

Urban Guided Transport Management System (UGTMS)

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Abstract: - Many urban rail systems have over the last thirty years been equipped with transport management system covering train supervision, automatic train protection, automatic train operation and, more recently, driverless or unattended operation. The main suppliers have developed individual systems and each operator mainly uses products built in his own country. Several initiatives (European UGTMS research project, UGTMS IEC WG40 working group, ...)aim to improve this situation in the field of *research, standardisation and rules* and contribute to create a range of innovative, interoperable and interchangeable technological solutions. On one hand supply industry will rationalize production, achieve economy of scale and promote Win/Win strategies. On the other hand operators will offer more attractive, user friendly, flexible, safer and secure public transport.

1. Introduction

Many urban rail systems have over the last thirty years been equipped with traffic management and maintenance assistance systems covering centralised supervision, automatic train protection, automatic train operation and, more recently, driverless or unattended operation. The main suppliers have developed individual systems for information processing and for communication between trains and control centres, and each operator mainly uses products built in his own country.

In parallel, for almost 12 years, railway suppliers have made, with the support of European Union, important efforts to meet the needs for interoperability of transeuropean railway networks and to comply with the requirements of the relevant European regulations. These efforts contribute to ensure a higher degree of open system standards and a possibility for gradual change towards harmonised systems in order to support the European market and reduce Life Cycle Costs (LCC) of the systems. And for the European railways the three pillars ; research, standardisation , regulations are in place at a supranational level.

For the Urban rail systems a similar process was launched by the European Commission for the Command Control Systems by an appropriate call for tender during the year 2000.in the key action 2 of the competitive and sustainable growth research programme.

Within the UGTMS research project operators, industry and universities will create a set of functional and system requirement specifications (European/world-wide) for future mass transit systems. European transportation companies (Paris RATP, Berlin BVG, London Underground, Metro de Madrid, Metropolitano de Lisboa), the railway suppliers (Alcatel, Alstom, Ansaldo, Bombardier, Invensys, and Siemens), research centres (INRETS - France & JRC - EC) and European universities (TU Dresden, UCL London, Valenciennes) have agreed to cooperate in the project. The European Commission has approved the project and will fund 50% of the costs in order to create in this domain the relevant European research pillar.

Within the UGTMS WG40 working group operators and suppliers on a voluntary basis have proposed a new standardisation initiative in the technical committee TC9 of IEC in order to begin building the relevant world-wide standardisation pillar in this domain.

2. The UGTMS Research Project

Objectives of the UGTMS Project

UGTMS objectives are directly related to Common Transport policy. They are summarised as follows:

- Make public transport more attractive and user friendly
- Public transport must become more flexible and better suited to meet the needs of its users.

This project will develop and implement Common Transport Policy as follows:

- Promoting transport sustainability from social view point
- Enhancing the efficiency and quality of transport systems and services
- Improving safety and security and optimising the human role and performance
- Integrating a range of innovative technological solutions in operational processes to guarantee higher level of safety in transport.

The key challenge for sustainable mobility is how to match the increased demand for transport on one hand, and the need to reduce its impact on the physical, social and human environment on the other hand. UGTMS will balance the use of passenger transport against private transport by providing a set of measures, applying information technologies in order to increase the use of collective means of transport in urban and regional areas. This will lead to efficient functioning of transport operations and infrastructures, ensuring high level of safety at an affordable cost for both individual users and society.

Main features

At European level, exploitation of UGTMS will facilitate better understanding and methods for focusing future investments in **traffic management systems** in Europe by exploiting past, current and potential future measures in the best way. In particular UGTMS :

takes in account:

- major projects and recent realisations l.

covers a large spectrum of needs:

- PCC (ATS), Command/Control (ATP et ATO),
- Automatic or conventional systems (with/without driver, with/without other staff on board),
- From light rail systems to commuter trains

addresses mainly interchangeability (plug and play constituents) and in some cases interoperability with other railways networks:

- Common functional Requirements Specification (FRS),
- Core architecture based on System Requirement Specification(SRS) and standardised interfaces (FIS, FFFIS)

allows supply industry to:

- Rationalise production
- Achieve economy of scale
- Promote Win/Win suppliers/operators strategies

Implementation

Operators, industry, and university partners will jointly work out the requirements and also migration plans. In the first phase of the project the scope of work mainly covers the UGTMS functional requirement specifications. Operators will define their needs based on existing and future operating modes, i.e. with driver, driverless, and/or unattended. In addition benchmarking of several mass transit projects will lead to a broad brush picture of mandatory, optional, and "nice-to-have" requirements and solutions.

In any case, UGTMS is based on an open, modular architecture which allow each industry partner to maximise their investment return on one or several parts of UGTMS. The "plug and play" approach will facilitate joint ventures between industry suppliers, providing economy of scale and ability to answer to a turnkey call for tender (including BOT contracts).

First Results

The European commission has approved the project and. the contract was signed March 8th, 2002. The total budget of the project is 4,9 Mil. Euro, EC will fund 50 %: The project has started in March 2002. and the duration of the project is 24 months. This will cover the first phase, i.e. deploy the UGTMS ATP functional requirement specification (ATP FRS) and will provide the main following public deliverables :

UGTMS ATP Functional Requirements Specification
Safety conceptual approach and guidelines for FRS
Conformity assessment, human factor impact, guidelines for FRS
Reports for a definition of UGTMS including system principles, architecture, list of functions
Reports on benchmarking
Report on Users Group and Network of Universities activities
Technology Implementation Plan

The first report for a definition of UGTMS called D1 and the first report on benchmarking called D2 are already available.

Future actions

All partners have also agreed to achieve a second phase, which will result in technical implementation (system requirement specification SRS) and pilot installations.

3. The UGTMS WG40 IEC Working Group

For any European project Consortia are committed to launch or participate to the relevant standardisation activities. In consequence RATP through the appropriate French National standardisation body proposed a new working group dealing with standards in the field of urban and regional command control systems.

After several discussion taking in account that in this domain the market is at a world wide level the proposition was submitted to the IEC (International Electrotechnical Commission) at the end of 2001.

The IEC Technical Committee TC9 has accepted the proposition and the working group WG 40 was launched in 2002, seven country are represented : France (convenor), Canada, China, Germany, Italy, Japan, USA with about 15 attendees from the main suppliers and operators.

National Standardisation bodies can proposed any new participants following the IEC rules.

A strong co-ordination will be put in place at the European level thanks to the procedure of parallel voting : any IEC standard will be part at the end of CENELEC standards, an equivalent procedure will also be put in place in USA with IEEE standards.

At the beginning of January 2003 the 1st CD (Committee Draft) was proposed to IEC TC9.

In this draft the part 1: deals mainly with System Principles and Fundamental Concepts

This draft will circulate during the first semester for enquiry to all National Committees members of TC9 and the amendments will be discussed at the next TC9 plenary meeting in September 2003.