Authors

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Isaac de Frutos
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Paulo Gomes
## Revision and history chart

<table>
<thead>
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<th>VERSION</th>
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<th>COMMENTS</th>
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| 0.1     | 26/09/2011 | Emilio Cacheiro  | 1st draft.  
The main updates respect to the deliverable in M1 are:  
• New template  
• New Structure sketch  
• WPs summary of activities |
| 0.2     | 29/09/2011 | Emilio Cacheiro  | 1st draft updated with:  
• WP2000 summary of activities  
• S6 and S7 description: new sketch |
| 0.3     | 30/09/2011 | Emilio Cacheiro  | 1st draft updated with Alfonso Basabe and Miguel Seisdedos (IRIDIUM) comments |
European Field Operational Test on Safe, Intelligent and Sustainable Highway Operation

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< position >
• Overview
• Objectives
• Services
• Work Plan
• Test-Sites
• Consortium
• Project Main Figures
OVERVIEW
Many EC-funded research efforts have approached cooperative systems from a vehicle perspective.

Some current projects related to cooperative systems have influence in the infrastructure.

There are almost not private Infrastructure Operators involved in ICT for Transport projects.

Spanish OASIS initiative for developing the Highway of the Future, starting point for Infrastructures participation in European projects: FOTsis.

FOTsis is one of the two Integrated Projects approved in the Call ICT for Mobility of the Future (FP7-ICT-2009-6).
FOTsis is a large-scale field testing of the road infrastructure management systems needed for the operation of close-to-market cooperative I2V & V2I technologies, in order to assess in detail both 1) their effectiveness and 2) their potential for a full-scale deployment in European roads.

FOTsis represents a step forward to better connect vehicles, infrastructures and traffic management centres.
FOTsis can contribute to a safer, more intelligent and more sustainable road transport system.

FOTsis will test 7 services in several experimental environments throughout Europe:

- S1: Emergency Management
- S2: Safety Incident Management
- S3: Intelligent Congestion Control
- S4: Dynamic Route Planning
- S5: Special Vehicle Tracking
- S6: Advanced Enforcement
- S7: Infrastructure Safety Assessment
FOTsis main objective is to test the infrastructure’s capability to provide the aforementioned 7 services.

FOTsis will review the following elements in connection to the infrastructure:

- Communication networks
- Integrated ITS Systems
- Interaction between Infrastructure and Users
- Infrastructure Management Tools for Safety and Mobility
- Regulatory Framework
- Stakeholders’ Relations
- Impact on Safety, Mobility and Sustainability
Infrastructure as cooperative services provider:

- Government
- Emergency services
- Road operators and service providers
- Develop I2V and V2I communications
- Integrate existing in-vehicle services
- Test close-to-market ITS services

End users
OBJECTIVES
FOTsis General Objectives:

- FOTsis can contribute to a Safer, more Intelligent and more Sustainable road transport system
- Develop a common ITS & Communication Architecture for the European infrastructures
- Develop and test FOTsis Cooperative Services
- Promote the implementation of this Architecture and these Services in the existing and future highways
- Generate Business Models to promote these Services
- Dissemination Cooperative Services vs. Infrastructure
- Ensure that the Infrastructure is prepared to current and future Cooperative Services
FOTsis will develop its General Architecture according to European Standards.

FOTsis aims to integrate different existing solutions of:

- On Board Units
- Communication access
- Road Side Equipment
- Control Centre Systems

FOTsis will cooperate with parallel FOTs and related R&D initiatives towards an European interoperability & standardization of Cooperative Services.

FOTsis will be open to disseminate technical tools promoting the deployment of ITS Cooperative Services in European motorways network.
GENERAL ARCHITECTURE

ITS Data Acquisition

Traffic Management Module

Alert/Incident Management Module/Procedures

Emergency Management Module/Procedures

ITS Equipment / Data Control

ROAD SIDE

EXTERNAL ACTORS

VEHICLE

Galileo/GPS/Glonass

Cell ID (Localisation services GSM)

Localisation equipment /OBU

PDA / Mobile Phone

Vehicle
• Accident detection (vehicle & infrastructure)
• Infrastructure data emission to the PSAP and generation of the eCall-i
• Emergency management protocol activation including emergency vehicles recommendations and information disseminated to drivers
S2. SAFETY INCIDENT MANAGEMENT

- Incident detection by roadside equipment. Starting automatic action management protocols should an incident occur.
- Processing and analysis of data in control centre, taking into account the implications to existing traffic.
- Information disseminated to drivers/users of the infrastructure by means of different media formats (I2I & I2V communications).
• Traffic management system based on new predictive traffic engineering algorithms

• Estimate traffic conditions based on the correlation between weather forecasts and traffic sensor data

• Improve traffic load balancing in the road networks from the integration of dynamic data from diverse traffic information sources including control strategies → dynamic speed limit

• Information disseminated to drivers/users using I2I & I2V communications
• Personalised route calculation (from the infrastructure) based on Rules System obtained from Service 3

• Alternative route evaluation:
  ✓ Current travel time delay on the main and alternative route
  ✓ Forecasted travel time delay from now into the future
  ✓ Travel time delay between normal and alternative route at normal traffic
  ✓ Information disseminated to the users/drivers by a nomadic device (I2V)
• Special vehicles communicate critical in-vehicle information to the infrastructure

• The infrastructure monitors the special vehicle conditions, and deploys intervention protocols should an emergency occurs
S6. ADVANCED ENFORCEMENT

- Integration of infrastructure data with vehicle data to carry out enforcement of traffic (e.g. speed limits) or other rules related to the use of a road infrastructure (e.g. obligation of the use of a DSRC OBU)

- Notification of rules and infractions to the drivers by I2V/V2I communications
Infrastructure safety assessment analysing information provided by the infrastructure and in-vehicle information (concept of OBU as a black box)

Reconstruction of specific safety-related situations and driving behaviour (post-processing)

Evaluation of safety in specific stretches of a highway
WORK PLAN
### Timeline of Work Packages

<table>
<thead>
<tr>
<th>Id.</th>
<th>Work package</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
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<tr>
<td>1</td>
<td>WP1000: COORDINATION</td>
<td>T4</td>
<td>T1</td>
<td>T1</td>
<td>T4</td>
</tr>
<tr>
<td>2</td>
<td>WP2000: FOT DESIGN</td>
<td>T4</td>
<td>T3</td>
<td>T2</td>
<td>T4</td>
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<td>3</td>
<td>WP3000: FOT EXECUTION</td>
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<td>4</td>
<td>WP4000: EVALUATION &amp; ASSESSMENT</td>
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<td>T4</td>
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<tr>
<td>5</td>
<td>WP5000: DISSEMINATION &amp; EXPLOITATION</td>
<td>T1</td>
<td>T2</td>
<td>T3</td>
<td>T1</td>
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</tbody>
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- **Project Begin Date:** April 1\(^{st}\) 2011
- **Project End Date:** September 30\(^{th}\) 2014
- **Project Duration:** 42 months
- **Project KOM:** April 13\(^{th}\) – 14\(^{th}\) 2011
WP1000: COORDINATION

• **General objectives:**
  - To define and manage the overall project organisation ensuring smooth and efficient running of FOTsis towards its goals
  - To guarantee fluent communication channels through discussions and Consortium meetings amongst the partners and with the European Commission

• **Start - End date:** M1 – M42

• **WP leader:** IRIDIUM
Project Start:
• Grant Agreement signed during March 2011
• Consortium Agreement signed during April 2011
• Project Kick Off Meeting held days 13th and 14th of April 2011 in Madrid
• Financial and Administration Training

Deliverables:
• D1.1 Annual Presentation (M1 & M6)
• D1.5 Consortium Administration Manual (M3)
• D1.6 Quality & Risk Management Manual (M3)

Meetings:
• 1st SC Meeting held on the 14th of July 2011 in Madrid
• 2nd GA and SC to be held on 13th and 14th of October 2011 in Munich

FOTSis tools:
• Online management tool (Project Place) setup in June 2011 and running since then
**General objective:** To plan main FOTsis activities (to be undertaken in WP3000 and WP4000)  
Produce a detailed FOTsis Manual

FOTsis Manual based on FESTA Methodology and adapted to the needs of FOTsis services and Test-Communities. Manual updated on a regular basis in order to take into account the scientific and technical developments in the V2I & I2V domain area.

**Start - End date:** M1 – M30

**WP leader:** GMVIS SKYSOFT
WP Start / Meetings:

- WP2000 Kick Off Meeting held 20th of May 2011 in Lisbon
- WP2000 2nd workshop held 15th September in Tres Cantos (Madrid)
- These two meetings gather all involved partners to discuss services and common architecture issues

Deliverables:

- D2.1 FOTSIS Manual: 1st Version – D2.1.1 (M6)
- D2.2 Test Communities Overview: 1st Version – D2.2 (M6)
- D2.4 Services Specifications: 1st Version – D2.4.1 (M6)
- D2.6 V2I & I2V Cooperative Systems Monitoring: 1st Version – D2.6.1 (M6)

Work up to now focused on:

- Describing in detail the FOTsis services and test-sites
- Aligning and describing the common parts of the FOTsis trials (namely the ones involving the common database that will be the basis for the services evaluations)
• **General objective:** To design, develop and validate 9 test-sites (in Spain, Portugal, Germany and Greece) by means of conducting both large-scale and detailed trials for assessing the road infrastructure management systems needed for the operation of the cooperative I2V & V2I & I2I FOTsis services described in WP2000

• **WP3000 is the largest WP in FOTsis, accounting for more than 50% of the total project costs. It constitutes the first large-scale approach at European level, to set up Field Operational Tests for traffic managements centres**

• **Start - End date:** M7 – M36

• **WP leader:** OHL Concesiones
WP Start / Meetings:

- WP3000 Kick Off Meeting held 16th of September 2011 in Tres Cantos (Madrid)

Main activities:

- Links WP2000 – WP3000 analyzed
- General Architecture design
- General Time Schedule proposed for:
  - Pilot Tests: Architecture’s pilot test and Services’ pilot test
  - Field Operational Tests (FOT): Large-scale and Detailed
- Working Groups:
  - General Architecture WG
  - Test-Sites WG
  - Tools & Developments WG (RQs WG & PIs WG)
  - WP3200-WP3700 WG
WP4000 General description

WP4000: EVALUATION & ASSESSMENT

- **General objectives:**
  - To evaluate and assess data collected in the trials undertaken in WP3000
  - Identify the impacts of the operation of the seven FOTsis services in real traffic conditions from a safety, mobility and sustainability point of view
  - Effectiveness and potential for a full-scale deployment

- **Start - End date:** M13 – M39

- **WP leader:** UPM
WP4000 Summary of activities

WP Start / Meetings:

- WP4000 not started yet (WP start on M13)
WP5000 General description

WP5000: DISSEMINATION & EXPLOITATION

- **General objectives:**
  - Create awareness of FOTsis activities and recommendations
  - Elaboration of dissemination material and means for communications
  - Open dialogue with government, industry, users and other relevant stakeholders to create strategies to foster a full deployment of FOTsis services in European Roads

- **Start - End date:** M1 – M42

- **WP leader:** IRIDIUM
WP Start / Meetings:

- WP5000 Kick Off Meeting held days 1st June 2011 in Brussels

Deliverables:

- D5.2 Identity Handbook (M3)
- D5.3 Web Site (M3)
- D5.4 Brochures & Posters (M6)
- D5.5 FOTsis e-Newsletter (M6)

Dissemination activities:

- Participation in events: FOT-Net, ROAD INFRASTRUCTURE SAFETY FORUM, Drive C2X KOM, Preserve KOM, Concertation Meeting, ASECAP Days, ITS Europe, DIGITAL AGENDA
- Articles & Brochures: FOT-Net Newsletter, FOTsis Brochure for ASECAP Days, FOTsis Fact Sheet for EC publication, Thinking Highways, Autostrada

FOTsis tools:

- FOTsis Website [www.fotsis.eu](http://www.fotsis.eu) / [www.fotsis.com](http://www.fotsis.com) setup in June 2011 and running since then
### WP5000 Events

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<tr>
<td>FOT-Net 4th Stakeholders Meeting</td>
<td>2nd December 2010</td>
<td>Brussels</td>
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<tr>
<td>ROAD INFRASTRUCTURE SAFETY FORUM</td>
<td>14th December 2010</td>
<td>Brussels</td>
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<tr>
<td>&quot;New Challenge Ahead&quot;</td>
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<td>Drive C2X Project Kick-Off Meeting</td>
<td>28th January 2011</td>
<td>Turin</td>
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<td>Preserve Project Kick-Off Meeting</td>
<td>1st February 2011</td>
<td>Enschede</td>
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<td>Concertation Meeting</td>
<td>4th &amp; 5th April 2011</td>
<td>Brussels</td>
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<td>FOT-Net Seminar: starting a cooperative system FOT</td>
<td>15th April 2011</td>
<td>Vigo</td>
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<td>39th ASECAP Days</td>
<td>31st May 2011</td>
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<td>FOTsis WP5000 Kick Off Meeting</td>
<td>1st June 2011</td>
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<tr>
<td>ITS Europe</td>
<td>6th to 9th June 2011</td>
<td>Lyon</td>
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<tr>
<td>DIGITAL AGENDA Workshop 12</td>
<td>16th June 2011</td>
<td>Brussels</td>
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**FOTsis Presentation**
Articles & Brochures:

- FOT-Net Newsletter – March 2011
- FOTsis Brochure for 39th ASECAP days – 30th May 2011
- FOTsis Fact Sheet for EC publication
- FOT-Net Newsletter – Next Edition
- Thinking Highways – Next Edition
- Autostrada – Next Edition
WP5000 Deliverables

Deliverables:

- June 2011, D.5.2 I Handbooks & D.5.3 Web Site
- September 2011, D.5.4 Brochures & Posters
- September 2011, D.5.5 FOTsis e-Newsletter

FOTsis Presentation
TEST-SITES
TEST-SITES

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<td>GREECE</td>
<td>Pathe Motorway</td>
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Map showing locations in Europe with labels for test sites and regions.
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<td>Pathe Motorway</td>
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Location
Madrid, Spain

Infrastructure operator
Autopista Eje Aeropuerto
Grupo OHL

Total length: 9.4 kms

Short description
Connection to Madrid’s airport. It has a 1.7 kms tunnel, multiple links and intersections, and quite full ITS equipment.

Services to be tested:
S1 Emergency Management and S2 Safety Incident Management
Test-site A2 (1st stretch)

- **Location**: Madrid, Spain

- **Infrastructure operator**: Autovía de Aragón Tramo 1

- **Total length**: 56.1 kms

- **Short description**: Central and Northeast connection. Urban area with intense traffic. First stretch (exit from Madrid)

- **Services to be tested**: S3 Intelligent Congestion Control and S4 Dynamic Route Planning
● **Location**
  Medinacelli-Calatayud, Spain

● **Infrastructure operator**
  AUMECSA

● **Total length:** 88.42 kms

● **Short description**
  Central and Northeast connection. Interurban highway. Third stretch A2.

● **Services to be tested:**
  S2 Safety Incident Management and S5 Special Vehicle Tracking
Test-site Baixo Alentejo

- **Location**
  Grândola, Portugal

- **Infrastructure operator**
  Planestrada, S.A.

- **Total length**: 350 kms

- **Short description**
  A26 – Highway Sines / Beja, located in south of Portugal, a new road connection between the Atlantic coast and the center of Alentejo

- **Services to be tested:**
  S5 Special Vehicle Tracking and S7 Infrastructure Safety Assessment
• Location
  Faro, Portugal

• Infrastructure operator
  Marestrada, S.A.

• Total length: 270 kms

• Short description
  Roads: EN125, EN125-10, IC4, EN398, EN270, ER270, IC1, EN266, EN268, EN124, EN124-1, EN396

• Services to be tested:
  S6 Advanced Enforcement and S7 Infrastructure Safety Assessment
• Location: Munich, Germany

• Infrastructure operator
  
  ABDS
  Motorway Authority of Southern Bavaria

• Total length: 125 kms

• Short description
  All three highways are well equipped with detectors and control facilities:

  ✓ A99 is a ring road distributing the traffic around Munich
  ✓ A9 is part of the North- South European route E45
  ✓ A92 connects the airport to the highway network and is used as an alternative route from the West to the North of Munich.

• Services to be tested: S3 Intelligent Congestion Control and S4 Dynamic Route Planning
• **Location**
  Athens to Maliakos, Greece

• **Infrastructure operator**
  Nea Odos S.A.

• **Total length:** 183.5 kms

• **Short description**
  ✓ Tolled Motorway. Urban, rural, open/closed track.
  ✓ Traffic Figures: 40,000 vehicles per day (20% heavy vehicles).

• **Services to be tested:**
  S1 Emergency Management and S6 Advanced Enforcement
CONSORTIUM
## Consortia: List of Beneficiaries

### Highway Operator
- Iridium (Spain)
- OHL Concesiones (Spain)
- Planestrada (Portugal)
- Marestrada (Portugal)
- Nea Odos (Greece)

### Technology Integrator
- Sice (Spain)
- Indra (Spain)
- ACB Systems (Germany)
- GMVIS Skysoft (Portugal)
- Transver (Germany)
- Terna Energy (Greece)
- GMV Sistemas (Spain)

### Research Centre
- Ilmatieteen Laitos (Finland)
- Center for research and technology Hellas (Greece)
- Centro de innovación de infraestructuras inteligentes (Spain)

### Map & Content Provider
- Geoville (Austria)

### Users Association
- Federation International de l'automobile (France)

### Industry Association
- European Union Road Federation (Belgium)
- Association Europeenne des concessionnaires d'autoroutes et d'ouvrages à peage (France)

### University
- Universidad Politécnica de Madrid (Spain)
- Aalto University Foundation (Finland)

### Telecommunications Operator
- France Telecom (France)
- Optimus (Portugal)

### Telecommunications Operator
- Terna Energy (Greece)
- GMV Sistemas (Spain)

### Telecommunications Operator
- Sice (Spain)
- Indra (Spain)
- ACB Systems (Germany)
- GMVIS Skysoft (Portugal)
- Transver (Germany)
- Terna Energy (Greece)
- GMV Sistemas (Spain)
### MAIN PROJECT DATES

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<td>Proposal Submission</td>
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<tr>
<td>Project End Date</td>
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<td>Project Time Frame</td>
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### MAIN ECONOMICAL FIGURES

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European Field Operational Test on Safe, Intelligent and Sustainable Highway Operation

Thank you for your attention!

For more info please contact: management@fotsis.eu