iTETRIS

*Roads to the Future
Open for Simulation*

Join the **iTETRIS** community
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www.ict-itetris.eu/10-10-10-community

iTetris Consortium

THALES cbt Communication Engineering DLR EURECOM HITACHI Inspire the Next innovalia ASSOCIATION PEEK UNIVERSITAS Miguel Hernández

*The Integrated Platform for Large Scale Simulation
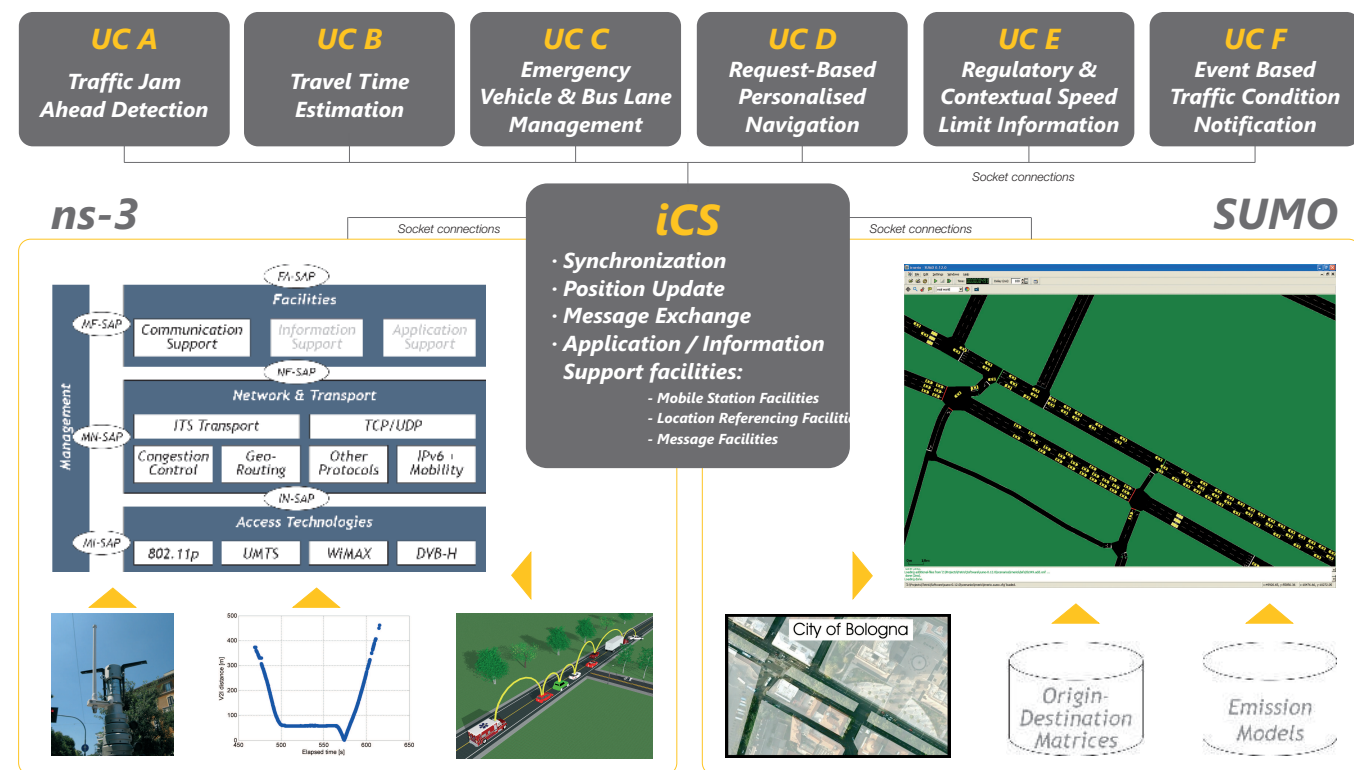of Cooperative ITS Strategies*
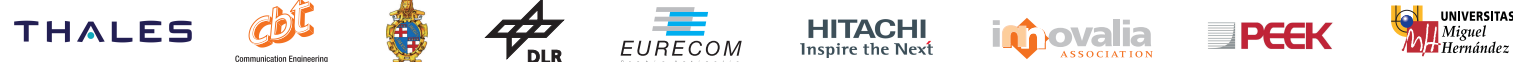
The most important question raised today by road authorities is: how can road traffic engineering applications be estimated in terms of the actual worthiness of investment and effectiveness in large-cities? V2V/V2I communication technologies promise to improve traffic management through Real-Time exchange of Traffic Information (RTTI). However, before cooperative ITS systems are widely deployed and evaluated in Field Operational Tests (FOTs), road authorities need clear evidence at city level on the benefits and impact of these solutions for their own particular scenarios.

The iTETRIS FP7 project (http://ict-itetris.eu/) has developed an open, ETSI standard compliant, and flexible simulation platform to satisfy this need within a close collaboration between engineering companies, road authorities, and communications experts.
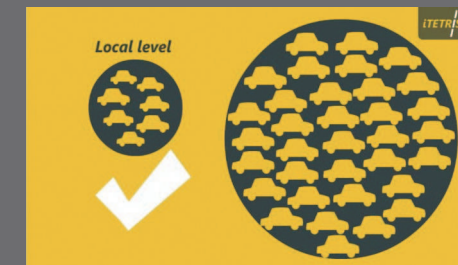
iTETRIS integrates wireless communications and road traffic simulation platforms in an environment that is easily tailored to specific situations allowing performance analysis of cooperative ITS at city level. The accuracy and scale of the simulations leveraged by iTETRIS will clearly reveal the impact of cooperative ITS assisted-traffic engineering on city road traffic efficiency, operational strategy, and communications interoperability.

iTETRIS Features

Large Scale and the Real World

The correct dimensioning of the models employed is crucial. Small-scale evaluations of cooperative ITS systems could exhibit a high level of effectiveness at a local level but hide the problems caused by reallocating traffic on a wider scale.

The importance of communication

The project has devoted a great deal of effort to the development of accurate wireless ITS communication models. For this purpose, iTETRIS considers the main communication technologies involved in V2V and V2I: ITS 5.9GHz, UMTS, WiMAX, and DVB-H.

ESTI ITS Standard Compliant

The platform has been developed following the recommendations of the novel European ITS standard which guarantees the alignment of the iTETRIS platform with the international standardization efforts.

UC A
Traffic Jam Ahead Detection

UC B
Travel Time Estimation

UC C
Emergency Vehicle & Bus Lane Management

UC D
Request-Based Personalised Navigation

UC E
Regulatory & Contextual Speed Limit Information

UC F
Event Based Traffic Condition Notification

Socket connections

ns-3

Socket connections

iCS
· Synchronization
· Position Update
· Message Exchange
· Application / Information
Support facilities:
  - Mobile Station Facilities
  - Location Referencing Facilities
  - Message Facilities

Socket connections

SUMO

City of Bologna

Origin-Destination Matrices

Emission Models

From Traffic Solutions Design to Concrete Impact Evaluation

Characterising the traffic problem

Traffic Management Policies and Protocols

Traffic Modelling

Assesing the solution

Traffic Congestion Problems in Large Cities

SUMO

ICS

ns-3

Traffic Algorithms

Characterising the communication context

Wireless Measurements

Wireless Communications Simulation Modelling

Simulation Platform

iTETRIS
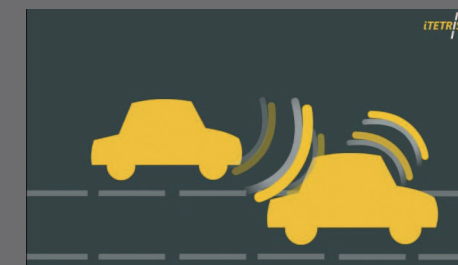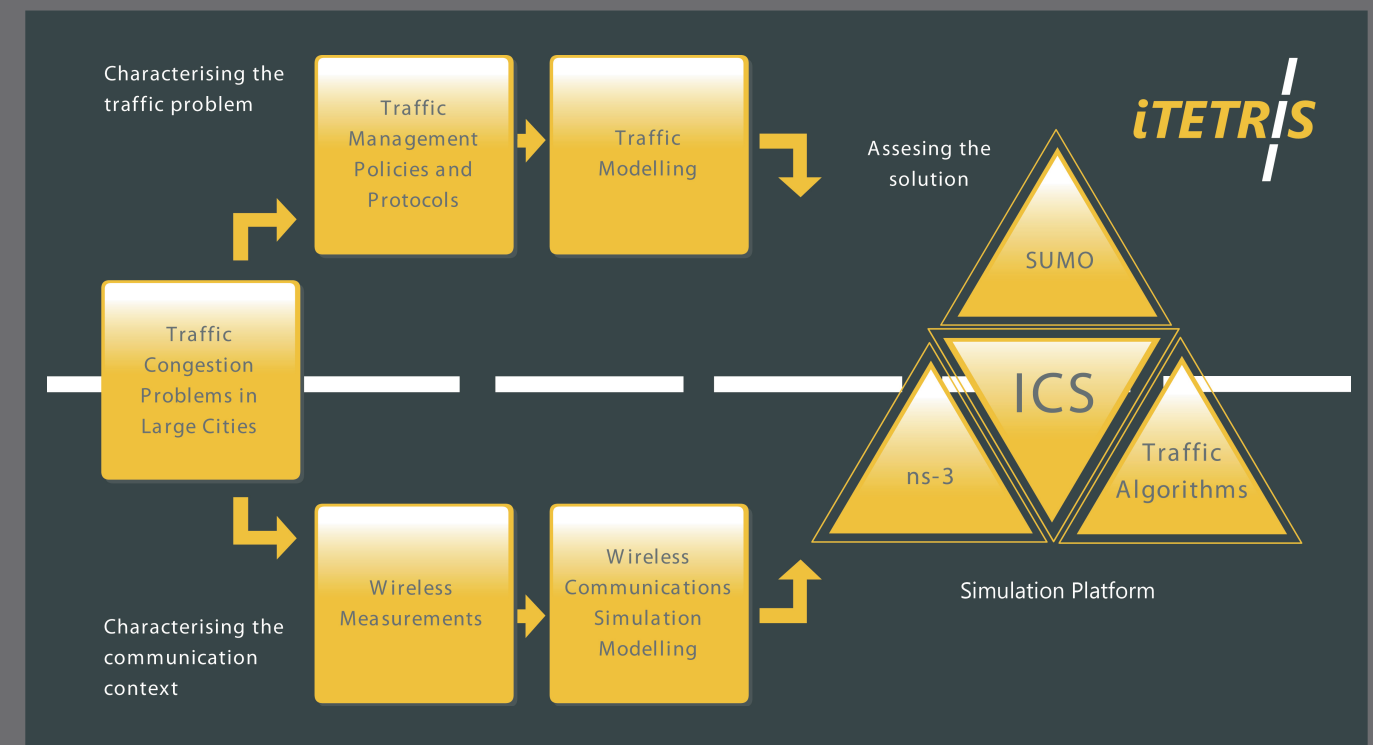
The main iTETRIS components

- **SUMO** is an open-source microscopic traffic simulation platform developed by DLR that simulates traffic movement continuously in space and discrete in time.

- **ns-3** is an open-source wireless communications simulation platform. It offers advantages in terms of large-scale simulations and supports multiple radio-access-technologies.

- **iCS (iTetris Control System)** synchronizes the complete platform and controls traffic efficiency applications. These applications monitor vehicular traffic conditions and execute distributed or centralized cooperative traffic management strategies to improve traffic efficiency.

iTETRIS has devoted a significant effort in the development of mechanisms that would leverage **quantifiable (results** of large-scale deployments and investment on cooperative ITS applications. The figure above illustrates how a use case has been constructed and how finally evidence can be presented to road authorities in meaningful formats for informed decision making.