmart** ticket printer and the **PROXmobil** terminal. This means that soon all Trent Barton customers will be able to take advantage of the e-ticketing system.

Customer surveys during the pilot phase found that by introducing “MANGO” Trent Barton could considerably improve its performance as well as enhance service quality. In addition, the transport company is more flexible in the design of its fare stages and thus incurs reduced costs for the handling of tickets and cash.

Integration into the ITCS and the passenger information system.

Around 60 of Trent Barton's buses are currently taking part in the so-called star trak system. The regional RTPI and fleet management system is based on **MOBILE-ITCS**, INIT's

Intermodal Transport Control System, taking advantage of its open system architecture. The real-time system, which is based in the East Midlands around the cities of Leicester and Nottingham, currently integrates six transportation authorities and five bus operators. For this purpose, buses have been equipped with on-board computers with GPS location, as well as an integrated WLAN and radio module. As part of the current rollout the **EVENDsmart** will take over the functions of the on-board computer. This will conveniently combine all ticket-vending and ITCS functions in a single device—a considerable improvement for drivers and an efficient solution for the transport company.

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EVENDsmart

The extremely flexible mobile driver terminal features a 6.5" graphic TFT display, a high-performance proximity card reader and a high-speed thermal printer for the printing of paper tickets. Integrated WLAN functionality for the exchange of data between central control and the vehicle renders additional WLAN components obsolete. The exact position of the vehicle is determined using a GPS receiver, as well as odometer pulses and door events.

INIT prevails against several competitors after several months of tests.

Oslo Metro upgrades its passenger information with LED displays from INIT.

For a couple of years now around 1,000 buses and trams have been managed more efficiently using advanced ITS technology from INIT. In addition, Oslo passengers have been provided with reliable Real-Time Passenger Information delivered by the so-called SIS system which is operated by Trafikanten Oslo.

After integrating the Oslo Metro network into the Real-Time Passenger Information system last year, Kollektivtransportproduksjon AS, the organization responsible for public transportation in Oslo and parent company of Oslo T-banedrift (operator of the Oslo Metro) has now opted for LED displays from INIT in its decision to modernize its stations.

Above and below ground – Oslo backs technology from INIT.

Soon 60 LED station displays of the type **PIDstation** will initially be installed at 17 heavily frequented stations, the majority of which are part of Oslo's underground circle line, T-baneringen. Further T-bane stations may be fitted with LED display systems from INIT in the future.



> 60 **PIDstation** passenger information displays will be installed at 17 highly frequented T-bane stations.

At around 60 million passengers per year, the T-bane is second only to the bus in terms of public transportation used in Oslo. The underground network in the Norwegian capital has a trackage of some 85 kilometres and comprises 104 stations operating a total of six metro lines. All lines pass through what is known as the city centre tunnel. Here, too, the display systems from INIT ensure that passengers in the stations always

know exactly on which platform to expect their train and when the next service is due.

That the station displays from INIT are perfect for this was proven in a test run that lasted several months. In the course of this long-term test, INIT managed to prevail against the competition to be finally awarded the contract.

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> With **INIT's** passenger information displays and Real-Time Passenger Information, passengers in Oslo are always reliably informed.

INIT celebrates Grand Opening in Dubai.

INIT opens a new chapter of its success story in Dubai.



> **Eyad Tayeb**, Managing Director of INIT FZE; **Mohamed Mezghani**, Head of UITP Middle-East and North Africa Office; **Dr. Jürgen Greschner**, Chief Sales Officer of init AG and **Hans-Burkhard Sauerteig**, German Deputy Consul General.

After 25 successful years INIT celebrated the Grand Opening of its latest subsidiary, Init Innovation in Traffic Systems FZE at the Dubai Airport Free Zone on 19 November 2008.

The new office is an expression of INIT's strategy to offer its customers advanced ITS solutions successfully in use worldwide whilst providing a local service. The highly qualified team at the new branch office will

guarantee the success of the ITS project INIT is currently realising in Dubai together with its local partner. The fully integrated fleet management and information system for the Roads & Transport Authority (RTA) bus operations will incorporate more than 1,350 buses during the initial phase and it is planned to successively expand the fleet to up to 3,000 vehicles.

On 19 November 2008 a ceremony to celebrate the Grand Opening took place at the JW Marriott Hotel in Dubai. On this occasion INIT was glad to welcome numerous friends, partners and customers. A special honour and joy were the kind welcoming speeches addressed to INIT and its guests by the German Deputy Consul General, Hans-Burkhard Sauerteig, and Mohamed Mezghani, head of the UITP Middle-East and North Africa Office.

This unique event and INIT's successful participation at the Roadex-Raillex exhibition that took place in Abu Dhabi from 23–25 November have opened promising new perspectives for 2009.

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- 18 – 20 February 2009 “APTA TransITech Conference” in Toronto, ON/Canada
- 9 – 11 March 2009 “4th ÖPNV-Innovationskongress ” in Freiburg, Germany
- 7 – 11 June 2009 “58th UITP World Congress and Mobility & City Transport Exhibition” in Vienna, Austria
- 19 – 21 October 2009 “International User Group Meeting – 10 Years INIT in the USA” in Chesapeake, VA/USA

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