Publishable Executive summary

Project no.: **516233**

Project acronym: **REACT**

Project title: **Realizing Enhanced Safety and Efficiency in European Road Transport**

Instrument: **Specific Targeted Research Project (STREP)**

Thematic Priority: **Sustainable Development, Global Change and Ecosystems-Sustainable Surface Transport**
(Objective 4: *"Increasing road, rail and waterborne safety and avoiding traffic congestion"*)

Period Covered: 01/01/05 - 31/12/05	Date of preparation: 14 February 2006
Start date of project: 01-01-2005	Duration: 24 months
Project coordinator name: Dr. Chanan Gabay	Revision: R1.6
Project coordinator organisation name: Motorola Israel	

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Executive summary

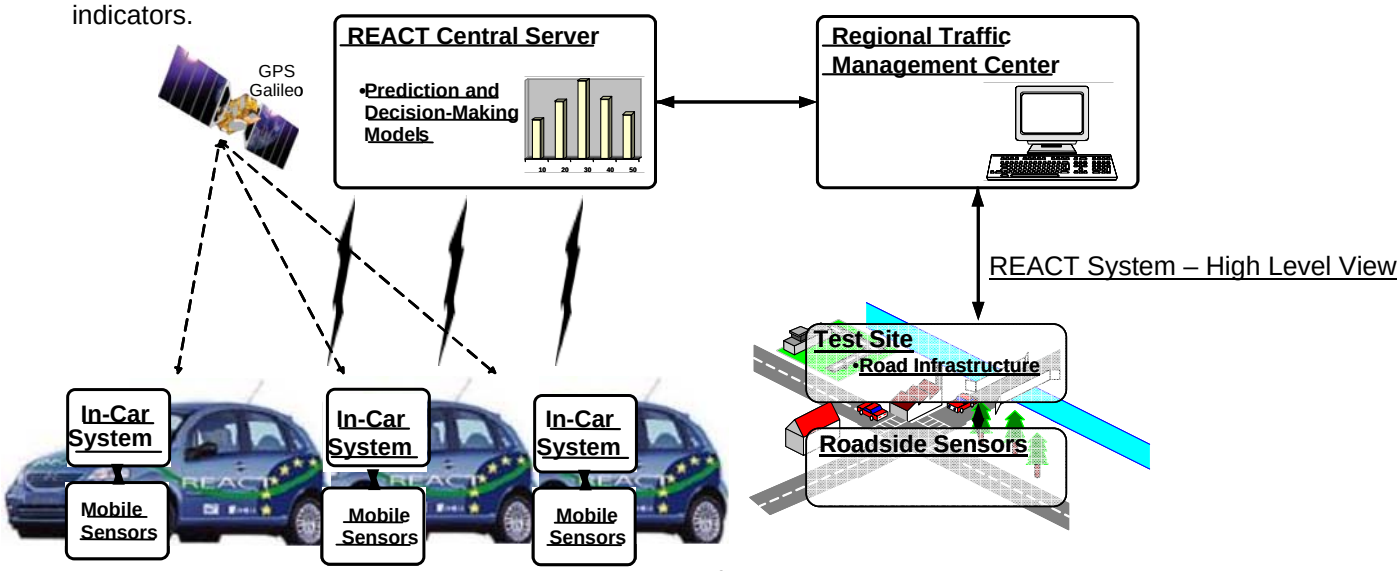
The REACT project will represent a breakthrough towards the long-term vision of reducing traffic deaths significantly and improving transport infrastructure efficiency. Integrating state-of-the-art technologies, REACT will sense natural and infrastructure conditions within and in the vicinity of each equipped vehicle, will transmit sensed real-time data to a central server where they will be analyzed by a set of sophisticated prediction and decision-making models, and will generate 1) safety alerts, speed and route recommendations, to be communicated to specific vehicle drivers; and 2) relevant information for road and law enforcement authorities.

Project objectives

The main scientific and technological objectives of the REACT project are:

1) Develop/adapt real time mobile sensors that measure natural and infrastructure conditions such as:
    a. Road friction sensors
    b. Visibility sensors
    c. Traffic sensors
2) Develop a method for generating in-car recommendations to the driver based strictly on data from the vehicle's in-car sensors
    - Decision-making model for generating recommendations.
3) Develop state-of-the-art secure communication capability
    a. Within car communication from sensors to in-car computer
    b. Two-way communication between car and central server.
4) Develop/adapt analysis, prediction, and decision-making models in a central server
    a. Natural and infrastructure prediction model
    b. Traffic monitoring model
    c. Safety risk prediction model
    d. Traffic prediction model
    e. Decision-making model.

Improvements will address a number of indicators (to be specified in detail in the evaluation plan), the most important of which will be related to traffic safety and efficiency. With regard to safety, it is well-known that the number of accidents cannot deliver statistically significant results if demonstrations are planned to run for a few months only. This difficulty will be circumvented via the intended development of risk indicators and models that may be fed with real traffic data. The risk indicators measure the likelihood of an incident occurrence and they may therefore be used as a quantitative measure of success even without actual accident occurrence. Targeted measurable improvements with regard to risk indicators will be defined during the project's lifetime, after the development and validation of such indicators.



Contractors involved

Partic. no.	Participant name	Participant short name
1	Motorola Israel	MIL
2	ARTTIC Israel	ARTTIC
3	Transver	TRANSVER
4	Technical University of Munich	VT-TUM
5	INRIA	INRIA
6	ARMINES - Ecole des Mines	ARMINES
7	TNO Automotive	TNO
8	DMR	DMR
9	Intempora	INT
10	Motorway Authority of Southern Bavaria	ABDS

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Work performed

The main work items, in summary, that have been performed in the project in the reported period are:

- The system architecture and the communication system have been developed:
    a. The communication system with the vehicles and the traffic management center has been designed
    b. The in-vehicle telematics system (prototype and pilot) communicating with sensors and collecting information received from distributed sensors has been designed.
- Real time mobile sensors measuring natural and infrastructure conditions have been developed:
    a. The visibility sensor has been developed and installed on board the test vehicle and first experiments were carried out
    b. The traffic sensor has been developed and demonstrated. Further development has been done resulting a.o. in a significant set of tests.
    c. A first version of the friction monitor on dedicated automotive hardware was realised. A prototype of this automotive hardware was firstly built in the REACT project. Evaluation was done in simulation and with recorded data from wintertesting.
- The decision model for generating in-car recommendations to the driver (advices and warnings) has been developed
- The prediction, and decision-making models in the central server have been developed
    a. The accident risk prediction model has been realized and The traffic state monitoring system is nearly finished
    b. The Traffic and Route Quality Prediction models have been defined and developed
    c. The sofware design of the graphical user interface for monitoring of traffic state, traffic prediction and travel times has been designed
    d. The conception of the software integration for the city and highway models have been realized
    e. The decision logic for the alert and guidance system (Traffic Flow Harmonization and Optimization) has been developed
    f. The integration in the cars has started and a draft detailed test plan has been written

Expected end results

The work described above was carried out during the first year of the project. The expected end results related to the objectives of the first period are the following:

- Real time mobile sensors that measure natural and infrastructure conditions
- Generated in-car recommendations to the driver based strictly on data from the vehicle's in-car sensors based on a well designed decision-making model.
- Developed state-of-the-art secure within car communication capability from sensors to in-car computer and between the car and the central server (two-way communication).
- Prediction, and decision-making models developed (Natural and infrastructure prediction model, traffic monitoring model, safety risk prediction model, traffic prediction model, decision-making model)

Intentions for use and impact

The REACT project has the potential of reducing traffic fatalities, increasing road transport efficiency, and contributing to greater standardization and harmonization throughout Europe.

- Economic and Societal Impact
  - Reducing traffic fatalities
  - Improved transportation efficiency
  - Cross-Europe Impact
  - The Issue of privacy and individual freedom
  - Driver Acceptance
- Technological Impact

  The establishment of the REACT system
  - Integrating mobile sensors with a central analytic and decision-making system
  - Utilizing effective communications within vehicles, between each vehicle and the central server, and from the central server to interested public authorities
  - Where REACT is fully coordinated with existing regional traffic management systems

will be a first step towards a system of greater knowledge of traffic and safety conditions, better prediction models and, ultimately, greater control of transport safety and efficiency.

The project web site

URL: click on the project logo
Or www.react-project.org