GNSS ON TRACKS: RAILROAD

Prof. Dr. Eckehard Schnieder, Institute for Traffic Safety and Automation Engineering, TU Braunschweig, Germany
Prof. Schnieder has chaired session 4 of this Summit. After thanking all participants for their participation in the conference of this year, he introduced all participants of the panel discussion. Further on, he gave some general remarks on railroad tracking mentioning that fleet management delivers an easy return on investment, however the realization of safety-critical services requires a very high amount of investment.

Dr. Julie Beugin, INRETS-LEOST, Villeneuve d´Ascq, France
Initially, Beugin introduced her institute INRETS as the Public Research Institute under the administrative supervision of the French Ministries in charge of Research and Transport.
Beugin presented recent scientific activities in the field of the application of GNSS in railway tracking which already includes Galileo. The work of INRETS deals with the impact of the propagation channel on localisation performances. In order to cope with serious propagation channel issues several algorithms have been developed and tested. Moreover, an availability analysis has been carried out. Finally, accuracy enhancements are attempted to be achieved by error modelling and filtering techniques.

Alvaro Urech, INECO, Directorate of Air Traffic Management, Madrid, Spain
INECO is doing consultancy and is owned by public transport providers. Urech introduced the GRAIL project whose objective is the support of the introduction of GNSS in the rail market with a particular emphasis on high-speed lines. The project is co-financed by GSA, will be finished in July 2008 and contains three goals. The first goal was to find a common specification for a GNSS subsystem in terms of enhanced odometry, absolute positioning, train awakening and train integrity. Second goal was to develop and test a prototype of the subsystem, especially in terms of the enhanced odometry. This part of the work was accompanied by intensive field tests. The third goal was to study complementary aspects as economic and legal issues and to integrate local GNSS elements.

Prof. Burkhardt Stadlmann, Upper Austria University of Applied Sciences, Wels, Austria
Stadlmann recognized three groups of railway applications, firstly information systems for passenger and freight travels, where no high accuracy and reliability is needed. The second group is related to civil engineering, which needs a higher accuracy, but not such a high reliability. The third one is train control which is deeply connected to safety of life demands and needs a very high reliability. Subsequently Stadlmann presented a fully implemented train control system on a 90 km long track on a local train line in Upper Austria which is already fully operational. An onboard unit on each train consists of a GPS receiver and a data radio system submitting all information to a central station. GPS data is supported by odometry and delivers an accuracy of better than 10 m all the time. The central facility acts as the moving authority and supervises the train driver who is still necessary since the current system is still not able to meet all requirements in terms of safety-of-life.

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Mario Musmeci, Telespazio, Rome, Italy
Musmeci started his speech with terrible accident reports. These reports encompassed unwanted train divisions, unmanned locomotive movements, collisions, accidents at level crossings and other cases. By these examples he made the auditorium sensitive to the necessity of a reliable train control and integrity check. Consequently, he brought satellite navigation into play and asked for new paradigms to be introduced as for example to overcome the conventional approaches and to make the block concept on railway tracks more variable.

Georg Mandelka, Bombardier, Mannheim, Germany
After listening to the presentations of the other speakers who addressed applications and requirements Mandelka tried to find an answer to the question why it is so difficult to find solutions using GNSS. According to Mandelka the reason for the late return on the investment is the lack of standardization in the railway domain. There are few domain-specific products and only a few experts are currently working in the field on GNSS positioning on railroads.
Mandelka suggested to invent a user terminal that should become standardized and certified equipment which is fundamental for an easy market introduction.

Prof. Lesley J. Smith, Leuphana University, Lueneburg, Germany

Smith focused on the interaction between European railway safety standards and the law of liability. In this context she stated that the existing organization CENELEC could be commissioned to harmonise the level of different European standards which can finally be integrated into national law. However, she also pointed out that a difficulty is that each of the 27 member countries of the EU has a different civil and criminal law system. In a further step Smith presented the legal structure of GNSS liability in Europe mentioning the different entry levels for the GSA, the operator, the manufacturers, the service providers, the users, and third parties. Having the diversity of the contributors in mind Smith is convinced that the liability questions have to be addressed to the different applications and sectors individually. She asked the question “What has to be done?” and - due to the complexity of the topic - gave a framework of answers. Among other points, she quoted that the risk allocation should be to worked out by the EU and the same remedies should be valid in all member states.