

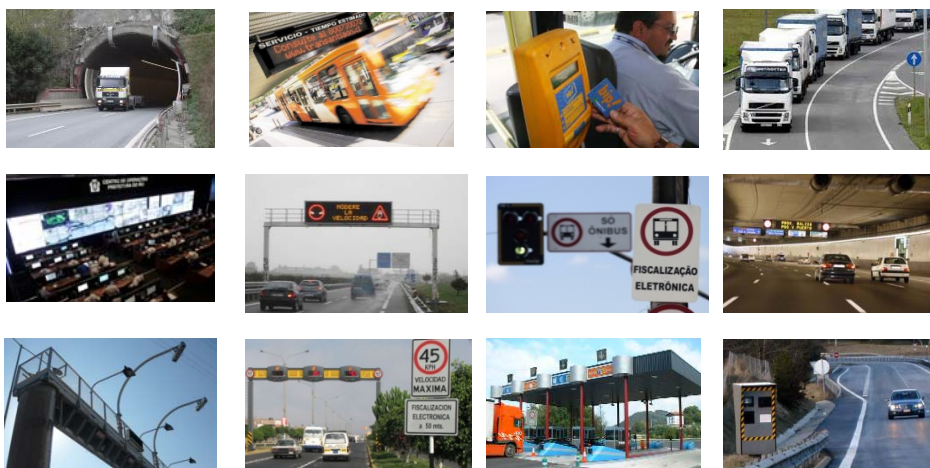


Secretaria de Estado de Mobilidade do
Distrito Federal

Programa de Transporte Urbano do Distrito Federal – PTU/DF (Project ID: BR-L1018)

Contratação de Serviços de Consultoria Especializada para Desenvolvimento de Solução para o Sistema de Bilhetagem Automática (SBA) do Sistema de Transporte Público Coletivo do Distrito Federal – STPC/DF

CONSULTORIA - MANIFESTAÇÃO DE INTERESSE – nº 001/2015



TEKIA INGENIEROS

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1 INTRODUCTION

Tekia Ingenieros, S.A. (Tekia) is an engineering and consulting company that devotes all its resources to international engineering and consultancy activities in the field of Intelligent Transports Systems, named ITS, as a means to improve transport operations in terms of efficiency and sustainability. During the past 17 years we have successfully carried on nearly 400 ITS projects, many of them with a high level of complexity.

Specifically, Tekia is highly knowledgeable in public transport systems, including automatic vehicle location and monitoring and computer aided dispatching, automatic fare collection, transport business analytics, regional transport integration, integrated information to travelers, passenger counting, on board surveillance and emergency management, eco-driving and efficiency/safety driver assistance systems, traffic light signal preemption and others.

In the field of automatic fare collection, we have worked in the extension and migration of the integrated ticketing systems of Barcelona and Madrid, as well as the definition of the system in Lima. The scope of our work included the definition of the AFC model, technology analysis and support for selection of solutions, definition of contactless smart card data structures, definition of security architecture and Sam modules, definition of all processes with the card (validation, loading, inspection, personalization), definition of the card management systems, definition of information interchanges among different operators and administrations, writing of tenders to procure on board systems, backoffice systems and sales networks among other aspects.

For all of this, we believe that our knowledge and experience could be decidedly valuable for the development of the Sistema de Bilhetagem Automática (SBA) do Sistema de Transporte Público Coletivo do Distrito Federal.

The following sections of this Expression of Interest outline the capabilities, experience, human resources and overall understanding of projects regarding state of the art public transport ticketing, that TEKIA would like to put at your service.

2 ORGANIZATION PROFILE

2.1 ABOUT TEKIA INGENIEROS, S.A.

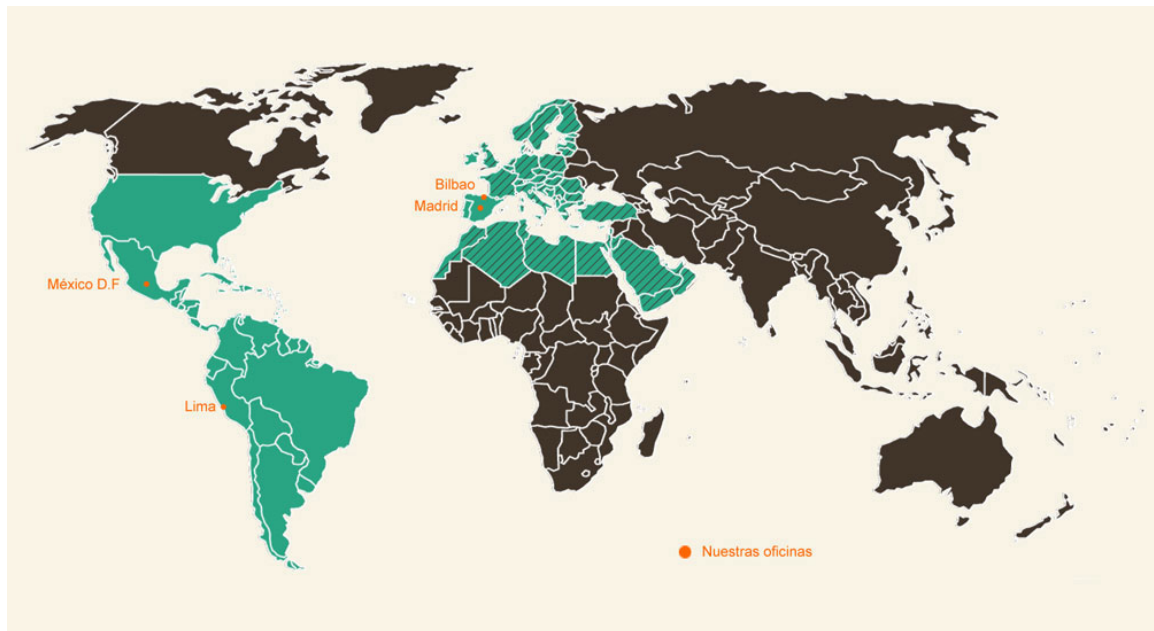
TEKIA is an international engineering and consulting firm based in Spain, whose single and core business is ITS and whose know-how is transport.

Since its foundation in 1998, TEKIA has worked in projects involving most of ITS technologies and contribute to the sustainability of transport from a global point of view, identifying the best ITS experiences worldwide and their technological, organizational and financial key parameters. The main work experiences in TEKIA refer to Automated Fare Collection for Public Transport, Public Transport Information and Bus Fleet Control (AVLC), Strategic ITS (National ITS architectures, ITS Action Plans, etc.), ITS in highways, Electronic Toll Collection, Tunnel safety, Traffic Management, Incident and Emergency Operation, Smart Mobility, etc.

Strategic ITS	ITS in Highways/ETC	Tunnel Safety	Traffic Management	ITS in Public Transport	Smart Mobility
<ul style="list-style-type: none"> National ITS architectures, physical or logical ITS architecture, ITS classification. ITS Action Plan (ITS Action Strategies, ITS Investment Plan). Definition of national methodologies for cost-benefit analysis and investment prioritization. Standardization, consensus, project reference in ITS categories. (Fare interoperability on motorways and other scenarios. Technological and organizational models in regional or metropolitan public transport. National traveller information policy). 	<ul style="list-style-type: none"> Traffic modelling and simulation for incident management, user info, tolling architecture design and others. Electronic toll and Traffic management projects design. Operation plans design: revenue control, safety, maintenance, including computer aided operation systems. Emergency plan. User info & attention: evaluation of service provided to users. Electronic toll and Traffic management projects design. Consulting services for the implementation of new tolling schemes (Urban areas: congestion charging with electronic toll collection systems (ETC) or video 	<ul style="list-style-type: none"> Safety evaluation and risk analysis. Operating Manuals and Emergency Plans. Design of safety equipment projects (ventilation, lighting, power supply, water supply, traffic management, monitoring systems,... Technical assistance for the project management, quality control and supervision of safety equipment projects. Design of ventilation algorithms, air flow and hot smoke testing. Computer aided operation system. Adaptation of the tunnels to the European Directive on tunnel safety and other sector-specific regulations. Support tunnel safety regional policy definition, 	<ul style="list-style-type: none"> Regional/national ITS deployment, maintenance and operation Plans. Traffic demand analysis and new transport planning. Project design, technological consultancy. Traffic modelling and simulation for incident control and traffic management. Consulting and reengineering in road operation and traffic management. Strategic Plan for Speed Enforcement devices deployment (National Safety Plan). 	<ul style="list-style-type: none"> Regional Automated Fare Collection Systems. Advanced Vehicle Location and Management (AVL&M). Safety Operation Plans and Emergency Systems. Public Transport Information Systems. Passenger Counting and Demand Responsive Systems. Regional Multimodal Operation Center. Transport demand analysis and new infrastructure planning. 	<ul style="list-style-type: none"> Urban traffic management. Traffic light management. Arterial and intermodal management, etc. Smart Mobility, with the addition of demand management functions in a center that interchanges information with other centers and with other transport systems. Smart City that integrates the environment and energy efficiency.

Strategic ITS	ITS in Highways/ETC	Tunnel Safety	Traffic Management	ITS in Public Transport	Smart Mobility
	tolling. Highways: ETC, free flow tolling, traditional tolling. National o regional areas: Heavy Goods Vehicle tolling).	including the necessary standardization. – Safety Officer services, inspection entity and other requirements.			

TEKIA has worked all over the world, from its first strategic focus is Latin American Countries. Many projects have being carried out in Mexico, Colombia, Chile, Peru and other countries in the region, from its subsidiary companies in Mexico and Perú: TEKIA Ingenieros de México, S.A. de CV and TEKIA Ingenieros del Perú, SAC.



Beyond its primary Latin American vocation, TEKIA has worked all over the world since its founding in 1998, has devoted all its resources to the most efficient, safe and sustainable transport, following ITS concept. TEKIA has a large experience in Intelligent Transport Systems (ITS) definition and implementation projects.

The mission of TEKIA is to make best the public service, in active cooperation with the Authorities and the public transport providers in order to achieve all their objectives (social life technologies):

- Improving the public transport quality.
- Making profitable the investments in mass transport.

The natural space of TEKIA is the transport. TEKIA is a consultant expert in projects that pursue to improve the transport infrastructures and processes, normally thru the implementation of technology.

The implementation of an efficient and economically viable public transport offer requires an administrative organization that assures a strong modal fare integration around consortia and

transport authorities. In this context TEKIA seeks greater efficiencies in the public transport offer from a proper organization and the incorporation of new technologies.

This has been possible thanks to its highly qualified staff, including a team of over 30 engineers with an average experience of over 10 years in the ITS sector.

Some relevant facts concerning TEKIA´s ITS activities in Spain and Europe:

- Member of ITS Spain since its foundation in 2003 and former member of ITS America.
- Member of Spanish Technical Committee for Safety in Road Tunnels by the Spanish branch of PIARC (World Road Association) and correspondent with the PIARC Committee, since 1999.
- Member of AENOR CTN 199 Spanish Technical Committee for the Standardization of Equipment and Systems for Traffic Control & Management, since 1998.
- Member of AENOR CTN 159 Spanish Technical Committee for the ITS Standardization, correspondent of the ISO 207 and CEN 278 International and European committees, since 2000.
- Founder of Fundación ITS (2004) and old editor of Revista ITS (2005-2008), the only magazine in Spanish dedicated to ITS.
- “Foro ATIS”. Project for the consensus about a Spanish model of dissemination of transport information. Later resulted in the creation of ITS Spain (2002).
- “San Isidro Corridor”. Project led by TEKIA and participation all the Spanish Transport Sector. Research of the state of the art and the design of a Spanish strategy for improved information systems that combine traffic and public transport Information (1998-2001).
- **Member of “European Bus System of the Future (EBSF)” Project included in the European Union Seventh Framework Programme. The aim of the project is to define the requirements for the bus of the future, particularly concerning electronic equipment. (2011-2014)**
- Cooperation with the Spanish Traffic Authority in the ITS deployment along the main Spanish Roads (2000-2015) and the National (Spanish) Speed Control Plans (2005-2007 & 2009-2011, Spain) and the ITS Consolidation Plan for the “Dirección General de Tráfico” (2007-2010).
- **Participation on the implementation of the technological architecture of Public Transport for Consorcio Regional de Transportes de Madrid. This includes an advanced monitoring and control of public transport offer and demand (Regional Transport Authority of the Madrid Metropolitan Area, 1998-2015).**
- National Mexican ITS Architecture (2013) and ITS Mexican Action Plan (2014).



- **Technological Plan for the Integrated Public Transport Systems of Lima Metropolitana (2013-2014).**
- Development of regional tunnel safety regulations in the region of Biscay (Spain, 2005-2006).
- Participation in the implementation of the European Electronic Toll System (EETS), according to Directive 2004/52/CE (2004-2005).
- Etc.

The technicians of TEKIA are expert engineers in the construction of solutions directed to the world of the transport. Our strategy is to look for the world antecedent of the problem, to know with operators and manufacturers of the solution the terms in that the success was got, to define the conditions for its installation in our environment and to build the technical, organizational and financial project until it produces the maximum social yield.

It leads to meet the two visions that will make a success the installation of ITS: (1) an appropriate general engineering characteristic of a consultant, that includes the analysis of the problem, the design of the solution and its implementation, as well as of the conditions in that it will be exploited, (and 2) an appropriate engineering for construction coming from the experience during more than ten years in the installation and commissioning of ITS projects.

TEKIA makes a commitment to meet customer requirements, applicable legal regulations and the provisions of its Integrated Management System in accordance with the UNE-EN-ISO 9001:2008 quality in business management, UNE-EN-ISO 14001:2004 environmental management, and OHSAS 18001:2007 safety and health at work.

3 BRIEF SUMMARY OF UNDERSTANDING OF THIS PROJECT

As clearly stated in the “Programa de Transporte Urbano do Distrito Federal”, the rapid growth of the 29 RA brought along the unoptimized distribution of population, not unlike other main urban areas of Latin America.

In these regions public transport is the essential solution for mobility, and payment must be carried out through advanced technologies that allow fast access to the transport units, easy maintenance and security against fraud.

Normally smart cards or mobile phones are used to access public transportation, adjusting the balance stored in their memory after each trip carried out.

The Regional Automated Fare Collection Systems are required in the large metropolitan areas in Latin America, where the most massive public transportation, like BRT (Bus Rapid Transit), consider this system one of the main technological points in the transportation project.

The transport planning in these metropolitan areas should include a Technological Plan, where the Regional Automated Fare Collection System is the keystone for articulating the new public transport system.

The Transportation Plan in those metropolitan areas should include a Technology Plan in which the collection technology is centrally important to articulate the new public transport system.

Depending on the final scope of the “Serviços de Consultoria Especializada para Desenvolvimento de Solução para o Sistema de Bilhetagem Automática (SBA) do Sistema de Transporte Público Coletivo do Distrito Federal – STPC/DF ”, different services will be required.

These will include design and implementation of advanced electronic fare collection systems for public transport in case of new fare systems implementations, extension of current systems or migration from existing systems to a new generation:

- Technological (contactless cards, mobile phones) and technical (sales and consumption networks, and clearing centers) design of electronic fare collection systems in multimodal environments.
- Multiservice architecture design.
- Transport payment applications design based on contactless smartcards or phone:
 - Smartcard memory organization (physical and logical data structure).
 - Security architecture.
 - Data flows format.
 - Integration: Advanced Vehicle Location and Management (AVL&M) - Regional Automated Fare Collection System.
 - Definition of functions and processes in the fare collection management center.
- Technical assistance in bidding processes for supply, installation, operation and maintenance of fare collection systems and other onboard equipment (Advanced Vehicle Location Management, User Information, etc.).

- Implementation supervising of fare collection systems and other onboard equipment (Advanced Vehicle Location Management, User Information, etc.).

4 EXPERIENCE OF THE CONSULTANT

4.1 EXPERIENCE IN SIMILAR ASSIGNMENTS

4.1.1 Specific experience in automatic fare collection and advanced payment systems

TEKIA has carried out projects of great importance related with the present Expression of Interest in Lima (Peru), Madrid (Spain) and Barcelona (Spain). Below are described these projects in more detail:

- **Considering the Technological Plan for the Public Transport Integrated System of the big Metropolitan Area of Lima (Peru) previously designed, consulting support to the Transport Authority (PROTRANSPORTE) for the evaluation of proposals submitted (2014).**

The carried out tasks were the following:

- Comparative analysis of the proposals submitted to the call for tenders from PROTRANSPORTE Authority.
- Technical support to the complete buying process since the call to the contract assignment.

- **Design of the Technological Plan for the Public Transport Integrated System of the big Metropolitan Area of Lima (Peru), including Automatic Fare Collection and Advanced Vehicle Management Systems (2012-2013).**

The carried out tasks were the following:

- Analysis of the state of art in Latin America and worldwide.
- Analysis of advanced payment systems implemented in various public transport operations in Lima city and analysis of the possibilities of integration and interoperability.
- Proposed technological solution for the fare collection in the public transport in Lima, including some interoperability alternatives.
- Writing basic technological project and terms of reference for public bidding.
- Evaluation of a private initiative proposal to the Municipality of Lima to implement an advanced collection system in the metropolitan area.

- **BIT (Billética Integrada del Transporte, Transport Integrated Ticketing) Madrid:**

Conceptual design, technology definition, tender documents and project management for **migration from magnetic ticketing system** to a new Automatic Fare Collection System implementation (based on MIFARE DESFire chip) in all modes of public transport in Madrid (METRO, TRAIN, LIGHTRAIL and BUSES) using Contactless Smart Cards and advanced security technologies (2000-2009). The carried out tasks were the following:

- Previous studies to assess the impact of technology on the Regional Madrid Transport System, concluding a worldwide survey that the implementation of an advanced AFC Systems contributes enormously to establish an Integrated Transport System with a powerful Transport Authority.
 - Technological definition of the Sube-T Contactless Smart Card to be used within the Madrid Regional Transport.
 - Conceptual Plan to deploy the new Contactless Smart Card (CSC) based Automatic Fare Collection (AFC) System.
 - Specification of the testing and quality control system throughout all phases of implementation.
 - Drafting of the Tender Documents for the deployment of a payment network on board and in stations in the territory of Regional Transport Authority of Madrid.
 - Drafting of the Tender Documents for the implementation of a sales and reloading network of Sube-T Smart Cards in the territory of Regional Transport Authority of Madrid.
 - Technical proposal for the utilization of Sube-T CSC in libraries. Analysis of the impact on the current fare processing center of the Regional Transport Authority of Madrid.
 - Definition of the Development and Unification Center (CDH) of for the Sube-T Smart Card technology in Madrid. Control and maintenance of all common specifications of the project.
- **Drafting of Master Plan for the implementation of hands-free cards for sale and validation of public transportation Barcelona (Spain) metropolitan environment (2007).**

The carried out tasks were the following:

- Benefit analysis of the *migration from an Edmonson magnetic to a Contactless Smart Card system*.
 - Definition of an objective scenario for implementation (actors and their roles, supports and titles), including the fare integration of all public transport operators.
 - Global planning of the project in phases.
 - Impact analysis of the project in the infrastructure of the operators, sales network, and Transport Authority.
 - Investment estimates.
- **Technical support for the implementation of a multiservice card scheme to the public of Barcelona City (Spain, 2008).**

The carried out tasks were the following:

- Analysis of the services to be implemented in the card and proposal of implementation: public transportation, surface parking, rotation parking, bikes, libraries, administrative services.
 - Analysis of smart card technologies, contact o contactless technology, and solution proposal for the implementation of Barcelona public cards.

- **Drafting of the first phase of project implementation of the Contactless Smart Card for the selling and validation of titles for public transportation in the Barcelona (Spain) Metropolitan Area (2007-2008).**

The carried out tasks were the following:

- Functional analysis of the rating system of the Barcelona Metropolitan Area and definition of CSC products and support.
- Specification of the system security architecture.
- Definition of sale operations and use of CSC products and support.
- Compatibility of CSCs in Catalonia. Analysis of international and possible scenarios in the RMP.
- Compatibility of CSC in Catalonia. Compatibility model in reference to the development of the transportation application.
- Application specification for pre-personalized cards.
- Application specification for the personalization/sale of cards.
- Application specification for the validation/cancelation of transportation titles.
- Application specification for rate consultations.
- Specifications for a secure information exchange system between the entities involved.
- Specification of technical requirements for validators.

- **Technical support for the implementation of a multiservice card scheme to the public of Barcelona City (Spain, 2008).**

The carried out tasks were the following:

- Analysis of the services to be implemented in the card and proposal of implementation: public transportation, surface parking, rotation parking, bikes, libraries, administrative services.

- **Specification of requirements for requests for tender regarding adaptation of contact free systems for METRO, EMT and RENFE Cercanías projects (Spain, 2005).**

- Specification of requirements for the acquisition of cards (pre-personalized and fabrication).
- Specification of requirements of validation, personalization/sale, load/reload and inspection terminals.
- Definitions of SAM modules.
- Security and management of black list architecture proposal.
- Proposal for a system of information interchange.
- Definition of transaction registries.
- Definition of SAM module management procedures.
- Project planning.

- **iTRA System (Spain, 2004-2009).**

Many systems are updated by request.

- Many systems are updated by request
- Integration with:
 - Payment systems
 - Information systems
 - Passenger information
 - Emergency management systems
 - Localization systems within enclosed environment (interchanges)
- Integration of information from outside SAE's within a Administration center
- Other functions that are developed by TEKIA and evaluated by the Regional Consortium of Transportation of Madrid

4.1.2 Relevant experience in management and implementation of ITS in public transport systems

The following table summarizes some of the latest engineering and consultancy projects carried out by TEKIA, regarding Intelligent Transportation Systems applied to Public Transport.

Project	Country and customer	Date
Support to the development of Intelligent Transport Systems: Regional Observatory of Intelligent Transport Systems in Latin America and the Caribbean" (RG-T2360) (Inter-American Development Bank)	LAC Countries. Interamerican Development Bank	2014-2015
Madrid Regional Passenger Information System including 600 Stop Panels displaying service and incident multimodal information.	Spain. Madrid Regional Transport Authority	2011-2014
Design of the Technological Plan for the Public Transport Integrated System of the big Metropolitan Area of Lima (Peru), including Automatic Fare Collection and Advanced Vehicle Management Systems. Technical Assi	Peru. PROTRANSPORTE	2012-2014
Partner in the European Bus System of the Future (EBSF) Project, in the VII European R+D Framework Programme. Design of the AVMS of the future being one of the reference systems in the EBSF test system carried on	UE. VII European Research Frame Program	2008-2014
Preliminary study of the current situation and solution design for the Automatic Fare Collection (AFC) to the public transport of Gijón	Spain. Gijon Municipal Bus Company.	2013

Project	Country and customer	Date
Diagnosis of the new technologies implementation status and needs in Road and Rail Cargo and Passenger Transport, including a catalog of the available products and the design of an Action Plan to promote these technologies among the transport operators	Spain. Ministerio de FOMENTO	2010-2012
BIT (Billética Integrada para el Transporte). New Automatic Fare Collection project in Madrid region for all transport modes METRO, TRAIN, LIGHTRAIL and BUSES using smart Card and advanced security technologies.	Spain. Madrid Regional Transport Authority	2005- 2012
System for demand data collection and processing at the Clearing Center of Madrid	Spain. Madrid Regional Transport Authority	2009
Technical study for the implementation of a multiservice card scheme to the public of Barcelona City becoming from the CSC for the public transport	Spain. Barcelona Municipality	2008
Implementation of a Emergency Alarm System in the Madrid metropolitan night buses	Spain. Madrid Regional Transport Authority	2008
Integration of several services for public transport within the Madrid Integrated Public Transport Management Center (CITRAM)	Spain. Madrid Regional Transport Authority	2009
Drafting of Master Plan for the evolution of the Automatic Fare Collection system to a Contactless system in the Metropolitan Area in Barcelona	Spain. Barcelona Metropolitan Transport Authority	2007-2009
Operation safety and quality plans for the Intermodal Transport Stations in Madrid	Spain. Madrid Regional Transport Authority	2005-2006
Specification of requirements for requests for tender regarding adaptation of contact free systems for METRO, EMT and RENFE Cercanías projects	Spain. Madrid Regional Transport Authority	2005
Resource-sharing AVL development for the intercity buses of Madrid, with real time information (ITRA System)	Some buses companies in Spain	2004-2008

4.2 RELEVANT EXPERIENCE IN ITS

The following table summarizes the latest engineering and consultancy projects carried out by TEKIA, in the field of Intelligent Transportation Systems.

Project	Country	Date
Risk Analysis concerning the safety of the Tunnel of San Cristobal in the urban motorway Americo Vespucio Norte	Chile	2015
Support to the development of Intelligent Transport Systems: Regional Observatory of Intelligent Transport Systems in Latin America and the Caribbean" (RG-T2360) (Inter-American Development Bank)	LAC Region	2014-2015
Preparation of studies and technical reports on the traffic and information management of the Traffic Management Center of Madrid (Spain)	Spain	2014-2015
Technical Assistance for the bidding documents drafting for maintenance and operation contract of the toll highway AP-1 during the period 2015-2018.	Spain	2014-2015
Technical Assistance for the supervision of ITS projects in Mexico-Irapuato, Mexico-Veracruz, and Michoacan Road Highways.	México	2014
Project drafting of Toll Collection, Traffic Management and Safety Tunnel Systems for Colombian 4G Highways.	Colombia	2014
Safety Operation Manual for the Nuevo Necaxa Tihuatlan Highway.	Mexico	2014
Basic Project drafting for the Bogotá Villavicencio - Sector 1 (Colombia) about Toll Systems, Tunnel Safety Installations and ITS Systems	Colombia	2014
Auditing services of the ITS Systems connected to the NW Traffic Control Centre depending of Spanish National Traffic Authority	Spain	2014
Technical Assistance for the supervision of the implementation of ITS Systems along the A-66 motorway	Spain	2014
Design of an Action Plan for the implementation of Intelligent Transport Systems in the transport infrastructure in Mexico.	Mexico	2013-2014
Definition of the National ITS Architecture (v2.0) and preliminary design for Regional ITS Architectures in Mexico.	Mexico	2013
Supervision of the executive project design and the implementation of ITS installations and toll plazas on Celaya bypass.	Mexico	2013
Diagnosis and ITS analysis of the Urban Traffic Management Centers in Santiago de Chile and other important Chilean cities.	Chile	2012-2014

Project	Country	Date
Supervision of the execution of ITS installations and toll plazas in Guadalajara-Colima highway.	Mexico	2013
Traffic management and safety facilities design for the "Guadalajara-Colima" Motorway.	Mexico	2012-2013
Conceptual study and planning of interoperable nacional ITS systems, reference project design and definition of a methodology for cost-benefit studies regarding the implementation of ITS systems in road corridors.	Mexico	2012-2013
Operation and Traffic Incident Planning Design and implementation of a computer aided Incident Management Tool on Durango Mazatlan corridor.	Mexico	2012-2013
Safety facilities design for the nine new intelligent tunnels and "Baluarte" Bridge on Durango Mazatlan corridor	Mexico	2012
ITS and Tolling Project Design of Atlacomulco-Maravatío and Guadalajara-Colima Highways , new operating model for toll roads of Banobras (Mexico).	Mexico	2012-2024
Preparation of bidding documents for the Celaya bypass installations and consultancy.	Mexico	2011-2012
Services for the integral consultancy, management, monitoring, supervision and administration of the Operation, maintenance and renovation of the Atlacomulco-Maravatío Highway.	Mexico	2011-2012
Technical Assistance for the ITS systems provision and operation in Guadalajara-Colima highway: toll collect and traffic management.	Mexico	2011-
Drafting of an Strategic Plan for the Modernization and Improvement of Nationwide Electronic Toll System in Mexico.	Mexico	2010
Tunnel Ventilation Design in "Ruta del Sol" Highway Sector 1 (Villeta-Guadero-El Korán).	Colombia	2010
Risks analysis about dangerous goods transport trough Buenavista Tunnel.	Colombia	2010

5 PROPOSED EXPERTS

For the provision of consulting services, TEKIA proposes the following experts in automatic fare collection and advanced payment systems:

Curriculum Vitae



Hector Corazzini Mancha

TECHNICAL DIRECTOR AND R&D

Summary of competencies

Héctor is a Senior Engineer with a broad experience in the ITS field. Since 1998 he has been working in TEKIA Ingenieros S.A., as Technical Director carrying out more than 250 ITS projects in which the technology is applied to change the organization of public transport and achieve highest goals: modal / operational integration, pricing / financial integration.

Recent project experience

The most relevant projects developed as Quality Control Supervisor and Technical Director are the following:

QUALIFICATIONS

Electrical Engineer (University of Florida, Gainesville, Florida) – 1985-1989

Master of Engineering in Electrical Engineering (University of Florida, Gainesville, Florida) -1989-91

PROFESSIONAL MEMBERSHIPS AND AFFILIATIONS

EXPERTISE

- He has over 20 years' of experience fully dedicated to Intelligent Transport Systems (ITS) technologies:
1998 – currently, Technical Social Director of TEKIA Ingenieros.
- 1992-95. ENA Tráfico. Working as Technology Manager, project manager and System Engineer.
- 1990- Investigator at Mind Machine Interaction Research Center. (U.S.A.)
- 1989- N.A.S.A. System Engineer (U.S.A.)

Regional Transportation Consortium of Madrid Modernization Plan. 2010-2012

Client: Regional Transportation Consortium of Madrid (Spain)

Implementation of technologies from the modernization plan of Madrid formed in part by a consortium that has supplied the bus and passenger information management systems at the bus stops, including 600 wall panels, 1,800 buses and 26 companies, planted using the COMPASS system, developing the passenger information management system and installing the information wall panels.

European Bus System of the Future Project. 2008 – 2012

Client: Regional Transportation Consortium of Madrid (Spain)

European project for the specification of future bus systems. Participation in the development teams of information technology for vehicles and central systems in the area of Support Systems and Passenger Information.

IDEX Project. 2009 - 2010

Client: Regional Transportation Consortium of Madrid (Spain)

Specification of an integration system for development information for the Regional Transportation Consortium of Madrid.

Technical support for the implementation of integrated card services to the public in Barcelona (Spain). 2008

Client: Barcelona Municipality (Spain)

Analysis of the services to be implemented in the card and proposal of implementation: Public transportation, surface parking, rotating parking, bikes, libraries, administrative services.

Analysis of smart card technologies, with and without hands-free technology, and solution proposal for the implementation of Barcelona public cards

Curriculum Vitae



Hector Corazzini Mancha

TECHNICAL DIRECTOR AND R&D

Drafting of the first phase of project implementation of the hands-free card for the selling and validation of titles for public transportation in the Barcelona (Spain) metropolitan region environment. (2008)

Client: Barcelona Municipality (Spain)

Functional analysis of the rating system of the Barcelona metropolitan region and definition of hands-free products and support.

Specification of the security architecture of the system.

Definition of marketing operations and use of hands-free products and support.

Compatibility of hands-free cards in Cataluña. Analysis of international and possible scenarios in the RMP.

Compatibility of hands-free cards in Cataluña. Compatibility model in reference to the development of the transportation application.

Application specification for pre-personalized cards.

Application specification for the personalization/sale of cards.

Application specification for the validation/cancelation of transportation titles.

Application specification for rate consultations.

Specifications for a secure information exchange system between the entities involved.

Specification of technical requirements for validators.

Specification of a platform to perform testing.

Technical assistance for project management for implantation in all methods of public transportation in Madrid (Spain) for the new smart payment method BIT-MADRID. 2006-2007

Client: Regional Transportation Consortium of Madrid (Spain)

Specification of the testing system, verification and quality control system throughout all phases of implementation.

Drafting of the Tender for the Technical Conditions for the implementation and development of a marketing network of tariffed products supported by contract-free Sube-T technology of the Regional Transportation Consortium of Madrid.

Drafting of Tender for the Technical Conditions for the implementation and development of a reloading network in check outs of Sube-T cards of the Regional Transportation Consortium of Madrid.

Technical proposal for the utilization of the contact-free cards in libraries. Impact analysis of the development of information in information processing center of the Regional Transportation Consortium of Madrid. Specifications of the Development and Unification Center (CDH) [Centro de Desarrollo y Homologación] of contact-free technology utilized in Madrid. Control and maintenance of all the common specifications of the project.

Curriculum Vitae



Hector Corazzini Mancha

TECHNICAL DIRECTOR AND R&D

Drafting of Master Plan for the implementation of hands-free cards for sale and validation of public transportation Barcelona (Spain) metropolitan environment. (Spain). 2007

Client: Barcelona Municipality (Spain)

Benefit analysis of the migration to a hands-free card system.

Definition of an objective scenario for implementation (actors and their roles, supports and titles)

Global planning of the project in phases.

Impact analysis of the project in the infrastructure of the operators, sales network, and Transport Authority.

Investment estimates.

Development Model for Interchanges in Madrid. 2006

Client: Regional Transportation Consortium of Madrid (Spain)

Development for the Regional Transportation Consortium of Madrid of the general development method of Transportation Exchange.

Specification of requirements for requests for tender regarding adaptation of contract-free systems for METRO, EMT, and RENFE Cercanías projects in Madrid. 2005.

Client: Regional Transportation Consortium of Madrid (Spain)

Specification of requirements for the acquisition of cards (pre-personalized and fabrication). Specification of requirements of validation, personalization/sale, load/reload and inspection terminals. Definitions of SAM modules. Security and management of black list architecture proposal. Proposal for a system of information interchange. Definition of transaction registries. Definition of SAM module management procedures. Project planning.

iTRA System. 2004-2009

Client: Regional Transportation Consortium of Madrid (Spain)

Many systems are updated by request, integration with payment systems, information systems, passenger information, emergency management systems, localization systems within enclosed environments (interchanges), integration of information from outside SAE's within a Administration center, and other functions that are developed by TEKIA and evaluated by the Regional Consortium of Transportation of Madrid.

Curriculum Vitae



Eliseo Álvarez Palomares

PUBLIC TRANSPORT PROJECT MANAGER

Summary of competencies

Eliseo is a Senior Engineer with a broad experience in the ITS field. In the last 9 years he has been working as Project Manager in TEKIA Ingenieros S.A., a consulting firm, highly specialized in engineering and consultancy services on ITS Systems, particularly in Spain and Latin American countries.

Recent project experience

Technical assistance to bidding process of the Fare Collection System in Lima and other equipment of the buses fleet (Advanced Vehicle Location Management and User Information System), 2014-2015

Served as **Project Manager** responsible for advice in the bidding process for the selection of the Fare Collection System operator in Lima:

Technical assistance in the queries stage.

Bidding Terms update.

Technical assistance in the proposals evaluation stage.

Advise in the signing of the Concession Agreement.

Diagnosis and ITS analysis of Traffic Management Control Center in Santiago de Chile and the other regions of the country (Chile), 2012-2014

Client: Chilean Traffic Management Authority (UOCT)

Served as a **Project Engineer**, works, together with the Project Manager to ensure that the Chilean Traffic Management Authority (UOCT) aims are clearly understood and the reports submitted to the customer are developed under high quality standards and fulfill all the requirements specified for the work.

Chile is developing a National network of Traffic Management Control Centers, with a main Control Center in Santiago de Chile and their 15 regions. Since there is not a standardized ITS architecture, the Authority is finding the first problems to integrate the information from the different control centers.

Consultancy services for the design of an integrated electronic ticketing system for the Public Transport of Lima metropolitan area (Peru). 2012-2013

Client: Instituto Metropolitano PROTRANSPORTE (Lima, Peru)

Served as **Project Manager** responsible for:

Diagnosis of electronic ticketing systems in public transport (regulations and standards analysis, collection and analysis information regarding public transport ticketing systems in Latin America and Europe).

Alternative analysis and proposed solution for public transport electronic ticketing system of Lima.

Drafting of bidding documents for the electronic ticketing system bidding process.

QUALIFICATIONS

Higher Technical School of Industrial Engineers, Polytechnical University of Madrid (UPM) 2001-Industrial Engineer.

Master's Degree in Prevention of Labor Risks, Instituto Madrileño de Formación in Madrid 2005

Master's Degree in Supply Chain Management, Fundación ICIL in Madrid 2009

PROFESSIONAL MEMBERSHIPS AND AFFILIATIONS

EXPERTISE

- Working as a consultant, he has over 13 years' of experience, 9 years fully dedicated to Intelligent Transport Systems (ITS) technologies. Participation in a great variety of technological projects related to Electronic Fare Collection Systems in Public Transport, Electronic Tolling, Tunnel Safety, Information Technologies applied to Land Transport, etc. International experience, participating in ITS projects in Spain, Chile, Mexico, Colombia and Peru.
- Project Manager in the IT Department in LOGISTA S.A. (design and implementation of improvements in the IT system, management of great logistic projects)

Curriculum Vitae

Eliseo Álvarez Palomares

PUBLIC TRANSPORT PROJECT
MANAGER

Consultancy services for the study of the current situation and solutions designing for the public transport ticketing system of Gijón (Spain). 2012

Client: EMTUSA (the urban bus operator in Gijón) (Asturias, Spain)

Served as **Project Manager** responsible for:

Technical report about the current situation of the Gijón's public transport ticketing system.

Designing and Proposal of solutions for the ticketing system of EMTUSA (the urban bus operator in Gijón).

Drafting of technical specification for the electronic ticketing system bidding process

Diagnosis of the new technologies implementation status and needs in Road and Rail Transport, including an electronic catalogue of the available products and the design of an Action Plan to promote these technologies among the operators (Spain). 2010-2012

Client: Minister for Development (Spain)

Served as **Project Manager** responsible for coordinating the work team and receiving instructions from the clients representative.

The Spanish "Ministerio de Fomento" (Minister for Development) in charge of infrastructure and transportation aimed to increase the use of Intelligent Transportation Systems among Road and Rail operators. TEKIA was awarded a contract to develop a study including: (1) An evaluation of the demand for new technologies in the field of land transport (road and rail). The study was carried out among the transport companies in Spain; (2) Market analysis concerning new available technologies in the field of land transport (road and rail). The study was carried out among national and international IT providers and manufacturers; (3) Implementation of an Electronic Catalog (web site) of new technologies which could be useful for land operators in the transport sector; (4) Design of a five year Action Plan to Promote New Technologies among these operators, including new regulations, financial incentives for companies investing in new technologies and other measures.

Technical support for the implementation of integrated card services to the public in Barcelona (Spain). 2008

Client: Barcelona Municipality (Spain)

Served as **Project Manager** responsible for:

Analysis of the services to be implemented in the card and proposal of implementation: Public transportation, surface parking, rotating parking, bikes, libraries, administrative services.

Analysis of smart card technologies, with and without hands-free technology, and solution proposal for the implementation of Barcelona public cards

Drafting of the first phase of project implementation of the hands-free card for the selling and validation of titles for public transportation in the Barcelona (Spain) metropolitan region environment. (2008)

Curriculum Vitae

Eliseo Álvarez Palomares

PUBLIC TRANSPORT PROJECT
MANAGER

Client: Barcelona Municipality (Spain)

Served as Project Manager responsible for:

Functional analysis of the rating system of the Barcelona metropolitan region and definition of hands-free products and support.

Specification of the security architecture of the system.

Definition of marketing operations and use of hands-free products and support.

Compatibility of hands-free cards in Cataluña. Analysis of international and possible scenarios in the RMP.

Compatibility of hands-free cards in Cataluña. Compatibility model in reference to the development of the transportation application.

Application specification for pre-personalized cards.

Application specification for the personalization/sale of cards.

Application specification for the validation/cancelation of transportation titles.

Application specification for rate consultations.

Specifications for a secure information exchange system between the entities involved.

Specification of technical requirements for validators.

Specification of a platform to perform testing.

Technical assistance for project management for implantation in all methods of public transportation in Madrid (Spain) for the new smart payment method BIT-MADRID. 2006-2007

Client: Regional Transportation Consortium of Madrid (Spain)

Served as Project Manager responsible for:

Specification of the testing system, verification and quality control system throughout all phases of implementation.

Drafting of the Tender for the Technical Conditions for the implementation and development of a marketing network of tariffed products supported by contract-free Sube-T technology of the Regional Transportation Consortium of Madrid.

Drafting of Tender for the Technical Conditions for the implementation and development of a reloading network in check outs of Sube-T cards of the Regional Transportation Consortium of Madrid.

Technical proposal for the utilization of the contact-free cards in libraries. Impact analysis of the development of information in information processing center of the Regional Transportation Consortium of Madrid. Specifications of the Development and Unification Center (CDH) [Centro de Desarrollo y Homologación] of contact-free technology utilized in Madrid. Control and maintenance of all the common specifications of the project.

Drafting of Master Plan for the implementation of hands-free cards

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Curriculum Vitae

Eliseo Álvarez Palomares

PUBLIC TRANSPORT PROJECT
MANAGER

**for sale and validation of public transportation Barcelona (Spain)
metropolitan environment. (Spain). 2007**

Client: Barcelona Municipality (Spain)

Served as **Project Manager** responsible for:

Benefit analysis of the migration to a hands-free card system.

Definition of an objective scenario for implementation (actors and their roles,
supports and titles)

Global planning of the project in phases.

Impact analysis of the project in the infrastructure of the operators, sales
network, and Transport Authority.

Investment estimates.

Curriculum Vitae



Ismael Corrales Toribio

IT PROJECT MANAGER

Summary of competencies

Ismael is a Senior Engineer with a broad experience in the ITS field. He has over 10 years of professional experience fully dedicated to Intelligent Transportation System (ITS) technologies. Participation in a great variety of technological projects related to Traffic Management (both urban and interurban), Incident Management, Tunnel Safety, Electronic Tolling, etc.. Extensive international experience, participating in ITS projects in Spain, Portugal, Andorra, Mexico, Colombia and Peru.

Recent project experience

Electronic toll design for Via Expresa Sur motorway, in the Metropolitan Municipality of Lima 2014-to date

Client: VESUR (Lima, PERÚ)

Served as **Project Manager** responsible for advice in the bidding process for the selection of the Fare Collection System operator in Lima:

Technical assistance in the queries stage.

Bidding Terms update.

Technical assistance in the proposals evaluation stage.

Advise in the signing of the Concession Agreement.

Responsible for Security of the Tunnels of Highway AP-66 (León-Campomanes). 2011-to date

Client: AUCALSA (SPAIN)

Served as **Project Manager** responsible for:

Security monitoring of tunnels.

Updating security documentation.

Development and execution of a security training plan.

Planning and direction of periodic emergency simulations in the tunnels.

Analysis of significant accidents and accident rate indices in the tunnels.

Assessment of security operation and installation.

Definition of management algorithms for the ventilation system of tunnels of Highway Bogotá-Villavicencio (Colombia). 2012-2013

Client: COVIANDES SAS

Preliminary safety facilities design for the urban tunnels of the La Molina-Angamos connection link, in the Metropolitan Municipality of Lima 2013 (PERU)

Client: OHL

QUALIFICATIONS

Higher Technical School of Industrial Engineers, Comillas University in Madrid 2003 - Advanced Automatic and Electronic Industrial Engineering 2001-2003

Technical School of Industrial Engineers, Comillas University in Madrid 2001 - Industrial Technical Engineering. 1998-2001

PROFESSIONAL MEMBERSHIPS AND AFFILIATIONS

Member of the Standardization Technical Subcommittee AENOR 159, corresponding to CEN TC/278 "Road Transport and Traffic Telematics" and ISO/TC 204 Intelligent Transport Systems". Within this AENOR 159 subcommittee, national (UNE), European (CEN) and International (ISO) standards are being developed and revised.

EXPERTISE

- Jun 04- current: Working as a Project Manager, he has over 10 years fully dedicated to Intelligent Transport Systems (ITS) technologies. Participation in a great variety of technological projects related to, Electronic Toll Collection, Tunnel Safety, traffic management, International experience, participating in ITS projects in Spain, Chile, Mexico, Colombia and Peru.
- Jan 04-Jun 04: Project Engineer S.A.C. (Sistemas Avanzados de Control [Advanced Control Systems]).

Curriculum Vitae

Ismael Corrales Toribio

IT PROJECT MANAGER

Diagnosis and ITS analysis of Traffic Management Control Center in Santiago de Chile and the other regions of the country (CHILE) 2012- 2014

Client: Chilean Traffic Management Authority (UOCT)

The Republic of Chile is developing a National network of Traffic Management Control Centers, with a main Control Center in Santiago de Chile and their 15 regions. Since there is not a standardized ITS architecture, the Authority is finding the first problems to integrate the information from the different control centers. The project includes a) to make an inventory of the installed systems, b) a State of the Art analysis including the most advanced Traffic Control Centers in the world, c) the outline the systems architecture for the future main and regional centers d) design a route map for a technological convergence of all traffic control centers.

Preliminary safety and traffic management facilities design for the tunnels of the Bogota-Villavicencio Highway, Colombia. 2013

Client: Proindesa (Spain)

Traffic management and safety facilities design for the Guadalajara-Colima Motorway. México 2013.

Client: Banobras

Served as **Project Engineer**:

Supporting the decision of BANOBRAS to appoint a new highway operator.

Executive project of ITS, traffic management and tolling installations.

Supervision of construction activities by the new operator.

Conceptual study and planning of interoperable ITS systems, reference project design and definition of a methodology for cost-benefit studies regarding the implementation of ITS systems in road corridors. Mexico. 2012-2013

Client: Secretaría de Comunicaciones y Transportes (SCT)

Served as **Project Engineer**:

Art Studio in Global ITS.

Defining a cost-benefit methodology.

Design a ITS referential project on a highway.

Computer model for the evaluation of ITS projects.

Safety facilities design for the nine new intelligent tunnels and "Baluarte" Bridge on Durango Mazatlan corridor, Mexico. 2012

Client: Aldesa

Served as **Project Manager** responsible for:

Curriculum Vitae

Ismael Corrales Toribio

IT PROJECT MANAGER

Security monitoring of tunnels.

Updating security documentation.

Development and execution of a security training plan.

Planning and direction of periodic emergency simulations in the tunnels.

Analysis of significant accidents and accident rate indices in the tunnels.

Assessment of security operation and installation.

Drafting of construction, viability and definition Projects regarding operational conditions of the "Mungia-Bermeo" stretches in the transversal roads of the AP-8, Spain. 2010-2011

Client: Interbiak

Safety Operation Manual.

Ventilation and safety systems in tunnels.

Traffic management and CCTV facilities, communications network and centralized control system.

Shadow toll in some sections.

Design of the Control Center for several sections and its integration into the Peñascal Control Center of South Metropolitan Ringroad of Bilbao.

Definition of equipment for management and traffic control and improve road safety in the city of Ferrol, A Coruña. Spain. 2010

Client: Road Traffic Agency (Dirección General de Tráfico, DGT)

Definition of the Operation Model and drafting of the structural project for the Toll System (with a study for the alternative implantation of a Free Flow type system) of the Second Ring-Road of "Donostia – San Sebastián". Spain. 2009

Client: Bidegi

Drafting of the structural Project of installations for Highway A4/IP4, between Amarante and Vila Real, with a distance of more than 30 km, including a 6 km tunnel under Sierra de Marão, Portugal. 2009-2010

Client: Autoestradas de Portugal [Highways of Portugal].

Traffic Management and Shadow Toll facilities design for M-407 Highway, Spain. 2005.

Client: Ferrovial