iTETRIS Newsletter

January 2011

Welcome to the fourth and final issue of the iTETRIS (www.ict-itetris.eu) newsletter. This project supported by FP7 Cooperation Work Programme ICT has engineered the first large scale integrated wireless and traffic simulation platform for real-time road traffic management solutions fully compliant to ETSI ITS standards. This final issue brings to an end the activities of the project. It is with great pleasure and proud that the iTETRIS team members wish to let all the community know that there is now available a new open-source simulation platform for Cooperative ITS that can be downloaded and enjoyed just joining the iTETRIS Community (http://www.ict-itetris.eu/10-10-10-community).

The official release of the platform took place at the C2C-CC Forum in Paris and short after at the POLIS 2010 Conference. Now, it is your turn, just click on (http://www.ict-itetris.eu/10-10-10-community) and start your iTETRIS large scale simulation experience.

It has been a pleasure to convey you the iTETRIS progress over these last 30 months. We hope to continue this relationship over our community beyond the end of the project. So, please do not hesitate to join the iTETRIS constituency in the iTETRIS Cooperative ITS journey.

Roads to the future are now open for simulation.

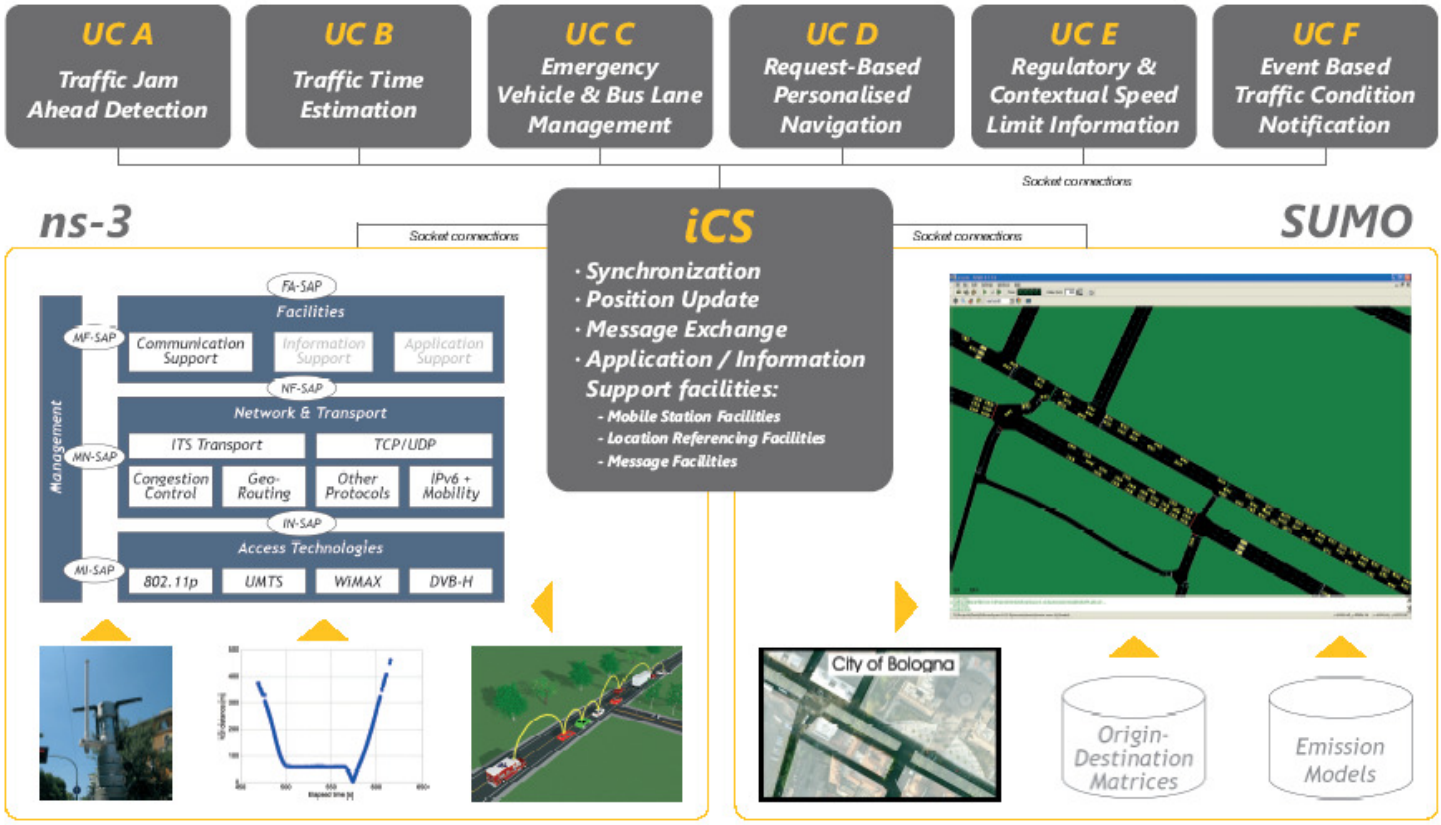
iTETRIS – Cooperative ITS at Large Scale

Roads Today. There is a significant increase in demand for mobility of both people and goods, costing €50 billion a year to the EC. Furthermore, 1.4 million accidents occur and 40,000 lives are lost every year. In terms of ecological impact 850 tons of CO2 were discharged to the atmosphere. This demand of mobility took the 26% of the UE total energy consumption.

Roads Tomorrow. Urban environments do not allow for building additional roads to tackle this situation. This makes wireless vehicular cooperative systems a great solution to improve road traffic management. Cooperative ITS solutions are key in future sustainable mobility solutions. How can the worth of this investment and its effectiveness on city traffic be estimated? New cooperative ITS urban mobility policies demand new city-level decision-making tools.

iTETRIS Capacities & Models

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. Integration of high-fidelity wireless communication models and road traffic simulation platform is crucial to quantify the effectiveness of Cooperative ITS strategies. Standard compliant decision-support tools are mandatory to guarantee accuracy and realism in the results obtained. **iTETRIS** leverages through **open APIs, the first ETSI standard compliant, and flexible simulation framework** iTETRIS integrates **high-fidelity 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 distributed ETSI ITS communications architecture (@ iTETRIS Consortium)

The main iTETRIS components are:

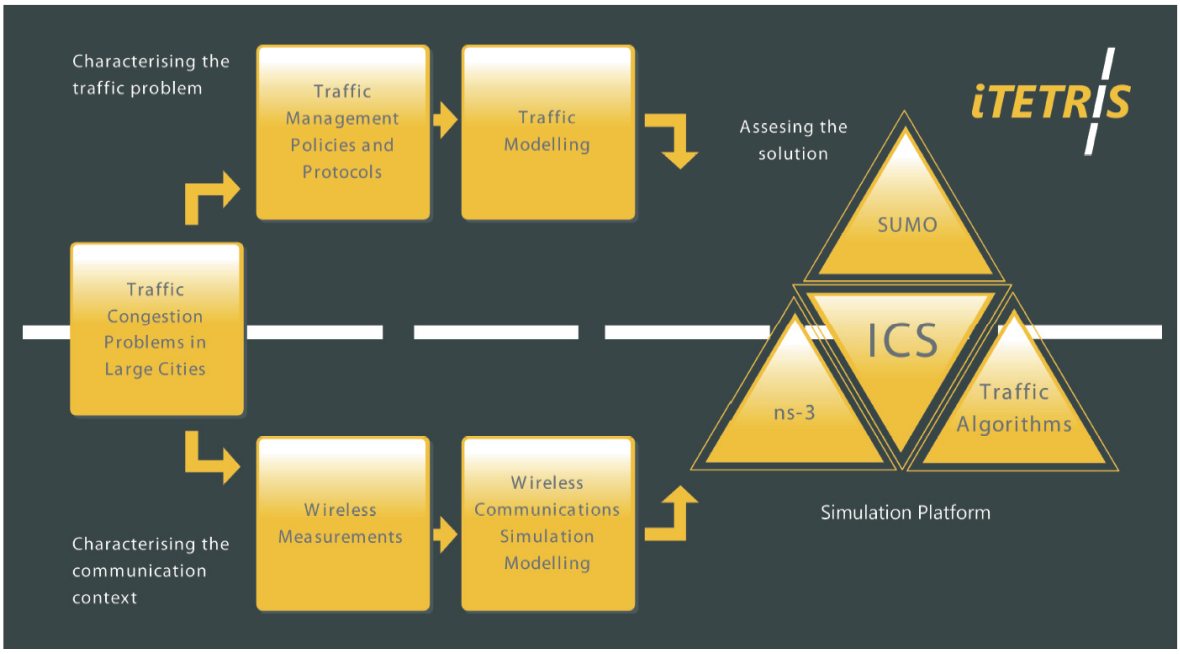
- ***SUMO*** is an open-source microscopic traffic simulation platform developed by DLR that simulates traffic movement continuously in space and discrete in time.
- ***ns-3*** is an open-source wireless communications simulation platform. It offers advantages in terms of large-scale simulations and 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.

Through these three components iTETRIS provides the following functionality:

- **Open-source large-scale simulation environment**
- **Open real traffic mobility data for large scale urban mobility scenarios**
- **Emission models: CO2, NOx particles, noise**
- **Communication model: V2V/V2I, UMTS, DVB-H, Wi-Max, etc.**
- **ETSI TC ITS protocol stack implementation**
- **Multi-hop data dissemination strategies for V2V+V2I**
- **Diverse traffic efficiency applications**

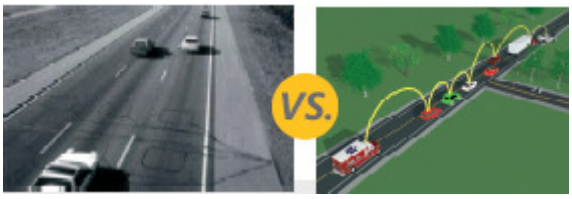
From Traffic Solutions Design to Concrete Impact Evaluation

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. This Section 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.

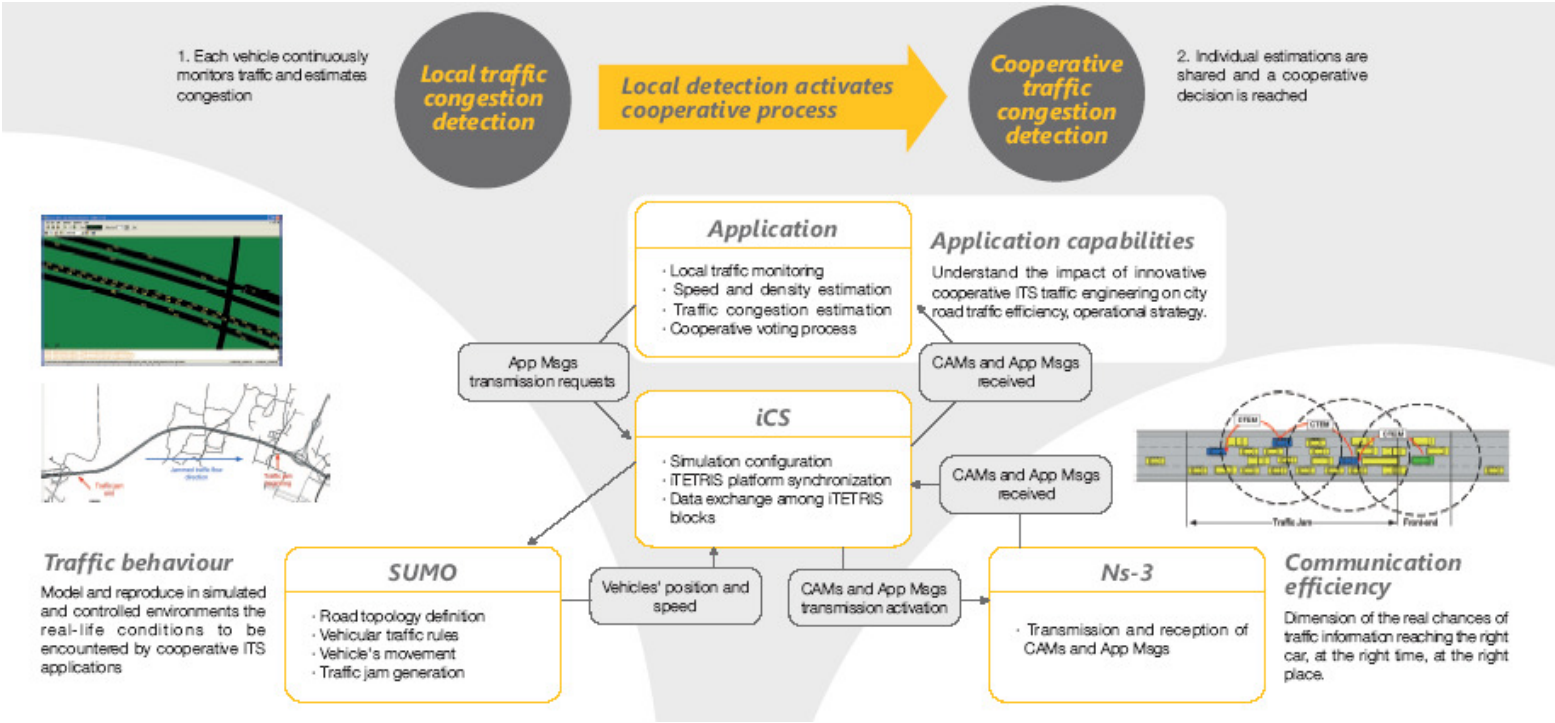


The specific use case was aimed at addressing two clear research questions:

- Can traffic congestion be detected in a distributed fashion – V2X communications?
- How V2X detection results compare to traditional mechanisms – i.e. Inductive loops?



These two questions have been modelled and studied with the assistance of iTETRIS platform.



Large scale evaluation of the algorithm proposed by iTETRIS demonstrates that V2V communication strategies out-perform inductive loop detection of congestion with a placement of such induction loops every 200 m, showing a worse performance than traditional techniques if induction loops are placed every 100m.

Detection Technology	INDUCTIVE LOOPS				V2V COMMUNICATIONS
Loops Separation Distance	100m	200m	500m	1000m	NaN
Success Congestion Classification Rate	84.04%	77.19%	68.44%	54.73%	78.72%

iTETRIS Open Source Community

If you wish to conduct your own studies, perform your research or contribute to the activities of the community just join us at the following address. You will immediately gain access to the iTETRIS source code and will get in touch with a vivid community engaged in building the technology for the roads of the future.

www.ict-itetris.eu/10-10-10-community

iTETRIS Information

Project Duration:

July 2008 – January 2011

Project Coordinator:

Mr. Jérémie Leguay (Thales Communications France)

coordinator@ict-itetris.eu

Dissemination Contact Email:

dissemination@ict-itetris.eu

Project Website:

www.ict-itetris.eu

iTETRIS Consortium