SAFE-UP

proactive SAFEty systems and tools for a constantly UPgrading road environment

Taking a more holistic approach to mobility

Dr. Johanna Tzanidaki (ERTICO - ITS Europe)

Safety in mobility is a priority for all stakeholders - public and private - as both benefit from it. Nonetheless, the number of human lives lost on European roads is still much too far from the dramatic reduction we all aim for. Since 2010, the number of EU road fatalities has decreased by **around 24%**, but we must do more to reach the 50% reduction target by 2030.

ERTICO – ITS Europe, the membership-based organisation that brings together ITS stakeholders from the public and private sector, was founded by 15 organisations and the EC back in 1991. Since its creation, ERTICO has constantly been working towards making mobility safer, smarter and more efficient for all. A good example of this commitment is the long-term engagement with the eCall deployment activities, the pan-European in-vehicle emergency call service based on 112. The journey started back in 2001, and after several projects (eMerge, HeERO, etc.) and other parallel activities (e.g. eSafety Forum) led by ERTICO, it eventually **became policy in April 2018**, with the compulsory requirement to be equipped in all new car and light vehicle models within Europe.

The European Commission, with its Vision Zero, has set its targets towards zero deaths on European roads by 2050. Developments in technology are of great help in supporting our work in mobility innovation towards achieving that target. However, ambitious targets and technologies are not enough. Identifying what makes mobility safe in a constantly evolving mobility landscape is not a task without challenges...

Read the full text

IN THIS ISSUE

Update from the Coordinator

Núria Parera (Applus IDIADA)

Dear reader,

I'm Núria Parera from Applus+ IDIADA, and as Project Coordinator, I am delighted to welcome you to the first SAFE-UP newsletter.

The project officially commenced on the 1st of June 2020, and much like other new EU initiatives, we held our kick-off meeting and first ever General Assembly virtually, due to COVID-19 restrictions. Although technology today has allowed us to connect and collaborate online with no issues, the consortium is very much looking forward to meeting in person - sooner rather than later!

During the first few months of the project, we launched the SAFE-UP **Twitter profile** and **LinkedIn showcase page**, as well as our **official website**. We are continuously updating the accounts with insightful information, articles and events related to the project and road safety as a whole, so please do follow along and engage with us.

In November, we kicked-off a new series of knowledge transfer webinars with fellow R&D&I projects **OSCCAR** and **HEADSTART**, with the aim to facilitate synergies and participate in discussions related to the evaluation methodologies, scenarios and occupant protection. You can read more about the session **here**.

Recently we presented the first **CARE** results on accident data analysis and now we're analysing in-depth accident databases such as **GIDAS** and naturalistic driving data. These results will be explored further in an upcoming deliverable due mid this year. As well as this, the behavioural models that need to be integrated into the AIMSUN simulation platform are currently being developed and we expect to see the first run very soon - so stay tuned for that.

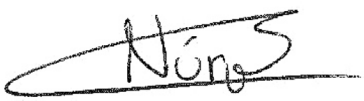
As for the 4 SAFE-UP demos, all of the basic requirements have been defined and soon we will commence the development phase of the active and passive systems. The requirements for the impact assessment have also been defined and within the next few months we will have a public deliverable to share with you outlining the methodology to be implemented.

The team members involved in the Training and Knowledge Transfer activities have been preparing some interesting tools that will soon be available on the SAFE-UP website. They are also in the midst of establishing a Safety Network Partner forum as part of the project, which we look forward to launching in the near future.

If you haven't already, I invite you to **subscribe to all future newsletters** and follow us on both Twitter and Linkedin so you can stay updated on the latest news, activities and progress of SAFE-UP.

See you in the next newsletter!

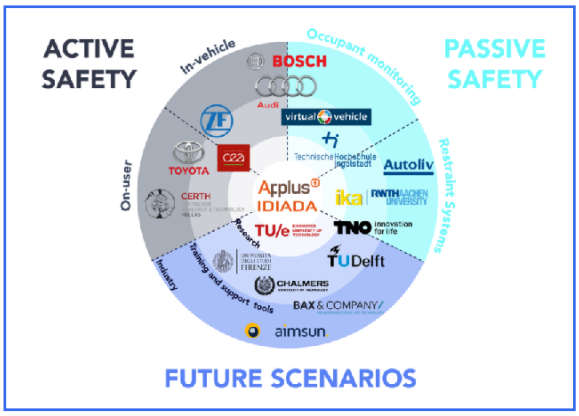
Núria



MEET THE SAFE-UP CONSORTIUM

The SAFE-UP consortium brings together the diverse expertise of researchers, leading OEMs and industry suppliers in automotive engineering, connected and automation technology, and experts in road user safety and training, all with established track records in EU road safety and innovation initiatives.

Discover some of the main activities each partner is involved in, as well as their key ambitions within SAFE-UP:



The SAFE-UP partners are focusing on all the different approaches to road safety

APPLUS IDIADA - Lead Partner

IDIADA Automotive Technology, S.A., coordinating partner of the project, provides complete solutions for automotive development projects worldwide - defining systematic methodologies that unify the criteria for evaluating and validating active and passive safety systems. IDIADA looks forward to improving their capabilities in active safety systems testing, new functionalities development (especially in sensor augmented connectivity) and new services for the automotive industry - testing of new safety scenarios and seating positions.

AIMSUN

Aimsun SL is a leading international provider of software and services for traffic planning, simulation and prediction.They will contribute to improving models to mimic future road users' behaviour in order to accurately estimate and predict traffic conditions and road users' interactions. They will also develop the traffic simulation platform (from TRL6-7 to TRL 8-9) for the design and testing of CAVs in the Safety-Critical scenarios defined by various physical and digital infrastructure, and traffic conditions.

AUDI

AUDI AG is one of the world's leading automotive premium brands and builds high quality, technologically progressive cars. AUDI will extract main parameters from accident databases, e.g. GIDAS, contributing to system specification, also reviewing NDD focused on near-crash data. They will also review different weather scenarios to be included in future ISO specifications.

AUTOLIV

Autoliv is the largest supplier of occupant restraint systems for the automotive industry. Their range of products covers seat belt systems, airbag systems, inflatable curtains, side bags, anti-whiplash systems, pedestrian protection airbags and more. Autoliv's main ambition is to save lives and reduce injuries. Throughout the project they will continue to build knowledge on the influence of ADAS technologies and automated vehicles on protection systems for vehicle occupants (of all ages, genders and BMIs), as well as vulnerable road users.

BAX & COMPANY

Bax & Company is a specialised consultancy firm dedicated to defining and executing open innovation strategies. They are leading the dissemination and exploitation activities, as well as supporting IDIADA in project management. The team involved look forward to building upon their knowledge in the AD field to increase the market penetration of cutting-edge technologies that could deliver substantial societal, environmental and economic impact.

BOSCH

Being a manufacturer of active safety systems, namely sensors, BOSCH will investigate bad weather effects on VRU detection as well as the development of advanced combined steering and braking manoeuvres for accident avoidance. They will also serve as an interface to the OSCCAR project. BOSCH looks forward to contributing to Vision Zero by providing NCAP-compliant new safety features in next product generations; improving the effectiveness of safety features like emergency braking, right/left turn assist and automated emergency steering, etc.

CEA

CEA-Leti is the largest French research and technology organisation specialised in micro- and nanotechnologies. CEA will extend the simulation framework of other partners where vehicles cooperate between themselves (V2X) or with the infrastructure (V2I). Thus, the case when VRU is in a non-line-of-sight situation can be addressed, as well as the cooperative path planning when several vehicles plan a collision-free path to avoid an incoming VRU. CEA aims to enhance their global knowledge on both C-ITS and automotive domains. CEA simulators will also be upgraded to take into account the specificity of the project.

CERTH

The Centre for Research and Technology Hellas (CERTH) is one of the largest research centres in Greece. CERTH will lead the work on the cross-cutting concept of the training schemes and awareness raising and education, in close collaboration with UNIFI. CERTH looks forward to exploring the C-ITS communication innovation and training tools and assisting in the technology transfer of the prototypes created, as well as the training courses in the transportation clusters.

CHALMERS UNIVERSITY OF TECHNOLOGY

Chalmers University of Technology - located in Gothenburg - is responsible for the identification of use cases for simulation and the selection of preliminary Safety-Critical scenarios.They will also analyse the simulation results and develop and validate virtual chest and pelvis body models. The team is motivated to develop a method for impact assessment that can address both active and passive safety systems and support in its application. CHALMERS will also conduct a systematic study of data weighting.

IKA-RWTH

The Institute for Automotive Engineering (IKA) of RWTH Aachen University is active in the field of applied automotive research. They will be involved in the definition of use cases and safety metrics for vehicle to VRU interactions. Based on participant studies in virtual reality, IKA will develop behavioural models for pedestrians and cyclists, which will be integrated into a traffic simulation environment in order to analyse the changes on the baseline traffic interaction metrics caused by the introduction of future traffic participants. IKA will actively contribute to the specification of occupant safety use cases and a corresponding vehicle concept. They will also lead simulation studies to demonstrate the benefits of optimised deployment times for passive safety systems and contribute to passive safety supporting the definition of requirements for an impact assessment.

TECHNISCHE HOCHSCHULE INGOLSTADT

The University of Applied Sciences Ingolstadt (THI) is highly committed towards R&D. THI will lead the work on in-vehicle active safety systems, especially testing under adverse weather conditions; THI will focus on the design and development of the occupant monitoring system and pre-crash simulations as well as the object detection algorithm. They will also support indoor-driving tests under adverse weather conditions for complete system validation.

TNO

The goal of the Netherlands Organization for Applied Scientific Research (TNO) is to provide research and data ready to be applied by businesses and governments. TNO will coordinate the technical activities on defining future Safety-Critical scenarios, focused on contributing in the use cases and metrics definition for non-safety-critical and safety-critical traffic interactions. The team will also develop new driver models for traffic micro-simulation and contribute with their integration.

DELFT UNIVERSITY OF TECHNOLOGY (TU Delft)

TU Delft is the oldest and largest technical university in the Netherlands. They will be involved mainly in defining future Safety-Critical scenarios analysing naturalistic driving data to understand the behaviour and its variabilities for vehicles and VRU. They will also specify active safety systems for vehicle-VRU interaction and develop new methods to identify Safety-Critical scenarios and to assess the trajectories of CAVs.

EINDHOVEN UNIVERSITY OF TECHNOLOGY (TU/e)

Eindhoven University of Technology is a research university specialised in engineering science and technology. They will contribute to the definition, specification and implementation of right delivery/format/interface of results from collision free motion/path planning based on VRU detection studies for upgrading simulation models. TU/e will also verify the developed active safety systems for vehicle-VRU interactions.

TOYOTA

Toyota Motor Europe oversees the wholesale sales and marketing of Toyota and Lexus vehicles, parts and accessories, and Toyota's European manufacturing and engineering operations. In SAFE-UP, Toyota will participate in the development of the on-time warning provisions to VRUs and drivers in critical conditions and will also provide the vehicle where V2X safety measures will be integrated and evaluated. They will also be involved in the implementation of the assessment method in the active safety system related to the VRUs safety enhancement. Finally, Toyota will also collaborate on the validation of occupant models.

UNIFI

The Università degli Studi di Firenze (UNIFI) is involved in SAFE-UP through the Department of Industrial Engineering. UNIFI will participate in the definition of safety metrics related to PTW, developing a Powered Two-Wheeler rider model based on experimental data that will be part of the simulation environment to derive future accident scenarios. UNIFI will lead the identification of training needs, requirements, scenarios and KPIs, and the knowledge translation activities, and will cooperate with CERTH to create a comprehensive framework to raise awareness of future traffic scenarios.

VIRTUAL VEHICLE

The VIRTUAL VEHICLE Research Centre (ViF) is an independent, international R&D centre based in Graz which deals with application-oriented vehicle development and future vehicle concepts for road and rail. VIF will lead the work on the systems developed, bringing its knowledge on HBM positioning, simulation and assessment, and in coupled integrated safety system simulations.

ZF

ZF Friedrichshafen AG (ZF) is a global leader in driveline and chassis technology as well as active and passive safety technology. As a leading automotive supplier, ZF will assess and validate active functions for VRUs, bringing in knowledge on the evaluation methods related to future AD scenarios. ZF will be involved in the simulation-based validation and assessment of the developed active safety functions and will contribute to the overall assessment of SAFE-UP.

THE LATEST IN ROAD SAFETY RESEARCH

A select few research highlights from the world of road safety and AVs. Want to feature in our next newsletter? **Contact us!**

The **SLAIN project** ***(Saving Lives Assessing and Improving TEN-T road Network safety)*** led by **EuroRAP**, a member of our Advisory Board, has recently published a deliverable addressing road initiatives to meet the needs of automated cars; including road markings, roadways, VRUs and speed, all to improve road safety.

Read more

Exchanging safety-critical information between nearby vehicles and infrastructure enables us to drive down the number of accidents and casualties. The **European Data Task Force (DTF)** has launched a call for more stakeholders to join the SRTI (Safety-Related Traffic Information) ecosystem and contribute to further improving road safety in Europe.

Read more

Presented at the 29th Aachen Colloquium Sustainable Mobility Conference last October, the paper *'Towards Safety Concepts for Automated Vehicles by the Example of the Project UNICARagil',* illustrates the interconnection of different complementary approaches towards behavioural safety for automated vehicles.

Read more

The latest paper from the **OMniCAV project** focuses on using a systems thinking inspired safety analysis method called System Theoretic Process Analysis (STPA) to identify accident causes of driver-vehicle interactions. The analysis focuses on a SAE Level-4 Vehicle that is in the development phase, and is controlled partially by a safety driver and its built-in Autonomous Driving System (ADS).

Read more

Partners of the **5G-MOBIX project** have published a paper which identifies relevant future 5G enhancements, specifically those specified by Third-Generation Partnership Project (3GPP) releases beyond Release 15, and outlines how they will support the ambitions of highly automated driving in cross-border corridors. 5G mobile networks aim to be qualified as the core connectivity infrastructures to address Cooperative, Connected and Automated Mobility (CCAM).

Read more

The European Automobile Manufacturers' Association (**ACEA**), has developed a position paper on the approach of EU automobile manufacturers to Artificial Intelligence (AI). Holding enormous potential for the auto industry, in-vehicle AI applications for Cooperative, Connected and Automated Mobility will play a crucial role in taking automated and autonomous driving to the next level. Besides automated vehicles, AI also plays an important role in safety features, like ADAS.

Read more

Communication between automated vehicles and vulnerable road users in future traffic

Article summary by Marilee Nugent (University of Florence | UNIFI)

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

In the new opinion paper 'Vulnerable road users and the coming wave of automated vehicles: Expert perspectives' 16 experts in human factors and vehicle automation technology weigh in on the hot issues and challenges of integrating vehicle automation and connected technologies in urban traffic. How will AVs and vulnerable road-users - pedestrians, cyclists, motorcyclists - interact? What messages need to be communicated between them and how?

Can automated vehicles (AVs) make urban traffic environments safer for vulnerable road users (VRUs)? By reducing human error - and bad decisions - the hope is that the majority of causal factors in vehicle-to-VRU crashes can be drastically reduced. A vehicle programmed to obey road rules would not run amber or red lights, suddenly try to make a turn from the wrong lane, exceed speed limits in pedestrian dense areas, fail to stop at an occupied zebra crossing, or drive under the influence of alcohol.

Sounds promising on paper, but what are the practical challenges? Most of the automation research has been done on highway environments where, although traffic flows at high speeds, road user interactions are more predictable than in urban environments. In cities and towns, however, the modes of travel are more varied and the interactions are much more complex. Through both instinct and cultural training, we exploit the exchange of many different forms of signals and social cues to predict what others driving, walking, cycling, running intend to do next, to help us make decisions about our own movements. So too, AVs will have not only to detect VRUs but predict their behaviour and communicate the vehicle's intentions.

In this new opinion paper, 16 researchers in human factors were interviewed for their expert personal opinions on the current status of technological developments, bringing us up to date on the ongoing challenges to be addressed for safe interaction between VRUs and AVs in the future urban traffic.

Read the full text on the SAFE-UP website

UPCOMING PROJECT ACTIVITIES

What to expect from the SAFE-UP project over the next six months...

Use case definitions on passive safety systems

Through an extensive literature review, this upcoming SAFE-UP report will define the novel vehicle interiors, identifying the main characteristics of the vehicle concept (interior configurations, seating positions, seat capabilities, etc.) and develop the generic environment based on previous research.

Metrics for traffic interactions

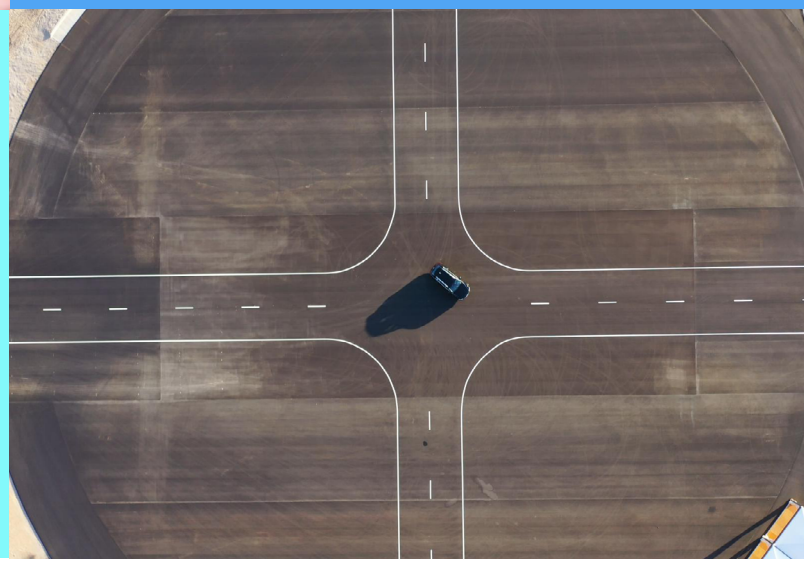
This SAFE-UP report will explain how to define both Safety-Critical and non-Safety-Critical traffic interactions based on a range of performance indicators.

Architecture of passive safety systems

These results will outline an adequate set of restraint concepts (configuration, requirements). The main adaptive components of the restraint system will be the load limiter and the airbag.

Requirements for impact assessment

Considering the results obtained from active and passive safety systems, a specific set of requirements and workflow for the impact assessment will be defined. This will include the identification of suitable tools, models, software and hardware, as well as the process for data management - including the definition of scenarios for validation at function level.



Images: Applus+ IDIADA HQ facilities

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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**

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