Rail transportation, in the widest sense of the expression, is becoming more and more significant both economically and ecologically. The growing number of megacities need mass transportation systems both within their ever expanding city limits, but also between the urban centres. In addition, more isolated areas need cost efficient, safe, and reliable transportation systems for people and goods into the urban centres. Politicians all over the world are beginning to realise the importance of a well-developed and stable mass transport infrastructure as an alternative to the ever expanding and accident prone individual transportation on congested roads, as is witnessed by the numerous strategic programs for railway and metro systems.

The introduction of the European Rail Traffic Management System ERTMS some 20 years ago has led to a rejuvenation of railways within Europe. This process has been reinforced by the EU directives on interoperability that started with high-speed railways, continued with conventional rail and have now been united to a single directive for both high-speed and conventional rail. The directive aims at achieving harmonised railway systems that can traffic throughout Europe without encountering national barriers. The ERTMS technology is being adopted outside Europe so that the day will come when “orient express” will mean trains travelling from Paris to Beijing!

The processes for authorising the use of railway systems are also being harmonised in Europe and work is being done to define common safety requirements and common safety methods for use with ERTMS in the European railways. ERTMS is a communication based train control system not unlike the systems that are widespread in urban and light rail around the world, and the methods and techniques that are emerging for European interoperability will be equally applicable to urban and light rail systems all over the world. Just as the ERTMS technology is being adopted also outside Europe, we can expect that common European safety requirements and methods will be adopted by the international community.

This book presents state of the art techniques that are actually being used in real life applications by leading experts in the field. It contains descriptions and explanations of methods and techniques that have been developed in order to achieve or improve the dependability of existing and projected railway applications. As such it is not only important for students and professionals who want to learn and apply the best practices of today; it is also a compendium of techniques that can be approved by assessors and notified bodies.

Technology is developing rapidly, and with it there are emerging new requirements requiring innovative solutions. This applies not only to the technical requirements, but also to the methods and processes that are applied. The techniques for demonstrating not only reliability, availability, maintainability and safety, but also interoperability must be suitable for the new technologies. Techniques that a few years ago were considered to be “exotic” in a railway context are now becoming more and more established, and this book gives a good insight into the latest developments.
The inclusion of security aspects deserves particular mention. For decades, safety and security have been disjoint worlds with an almost hostile relationship to each other, but experts on both sides are moving towards each other. It is now accepted that safety without security is wishful thinking, and that security without safety is a contradiction.

Whether you are a student who wants to learn, a practitioner wants to apply or an assessor who needs to evaluate state of the art techniques, this book will provide you with the information you need.

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