S∧FE-UP

proactive SAFEty systems and tools for a constantly UPgrading road environment

EU road deaths: we need safer infrastructure

Antonio Avenoso (ETSC - European Transport Safety Council)

Last month, the European Commission published a new analysis of EU road death data that shows which modes of transport are responsible for inflicting the most harm. Similar analyses have also been carried out at a national level in both the UK and France.

The breakdown (see infographic here) shows road user type and the other 'main vehicle' involved in the crash. The figures have been taken from 2019 as detailed data for 2020 is not yet available.

The analysis reveals that **deaths overwhelmingly occur in collisions involving cars and trucks** and confirms the urgent need to increase the protection of vulnerable road users (VRUs) such as pedestrians and cyclists. Of course, this is not new information, but presenting the data in such a clear way highlights the need to do much more in encouraging a shift from the modes that cause the most harm, and to find more effective ways of protecting our most vulnerable road users.

EU policies are already evolving in this direction, to some degree, with the new mandatory vehicle safety measures introduced by the General Safety Regulation focused on VRUs. Vulnerable users also need to be taken systematically into account by countries when applying the Road Infrastructure Safety Management Directive - though this does not apply to all roads.

Read the full text

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Update from the Coordinator

Núria Parera (Applus IDIADA)

Dear reader,

As we're fast approaching the end of the year and the halfway point of the project, now seems a fitting time to reflect on what has taken place so far in SAFE-UP.

One of our main highlights was the WP2 workshop which took place in Barcelona on the 25th and 26th of October - the **first-ever face to face meeting in SAFE-UP history!** The two-day meeting allowed us to detect potential issues regarding the integration of the models in the Aimsun Next platform (AV, pedestrian, cyclist, advanced human driver and PTW rider models) and engage in interesting discussions on the simulation metrics, the Safety-Critical Scenarios and the desired KPIs and outputs of the simulation. Read more about it here.

Another WP2 milestone was reached too: we completed Task 2.1 and submitted the final deliverable on the Use case definitions and initial Safety-Critical Scenarios. This will soon be available on the project's website, so keep your eyes peeled.

Demos 2, 3 and 4 are currently undergoing preliminary tests in order to carry out the technical verification of the developed systems. Pre-crash simulations and in-crash simulations have also started, and the demo 1 prototype has been assembled, which is exciting!

As for the Knowledge Translation, Training and Awareness activities, a comprehensive infographic was created to explain Task 2.1 activities and how they feed into the other work packages, as well as early infographics on car-to-PTW conflict scenarios. A framework for guiding the development of training and educational programmes for VRU safety in future mixed traffic has also been developed and reported in D6.1. As well as this, the WP6 team hosted a **workshop in October with members of SAFE-UP's Safety Partner Network.** SAFE-UP partners shared T2.1 results on initial Safety-Critical Scenarios **to discuss relevance and applicability for external organisations and collect input on the needs and concerns of VRUs.**

Finally, we must mention our participation at this year's **ITS World Congress** in Hamburg where myself and fellow consortium members Arturo Tejada (TNO), Stella Nikolaou (CERTH-HIT), Tamara Djukic (Aimsun) and Ignacio Magallón (Bax & Company) took part in a special panel session on safety in the CAV environment. We were delighted to be joined by **Head of the European Commission's Road Safety Unit Claire Depré** who participated in the discussion as well - more about this on page 7.

If you haven't already, I invite you to **subscribe to our mailing list to receive our future newsletters** and follow us on both Twitter and Linkedin! Soon we will publish **a new roadmap** exploring the main challenges and breakthroughs on the path to road automation.

Sincerely,
Núria

MEET THE SAFE-UP PARTNERS
CERTH/HIT

Hellenic Institute of Transport (HIT) of the Centre
for Research and Technology Hellas (CERTH)

Dr. Evangelos Bekiaris **Dr. Mary Panou** **Stella Nikolaou**

Eleni Chalkia **Dr. Ioannis Gragkopoulos** **Katerina Touliou**

Who belongs to your SAFE-UP team?

SAFE-UP's CERTH team is truly interdisciplinary. It consists of experienced professionals with a deep specialisation in their field, collectively catering to the project's needs. Dr. Evangelos Bekiaris (Director of CERTH/ HIT) and Dr. Mary Panou (Head of the Department 'Human factors & Vehicle Technology') are leading the core team that consists of 4 additional highly qualified researchers. Ms. Stella Nikolaou is experienced in ergonomy and her fields of expertise encompass driver state/behaviour monitoring, **vulnerable road users' active safety** and human factors research on road safety and automation. Ms. Eleni Chalkia has an M.Sc. in transport and is experienced in transport safety, VRU safe mobility, as well as **road safety-related life-long training**. Dr. Ioannis Gragkopoulos is an Electrical Engineer experienced in the areas of **telecommunication networks, vehicle telematics, navigation, embedded systems and sensor networks.** Ms. Katerina Touliou is an Experimental Psychologist with extensive competence in **sensory perception in drivers, riders (cyclists/motorcyclists)** and vulnerable groups of users, in relation to safe mobility and behaviour.

What does CERTH bring to the project?

CERTH brings great added value to SAFE-UP since it's one of the top research centres in Europe. Our main objective is to conduct and support applied research activities in the field of transportation in Greece and across the EU. Specifically, the centre focuses on issues related to the organisation, operation, planning and development of infrastructure, standardisation, economic analysis, management, **vehicle technology and the impact assessment of land, maritime, air, and multimodal transport services.** CERTH/HIT has participated in more than 100 transport-related

projects, several of which are related to VRU safety (as approached in SAFE-UP's Demo 4), such as **Safeway2school** and **SAFERIDER** in the FP7 framework, as well as **ADAS&ME** and **AUTOPILOT** in the Horizon framework. HIT also has extensive experience in the development of training and educational programmes related to road safety, through its involvement in research projects, as well as relevant national initiatives, like the **e-Drive academy (of the Greek Ministry of Infrastructure and Transport) and the TAP (Trans-Adriatic Pipeline).**

Why did you want to take part in SAFE-UP?

SAFE-UP provides a unique opportunity for all participating organisations to collaborate in a highly ambitious and well-structured research project with innovative objectives and a strong, highly qualified consortium. Specifically for CERTH/HIT, participating in SAFE-UP is an opportunity to advance our technical know-how on **vulnerable road users' active safety through connectivity**, by developing a **C-ITS based bilateral communication system between VRUs and vehicles**, as well as the related on-time warnings for all actors. We will also apply and extend our knowledge and broad expertise in **training, education and awareness strategies** in road safety techniques to the challenging field of future mixed/hybrid (automated) traffic scenarios.

Which other related initiatives are you involved in?

CERTH/HIT is currently involved in two related initiatives. The first is the SHOW project **(www.show-project.eu)**, a large-scale innovation action, in which it acts as the project's technical manager. The main objective here is to support the deployment of shared, connected and electrified automation in urban transport to advance sustainable urban mobility. The second is the 5G-ROUTES project **(www.5g-routes.eu)**, another large-scale innovation project, this time focused on CCAM deployment of 5G over the Via Baltic corridor. Here we are involved in three technical use cases relevant to vulnerable road users' safety, with the aim to investigate the 5G technology potential over the traditional ITS-G5 communication, expecting to demonstrate lower network latency and enhanced accuracy of the positioning of the connected vulnerable road users (pedestrians and cyclists).

🌐 **www.hit.certh.gr**

in **www.linkedin.com/in/hit-certh-0942a9171**

🐦 **www.twitter.com/HitCerth**

MEET THE SAFE-UP PARTNERS
TNO

The Netherlands Organisation for Applied
Scientific Research

TNO innovation for life

Arturo Tejada

Gerdien Klunder

Kingsley Adjenughwure

Emilia Silvas

Robin Smit

Chris van der Ploeg

Who belongs to your SAFE-UP team?

In SAFE-UP, TNO is leading WP2 on Future safety-critical scenarios and participates with Arturo Tejada (work package lead), Kingsley Adjenughwure, Erwin de Gelder, Jeroen Manders, Gerdien Klunder, Nico Deschle, Marijke van Weperen, Jeroen Hogema, Paco Hamers and Lin Xiao. They combine their expertise on **mobility, traffic and vehicle safety** from two departments. In WP3, TNO focuses on collision-free path planning based on VRU detection and predictions and, leading task 3.3 on this very topic. The colleagues contributing to this are Emilia Silvas, Robin Smit, Chris van der Ploeg and Arjan Teerhuis, who combine their expertise on **planning algorithms, vehicle control, world modelling and prediction models.** TNO's contributions to other work packages are focused on the alignments with these two main development areas.

What does TNO bring to the project?

The main contributions of TNO focus on integrated vehicle safety topics, from safety descriptors for both non-critical and safety-critical situations, to metrics describing traffic interactions and various motion planning algorithms that ensure safe and comfortable driving in different scenarios. We are **developing advanced human-driven vehicle models and metrics describing traffic interactions** based on models extracted from existing driving data. Using knowledge from WP2 on future critical scenarios, in WP3 we are **developing the algorithm for path planning optimization and supporting the active safety demo to evaluate and demonstrate the potential of the new algorithms in decreasing road accidents.**

Why did you want to take part in SAFE-UP?

The ambitions of SAFE-UP contribute to the ambitions of TNO's two departments IVS (Integrated Vehicle Safety) and SUMS (Sustainable Urban Mobility and Safety). At IVS we develop (connected and cooperative) driving technologies and assessment methodologies to maximise safety, throughput, efficiency, comfort and to improve the mobility and logistics ecosystem with 4 distinct programs: **Streetproof**, (Monitored Deployment for Safe & Social Automated Driving), **Streetwise** (Scenario-based safety assessment methods for type approval of CCAM systems), **Automated Yards** (Localization, world modelling, planning and control technologies for more efficient and safe yards) and **Connected & Cooperative** (Communicating and cooperative applications; linking vehicles with road and data infrastructures). The methods developed in SAFE-UP will enhance several of these programs. Similarly in our SUMS department, SAFE-UP is very well aligned with our **Traffic Safety** program, focusing on ways to assess traffic safety on the system level and modelling the impact of new modalities and measures.

Which other related initiatives are you involved in?

TNO is involved in several other ongoing projects complementary to SAFE-UP, either focusing on safety assessment methodologies or developing (connected and cooperative) driving technologies. For example, HEADSTART (Harmonised European Solutions for Testing Automated Road Transport) **(www.headstart-project.eu)**, HI-DRIVE **(www.hi-drive.eu)** which aims at testing, demonstrating, and evaluating robust high automation functions in a large set of traffic environments, Next Perception **(www.nextperception.eu)**, where we focus on advanced localization methods, 5G-Mobix **(www.5g-mobix.com)** where we focus on developing and testing automated vehicle functionalities using 5G, and, as well as CERTH/HIT, we are involved in SHOW (SHared automation Operating models for Worldwide adoption), where we develop smart intersection crossing methods enabled by X2V.

www.tno.nl/en

www.linkedin.com/company/tno

www.twitter.com/TNO_Research

A comprehensive look into proactive safety: solutions for a highly automated and mixed traffic environment

A recap of our panel session at this year's ITS World Congress

Last October, during the ITS World Congress in Hamburg, four partners from the SAFE-UP consortium had the opportunity to participate in a panel session alongside European Commission representative Claire Depré.

Moderated by consortium member Ignacio Magallón (Bax & Company), the session revolved around innovative proactive safety in a highly automated and mixed traffic environment. The speakers emphasised the need to define a new approach to ensure that we can **tap into the safety benefits promised by Connected and Automated Vehicles (CAVs),** allowing us to stay on track towards Vision Zero - zero deaths on all EU roads by 2050.

Claire Depré, Head of the Road Safety Unit at DG-MOVE, provided an overview of **where the EU stands on its mission to Vision Zero**. Progress in reducing fatality

From left to right: Arturo Tejada, Núria Parera, Claire Depré, Stella Nikolaou and Ignacio Magallón

rates has stagnated in recent years and the EU missed its self-imposed target to halve the number of road deaths between 2010 and 2020. That's why SAFE-UP's research is so key. In addition to this overview, Claire introduced the eight new monitoring KPIs included in the last EU Road Safety Policy Framework 2021-2030, related to vehicle safety, infrastructure safety, speed, and more.

SAFE-UP coordinator Núria Parera (Applus+ IDIADA) revealed the testing and validation challenges for future safety-critical scenarios in the CCAM scheme – like the need for **quality data on accidents and naturalistic driving** to develop proper human driving models and the transition to a hybrid scheme combining physical and virtual testing. She also highlighted the importance of user acceptance, which is why testing with volunteers is essential for new AV and HMI systems.

Similarly, Arturo Tejada (TNO) explored the issues of **"social driving"** and how we could potentially **make AVs behave more human-like**. Although CAVs have a bright future, their adoption process and limited social driving skills may lead to new Safety-Critical situations. With that in mind, he presented how the future vehicle type approval should be.

Stella Nikolaou (CERTH-HIT) emphasised **connectivity as a major enabler for the safe and collaborative co-existence of all traffic participants** in CCAM mixed-traffic scenarios. More specifically, she touched upon the main challenges like latency, position accuracy, pedestrian connectivity, and human factors.

We very much look forward to continuing the discussions in the future!

If you have any questions for the participants, feel free to get in touch: contact@safe-up.eu

Current Safety-Critical Scenarios for Car-to-Pedestrian crashes in the EU (2018 data)

by Marilee Nugent (University of Florence | UNIFI)

Marilee is a SAFE-UP consortium member working on training and knowledge translation activities.

At the heart of Vision Zero, taking the Safe Systems Approach means that identifying the causal factors in crashes goes beyond the mistakes and errors made by road users, to consider systemic factors such as how infrastructure, the environment and different road user needs may interact to make crashes more likely.

Based on deliverable D2.6, Use case definitions and initial safety-critical scenarios, SAFE-UP researchers for Task 2.1 have provided an **updated analysis of the CARE database for general statistics on car-to-VRU crashes in the EU, mainly in urban areas.**

An in-depth analysis of the GIDAS* database allowed us to take a deeper look at contributing factors in crash causality, such as infrastructure, poor weather and visibility conditions, and communication failures between car drivers and VRUs. This knowledge is important for developing targeted implementation of new safety technologies aimed to support road users and compensate for mistakes

The infographic to the right illustrates some of these results which address the following questions: **Where do crashes happen most often with respect to infrastructure elements? What kinds of interactions are associated with the most frequent or most serious crashes?**

Particularly relevant to the development of active safety and CITS solutions was the confirmation that crashes occur primarily away from junctions and where the crossing of pedestrians is not supported by the infrastructure (non-designated crossings). When only crash cases involving fatal and serious injury cases are considered, the frequency of crashes outside of intersections compared to other safety-critical scenarios is even higher.

German In-Depth Accident Study
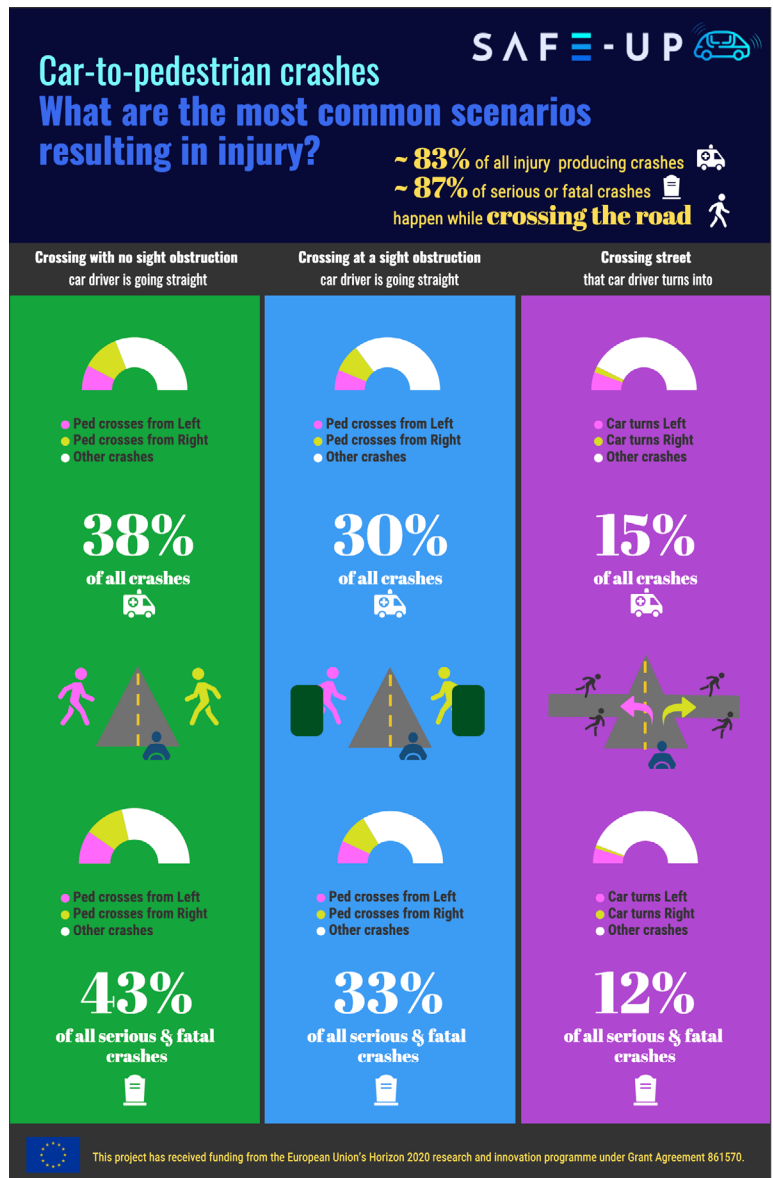
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If you would like to get in touch with a member of the SAFE-UP team send an email to: **contact@safe-up.eu**