The world's largest TETRA-based fleet management system.

Longtime partnership pays off for Stockholm.

For almost 20 years now, AB Storstockholm Lokaltrafik (SL) has been relying on the performance of INIT's telematics systems. The installation of a first generation of VMS-based computer-aided dispatch and automatic vehicle monitoring system in 1990 marked the beginning of the successful cooperation. INIT equipped around 140 buses on four main lines in the city centre to offer passengers a high service quality based on a a trunk network (called “Stomnät”). In the mid-1990’s INIT successfully implemented a dynamic passenger information system for the Stockholm light-rail system. Finally, in 2005 INIT started to implement a region-wide control system (Intermodal Transport Control System) for all buses in the Greater Stockholm area. Supported by the Intermodal Transport Control System **MOBILE-ITCS**, SL and its three bus operators now run the world's largest real-time controlled bus fleet based on TETRA radio technology with more than 2,000 vehicles.

init
The Future of Mobility

Stockholm manages the world's largest real-time contr

Intelligent Messaging System.

Controlling such a large fleet makes data transfers especially challenging. To cope with this challenge, WLAN hot spots for the 2,000 buses are spread across 28 depots in the municipal area. **MOBILE-PLAN**, the planning and data management system, provides the data, while **MOBILEims**, the specially developed Intelligent Messaging System, manages the download to the vehicles. All depots have been equipped with WLAN hot spots. Thus, the operating data are uploaded from the vehicles to the central statistics server via **MOBILEims**. Technical failures in the vehicles are posted as alarms and displayed on the IMS user interface.

More than 2,000 buses are equipped with INIT's vehicle IT platform COPILOTpc.

More convenience for drivers.

INIT and SL jointly developed the state-of-the-art on-board computer **COPILOTpc**. This vehicle IT platform offers completely new possibilities for transport companies and has set new standards in this line of business.

In Stockholm, the **COPILOTpc** handles the control of the typical peripheral devices like interior displays, head signs and internal and external announcements using a variety of interfaces. Standard VDV data bus and proprietary interface protocols are examples of the interfaces used for this. In addition, the on-board computer controls voice and data radio communication between the Intermodal Transport Control System and the control centre. The driver has complete control of these functions using the **TOUCHit**, the mobile data terminal, which is connected to the **COPILOTpc** via Ethernet. With the **TOUCHit**, the driver can see all relevant information at a glance and easily manage vehicle operations with the convenient touch screen.

A telematics system with superior capability – thanks to standardisation.

Due to the use of international standards and the Windows® XP Embedded operating system, it was possible to easily integrate third-party applications in a vehicle IT platform. An example is the Intelligent Speed Adaption (ISA), which alerts the Stockholm bus drivers when they are exceeding the speed limit. This application, developed by a Swedish company, is running directly on the **COPILOTpc** which continuously provides current GPS coordinates. ISA then matches this location information with a GIS map and the relevant information stored in a database, then returns the current speed limit to the **COPILOTpc**. The driver can see at a glance the maximum speed permitted at his/her present location on the mobile data terminal, **TOUCHit**. Visual and audible warning signals advise the driver when he/she exceeds the speed limit. Thus, the **COPILOTpc** plays a major role in increasing road safety. By the way, the **MOBILE-IMS** manages the download of the necessary geo-information as well.

With a clear information display and the convenient touch screen, the mobile data terminal TOUCHit optimises the driver's workplace.

Integrated passenger information.

The existing passenger information displays were integrated into the new **MOBILE-ITCS**. With the installation of a suitable interface, INIT made sure that the old "Stomnät-CAD/AVL" and the **MOBILE-ITCS** could operate in parallel during the migration phase. Thus, continuous operation could be maintained and reliable real-time passenger information guaranteed.

tolled bus fleet based on TETRA radio technology.

The interoperability of the MOBILE-ITCS allows the integration of third party systems, as well as of independent transport companies.

At present, a comprehensive information platform to cover all public transportation modes is being set up. This includes, e.g. a trip planner on the SL homepage, the SL customer service, a telephone service, displays and announcements at stops, as well as a SMS service. Passengers will be able to find out about the actual departure times of hundreds of buses, 18 light-rail, three commuter and seven subway lines anytime and from anywhere. **MOBILE-ITCS** calculates the corresponding predicted departure times, which are provided to the above services using various interfaces. Moreover, the Intermodal Transport Control System will pick up information about rail-bound traffic via the PubTrans interface which is widely used in Scandinavia. Intermodal connection protection between rail and bus services is thus guaranteed. This service is a definite plus for the passengers in Stockholm.

The new ITCS makes work a lot easier for the dispatchers in Stockholm.

The new Intermodal Transport Control System is also more convenient for the dispatchers in the Stockholm control centres. Since the voice radio control is linked into **MOBILE-ITCS**, the ITCS can carry out standard operations for this application also. For example, a voice call can be generated directly from the **MOBILE-ITCS** graphical user interface and the dispatcher can pull up the current location of a vehicle on the map directly from an incoming RTT.

Protection of sensitive data.

All in all, dispatchers monitor and control operations at eleven locations. Currently, three independent bus companies provide the services. It is therefore important to control access to sensitive data through appropriate access rights. The user management in **MOBILE-ITCS** authorises dispatchers to access only data relevant for themselves and their company. Thus, an integrated service is possible for passengers, while the bus companies' sensitive information is protected at the same time.

With more than 2,000 buses equipped and 28 depots integrated, the world's largest digital trunked radio based **MOBILE-ITCS** is currently operating in Stockholm.

Take advantage of our Experience.

State-of-the-art ITS honoured for outstanding innovation.

The sophisticated SL system, called JustNu, was awarded by the Swedish magazine CIO SWEDEN for the most innovative IT and telematics project in 2006. The jury was especially impressed by the performance of the **COPILOTpc**, INIT's on-board computer. Setting a new standard, the core of the JustNu system controls all telematics functions and organises voice and data radio. In addition, it calculates location information based on GPS as well as real-time schedule adherence, and controls the peripheral devices in the vehicle like the LED interior display **PIDmobil** and the vehicle's monitoring cameras.

Now, the driver can activate these functions using just one interface: the mobile data terminal **TOUCHit** with its clear information display and convenient touch screen. Thus, the **COPILOTpc** contributes considerably to optimising the driver's workplace.

Another decisive factor for CIO Sweden to grant the award however, was the real-time passenger information by INIT. The magazine's statement reads: *"The jury has been thrilled that the focus of this innovative major project is on customer benefits and effectiveness. [...]"* Thanks to JustNu the daily 600,000 passengers arrive at their destination not only faster, safer and more efficiently, but they are also better informed and thus more satisfied.

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