THE ISSUE

Traffic-Health-Environment:
Intelligent Solutions Sustaining Urban Economies

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THE ISSUE Project Coordinator
Leicester City Council

THE ISSUE

Traffic Health Environment

Intelligent Solutions for Sustaining Urban Economies

Framework Seven Programme: *" Regions of Knowledge"*

"Co-ordinated action to support sustainable economic development by boosting the competitiveness of transport-related economies"

Cooperation between 13 partners in 4 European regional research-driven clusters

THE ISSUE

*Identifying innovative technological solutions, through the application of **ICT and Space Data Products and Services**, to address key transport and urban mobility challenges impacting on the economy, environment and people's health in cities and regions across Europe*

THE ISSUE CONSORTIUM

4 Core Triple Helix Clusters and 8 Associate Regions

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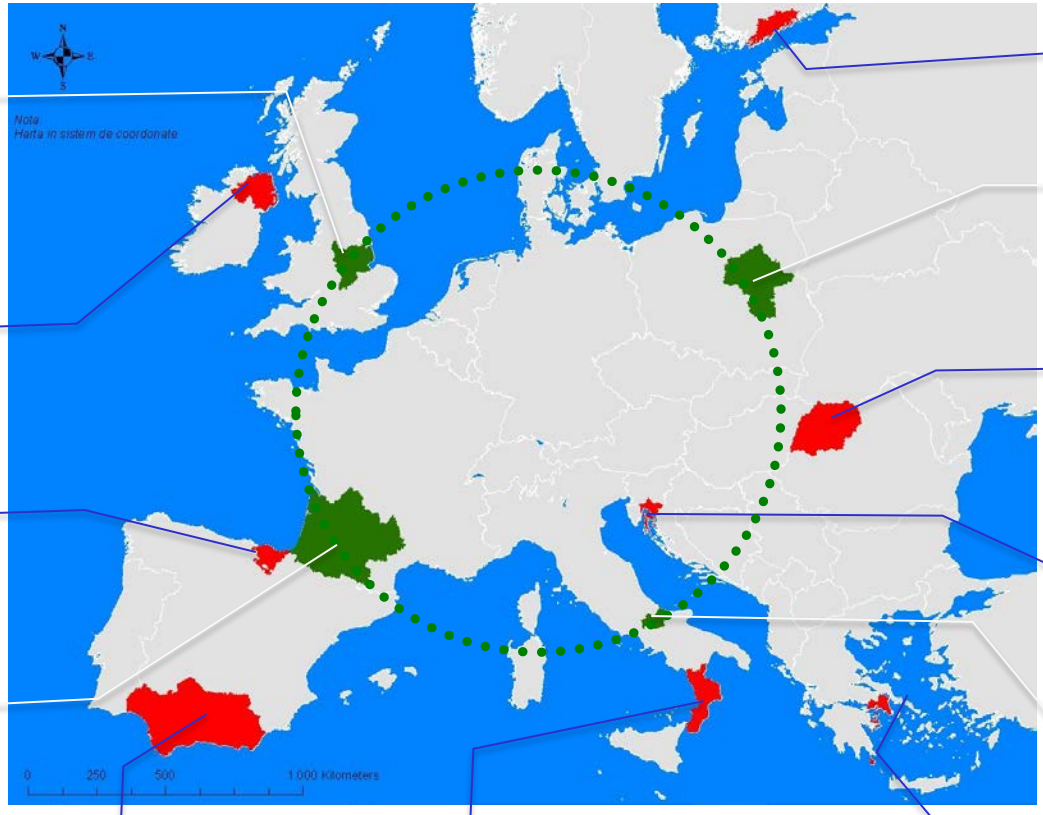
East Midlands (UK)

Northern Ireland (UK)

Basque Country (SP)

Midi-Pyrénées – Aquitaine (FR)



Uusimaa (FIN)

Mazovia (POL)

North-West Region (ROM)

Primorje-Gorskie (Croatia)

Molise (IT)

Andalucia (SP)

Calabria (IT)

Attica (GRE)

THE ISSUE

THE ISSUE “TRIPLE HELIX ”

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TRIPLE HELIX **OF ACTORS**

TRIPLE HELIX **OF THEMES**

THE ISSUE: Four Key Stages

Research & Technological Development (RTD) Capabilities in THE ISSUE Triple Helix Research Clusters

Priority Transport and Urban Mobility challenges impacting on the economy, environment and people's health in European cities and regions

Roadmap for new RTD Traffic, Health and Environment Applications in urban and regional economies across Europe

Model Programme of 20 priority RTD Actions to address 6 key Societal Challenges

THE ISSUE: Stage One

Mapping technological expertise in *ICT and Space Data Products and Services* of businesses and research centres in each regional cluster in fields of activity associated with priority themes of THE ISSUE

Database of technical expertise including:

- 300 small and medium sized enterprises
- 60 large enterprises
- 110 research centres
- 300 existing projects

THE ISSUE: Stage Two

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Analysing the Transport and Urban Mobility challenges impacting on the economy, environment and people's health in European cities and regions

Reviewing 30 local and regional transport plans, covering 130 local authority areas within THE ISSUE Consortium

Identifying the priority challenges facing cities and regions

THE ISSUE: Stage Three

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Roadmap for new RTD Traffic, Health and Environment Applications using ICT and Space Data Products and Services in urban and regional economies across Europe

Addressing barriers to exploitation

Accessing new enabling and cross-cutting technologies

Bringing to bear innovative research and blue skies thinking

Model Programme of 20 Priority RTD Actions for 2020

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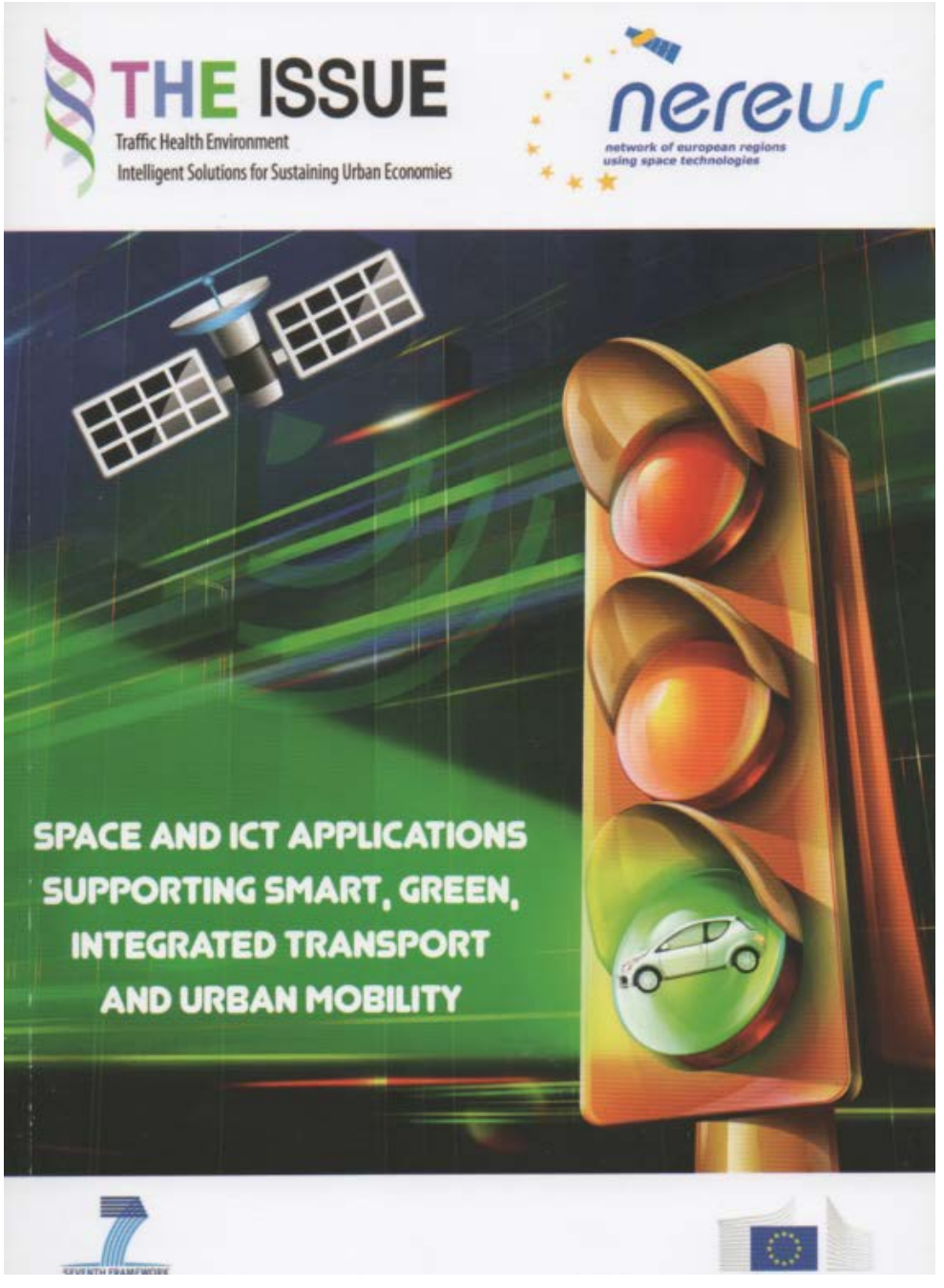


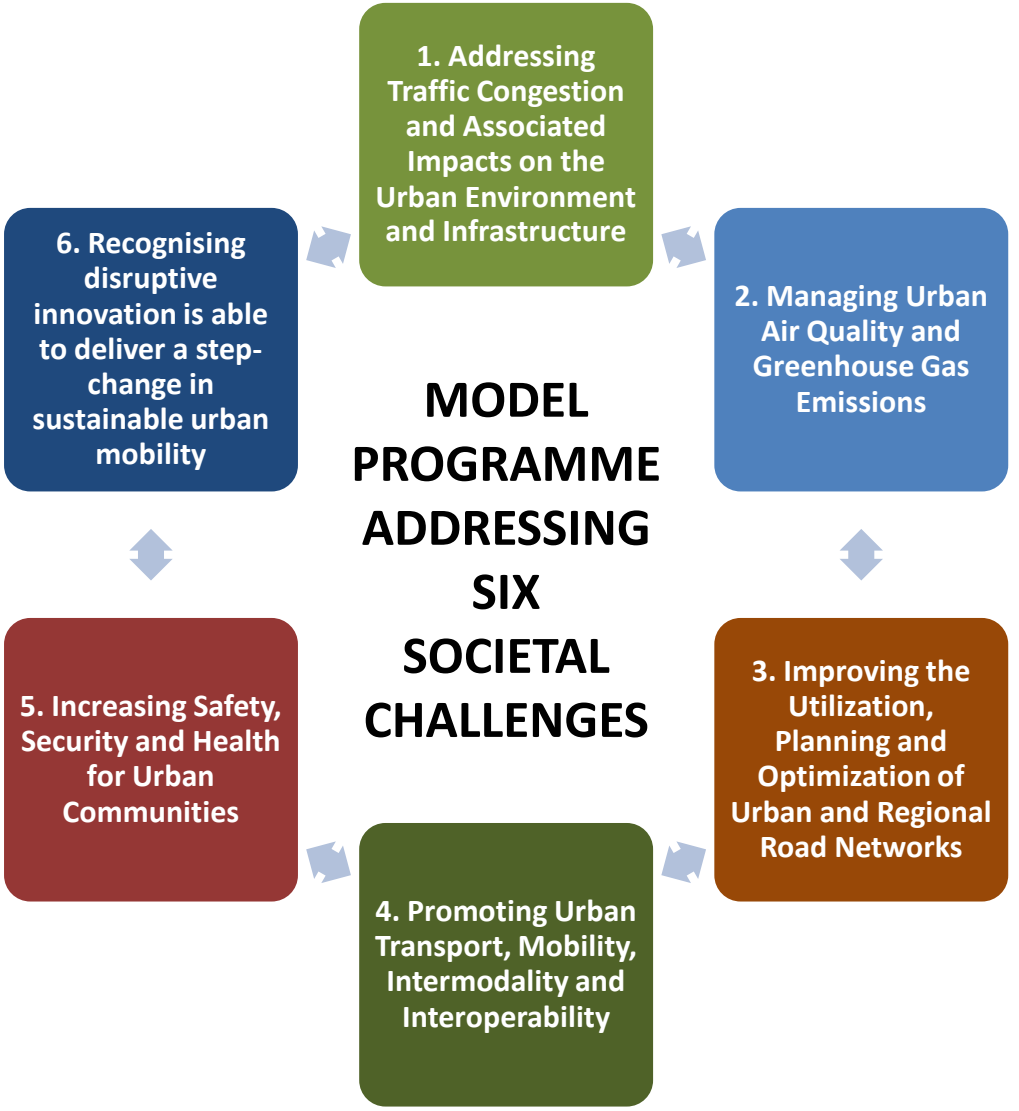
THE ISSUE Project:
"Triple Helix" Regional Academic/ Industry/Public Authority Partnerships.

R&D base with 300 RTD projects identified across THE ISSUE Consortium.

50% relevant to sustainable transport development objectives of Local and Regional Authorities.

40 Case Studies of applications of Space and ICT technologies. Over 50% are university or university/academic collaborative projects. Most are TRL 3+

THE ISSUE: Stage Four



THE ISSUE: Stage Four

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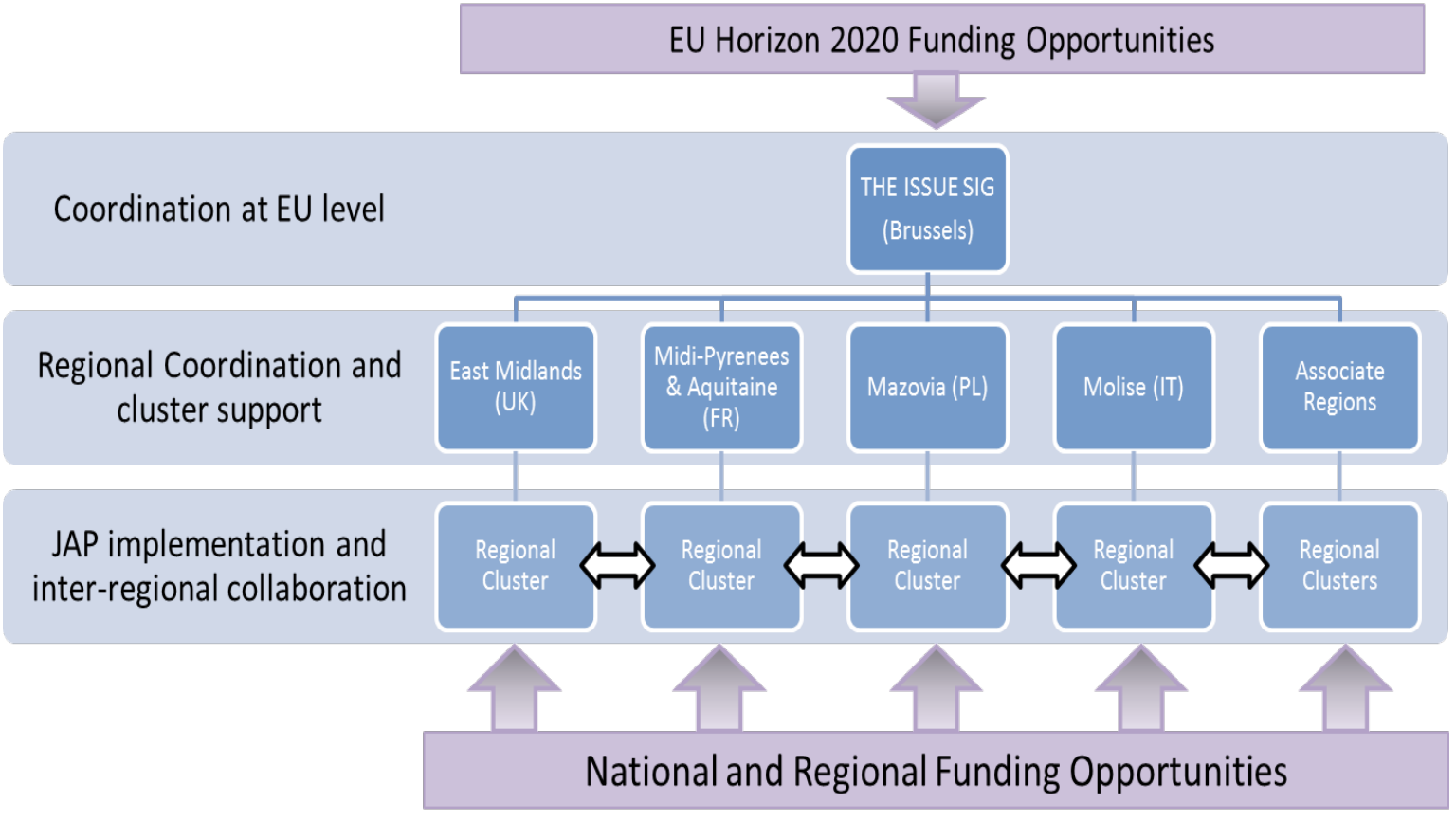
Exploiting the RTD capabilities in *ICT and Space Data Products and Services* within THE ISSUE Consortium

Offering urban and transport planners new, innovative, viable and sustainable solutions

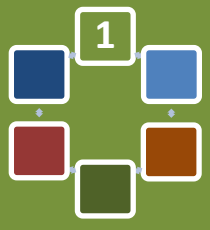
Delivered primarily through THE ISSUE Consortium and its legacy body – *A Transport Special Interest Group* - but outcomes widely transferrable

Accessing range of funding sources – Horizon 2020, European Structural and Investment Funds, National and Regional funding programmes

THE ISSUE Transport Special Interest Group



THE ISSUE's Model Programme
20 Priority RTD Actions for 2020



Challenge 1. Addressing Traffic Congestion and Associated Impacts on the Urban Environment and Infrastructure

THE ISSUE Priority RTD Actions:

1. Advanced Urban Traffic Management and Control systems.
2. Intelligent Traffic Systems for safety and incident management.
3. Intelligent Traffic Systems for use in transport planning.

Societal Challenge 1 Case Study

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iTRAQ : Integrated Traffic Management and Air Quality Control using Downstream Space Services (East Midlands Region)

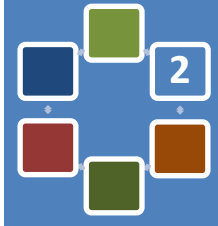
iTRAQ is a dynamic and adaptive traffic management system designed to optimize both traffic flow and air pollution in urban environments. The system responds to real-time traffic flow and air quality data from in situ and space based sensors to forecast enhanced traffic management strategies.

Local authorities have to meet the challenges of sustainable transport whilst complying with conflicting air quality targets.

Universities, industry and local authorities in the East Midlands Region in the UK collaborated in a feasibility study, funded by the European Space Agency, to demonstrate the use of computer intelligence and space data in a new approach to real time traffic and air quality management.

Simulation test results confirmed a reduction in traffic delay while increasing traffic flow and optimising local air quality.

THE ISSUE's Model Programme
20 Priority RTD Actions for 2020



Challenge 2. Managing Urban Air Quality & Greenhouse Gas Emissions

THE ISSUE Priority RTD Actions:

4. New integrated systems using space, airborne and in situ sensors to monitor air quality & identify sources of emissions in urban areas.
5. New tools to support the regulation of emission levels.
6. Satellite technology to determine greenhouse gas emissions.
7. Advanced sensor monitoring and model forecasting of emission levels.

Societal Challenge 2: Case Study

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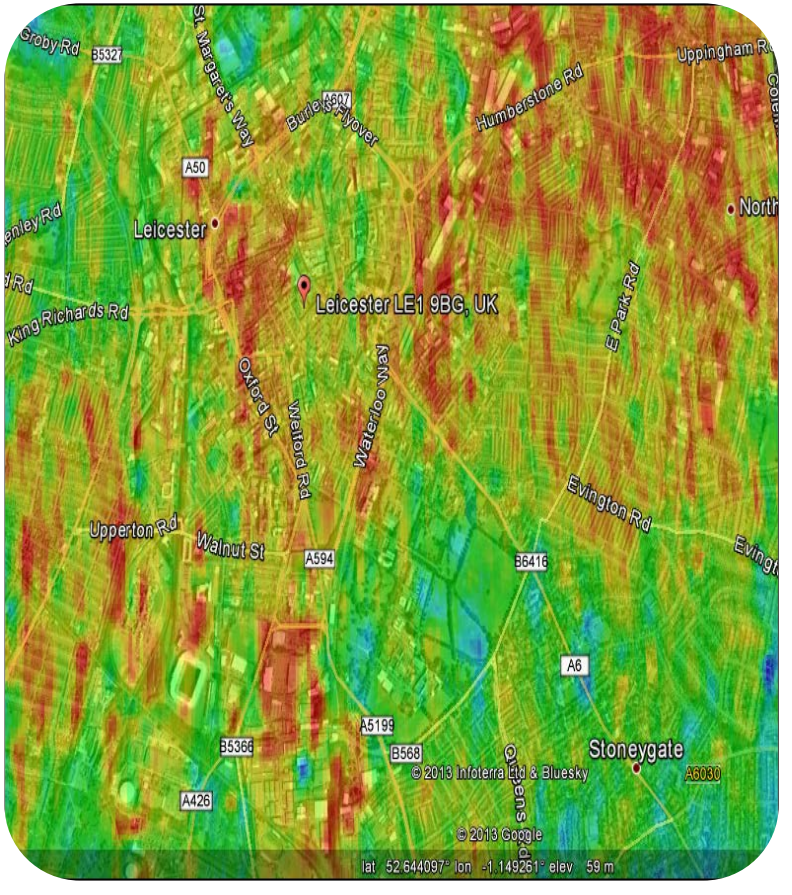
Airborne Air Quality Mapping for Improved Modelling (East Midlands Region)

The Airborne Air Quality Mapper was developed as a satellite prototype instrument at the University of Leicester's Space Research Centre to map Nitrogen Dioxide.

Accurate air quality modelling is essential to confirm understanding of the emissions, chemistry and dynamics of urban environments. Validation of complex models is challenging given the sparse nature of traditional sampling networks. A new mapping technology has been developed which enables NO_2 concentrations to be mapped at 30 m resolution over entire cities.



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20 Priority RTD Actions for 2020

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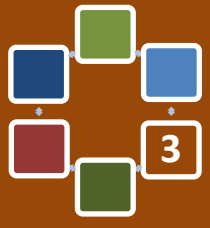

Challenge 3. Improving the Utilization, Planning & Optimization of Urban & Regional Road Networks

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THE ISSUE Priority RTD Actions:

8. Integrated technologies & techniques to help improve transport and physical planning.
9. Innovations in data gathering, fusion & processing from multiple sources.
10. Satellite and airborne-based technologies and Open Source GIS for transport and physical planning.

Societal Challenge 3: Case Study

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An emission dynamic meso-simulation model to evaluate traffic strategies in a wide urban network

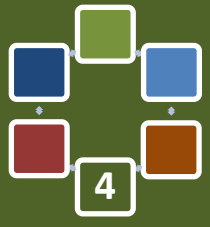
A new dynamic meso-simulation model, which supports mobility policies, taking into account both pollutant emissions and congestion. The model is based on mesoscopic approach considering daily variations of traffic conditions and parameters related to the different types of vehicles. This new tool is able to coordinate traffic management policies and on-line traffic control operations.

The developed dynamic emission model and the results from a real-life application at Brindisi (Italy) road network have been presented at the 19th ITS World Congress (2012). The application results show more reliable estimations with respect to the standard macroscopic approach, specifically in the "stop and go" conditions.

Also involves impact analysis of the adoption of strategies to reduce emissions, such as optimization of signaling at intersections, the optimization of a system of one-way streets and changes of the vehicle fleet composition.

Pollutant emissions could be reduced up to 50% for CO, 30% for NOx and 20% for PM.

THE ISSUE's Model Programme
20 Priority RTD Actions for 2020



Challenge 4. Promoting Urban Transport, Mobility, Intermodality and Interoperability

THE ISSUE Priority RTD Actions:

11. Localization-based services for mobile citizens.
12. Tracking services for freight transport.
13. Predicting and managing the behaviours of crowds.
14. Innovative travel planning tools based on GIS Technologies.
15. Smart integrated ticketing.

Societal Challenge 4: Case Study

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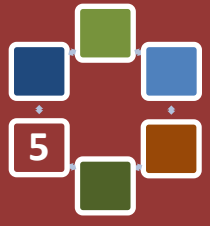
ANGEO : Pedestrian GPS for blind and visually impaired people (Aerospace Valley)

ANGEO, as a technical tool to support movement, encourages the visually impaired to develop their residual visual capabilities and their strategies of movement acquired from training institutes to detect the dangers nearby. Moreover, ANGEO represents a link between our urban society and a portion of the population having difficulties to live in this urban environment.

The product is born from a six-year research project certified by AEROSPACE VALLEY cluster. ANGEO is a so-called hybrid technology that uses calculated location by the GPS receiver when it is good, and combines it with the relative move estimated from inertial sensors contained in the embedded ANGEO-Mobile kit when the GPS signal is not available. To implement this technology, a unique patented mathematical algorithm imitating human walk has been developed. The ANGEO algorithm recalculates raw signals and gets 4 times more accurate results than the standard position given by the GPS. The accuracy is 3 to 5 meters.

THE ISSUE's Model Programme
20 Priority RTD Actions for 2020



Challenge 5. Increasing Safety, Security and Health for Urban Communities

THE ISSUE Priority RTD Actions:

16. New monitoring & mapping systems for road safety tools.
17. New incident control and management systems for the road network before, during and after incidents.
18. Traffic systems that respond to community health issues.
19. Security and location tracking for freight road traffic.

Societal Challenge 5: Case Study

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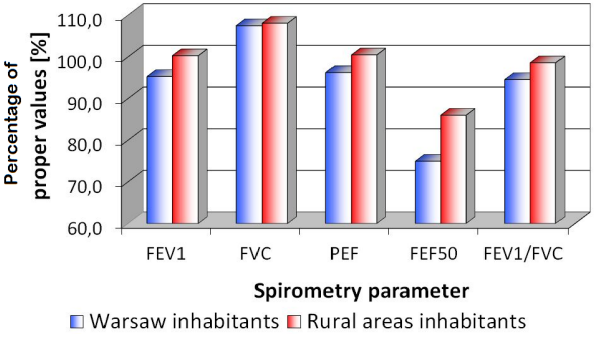
Traffic-related air pollutants as a risk factor of respiratory diseases (Mazovia Region, Poland)

Research programme of the health status of people living close to busy roads

In Warsaw (Poland) a study on the influence of traffic-related air pollutants on the health of people living close to busy roads has been conducted. People living in the vicinities of busy roads have lower values of respiratory function parameters and higher risk of bronchial obstruction.

Results of the study indicate that long-term residence near a busy street can significantly exacerbate the respiratory health status. All of the important spirometry parameters were statistically significantly lower among inhabitants of Warsaw in comparison to the residents in rural areas. A positive effect of practicing sports on the growth of spirometry parameters has also been observed. The results of the study indicated possible synergistic effects between air pollution and tobacco smoking among smokers.



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THE ISSUE's Model Programme
20 Priority RTD Actions for 2020

Challenge 6. Recognising disruptive innovation is able to deliver a step-change in sustainable urban mobility

THE ISSUE Priority RTD Actions:

20. SMART solutions for sustainable cities, regions and transport networks, including:
    - Triple-helix collaborations (industry, universities, public sector) to promote more effective organisational collaborations;
    - ITS solutions for changing user behaviour and overcoming barriers to modal shift;
    - Measures to overcome existing barriers and improve uptake of Low Carbon Vehicle Technology.

Societal Challenge 6: Case Study

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A TRIPLE HELIX partnership

Foresight Planning Technique: economic and scientific priorities for urban development through industry, local authority and academic partnerships (THE ISSUE Consortium).

Foresight Planning is the capacity to anticipate change in an area of future interest. Futures are informal scenarios that explore how a situation might evolve. THE ISSUE has undertaken a Foresight consultation concerned with the future for Transport, Health and the Environment in urban regions in Europe, on 10 year and 20 year timeframes. The remit: “to improve the efficiency and innovative use of transport infrastructures”.

The conclusions from the Foresight Planning are:

A 10-year *Futures* view anticipates impacts on mobility patterns due to rising fuel costs, pollution impacts and reduced government investment in infrastructure and services.

A 20-year *Futures* anticipates that ICT developments, autonomous and low energy vehicles could fundamentally change the way that the road infrastructure is used, allocated and paid for, whilst still satisfying continuing preference for individual mobility within a sustainable and low carbon environment.

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Traffic Health Environment

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