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Collaboration with other H2020 projects

Deliverable 1.1
Collaboration with other H2020 projects
Work package 1, Deliverable 1.1

Please refer to this report as follows:


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Duration: 36 months

Organisation name of lead contractor for this deliverable:
Loughborough University, UK LOUGH

Report Author(s):
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Executive summary

SafetyCube was one of five projects to be funded under the H2020 Topic MG-3.4-2014 Traffic Safety Analysis and Integrated Approach towards the Safety of Vulnerable Road Users. The five projects were invited by the European Commission to explore the possibilities to cooperate in technical and dissemination aspects.

Early collaborations have been established between SafetyCube and other projects supported under the H2020 Topic MG-3.4-2014 Traffic Safety Analysis and Integrated Approach towards the Safety of Vulnerable Road Users. A series of joint activities have been conducted including:

- Project Coordinator collaboration meeting
- Joint Session at Transport Research Arena Conference, Warsaw April 2016
- Informal joint project meeting at TRA
- Specific Joint Work Package meetings with InDeV in relation to the estimation of accident costs

Future joint activities are planned to further explore collaboration opportunities between SafetyCube and other projects:

- Invitation to other project representatives to attend SafetyCube Mid-term workshop
- A joint session at the International Cycle Safety Conference in Bologna, November 2016
- Further Work Package level discussions to explore potential cooperation in estimating the under-reporting of crashes.
1 Introduction

1.1 SAFETYCUBE

Safety CaUsation, Benefits and Efficiency (SafetyCube) is a European Commission supported Horizon 2020 project with the objective of developing an innovative road safety Decision Support System (DSS) that will enable policy-makers and stakeholders to select and implement the most appropriate strategies, measures and cost-effective approaches to reduce casualties of all road user types and all severities.

SafetyCube aims to:

1. develop new analysis methods for (a) Priority setting, (b) Evaluating the effectiveness of measures (c) Monitoring serious injuries and assessing their socio-economic costs (d) Cost-benefit analysis taking account of human and material costs
2. apply these methods to safety data to identify the key accident causation mechanisms, risk factors and the most cost-effective measures for fatally and seriously injured casualties
3. develop an operational framework to ensure the project facilities can be accessed and updated beyond the completion of SafetyCube
4. enhance the European Road Safety Observatory and work with road safety stakeholders to ensure the results of the project can be implemented as widely as possible

The core of the project is a comprehensive analysis of accident risks and the effectiveness and cost-benefit of safety measures focusing on road users, infrastructure, vehicles and injuries framed within a systems approach with road safety stakeholders at the national level, EU and beyond having involvement at all stages.

1.1.1 Work Package 1

WP1 deals with the overall coordination of the project and the administrative work required for monitoring the progress of the project.

WP1 comprises a single task, Project Management, which runs continuously through the duration of the project. It is conducted by the Project Coordinator, Loughborough University (LOUGH), and comprises the following activities:

Provision of administrative and contractual infrastructure for project partners
• Liaison with European Commission concerning any contract amendments
• Preparation of Consortium Agreement and any amendments
• Periodic and final project reporting to European Commission
• Distribution of project partner payments
• Routine monitoring of partner time and budget expenditure

Coordination of project activities
• Chair of project Steering Committee
• Maintaining focus on project objectives
• Monitoring of project progress against time-plan, adjustments to activities as required
• Scrutiny of dependencies between Work Packages, identification of obstacles and opportunities

Communication
• Routine communication with European Commission as required
• Communication between partners – direction of project, achievements and progress
• Coordination of annual project plenary meeting
• Representing the Project to the external reviewers
• Coordination of end of project conference
• Representing project to external groups including related H2020 and national projects

**Quality Assurance**
The Coordinator is responsible for managing the project procedures to ensure the quality of the results and deliverables. A quality assurance procedure has been established to ensure that each deliverable conforms to the specifications laid down in the Work Package descriptions and fully addresses the project objectives to advance the state of knowledge concerning accident causation, risks and the effectiveness of measures. Every member of the partnership is invited to support this QA process, as established in the Deliverable Review Process document. External reviews will also be conducted by external expert for those deliverables considered fundamental. Members of the group will also be invited to conduct an annual review of the progress of the full project against the work plan and expected quality criteria.

**Risk management**
The Coordinator has the responsibility to maintain the project risk management plan. The first version of the plan is included in the Proposal. Should any unexpected high impact events occur during the course of the project the plan may need further updating. The plan is expected to represent the responses needed by the project team should adverse events occur that impact on the success of the project. The coordinator will establish a monitoring procedure to detect problems at an early stage in sufficient time to react optimally.

**Legal and ethical issues**
Legal questions may arise at any time during the project. Normally these may be difficulties with legal changes affecting partners, changes of legal status or financial issues. There may be some aspects of the project that initiate ethical considerations although none have been identified at the current time. Many of these issues may need to be addressed under the guidelines laid down in the Consortium Agreement and some may need amendments to the Grant Agreement. The Project Coordinator will ensure there is sufficient legal oversight of the project to enable all of these issues to be addressed properly, maintain full communication with the relevant project partners and where necessary the European Commission, and will ensure that obstacles are addressed rapidly and efficiently by the project team.

During the project contract finalisation phase the SafetyCube team were informed of four other research projects to be funded under the same topic MG-3.4-2014 Traffic Safety Analysis and Integrated Approach towards the Safety of Vulnerable Road Users and were invited to explore opportunities for synergies and collaboration. The projects and Co-ordinating organisations are as follows:

<table>
<thead>
<tr>
<th>Project</th>
<th>Description</th>
<th>Organisation</th>
</tr>
</thead>
<tbody>
<tr>
<td>InDeV</td>
<td>In-Depth understanding of accident causation for Vulnerable road users</td>
<td>Lund University, SE</td>
</tr>
<tr>
<td>Prospect</td>
<td>PROactive Safety for PEdestrians and CyclisTs</td>
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<td>Safety-ENhancing Innovations for Older Road userS</td>
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</tr>
<tr>
<td>XCycle</td>
<td>Advanced measures to reduce cyclists' fatalities and increase comfort in the interaction with motorised vehicles</td>
<td>University of Bologna, IT</td>
</tr>
</tbody>
</table>
1.2 PURPOSE OF THIS DELIVERABLE

The SafetyCube project team has conducted liaison activities with the four other MG 3.4 projects during the first year of the project duration. This brief management report describes the first stages of engagement between the SafetyCube team and the work packages of the other projects. It does not report on any further engagement between the projects that does not involve SafetyCube.
2 Summary of project liaison activities

This chapter describes the inter-project engagement activities undertaken in the first project year by the SafetyCube team and the outcomes in terms of project synergies.

Liaison activities between SafetyCube and other projects have taken place using a top down approach, based on interaction between Project Coordinators, and a bottom up approach based on communications between project partners.

SafetyCube commenced project activities on 1 May 2015 and all Work Packages were fully established by the end of 2015. To initiate closer communications between the projects a web-based project liaison meeting was held on 4 March 2016. At this meeting Project Coordinators each presented an overview of the projects and discussed possible areas of cooperation.

2.1 PROJECT OUTLINES PRESENTED AT COORDINATION MEETING.

1. SafetyCube - Safety CaUsation, Benefits and Efficiency - (Pete Thomas, Loughborough University)

The objective of SafetyCube is to develop an innovative road safety Decision Support System (DSS) that will enable policy-makers and stakeholders to select and implement the most appropriate strategies, measures and cost-effective approaches to reduce casualties of all road user types and all severities. At the core of the project will be a novel and comprehensive analysis of accident causation factors combined with newly estimated data on the effectiveness and cost-effectiveness of safety measures, not just in relation to reduction of fatalities but also the number of injured. An operational framework will be established to provide future access to the DSS once the project is completed. The project has four sub-objectives:

1. To develop new analysis methods for (a) Priority setting, (b) Evaluating the effectiveness of measures (c) Monitoring serious injuries and assessing their socio-economic costs (d) Cost-benefit analysis taking account of human and material costs
2. To apply these methods to safety data to identify the key accident causation mechanisms, risk factors and the most cost-effective measures for fatally and seriously injured casualties
3. To develop an operational framework to ensure the project facilities can be accessed and updated beyond the completion of SafetyCube
4. To enhance the European Road Safety Observatory and work with road safety stakeholders to ensure the results of the project can be implemented as widely as possible

The project outputs will be framed according to the specific policy and stakeholder areas – infrastructures, vehicles and road users – so that the measures developed in the project can be most readily applied. A systems approach will ensure effective coordination between these areas. The close involvement of road safety stakeholders of all types at national and EU levels and wider will enable the DSS to be focussed on the most appropriate policy-making procedures and ensure the project outputs have global reach.
2. **Prospect** - PROactive Safety for PEdestrians and CyclisTs - (Andrés Aparicio, IDIADA)

The past decade has seen significant progress on active pedestrian safety, as a result of advances in video and radar technology. In the intelligent vehicle domain, this has recently culminated in the market introduction of first-generation active pedestrian safety systems, which can perform autonomous emergency braking (AEB-PED) in case of critical traffic situations. **PROSPECT** will significantly improve the effectiveness of active VRU safety systems compared to those currently on the market. This will be achieved in two complementary ways:

(a) by expanded scope of VRU scenarios addressed and
(b) by improved overall system performance (earlier and more robust detection of VRUs, proactive situation analysis, and fast actuators combined with new intervention strategies for collision avoidance).

**PROSPECT** targets five key objectives:

i. Better understanding of relevant VRU scenarios
ii. Improved VRU sensing and situational analysis
iii. Advanced HMI and vehicle control strategies
iv. Four vehicle demonstrators, a mobile driving simulator and a realistic bicycle dummy demonstrator
v. Testing in realistic traffic scenarios and user acceptance study

The consortium includes the majority of European OEMs (Audi, BMW, DAIMLER, TME and Volvo Cars) currently offering AEB systems for VRU. They are keen to introduce the next generation systems into the market. BOSCH and CONTI will contribute with next generation components and intervention concepts. Video algorithms will be developed by UoA and DAIMLER. Driver interaction aspects (HMI) are considered by UoN and IFSTTAR. Euro NCAP test labs (IDIADA, BAST, TNO) will define and validate test procedures and propose standardization to Euro NCAP and UN-ECE. Accident research will be performed by Chalmers, VTI and BME, based on major in-depth accident databases (GIDAS and IGLAD) and complemented by East Europe data. The work will be done in cooperation with experts in Japan (JARI, NTSEL) and the US (VTTI, UMTRI, NHTSA).

3. **InDeV** - In-Depth understanding of accident causation for Vulnerable road users - (Aliaksei Laureshyn, Lund University)

The InDeV project addresses the second bullet point of the topic MG.3.4, i.e. "... in-depth understanding of road accident causation...". The main objective of the project is to develop a tool-box for in-depth analysis of accident causation for Vulnerable Road Users (VRU) based on a combined use of accident databases, in-depth accident investigations, surrogate safety indicators, self-reported accidents and naturalistic behavioural data. The tool-box will help to link accident causation factors to VRUs’ accident risk, and provide a solid basis for developing preventive countermeasures and a better input for socio-economic cost calculations of VRU accidents. The proposed approach is to reveal the causational factors by focusing on the process of accident development, thus overcoming the main weakness of the traditional accident data based approach that might find correlations between various factors and accident frequency, but not show the causation chains. It will also employ, to a larger extent, observation of critical traffic events that are similar in process to real accidents, but are relatively more frequent and easier to collect in sufficient quantities. The InDeV project includes the following steps:

i) review of methods and identification of the critical sites and road user groups;
ii) observation studies at the selected sites;
iii) development of technical tools for automated behaviour data collection;
iv) analysis of the socio-economic costs;
v) compilation of the project results and development of the safety analyst tool-box.

The project has a clear focus on VRUs and the course of events in accidents they get injured in. It will provide solid knowledge, help to avoid a skewed view on the problem of VRUs' safety, and facilitate the proposed tailor-made countermeasures for these groups. Moreover, with the use of surrogate safety indicators, there will be no need to wait for accidents to happen in order to learn how to prevent them from happening.

4. **XCycle** - Advanced measures to reduce cyclists' fatalities and increase comfort in the interaction with motorised vehicles - Luca Pietrantoni, University of Bologna

Cyclists suffer a disproportionate share of serious injuries and fatalities, and indeed in recent years that disadvantage has been growing. At the same time they often are not treated equally by traffic systems (e.g. traffic signals frequently fail to register their approach or presence). XCYCLE has the aim of developing the means to equalise the treatment of cyclists in traffic and thus both encourage cycling and make cycling safer. XCYCLE will develop: technologies aimed at improving active and passive detection of cyclists; systems informing both drivers and cyclists of a hazard at junctions; effective methods of presenting information in vehicles and on-site; cooperation systems aimed at reducing collisions with cyclists. Two relevant use cases would be bicycle interaction with large vehicles and cars at intersections and the provision of an immediate or extended green traffic light for cyclists approaching traffic signals. An in-vehicle detection system and a system of threat mitigation and risk avoidance by traffic signals will be developed. The components developed and built up will be systematically integrated, implemented and verified. A new large-scale research infrastructure in the city of Braunschweig (DE) and a second test mobile platform will be used as test site. A demo bicycle with a cooperative technology will be developed and tested as well. A user-centred approach will be adopted. Behavioural evaluation will part of the whole process: attentional responses using eye tracking data; evaluation of human-machine interface; acceptance and willingness to pay. In the Cost-Benefit Analysis behavioural changes will be translated into estimated crashes and casualties saved per system. The project will contribute to innovative and efficient advanced safety measures to reduce the number of accidents, often of high severity, involving cyclists in interaction with motorised vehicles.

5. **Seniors** - Safety-ENhancing Innovations for Oldеr RoaduserS (Marcus Wisch, BASt)

European countries face great challenges because the demographic structure in the EU is changing rapidly, due to reducing birth rates and increasing life expectancies. In 2012, 17% of Europeans were aged 65 and older and in 2020 this will rise to 28%. Meanwhile, the mobility needs of the elderly are also changing. Maintaining a driver’s licence is an important issue of independence today, both for males and females. Also technological developments like the introduction of e-bikes enable access to other means of transport. These demographic and behavioural changes are of growing concern to mobility and road safety. While accident data show a decreasing number of fatalities and serious injuries on EU roads, recent data from the ERSO show an increasing proportion of elderly in the fatality statistics. This trend is a serious threat to the achievements of recent decades and poses a challenge that must be addressed to meet goals set for further reduction of road fatalities. Furthermore, there is an increasing rate of obesity in EU populations, which introduces changes in injury patterns and risks. The SENIORS project focuses on the protection of elderly and obese road users also by transferring nowadays younger generations’ safety standards. The objective is to develop the required understanding of accident scenarios, injury mechanisms and risks and to implement these findings in test tools and test and assessment procedures. An integrated approach considering the elderly in multiple transport modes is applied to reduce the portion of elderly fatalities. The small-scale project focuses on providing tools to encourage wider adoption of advanced restraint and pedestrian protection systems improving the protection of older and
obese vulnerable road users. The activities consolidate results from previous EU projects such as THORAX and AsPeCSS and meet the needs defined by the GRSP IWG on Frontal Impact working on a near-term (2015) and mid-term (2020) update of UN-R94.

2.2 TRANSPORT RESEARCH ARENA, WARSAW, POLAND

The five projects collectively proposed to hold a joint dissemination workshop in the form of a Special Session at the Transport Research Arena to be held in Warsaw, Poland. The session took place on 19 April and it included presentations of the five projects together with the research framework of the Forum of Road Safety Research Institutes (FERSI). Over 150 delegates were able to discuss the nature and purpose of the five projects and the FERSI research directions.

The session speakers are listed below and the presentations are attached in Appendix 1.

<table>
<thead>
<tr>
<th>Presentation</th>
<th>Title</th>
<th>Presenter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Session Chair</td>
<td></td>
<td>Pete Thomas, SafetyCube, Loughborough University</td>
</tr>
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<td>George Yannis, NTUA, GR</td>
</tr>
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<tr>
<td>FERSI</td>
<td>Forum of European Road Safety Institutes</td>
<td>Raschid Urmeew, BASt, DE</td>
</tr>
</tbody>
</table>

Figure 1 Delegates and speakers at the TRA Special Session

The Session Chair took the opportunity of the joint session to invite all partners of each project who were attending the TRA conference to hold an informal meeting with the intention of establishing further working links between the projects. Each delegate described their role in the their project and were able to identify several related activities in other projects including SafetyCube.
2.3 SYNERGIES BETWEEN SAFETYCUBE AND OTHER PROJECTS

SafetyCube Work Package Leaders have so far identified two areas of synergy with InDeV. Both projects include a task with the objective to estimate the costs of accidents for each EU Member State according to a constant methodology, in SafetyCube the work is undertaken within WP 7. The methodology includes the development of a standardised method to estimate costs followed by a questionnaire to be sent for completion to representatives of EU Member States. The two projects have decided to collaborate to ensure there will be no contradictory estimates of costs and to maximise the use of resources. The work is under development and InDeV will be able to use the national data that SafetyCube will collect with the support of DG-MOVE and the CARE experts group. SafetyCube will be able to use the additional contributions to a common methodology prepared by partners within InDeV.

A further area of potential synergy that was identified at the informal meeting concerned the under-reporting of serious injuries, again involving SafetyCube and InDeV. The task in SafetyCube is to compare methods to estimate the numbers of seriously injured casualties and certain groups including single cyclist and powered two-wheeler crashes are known to be under-reported in police and national statistics. Discussions between the projects are currently at an early stage and further discussions are planned to elaborate on possible collaboration.

2.4 PLANNED ACTIVITIES

Currently several future collaborations are planned.
1. A joint session to present the projects to be held at the International Cycle Safety Conference in Bologna in November 2016
2. Invitations to WP Leaders from other projects to attend the SafetyCube Mid-term workshop to take place in Brussels in September 2016.
3. Further discussions between WP Leaders from SafetyCube and other projects on potential areas of cooperation.
3 Conclusion

Early collaborations have been established between SafetyCube and other projects supported under the H2020 Topic MG-3.4-2014 Traffic Safety Analysis and Integrated Approach towards the Safety of Vulnerable Road Users. A series of joint activities have been conducted including:

- Project Coordinator collaboration meeting
- Joint Session at Transport Research Arena Conference, Warsaw April 2016
- Informal joint project meeting at TRA
- Specific Joint Work Package meetings with InDev in relation to the estimation of accident costs

Future joint activities are planned to further explore collaboration opportunities between SafetyCube and other projects:

- Invitation to other project representatives to attend SafetyCube Mid-term workshop
- A joint session at the International Cycle Safety Conference in Bologna, November 2016
- Further Work Package level discussions to explore potential cooperation in estimating the under-reporting of crashes.
Appendix 1: Presentations made at TRA conference 2016
SafetyCube

Safety CaUsation, Benefits and Efficiency
SafetyCube project

17 partners from 12 countries within EU (May 2015 - April 2018)

SafetyCube concept

- Problem
  - Evidence based road safety policies are becoming more usual and there is much better availability of national data and state of the art knowledge
  - Effective road safety policies need good information about accident risk factors and about measures
- SafetyCube will meet this need by generating new knowledge about accident risk factors and the effectiveness of measures relevant to Europe
- It will structure this information so it can be readily accessed at both top level and in-depth to meet the needs of all stakeholders

Evidence-based policy-making

- Identify and quantify risk factors
- Select potential measures
- Estimate expected costs and benefits
- Implement interventions
- Long-term follow up
- Evaluate safety effects

What is a risk?

- “Risk factor” denotes any factor that contributes to accidents or injuries.
- There are risk factors related to all elements of the road system and the interactions between these elements.
- The importance of a risk factor can be defined as the size of the contribution it makes to accidents or injuries.
**What is a measure?**

- A measure is any action intended to reduce the numbers of accidents or injuries.
  - May reduce the risk of a crash
  - May reduce the risk of injury
  - May reduce exposure to risk

**Challenges in evidence based approaches**

- Do we have a comprehensive method to identify risks?
  - Road, road users and vehicles
- Do we have a comparable method to evaluate measures?
  - Road, road users and vehicles
- How do we estimate the likely casualty reduction of a measure that has not been introduced to the real-world?
- Do we have a comprehensive method to evaluate cost-effectiveness?
- How do we handle the situation where there are many measures of effectiveness but they disagree?

**Decision-making – challenges of the evidence base**

1. How do we identify and quantify the risk factors and problem areas (e.g. Distraction)?
2. How do we select the most appropriate measures (e.g. speed – enforcement, infrastructure or vehicle measures)?
3. How do we estimate the likely safety benefits and costs?
4. How do we estimate the likely casualty reduction of a measure that has not been introduced to the real-world?
5. How do we make decisions when there is a lot of conflicting evidence?
6. How do we make decisions when there is little or no evidence?

**Challenges to access the evidence base**

- Much of the evidence on risks and measures is in the research literature – how can it be brought together?
- How can we assess transferability of measures from one country to another?
- How can the available information and data be synthesised?

**SafetyCube will meet these challenges**

SafetyCube will
- Provide new information about the *effectiveness* of measures by bringing together published information
- Produce a comprehensive method to evaluate the *costs and benefits* of measures
- Produce new information about *seriously injured* casualties
- Produce a new *Decision Support Tool* that will enable easy access to information on risks and measures

**SafetyCube Objectives**

- To develop new analytic methods to
  - *identify* the most important risk factors for crashes
  - *assess* the safety effects of measures that address these factors
  - *assess* serious injuries and socio-economic costs in crashes
  - *conduct* Cost-Benefit Analyses taking account of human and material costs.
- To apply these methods to available safety data to
  - identify the key accident causation mechanisms, risk factors and the most cost-effective road safety measures for fatally and seriously injured casualties
**SafetyCube will**

- Improve the evidence base for road safety policy-making
- Develop a new Decision Support System
- Bring together data about risks, measures and cost-effectiveness within a single comprehensive framework

**Federal Highway Authority CMF Clearinghouse**

- [www.cmfclearinghouse.org](http://www.cmfclearinghouse.org)
- A central, web-based searchable repository of CMFs (including the ones listed in the HSM) and of additional information and resources related to SPF and CMFs.
- CMFs are rated according to: study design, sample size, standard error, potential biases and data source.
- A star rating (1–5) is assigned based on the cumulative performance in the five categories.
**Project structure**

- WP 1: Project management
- WP 2: Dissemination and stakeholder consultation
- WP 3: Development and validation of the methodological framework
- WP 4: Road user behaviour analysis
- WP 5: Infrastructure safety analysis
- WP 6: Vehicles safety analysis
- WP 7: Serious road injuries, analysis and strategy
- WP 8: European road safety policy decision support system

**Hot Topics**

- An important current question in safety about a risk factor or the effectiveness of a measure.
  - Distraction
  - Automatic Emergency Braking
  - Cooperative driving systems
  - Helmet use for eBike riders
- Stay topical for duration of SafetyCube

**We need your help**

- What is the best way SafetyCube can support evidence based decisions?
- What would you like to see in the Decision Support System?
- What will it look like? How will it operate?
- What are the hot topics we should focus on?

**Purpose of today**

- To introduce SafetyCube to key stakeholders
- To form a relationship that we would like to last the duration of the project
- To start a dialogue about the project outputs to ensure they are as beneficial to road safety stakeholders as possible

**Contact**

- **www.SafetyCube-project.eu**
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InDeV

In-Depth understanding of accident causation for Vulnerable road users
InDev aims at:

- developing an integrated methodology to study accident causation for VRU

and

- improving assessment of VRU-accident costs

“Integrated methodology” utilises:

- Accident databases (police & medical care)
- In-depths accident investigations
- Traffic conflicts/observational studies
- Naturalistic cycling/walking (mobile app)
- Self-reported accidents

Traffic conflicts

- Accidents
- Serious conflicts
- Slight conflicts
- Potential conflicts
- Undisturbed passages

Traffic conflicts

- Accidents
- Serious conflicts
- Slight conflicts
- Potential conflicts
- Undisturbed passages

Just one step below accidents -> very similar
Technical tools for such studies

- Video analysis:
  - "Watch dog" - raise a flag when a conflict MIGHT happen
  - Advanced tracking - extracts trajectories, etc.

- Mobile APP for naturalistic walking/cycling (incl. single accidents/fails)

InDeV’s output

- Methodology
- Technical support tools (open source)
- VRU safety handbook & software manuals

Thank you very much for your attention!

This project has received funding from the European Union’s Horizon 2020 research and innovation programme under grant agreement No 635895
Prospect

PROactive Safety for PEdestrians and CyclisTs
PROSPECT
PROactive Safety for Pedestrians and Cyclists
Warsaw, TRA2016 conference
Andrés Aparicio, Applus IDIADA

Summary

- Background
- Objectives
- Key aspects
- Project facts
- Consortium
- Structure
- Further information

Background

- Accidents involving pedestrians and cyclists still remain as a pending issue for road safety.
- Pedestrians and cyclists fatalities account for 28% of road fatalities in EU.
- Most of these accidents are caused by the driver being in-alert or misinterpreting the situation.
- Active safety systems have potential to reduce these numbers.

Objectives and Results:

- To develop harmonized test and assessment procedures including a methodology for balancing active and passive safety benefit.
- Methods for active safety testing.
- Methods to adapt passive safety test conditions from the preceding pre-crash actions.

Results

- Test scenarios, their relevance and underlying accident data.
- Test set-up and related tools for AEB-P systems
- Test and assessment method integrated safety systems
- Benefit based.
**Background**

Performance of different vehicles in the market

- Adult 25% offset
- Adult 75% offset
- Child behind obstruction

**Objective**

PROSPECT aims to significantly improve the effectiveness of active VRU safety systems compared to those currently on the market

- by expanding scope of scenarios addressed by the systems
- and improving overall system performance

**Key aspects of the project**

1. Better understanding of relevant VRU scenarios
   - Macro statistical and in-depth accident analysis:
     - National statistics from specific countries.
     - CARE analysis for weighting to EU level.
     - Detailed understanding from GIDAS (DE) & IGLAD (CZ, ES, FR, IT, FR and SE).
   - Naturalistic urban observations with large number of VRUs:
     - Hotspots monitoring in different EU cities.

2. Improved VRU sensing
   - Enlarged VRU sensor coverage:
     - Higher field of view.
   - Improved sensor and situational analysis:
     - Partial occlusion dealing.
     - High resolution microwave radar with micro-Doppler evaluation.
     - Advanced machine learning techniques for vision sensors.
   - Proactive situation awareness, path prediction and human-observable indicators for future VRU motion.

3. Advanced system control strategies
   - Vehicle control strategies:
     - Accident avoidance by combined steering and/or braking.
     - Advanced actuator concepts, including high dynamic actuators and torque vectoring by braking.
Validation

- Testing in realistic traffic scenarios:
  - Real-world scenarios to be reproduced in controlled environments.
- Test methodology and test procedures to be proposed to Euro NCAP:
  - Intervention performance tests considering evasive actions.
  - Unjustified system interventions.
- User acceptance tests:
  - Influence of false warnings and incorrect system interventions.
  - Predictive model of acceptance.

Demonstrators

- 4 vehicle demonstrators:
  - Demonstration vehicle by Continental with stereo vision camera and high resolution radars, featuring high dynamic brake system combined with power assisted steering actuator.
  - Demonstration vehicle by Daimler featuring improvements in earlier and more robust detection of VRUs.
  - Demonstration vehicle by Bosch featuring enlarged FOV sensors including side coverage, avoidance by steering and braking and new HMI concepts.
  - Demonstration vehicle by Volvo featuring advanced HMI and control strategies to evaluate interaction between the driver and the vehicle.
- 1 mobile driving simulator:
  - Mobile DS featuring HMI findings.
- Development of realistic pedestrian and cyclist dummies including platform propulsion system:
  - Advanced pedestrian and cyclist dummy test targets for realistic testing.
  - Dummy propulsion platform with multiple target carrying on a predefined path.

Project facts

- Project title: PROActive Safety for Pedestrians and Cyclists (PROSPECT)
- Acronym: PROSPECT
- Funding: European Commission, Innovation and Networks Executive Agency, under the frame of Horizon 2020 programme
- Topic: MG-3.4-2014 Traffic safety analysis and integrated approach towards the safety of vulnerable road users
- GA number: 634149
- Consortium: 17 partners, 9 EU countries
- Coordinator: Andrés Aparicio, IDIADA Automotive Technology, SA
- Starting date: 1st May 2015
- Ending date: 31st October 2018
- Budget: 6.931.978,75 €

Consortium

- 9 EU countries
- 17 partners
- 4 car manufacturers
- 3 suppliers
- 5 research centres
- 4 universities

Further information

Visit our website
www.prospect-project.eu

- Detailed project information.
- Regularly updated news.
- Publications.
- Contact information.
Thank you

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This project has received funding from the European Commission’s Innovation and Networks Executive Agency, under the frame of Horizon 2020 programme, ref. grant agreement nº 634149.
Seniors

Safety-ENhancing Innovations for Older Road
Project Introduction
Alba Fornells, IDIADA on behalf of the SENIORS consortium

TRA, 19 April 2016

MOTIVATION

Tools for safety assessment don’t represent seniors people
Population is getting older

Figures from CARE (Community Road Accident Database)

→ Number of fatally injured road users is decreasing; however, share of elderly is increasing

Facts and key target group

Safe mobility = quality of life

Most new car buyers

The demographic change leads to higher participation of older people on the road corresponding with accident and injury risks

INTRODUCTION

What stands SENIORS for and who are we?

Safety ENhanced Innovations For Older Road UserS

Main Goal:
- To improve the safe mobility of the elderly, including obese, using an integrated approach.

Key facts:
- EC Horizon 2020 programme, contract no. 636136
- Run time: June 2015 – May 2018 (36 months)
- Budget: 2.9M€

Consortium:
- 8 European partners: Autoliv (SWE), BASt (DE), Fiat Chrysler Automobiles (IT), Ford (DE), Humanetics (DE), IDIADA (ES), LMU Munich (DE), Transport Research Laboratory (UK)

PROJECT IDEA / APPROACH

Integrated approach
**INTRODUCTION**

Focus of the project SENIORS

- Protection of the elderly (and obese persons) as car occupants and external road users (pedestrians, cyclists / e-bike riders)
- Study and evaluation of the reduction of injury frequency and types that can be achieved through innovative and appropriate testing tools and vehicle safety systems.

**PROJECT CORE**

**Identification of needs / Priorities for older road users**

- Quantification of needs
  - Literature (injury, behaviour, ...)  
  - Accident studies
  - Initial benefit assessment
  - Achievable injury prevention
- Analysis of risks
- Derivation of safety strategies

**Improved tools**

- Biomechanical testing
  - Dummies / impactors
  - Numerical models
  - Injury criteria

- Safety of older road users
  - Effectiveness of new tools and advantages of new procedures
  - Applied to current and advanced new safety systems
  - Passive
  - Active

- To be confirmed from the accident analysis

**Benefit and impact assessments**

- Car occupant
  - Better older thorax IRC
  - Obese occupant
  - Active HBM

- Pedestrian/cyclist
  - Flex-PLI with UBM
  - Head-neck
  - Pedestrian thorax

- Integrated benefit analysis

**PROJECT STRUCTURE**

**Expected results**

Selected sub-goals of SENIORS

- View on anthropometric particularities of the elderly and their injury mechanisms compared with younger persons
- Development and optimization of test tools, procedures and assessment methods regarding the needs of the elderly
- Use of an integrated approach (different types of road users)
- Identifying differences in the dynamics of different age groups in the pre-crash and crash phase
- Transfer of knowledge and results through cooperation with authorities and consumer protection organizations

**Expected results**

Preliminary results

**Obesity**

- Literature from US indicated higher injury severities with obese people in road traffic accidents
- Studies on European accident data did not show these effects yet.
  - There are BMI codings in a few European databases and only a few persons coded having a BMI > 30
  - Obese did not show clear trends of a higher injury severity
  - It was not able to identify different injury types or for obese occupants

**Preliminary results**

**Accidentology**

- Elderly are more frequent and more severe injured in general
- Obvious differences in various body regions
- Other databases show similar results
International collaboration

Vehicle safety and especially the safety of the elderly is among others also an issue in Asia and the US.

Seven Letters of Support (LoS) received:
- General Directorate of Transport in Spain
- Swedish Transport Ministry
- NTSEL (Japan)
- University of Virginia (USA)
- Expert bodies EEVC, AAAM und IRCOBI

Further external experts / advisors:
- Daimler
- University of Straßbourg
- NHTSA (USA)
- University of Michigan (USA)

For further information:
Marcus Wisch (wisch@bast.de)
Project Coordinator
Adrià Ferrer (adria.ferrer@idiada.com)
Project Manager

www.seniors-project.eu
WP4 - Current protection & impact of new safety systems:

- Testing procedures and assessment methods
- Evaluation of test procedures
- Benefit analysis and impact
Advanced measures to reduce cyclists' fatalities and increase comfort in the interaction with motorised vehicles
XCYCLE
Advanced measures to reduce cyclists’ fatalities and increase comfort in the interaction with motorised vehicles

Coordinator:
Prof. Luca Pietrantoni, University of Bologna
luca.pietrantoni@unibo.it

THE PROBLEM
From 2010 to 2014, the reduction in the number of cyclist deaths has stagnated

Objectives
• To improve cyclists’ safety in the potentially dangerous interaction with passenger cars and HGVs
• To develop the means to equalise the treatment of cyclists in traffic and both encourage cycling and make cycling safer

Concept and approach:
– Vehicle-based systems, Infrastructure-based systems, Cooperative systems
– Developing and testing technologies in the driving simulator and a “stationary” and “mobile demonstrator”
– Two use cases: 1) bicycle interaction with cars/HGVs at intersections; 2) provision of immediate or extended green traffic light for cyclists
– Behavioural evaluation part of the whole process
– Gender/age analysis
In-depth analysis of B-MV accidents

- Data analysis for ten European countries
- Data taken from government reports or statistical data collected by police institutions
- Cluster analysis to understand which are most frequent accident scenarios
- Systematic review: contributing factors to B-MV collisions

Examples of recent on-site systems

Examples of recent in-vehicle systems

Examples of recent on-bike systems

Analysis of existing safety systems

| Technology | HMI | ROS | TRL | P | 2016
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<tbody>
<tr>
<td>Varia Rearview Radar; Wireless Edge Pairing system; Blacklight warning system</td>
<td>X</td>
<td>X</td>
<td>9</td>
<td>Visible X*** Audible Haptic</td>
</tr>
<tr>
<td>TNO Intelligent Bike Forward-looking radar; rear looking sensor camera</td>
<td>X</td>
<td>X</td>
<td>7</td>
<td>Visible X*** Audible</td>
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<tr>
<td>MoDe:FlexeBike Ultrasonic rear sensor; central unit processor; pedal assistant system</td>
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<td>Visible X*** Audible X Haptic X</td>
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<tr>
<td>Hindsight Rear view camera; LCD display</td>
<td>X</td>
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<td>9</td>
<td>Visible X** Audible</td>
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<tr>
<td>The Owl 360 Rear view camera; LCD display</td>
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<td>Visible X** Audible</td>
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<tr>
<td>Hammerhead Smartphone app; LED interface device; Bluetooth</td>
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<td>Visible X**</td>
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- In-vehicle
- On-site
- On-bike
The XCYCLE system architecture

- Cooperative systems architecture
- High accuracy and speed
- On-bike system prototype and infrastructure sensors already available

Semi-naturalistic approach

- Semi-naturalistic approach
- Around 200 cycles per year in Europe
- High accuracy and speed
- On-bike system prototype and infrastructure sensors already available

Drivers' aggressiveness towards cyclists

- Drivers' aggressiveness towards cyclists
The consortium

International Cycling Safety Conference
3-4 November Bologna 2016
www.cyclingsafety.net