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DRIVE C2X project overview

Pan-European field operational test on cooperative systems based on CAR-2-X communication using WLAN and 3G communication technologies

• **Project Info:**
  • Start in January 2011, 3½ years duration
  • EC project 7th Framework program
  • Successor of PRE-DRIVE C2X project

• **Consortium:** 33 partners, 13 support partners
  • Coordinator: Daimler AG
  • Automotive OEMs, electronics and supplier industry, IT and road traffic engineering, research institutes, road operators and others

• **Objectives:**
  • Carry out a comprehensive assessment of cooperative systems through extensive European Field Operational Tests (FOT)
  • Create and harmonize a European-wide testing environment for cooperative systems
  • Coordinate the tests carried out in parallel throughout the DRIVE C2X community
  • Evaluate cooperative systems, promote cooperative driving

• **Liaisons**
**DRIVE C2X project overview: Use cases**

### Safety
- Approaching emergency vehicle
- Car breakdown warning
- Emergency electronic brake lights
- Motorcycle approaching indication
- Obstacle warning
- Road works warning
- Slow vehicle warning
- Traffic jam ahead warning
- Weather Warning
- Post crash warning

### Traffic Efficiency
- In-vehicle signage
- Traffic information and recommended itinerary
- Green-light optimal speed advisory

### Infotainment & Business
- Dealer management
- Fleet management
- Insurance & financial services
- Point-of-interest notification
- Transparent leasing

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**Project start date:** 01.01.2011  |  **End date:** 30.06.2014

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*5th ETSI ITS Workshop, 5 Febr 2013*
DRIVE C2X project overview: Test sites

Seven test sites:

• System test site:
  • Helmond/Eindhoven, The Netherlands

• Functional test sites:
  • Tampere, Finland,
  • Yvelines, France,
  • Frankfurt, Germany,
  • Brennero, Italy,
  • Gothenburg, Sweden
  • Vigo, Spain
DRIVE C2X Current status and achievements

FOT Framework
- Methodology framework
- Specification
- Technology enhancement
- Testing tools

FOT Operations
- System validation
- Test site adaptation
- Piloting

FOT Evaluation
- Evaluation framework
- Data & data quality
- Technical evaluation
- Impact assessment

- DRIVE C2X reference system specified, implemented, tested
- DRIVE C2X reference system validated at System Test Site
- Test site adaptation almost completed
- Piloting starting & progressing
Links between DRIVE C2X and ETSI TC ITS

- Contributions to base standards and test specifications
- Participation in ETSI™ Plugtests
- Experts in STFs
  - Such as STF 424 (ITS test platform), STF 447 (GeoNetworking ITS-G5)

5th ETSI ITS Workshop, 5 Feb 2013
Drive C2X
@ ITS world congress

• Joint demo of CAR 2 CAR Communication Consortium and Testfeld Telematik (TT) powered by DRIVE C2X

• Exhibition at EU exhibition area, 2 special sessions, 8 technical papers
Drive C2X @ Gothenburg, June 2013

- 3rd test site event in conjunction with general assembly and EU/US task force meeting, 12–14 June 2013
- Host: Swedish test site, Gothenburg

Planned activities:
- Demo day for experts (Thu 13 June)
- Public day for general public (Fri 14 June)
- Workshops, staged driving demonstrations
- Visit Swedish TMC
On-going standardization activities

• DRIVE C2X strives for **complete and consistent set ready for deployment**
  • Clear focus on safety and traffic efficiency based on ITS-G5 radio
  • Completion of base standards
    • CAM, DENM, GeoNetworking, ITS-G5 access, security protection
  • Identified gaps – work in progress
    • Decentralized congestion control
    • Multi-channel operation
    • Security
    • Interfaces
    • Infrastructure message (MAP, SPAT, ...)
    • Interference mitigation between CEN DSRC and ITS-G5
Summary and Outlook

- Pan-European field trial for impact assessment of cooperative ITS
- System test site and several functional test sites across Europe
- DRIVE C2X reference system fully complies with the standards developed in ETSI Technical Committee ITS as part of the EC mandate M/453
- Contributions to standardization process: development of base & test standards, Plugtests, experts in STFs
- Experiences and lessons learned are fed back to ETSI TC ITS
- Testing supports SW & system integration and enables interoperability
### C2X Core standards considered in DRIVE C2X

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<th>#</th>
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<th>Version</th>
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<td>V1.2.0 (2012-11)</td>
<td>Access layer specification for Intelligent Transport Systems operating in the 5 GHz frequency band</td>
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<td>Vehicular Communications; Geographical Area Definition</td>
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<td>V2X Application; Part 1: Road Hazard Signalling (RHS) application requirements specification</td>
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