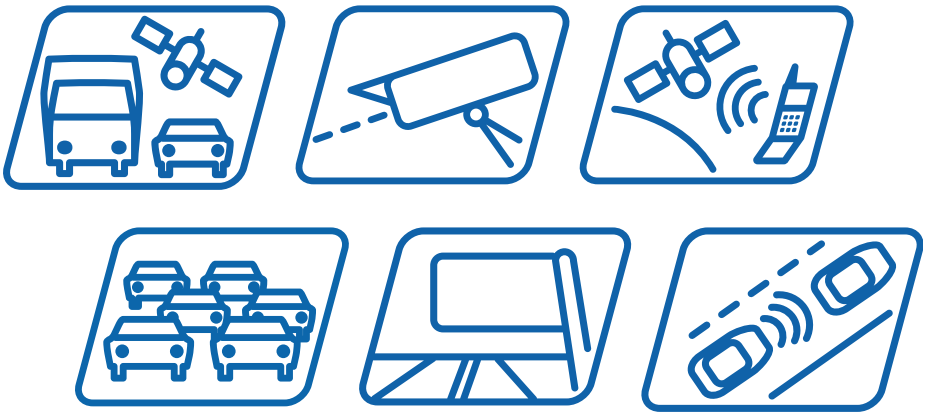
ITS in Italy

Italian Solutions for ITS



ITS Italia

Italian ITS Association

Foreword

Transport in Italy plays a key role in the national economy and in the quality of life of Italian citizens. We are aware that a deep economical development, creating business opportunities and wealth, derives also from an efficient transport system allowing to fully exploit market potentialities and the possibilities that the globalisation of commercial exchanges can offer.

However, in the last decades, the increasing of traffic volumes has brought to an exacerbation of congestion with consequent destroying impacts on environment, quality of life and transport safety.

The cost citizens every day pay in terms of waste of time, pollution and safety is enormous. The risk is then that the always increasing transport demand, characterizing the Italian transport system will make this cost no more sustainable.

Ensuring all the citizens the freedom of moving safely, efficiently and compliantly with environment, is therefore a National priority.

The trials carried out in these years have shown that this goal can be reached only through the direct intervention on transport demand, by distributing traffic flows among the different modes, in a more balanced way. The result will be the optimisation of infrastructure use so allowing safer, faster and cheaper travels and the promotion of sea and rail transport, in the modal balance context.

ITS are the key tool to achieve such a goal and make the Italian transport system more effective and competitive, ensuring greater convenience and safety, and a better environment for all.

In Italy, Public Authorities, private companies, research centres and universities have been working together for more than twenty years to develop new ITS systems and services aimed at allowing people and goods to travel smoothly and safely to any destinations in Italy, at the same time safeguarding our environment and protecting our artistic heritage from pollution.

ITS for traffic and transport management are operating in many Italian cities like Rome, Turin, Milan, Florence, Naples, and almost 80% of local public transport Companies use location and fleet management systems.

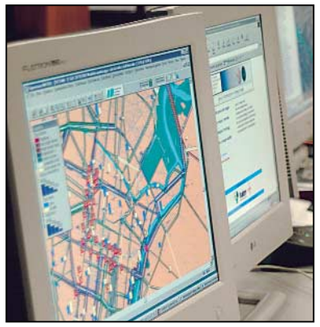
As far as motorways are concerned, electronic tolling is spread on the whole National territory and it is being used in diverse European Countries. Advanced systems for mobility control and management, realized by Italian Companies, are adopted in many European and Extra-European Countries.

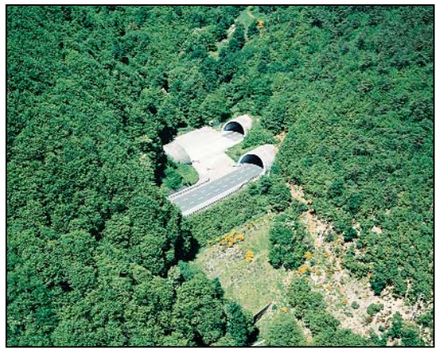
Car manufacturers have made important investments in the field of on board systems to increase vehicle (heavy vehicles included) safety level and numerous projects for encouraging the deployment of innovative telematic systems for logistics and intermodality and their integration have started.

As National ITS Association, our challenge is to create the enabling conditions to foster the full deployment and diffusion of ITS in Italy in the most effective manner for users. The release of the Italian ITS Architecture ARTIST represents an essential milestone towards this direction.

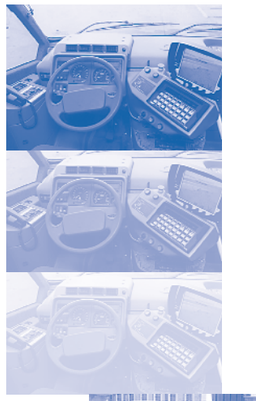
The purpose of this booklet is to provide the outline of some relevant ITS solutions available in Italy. The booklet is necessarily not exhaustive but we hope it can help to inform the global ITS community of the Italian expertises on ITS.

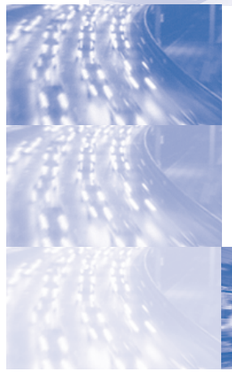
Giuliano Lamoni
President of TTS Italia - Italian ITS Association





ARTIST
ARchitettura Telematica Italiana per il Sistema dei Trasporti





The Key for Successful ITS: ARTIST - Italian ITS Architecture

ARTIST is the Italian ITS Architecture issued by the Ministry of Infrastructure and Transport in 2003.
ARTIST main objective is to provide public authorities, standardisation bodies, transport operators, infrastructure managers and private companies with general guidelines for steering ITS projects towards interoperable solutions compliant with National and European policies.
ARTIST aims at establishing the conditions for facilitating and harmonising the development of ITS market in Italy.

On the basis of the stated User Needs,
ARTIST is a strategic tool defining:

- The necessary services for users
- The functional, logical and physical relationships among systems
- Information flows
- The organisational links among the different users (Public and Private Institutions) involved in the development and management of ITS

ARTIST is an open Architecture, as the systems and services derived from **ARTIST** can easily integrate new functions and /or update the existing ones, bringing benefits in terms of cost reduction and efficiency improvement. The interoperability of components stimulates investments and creates the conditions for an open and competitive market, offering lower cost solutions.

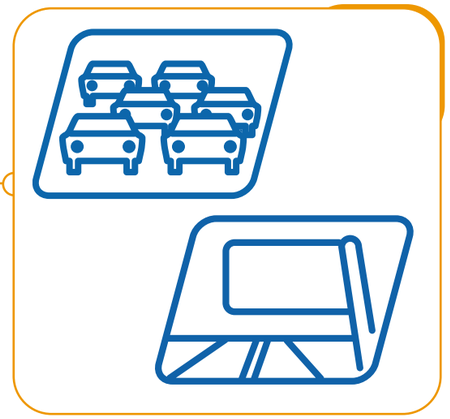
Elements of ARTIST are:

- **List of user needs**: The set of user requirements for which **ARTIST** provides a solution
- **Logical Architecture**: defines data flows necessary for supplying the services identified in the List of User Needs
- **Physical Architecture**: the step towards system realisations providing the methodology for designing the physical aspects of ITS
- **Organisational Architecture**: identifies the organisational and business aspects which make possible the services to be delivered to users
- **Navigation Tool**: a software enabling users to navigate interactively in **ARTIST**

The Organisational Architecture is an innovative element of **ARTIST** and represents a real “added-value” of the Italian ITS Architecture.

The Navigation Tool is available on-line at:
www.its-artist.rupa.it

Innovation at User Service: ITS solutions for Mobility Management and Control



Italy offers a lot of ITS solutions for mobility management and control. Huge efforts have been made to design and implement advanced ITS solutions for facing the negative effects of the chaotic traffic jams affecting the Italian cities and the motorway network. Such ITS solutions are fully compliant with ARTIST and many of them have also been adopted in several European and non European Countries.

In urban areas

› 5T System in Turin

The 5T system is one of the most advanced mobility management system in Europe. The system is able to control all the mobility issues in the Turin area and has been measured to increase Public Transport commercial speed (+ 17%) and to reduce Turin citizen travel time (-21%) improving traffic fluidity and providing real time information.
www.5t.torino.it

› ITS in Rome

The Integrated ITS System realised in Rome manages mobility in the City area. The core of the Integrated System is the Traffic Control Centre installed at STA (the Mobility Agency of the City of Rome) headquarters. This Control Centre has the main functions of monitoring, managing and controlling the urban traffic through several dedicated subsystems, each one playing a specific role, such as: Urban Traffic Control (UTC), Automatic Access Control related to the Limited Traffic Zone (ZTL), the User Information System based on Variable Message Signs (VMS) and the Traffic Information Centre (TIC). The System includes also a CCTV traffic surveillance system, with 45 TV colour cameras, located in the main intersections of the network and connected to the Centre via an optic fibres proprietary network.
www.sta.roma.it

› Utopi@ • "Urban Traffic OPtimisation by Integrated Automation"

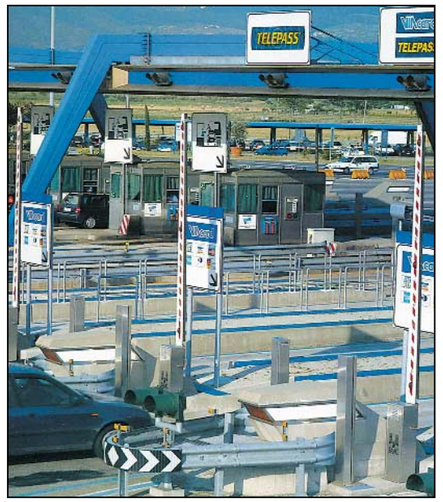
Utopi@ is a dynamically adaptative traffic signal control system designed by Mizar Automazione to optimise traffic flows in urban areas through a sophisticated control strategy. The system is able to operate on highly complex network providing real time forecasting of traffic flows, selective priority to public transport at traffic lights and dynamic traffic routing. Utopi@ is adopted in Rome, Turin, Milan, and in more then thirty European Cities. Also the WEB based version is now available and it is already operating for the city of Bologna.
www.miz.it

› URBIS® • "Urban Mobility Intelligent System"

URBIS® is a VR (virtual reality) representation system for traffic control centres. Conceived and developed by t&t, it enables urban mobility operators to receive real time information on the traffic situation, road conditions and pollution levels through an enhanced "virtual representation of the city".
www.t-t.it

› MatriX • (Model plAtform and TRaffic Information data eXchange) Supervisor

MatriX is a software tool developed by Mizar Automazione and CSST for real time monitoring, forecasting, managing and controlling urban or motorway traffic networks. The Supervisor offers as main services traffic observation, data collection, control strategies, geo-referenced user interface and user information platform. MatriX is in operation in Turin, Naples, in Stockholm, on the Venice beltway and on the Venice-Padua motorway.
www.miz.it wwww.csst.it



On motorways

› Telepass® 3G • The Evolution of Tolling Systems

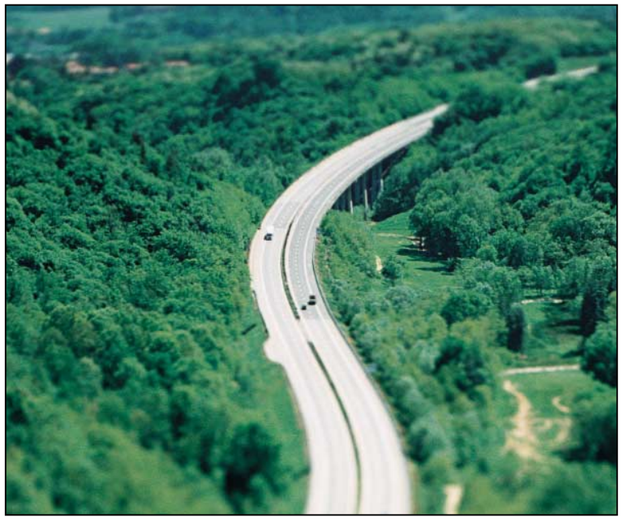
Autostrade per l'Italia SpA - the largest operator of toll motorways in Europe - has been studying a new concept On Board Unit, named Telepass® 3G, which is based on satellite technologies, GSM, Intranet/Internet. The system allows to monitor hazardous material vehicles and oversized/overloaded vehicles, to control the Operator's patrol cars or corporate and operation vehicles, to support the Traffic Information Centres and first aid vehicles during emergency operations, to manage fleet localisation and to provide traffic information.
www.autostrade.it

› The New Traffic Control Centre of Palmanova, north-east of Italy

The New Traffic Control Centre of Palmanova (Udine) started its operations in 2003. The Centre, operated by Autovie Venete, manages about 200 Kilometers of motorways in the north-east of Italy near the border with Slovenia and Austria and is linked with other centres in the Veneto region. The Centre presents innovative features responding to the user requirements of ITS solutions, as the Automatic Incident Detection system based on CCTV aimed at improving safety, and Radar-Infrared-Laser technologies used for traffic detection.
www.autovie.it

› MERLINO • An Innovative System for Real-Time Traffic Analysis and Prediction

MERLINO is a software tool conceived by ENEA -the Italian National Agency for New Technologies, Energy and Environment- for real-time traffic analysis and prediction, estimation of the current state of a transport network and prediction of the traffic state evolution by combining real-time traffic data with historical data collected and processed every day, early detection of traffic flows anomalies and short-term predictions of traffic congestion situations on the transport network. MERLINO is also able to evaluate long term air quality on the network and to assess the impacts of different traffic control strategies.
www.enea.it



Tools for Efficiency and Competitiveness: ITS Solutions for Fleet Management

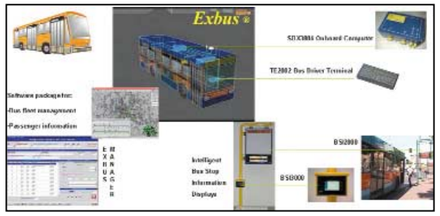
An optimised fleet management is essential to improve the efficiency of transport services. Local Administrations can make public transport more accessible and attracting for users, so attaining the objectives of the sustainable mobility policies. Commercial fleet operators can enhance their competitiveness on the market. In Italy many advanced ITS solutions for fleet management have been studied and developed and they are now extensivly diffused, bringing benefits in terms of overall quality of the transport services and cost savings.

For Public Transport

› EXBUS® • "EXecutive BUs System": AVM System for Public Transport

EXBUS is an AVM (Automatic Vehicle Monitoring) system, produced by t&t, that integrates onboard components with communication and positioning systems connected to a Control Centre based on a LAN of PCs, managed by the "Exbus Manager". The Exbus Manager© is a software package complying with the TRANSMODEL data model standard, that manages the system at the control centre working with a Client-Server architecture and in compliance with ARTIST ITS architecture.

www.t-t.it



› Position System

An Innovative Solution for Car Localisation or Fleet Management

Position is an innovative and small localisation system realised by Soft-In and composed by an on-board device without any connections to the vehicle, and a service centre software with a country map. The vehicle device is able to communicate the position via SMS or Data link on the GSM net and the user can set the type of communication. The main goal of this system is the easiness with which it can be installed because no power supply or external connection for antennas are required.

www.soft-in.com

› PowerDriver • Advanced Platform for Fleet Location

PowerDriver is a powerful PC-on-board based platform realised by Powersoft, suitable for advanced automotive applications. PowerDriver is extensively configurable on both hardware and software, allowing to tailor the platforms to the specific needs in all the applications related to mobility field. PowerDriver allows, as main functionalities, on-board sensors interface and CAN bus, Short Range communication via WLAN, time-and-position audio and video announces, GPS localization with inertial integration, data communication via radio (PMR/TETRA/GPRS…), data local storage on solid-state-device, even without power supply.

www.powersoft.it

› TSpm • "Transport Scheduling planning and management"

The TSpm (Transport Scheduling planning and management) system is a Transit Information System developed by Trieste Trasporti, the Public Transport Company of the City of Trieste. TSpm is a multi-level ERP system conceived and realised with object technology, characterised by the separation of the presentation functionality. The system adopts the European standard Trasmodel (ENV 12896), developed on a physical platform Oracle©. TSpm covers all the functional problems concerning transit network management, from the construction of the network to timetable definition, blocking and driver rostering and absence management, and depots management (refuelling, parking and service preparation). TSpm is an "open system" with external and programmable interfaces for GIS bus stop management, for maintenance, payroll, Certified Quality System, local transit Agency. Other interfaces are available for IVR (interactive voice response) system and AVM (Automatic Vehicle Monitoring).

www.triestetrasporti.it

› UPL 031 • Multipurpose System for Advanced AVM Applications

UPL 031 is a rugged, multipurpose, evolutionary system for advanced AVM applications produced by Thetis SpA. The system is based on PC 104 technology and has a Geode CPU and Flash memory and a large interfacing capability including Ethernet, CAN, serial ports as well as digital and analog I/O to handle a variety of peripheral units, such as driver terminal, ticket validators, audio and LED announcements, TV cameras, passenger counters etc. Communication capability includes any type of mobile telephone technologies, radio, tetra, WiFi. UPL 031 has been designed to protect customer investment for a long period of time. The system can also be expanded to new technologies and functions, adding or substituting PC 104 modules without mechanical reworking (it has 23 more slots available).

www.thetis.it

For Freight Transport

› Fleetrunner • An Effective Tool for Supporting the Management of Commercial Fleets and Public Transport Services

Fleetrunner is the telematic platform developed by Mizar to host WEB based applications for goods or passengers transport. Fleetrunner exploits the potential of the modern telecommunication technologies (GPRS, xDSL) and avoids the need to install and maintain proprietary control centres and is offered on a service contract basis.

The WEB based applications hosted by Fleetrunner are:

- **FLAG**, that provides the actors of the supply chain with integrated and added-value services, such as transport fleet monitoring, service summary, service planning and reporting.
- **FLASH**, which is dedicated to public transport operators and agencies and is conceived to operate in both mono and multi-operator environments. FLASH provides for public transport fleet monitoring, service regulation, service summary, maintenance support, user information services.

www.miz.it

› Fleet Management Suite

Fleet Management Suite is a suite of devices produced by FATA DTS, providing integrated solutions aimed at optimising planning, and scheduling transport activities integrated directly within vehicles and trailers. The Suite allows routing optimisation, resource allocation, geo-referencing and real time transport for fleet managers. Furthermore, Fata DTS monitors "snail trail" of both Truck and Trailer with GPRS connectivity incorporating modular telematic vehicle units with or without touchscreen display, collecting invaluable transport cycle data throughout for off-line analysis or real time track & trace of orders, in order to improve the efficiency of transport and, at the same time, to reduce costs.

www.fatadts.it

› MPIV/2 System • Info-telematic System for Fleet Monitoring and Management

MPIV/2 is a hardware tool developed by Hello Truck aimed at performing three main functions necessary for fleet operations: security, logistics and maintenance. MPIV/2 allows to localise the trucks on the transport network, to assure the security of the vehicle through vocal automatic alarm messages and data transmission to the Fleet Control Centre via GSM, SMS, GPRS and Wireless LAN.

MPIV/2 incorporates an expandable and modular Main Unity, installed on-board, with a microprocessor GEODE SC1200 at 266Mhz, proprietary boards, a GPS receiver, a GSM/GPRS module, a Wireless module, CAN BUS, a memory unit containing vector mapping, a microphone, a Text To Speech, speaker, a back up battery, and Operating System Windows CE 4.2. MPIV/2 system can be also applied to manage public transport fleets.
hellotruck@hellotruck.it

› NavMaster 2004 • An Innovative On-board Telematic Device for vehicles tracking

NavMaster is an innovative on board computer realized by Logosystem for freight fleet management. It features a colour touch display, many interfaces (as tachograph, CAN bus, voice messages, antitheft devices, USB, compact flash, Smart Card, GPS, GPRS) and application software. NavMaster is particularly suitable to hazardous freight monitoring.
www.logosystem.com

› Powertr@ck • A New Service for Fleet Management

Powertr@ck is a service designed by Powersoft offering the “state of the art” solution of fleet management. The users can get information about their fleets directly by Internet, since the operative centre is offered as ASP service. The black box to be mounted in the vehicle is “ready to install”, although its high configurability allows it to produce various solutions, all tailored to the user needs. The on board device is certifies to operate even in extreme working conditions and can be both bought and rented.
www.powersoft.it

› Service Centre for Transport Sector

The Service Centre for Transport by Telespazio, a Finmeccanica Company, is a leading centre in space systems and satellite applications for business and institutions worldwide. The Service Centre provides various lines of location-based services for transport and mobility applications, oriented to different market sectors: freight and fleet management, info-mobility, safety and security, emergency assistance, public transport. Thanks to its integrated and open architecture, the Telespazio Service Centre capabilities can be exploited towards the delivery of a wide class of value added positioning services targeting the transport sector and the whole mobility domain.
www.telespazio.it

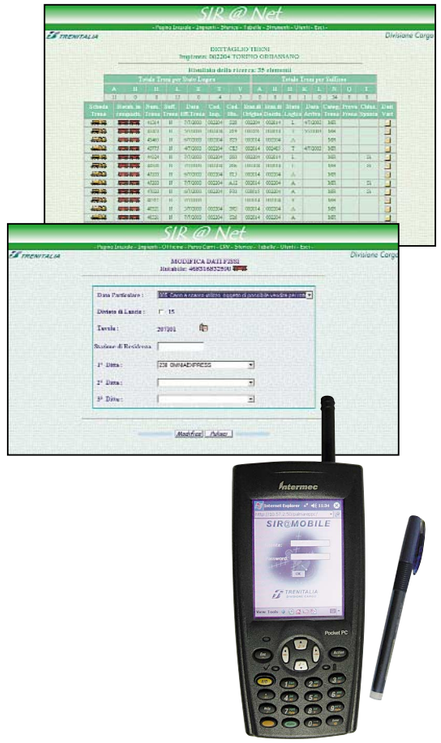
› Wastex® • “Waste Management System”

Wastex is a hardware and software system designed and installed by t&t for real-time fleet monitoring and the service control needs of companies operating waste collection services in the field of urban hygiene. Wastex enables to run a really effective waste collection services with higher efficiency levels. The extreme flexibility of the onboard system enables any type of vehicle (lorries, compactors, street sweepers, tank lorries) to be equipped with an onboard computer including a GPS receiver, a voice and GSM/GPRS data communication module and a driver/onboard sensor interface. Wastex Manager is the software package installed at the Control Centre that ensures the localisation and data collection, the voice and data communication with all the equipped vehicles, the information display on digital maps through a user friendly interface, reporting on the service carried out.
www.t-t.it

For Railway Transport

› INFOTREN • On board Real Time Information System for Trains

Infotren is a web based system developed by TSF that gathers “real time” information and data about train journey and provides related accurate “on board” information to customers (i.e.: travel data, convoy location, train delay, estimated arrival time, special cases, etc.). Installed on more than 400 Trenitalia S.p.A. trains (the Italian Railways operator), Infotren has been realised using the most advanced mobile communication technologies (such GPS and GSM).
www.tsf.it

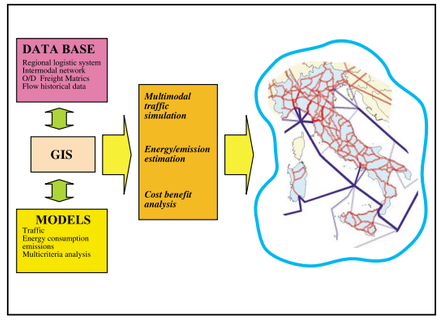


› SIR@NET AND SIRMOBILE • Advanced Tools for Rail Freight Operations

SIR@NET and SIRMOBILE are integrated web-applications developed and provided by TSF for management of Trenitalia Cargo S.p.a. (the freight division of Trenitalia) activities. These applications allow operators of Trenitalia Cargo S.p.a. to manage their own activities through simplified web interfaces and PDA Devices with GPRS or Wi-Fi connections. The main activities that can be managed by SIR@NET and SIRMOBILE are: station activity planning, rolling stock location, trail occupancy rate, train composition/modification management, technical documentation management, trains & wagons monitoring, intra station real time information exchange.
www.tsf.it

Optimising Freight Transport: Solutions for Enhancing Intermodality

ITS are essential to promote integration among transport modes.
This is a particularly crucial issue for freight transport and logistics.
ITS can contribute significantly to optimise the whole logistic process, from starting point to that of goods delivery by intervening in the managementof the various transport steps, so reducing costs.



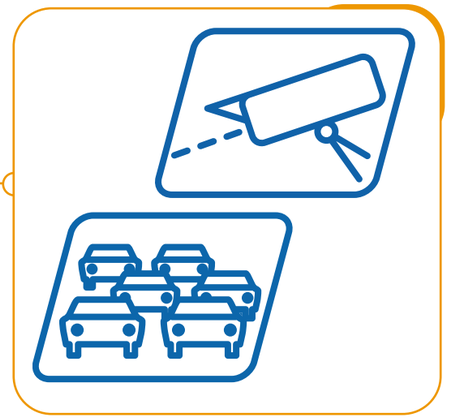
› SYLOG • Integrated Decision Support System for Intermodal Freight Transport

SYLOG is an integrated software system developed by TRAIN Research Consortium. The system allows functional, economic and environmental assessment of strategic intervention on regional freight transport systems. Actually such interventions take shape as structural and/or functional changes in freight transport inter-modal network. The tool is based on mathematical models, data base and GIS applications for the simulation and multi-criteria evaluation of technological and infrastructural scenarios of freight intermodal transport systems. In SYLOG three computational models have been integrated: a scenario simulation module (MTCO-TECH) for estimation of traffic flows on the intermodal network, a module for estimation of energy consumption and pollutant emissions (GoTrEIN), and a software for cost-benefit analysis (CBA).
www.consorziotrain.com

› Integrated and telematic systems for actions planning, maintenance and management in intermodal areas

Demonstrative modules, integrating existent informative systems for data and information management into and between interports or intermodal stations, have been conceived by TRAIN Research Consortium in order to realize advanced informative systems for intermodal freight transport. The main goal is an optimised management of logistic processes, gained through innovative technologies and devices, suitable for intermodal station or interports. The software modules allow the advanced statistical analysis of interportual data, the integrated management of the interportual infrastructure and of the interportual events, the automatic recognition and check of input/output freight vehicles and wagons, the management and control of vehicles operations in interportual areas.
www.consorziotrain.com

Safety for all as first priority: Innovative ITS Solutions for Safer Vehicles



In Italy road safety is a crucial issue. Only in 2002, road accidents have caused 6.736 deaths and the injuring of 337.878 people. The National Plan for Road Safety states that ITS can bring significant benefits for road safety improvement, in particular as far as vehicles are concerned. Italian car manufacturers are aware that ITS can play a key role in the development of safer vehicles. Many Research and Development projects are going on and huge investments have been made in the field of innovative on board systems and vehicle-infrastructure systems for enhancing the safety level of both driver and vehicle.

› Advanced R&D projects for enhancing vehicle safety from Fiat Research Centre

Fiat Research Centre is engaged in diverse R&D projects aimed at designing and realizing innovative ITS solutions to improve driving safety. Among them:

- **AIDER** is a European project aiming at developing an efficient Rescue Management System in order to improve rescue operations by reducing the time of intervention and optimising the use of rescue means.
- **AIDER** is an on-board system which, in case of an emergency, is enabled to make an Automatic SOS Call to a Control Centre, to provide automatic accident location and identification making an off-line accident reconstruction, to establish a voice, data and video link between the vehicle and the Control Centre, and to transmit to the Centre the biomedical data of passengers.
  www.crfproject-eu.org

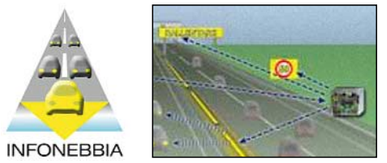
- **CHAMELEON** is a European Project with the purpose of developing and validating an advanced sensorial platform, able to detect an imminent crash and provide relevant data to passive safety systems, thus increasing overall safety. Situations of unavoidable collision are recognised by sensors and a suitable crash prediction algorithm, so that information is provided to smart restraints before the impact.
  www.crfproject-eu.org

- **EDEL**, “Enhanced Driver’s pErception in poor visibiLity”, is a European research project aiming at designing and developing a night vision enhancement system based on near infrared sensor and semiconductor illumination. The main outputs of the project will be: an automotive CMOS camera with non-linear response to reduce glaring; a pulsed semiconductor near infrared illuminator synchronised with the camera; image processing algorithms for single and stereo camera system and a Human Machine Interface based on direct-view display.
  www.edel-eu.org

- **EUCLIDE**, “Enhanced human machine interface”, is a European project for on vehicle integrated driving support system. The aim is the development of an integrated driver support system to detect the presence of potential obstacles in case of poor visibility and driver’s distraction. Far infrared camera images are processed together with radar data to inform the driver about the potential obstacles on vehicle trajectory in good and in poor visibility conditions like fog and darkness. The information is given to the driver in a head up display located in the driver’s peripheral view.
  www.euclide-eu.org

- **GALLANT** is a European Project whose object is to develop an innovative Predictive Cruise Control system based on GALILEO and integrated with advanced driver assistance systems. Vehicles are enabled to automatically adapt the cruise speed while approaching to critical curves, using the GNSS I - EGNOS positioning (in the future GNSS II - GALILEO), associated with the ahead vehicle scenario retried by advanced digital road maps available on board.
  www.crfproject-eu.org

- **ROAD SAFETY IN FOG** is a project carried out jointly by Fiat Research Centre and ANAS, the National Road Company, aiming at creating an integrated system that guarantees driving safety in conditions of poor visibility. The infrastructure is equipped to monitor road visibility and traffic conditions and to warn the drivers via Variable Message Panels, Intelligent Light Guides and on-board devices. The safety cars, equipped with anti-collision systems and a variable message bar based on the innovative Chip LED technology, guide platoons of vehicles through the fog.
  www.infonebbia.it



- **PROTECTOR**, “Preventive Safety for Vulnerable Road Users”, is a European project aimed at developing and validating sensors for detection and classification of vulnerable road users (pedestrian, cyclists,…) in order to reduce accidents involving pedestrians and allow smart passive safety devices.
  www.crfproject-eu.org

- **SAFETUNNEL** is a European project for the reduction of accidents inside road tunnels through preventive safety measures. This goal can be achieved by increasing awareness of vehicle status in order to avoid tunnel access to vehicles with detected or imminent on-board anomalies, monitoring vehicle speed and safety distance inside the tunnel, diffusing information to drivers in case of emergency, setting up two equipped trucks and a control centre for demonstration and validation.
  www.crfproject-eu.org

› ITS Solutions for Heavy Vehicles from Iveco

Iveco, company leader in heavy vehicles manufacturing, considers ITS as a main priority and makes a lot of efforts in developing innovative solutions for enhancing safety of both driver and vehicle. Among them:

- **Pre-crash system integrated with seat belt pretensioner**
  A long range radar that alerts the driver of possible frontal collision through a force applied on the seat belts. New electrical driven pretensioners improve the coupling effect of the seat belts already in pre-crash events by working in jointly with the radar system. The pre-crash forces slightly correct occupant position in case of upcoming frontal impacts and rollover, thus leading to accident avoiding effects.

- **Haptical Lane Warning**
  A highly sophisticated system that prevents from driving off-road by alerting the driver through a torque applied on the steering wheel. The capability of this system is that it can be integrated with collision warning system and extended to control the vehicle in order to automatically maintain an acceptable lane trajectory through interaction with the steering system.
  www.iveco.com

Need more information on ITS in Italy?

Please, contact **TTS Italia info desk** at:
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