

TINSA Ltd. sets its policy on conformity assessment to achieve interoperability of national rail system with the rail system within the European Union, based on internationally accepted documents and established practice. TINSA Ltd. works with highly qualified professionals and recognized in their professional activities partners; provides customers with competent service and provides confidence of all stakeholders and ensures that the verification and conformity assessment meet all the requirements for the EC verification.



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Multitel ASBL is an innovative centre specializing in solutions for certification, validation and testing of railway industrial solutions and components, in particular for railway signalling (ERTMS). Multitel ASBL provides R&D in the design of new solutions (hardware and software) for the railway sector.



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The Technical University of Sofia (TU-Sofia) is the largest educational and scientific complex in Bulgaria in the field of technical and applied science, preserved the best traditions of higher education set by its creators. As the first and largest polytechnic centre, which supported the establishment of most of the technical colleges in the country, it sets for 70 years the educational standards and national priorities for the development of engineering education and science.



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The main goal of the company is to boost the development of research, innovation and technological capabilities of Bulgaria through implementing different projects. The most fundamental project of "Sofia Tech Park" is creating the first science and technology park in Bulgaria. For this purpose, "Sofia Tech Park" created and managed a unique environment for innovation and provide support to the commercialization of new technologies, products and services. The aim of the Science and Technology Park is to become a platform through which participants in the Bulgarian innovation ecosystem can meet, exchange ideas and participate in joint projects.



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INTELLIGENT COMMUNICATION INFRASTRUCTURES LAB

Laboratory certification, monitoring, validation, measurement and testing in the field of railway transport and Internet of Things



The Laboratory "Intelligent Communication Infrastructures" is implemented with the financial support of the Operational Programme "Development of the Competitiveness of the Bulgarian Economy" 2007-2013, c-financed by the European Union through the European Regional development Funds and the national budget of the Republic of Bulgaria.

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Intelligent Communication Infrastructures Laboratory within the project of SofiaTech Park JCS was opened in June 2016 for certification of products with safety-critical applications in rail transport and the development of telecommunications networks by a new generation of applications in specific areas.

The laboratory covers the following areas of study:

- ▶ **Railway Components Tests** – European Vital Computer (EVC) according to the requirements of Subset-026, Subset-076 and Subset-094, Eurobalises and Balise Transmission Module (BTM), according to Subset-036 and Subset-085
- ▶ **Track/Train Compatibility Validation:** provide for early detection of problems in the validation of track/train compatibility based on design data, operational and technical rules, etc.
- ▶ **Maintenance solutions:** provide software and hardware tools for analysing signal quality of balises; services and testing options to upgrade railway infrastructure to newer version standards (baselines).
- ▶ **Internet of Things:** perform R&D in telecommunications new generation networks and their applications in specific areas.



The laboratory has the most modern equipment to perform tests in accordance with the requirements for interoperability of Control-command and Signalling subsystem as part of the European railway system, verification of conformity of products used in ERTMS/ETCS track-side and on-board equipment.

The use of certified components that are parts of ERTMS/ETCS guarantees that the interaction between railway vehicles and infrastructure will lead to efficient rail transport system. ICT laboratory performs track/train integrated tests and conducts additional studies for infrastructure managers, railway undertakings and manufacturers based on national and international legislation.

Integrated track/train tests are binding on the new ERTMS systems and components in vehicles and infrastructure. Integrated tests are essential when existing systems are upgraded or updated.



The high level of automation of the laboratory, together with the experience of TINSA Ltd, Technical University of Sofia and Multitel ASBL, provides customers with comprehensive service during testing ERTMS/ETCS, and offers reliable and verified test solutions for the railway industry reducing the time and costs in placing the systems in service, maintenance solutions for the systems, track/train validation and support to the infrastructure manager in deployment of ERTMS.

TINSA Ltd, Technical University of Sofia and Multitel ASBL participate in several European projects (TEN-T, INEA) and have highly qualified experts and reliable partners in the development of ERTMS Baseline 3. The team of ICT works closely with the client and with the infrastructure manager. The team offers planning test procedures, selection of scenario and effective approach to certification.



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The laboratory includes two testbeds - to test on-board computers (EVC) and testing balises & BTM, consisting of hardware and software subsystems complying with the specific requirements for this type of research and testing laboratories demanded in international standards. Notified Bodies recognize the results of these tests in the EC verification and assessment under Directive 2008/57/EC of the European Parliament and of the Council of 17 June 2008 on the interoperability of the rail system within the Community and CCS TSI, and are an important part of the process of commissioning.

ETCS On-board Lab: EVC tests, according to UNISIG SUBSET-026, Subset-076 и Subset-094

The equipment includes advanced specialized modules, software and power supplies, high-performance computers, robotic arm, cameras and monitors with high resolution and switching network equipment, allowing complete analysis in accordance with Subset-076.



This lab can be used for testing real tracks, connection with interlockings and performing operational tests. For that purpose, the laboratory allows the edition of track-side elements, balises and operational and test rules. Dedicated interfaces assure the real-time validation of the laboratory tests, including measurement of performance and reliability of the system, due to its fully automated operations.

Validation of the track lines can be done by either EVC simulator or a commercial on-board unit connected to the track simulator. The approach used in suspected problems during the validation of track signalling implementation, operational rules deployment and conformity with the System Requirements Specification (SRS).

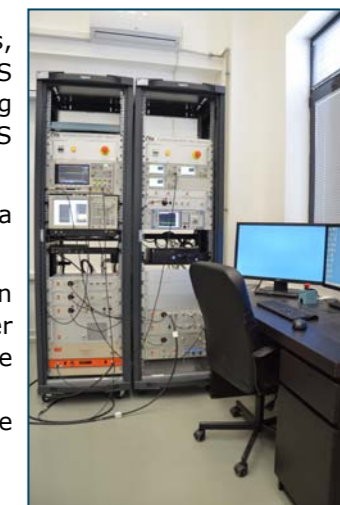
ETCS Trackside Lab: Eurobalise/BTM antenna tests, according to UNISIG SUBSET-036 and Subset-085

Equipment is designed for analysis, tests and validation of Eurobalises and BTM antennas, according to Subset-085 to confirm the interoperability and suitability for use of the ETCS interoperability constituents. Additionally to these tests, it is possible to perform aging tests and compatibility tests of ERTMS Eurobalise and BTM components with non-ERTMS systems.

Using independent laboratory is recommended, in order to ensure the interoperability of a particular project.

Test scenarios specified in harmonized documents must be performed before placing in service of trackside and on-board equipment. Furthermore, the infrastructure manager may require a specific test scenario for a particular project. Operational scenarios are tested with either real train or certified equipment connected to the testbed.

TINSA Ltd., Technical University of Sofia and Multitel ASBL suggest the advantages of the certified laboratory during placing in service of the trackside and on-board equipment.



Cooperative Smart Networks and Internet of Things Lab

This lab will carry out research and development in telecommunications new generation networks and their applications in specific fields. The main directions of work will be next-generation access networks, architectures and technologies for access, convergence beyond the last mile, network management, scenarios for smart cities, self-organizing architectures, 5G and integration of wireless technology, the Internet of Things, application communication technologies and applications for the active life, etc. It is equipped with high-performance computers and specialized software for modelling and simulation experiments.



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