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iDREAMS

NEWSLETTER

No. 1

January 2020

IN THIS ISSUE

iDREAMS

DEAR READER,

Welcome to the first newsletter of the *i-DREAMS* project.

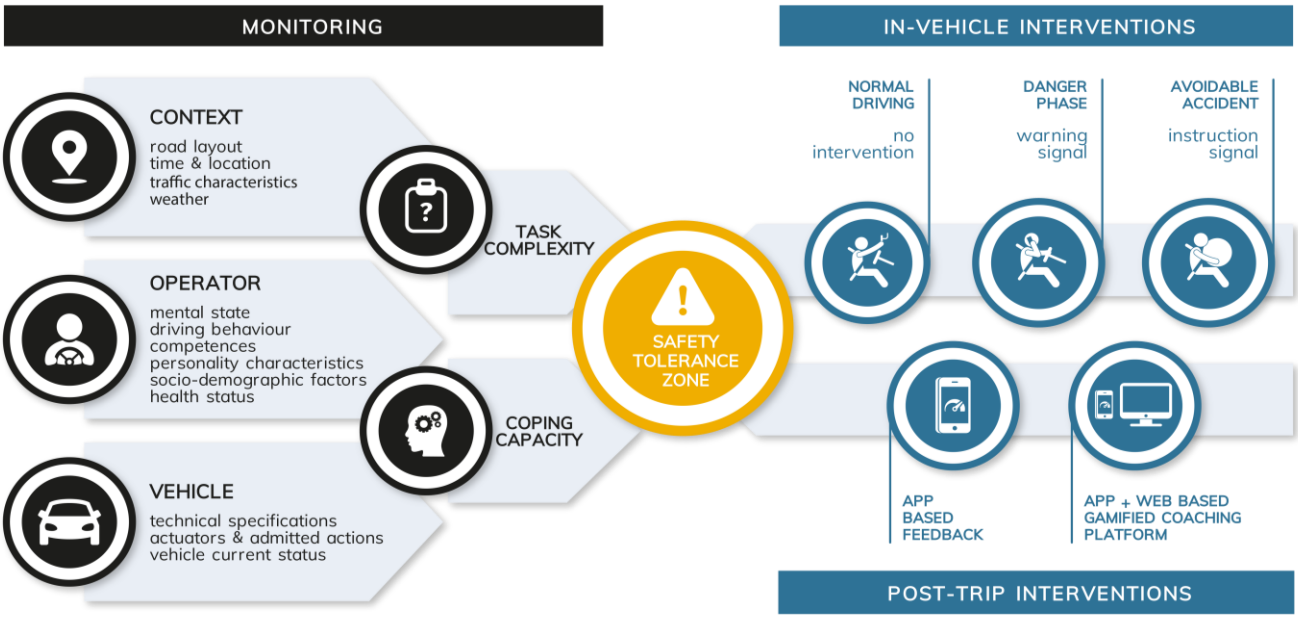
We took off in May 2019 with the aim to contribute to the EU road safety goals by creating a technological platform to monitor driving behaviour and create safety-oriented real-time and post-trip interventions. Our ultimate goal is to develop a driver monitoring system that will provide interventions to keep drivers within a safe driving zone.

We now look back at the first eight months of the project. In this period we have worked on an extensive revision of literature on driver state and task demand monitoring, and on the identification of effective technologies for safety interventions. Furthermore, a stakeholder survey has been carried out to gather valuable input for the development of the *i-DREAMS* system targeting experts in the field of transportation, including policy makers, sector specialists (e.g. operators), transport education/training providers, transport insurers or transport bodies/companies. Also, the technology partners in the consortium worked on prototyping and initial testing of essential *i-DREAMS* technological solutions which will later be used on a larger scale during the simulator tests and field trials in the project. This will help, in an early phase of the project, to further refine the project's concepts, models and technologies, using real-world examples.

I hope you enjoy reading our newsletter and invite you to check our website regularly, follow us on social media or contact us directly for more information.

Yours sincerely,

PROF. DR. TOM BRIJS
COORDINATOR



ABOUT i-DREAMS

i-DREAMS defines, implements and tests new ways and technologies for monitoring the increasingly complex interaction between driver, vehicle and road evironment. Furthermore, it develops and tests interventions to reduce crash risk, both under simulated and in real-life conditions.

New opportunities to tackle road safety

Several factors of driver state negatively impact road safety, such as distraction (in-vehicle or external), fatigue and drowsiness, health concerns (e.g. illness, frailty, cognitive state) and extreme emotions (e.g. anxiety, stress, anger). Moreover, differences in socio-cultural factors are still among the main determinants of road risks. At the same time, technological developments make massive and detailed operator performance data easily available. For example via new in-vehicle sensors that capture detailed driving style and contextual data. This creates new opportunities for the detection and design of customised interventions to mitigate the risks, increase awareness and upgrade driver performance, constantly and dynamically. The optimal exploitation of these opportunities is the challenge that *i-DREAMS* faces.

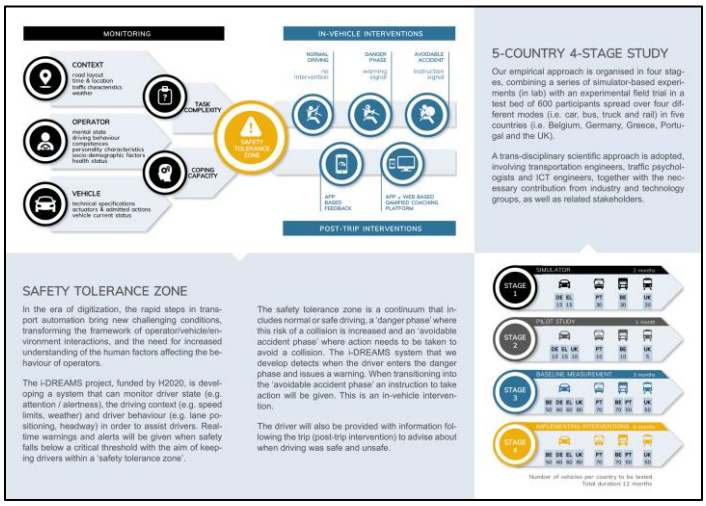
How will *i-DREAMS* make a difference?

The project focuses on the driver-vehicle-environment interactions and on the human factors affecting the behaviour of drivers. Technology to monitor and analyse driving behaviour is used, to keep the driver in the ‘Safety Tolerance Zone’. This technology can intervene both during and after the ride. During experiments, for example, sensors in the steering wheel or a wristband will monitor the driver's heart rhythm, so that both the driving behaviour and the alertness of the driver are measured in real-time. The vehicle could give a warning if the sensor detects that the driver is no longer concentrated or engages in risky driving situations. Even after the ride, the driver can be briefed about dangerous traffic situations that occurred while driving. This can have a sensitizing effect and can be used for driver training purposes.

For more information about i-DREAMS, make sure you check out:

The explainer video (click the image to open the video)

The tryptich flyer (click the image to open the PDF)



THE (i)-DREAM(S) TEAM

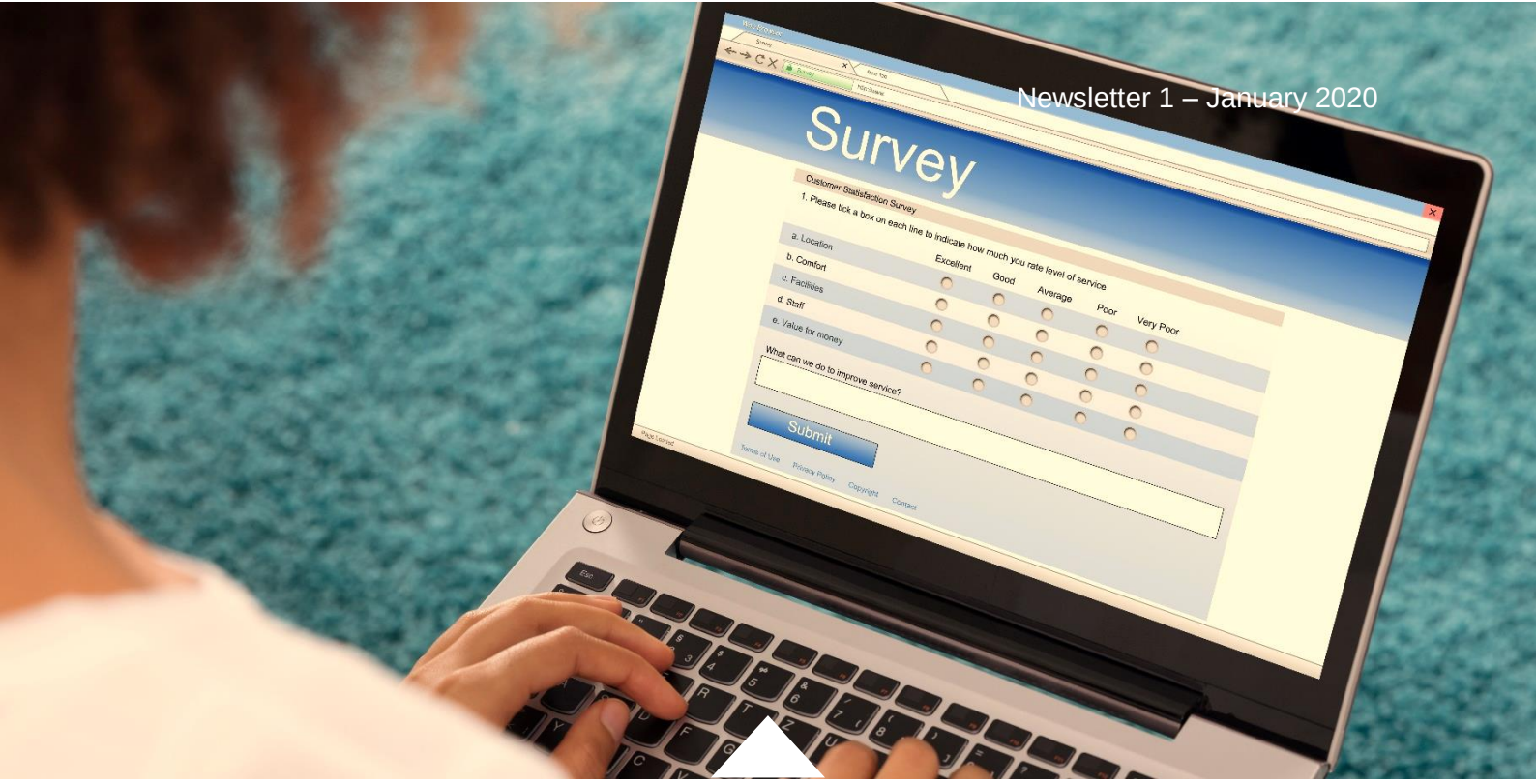
The project uses a trans-disciplinary approach and consists of:

- **Group 1 - Engineering Universities and Research Centres**[1]. They will design, develop and test the methodological framework for the Safety Tolerance Zone (STZ) calculation, and they will also design and develop the in-vehicle and post-trip interventions necessary to keep the driver/operator in the STZ. Furthermore they will recruit participants, set up and coordinate simulator and field experiments, analyse the results from the field data collection and provide practical and policy oriented recommendations.
- **Group 2 - Companies and ICT groups**[2]: These partners will specify the equipment required for the experiments and implement the software (and any necessary hardware) to monitor and intervene in the interaction between driver-vehicle-environment. Furthermore they will be responsible for the data synchronization, transmission and storage. They will assist group 1 in developing and implementing simulator scenarios, software and other applications for traveller information, notification and benchmarking.
- **Group 3 - Sector organisations**[3]: Both group 1 and 2 have strong connections with the transport industry. Two other partners with close links to transport safety stakeholders complete the team. These sector organisations will make sure that relevant stakeholders in their network provide feedback at different stages in the project. Before experiments to identify critical road safety issues and needs, and towards the end to evaluate and disseminate the proposed tools for risk evaluation and intervention.

[1] Hasselt University - IMOB, National Technical University of Athens, Loughborough University, Technische Universität München, Kuratorium für Verkehrssicherheit, Univerza v Mariboru, Technische Universiteit Delft

[2] OSeven Single Member Private Company, Barraqueiro Transportes, DriveSimSolutions, CardioID Technologies

[3] European Transport Safety Council, Polis



ONLINE STAKEHOLDER SURVEY

Purpose of the survey

In order to understand how the *i-DREAMS* system could reduce in the best possible way crash risk, a survey was carried out to capture experts' opinions on the main issues leading to crashes and the barriers we need to overcome to successfully integrate the system into everyday lives of drivers.

Hence, the *i-DREAMS* stakeholder survey aimed to capture industry expert's experience and opinions for various transport modes about the main crash types, the reasons behind these crashes, how technology might be able to help reduce such crashes and their personal experience with technologies, both current and concept designs.

103 respondents from 22 different countries, inside and outside of the EU

Method and response

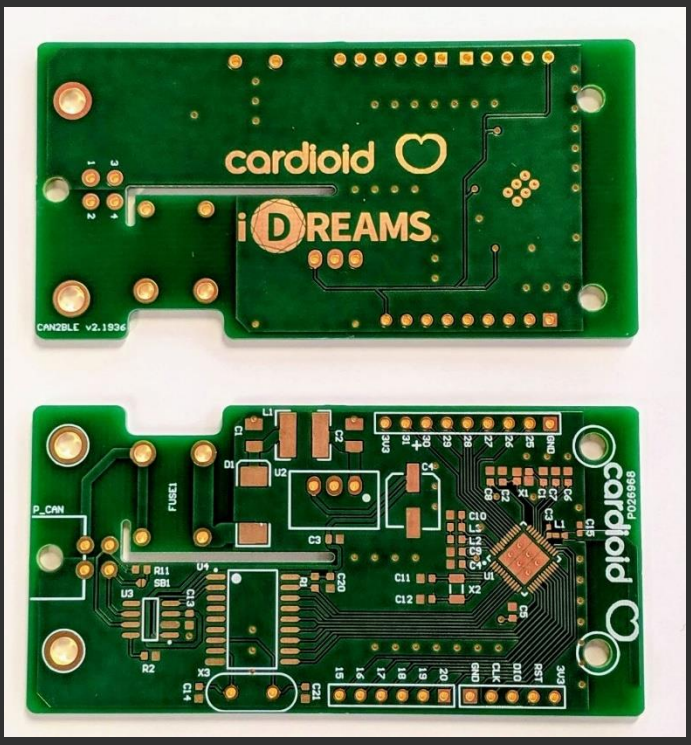
The survey was distributed electronically to relevant contacts of the *i-DREAMS* consortium partners, was made available on the *i-DREAMS* project website and through the different *i-DREAMS* social media channels. The survey was completed by 103 respondents from 22 different countries, inside and outside of the EU.

Main results

- According to respondents, collisions with vulnerable road users was seen as the most important type of collision for passenger car, whereas head on collisions and rear end collisions were respectively considered more important for bus/coach and truck.
- Passenger car experts reported as most important safety breach/incident, loss of control (often as a result of speeding), followed by close following another vehicle and failure to give way.
- Bus/coach experts reported as most important safety breaches/incidents, loss of control and sudden braking. Passenger behaviour was considered a secondary, but nonetheless important, breach/incident.
- For truck, the most important safety breach/incident reported by the survey respondents is close following of another vehicle.
- Driver fatigue/sleepiness and driver inattention are problems reported for all transport modes.
- Survey respondents see an important role to play in the future for active safety technologies, and for real time technologies monitoring and warning the driver when risky driving is detected.
- The use of post-trip interventions to engage drivers more strongly based on rewards, evidence-based feedback and positive reinforcement of good behaviour are considered promising.
- Technologies that are not currently in use and that all experts would not use are the most privacy- and driver-invasive ones, such as physiological monitoring.

THE i-DREAMS PROTOTYPE

Rapid prototyping of real time monitoring and intervention technologies to be adopted in different vehicle types (bus, truck, private car, rail) enables to better understand the safety potential and implementation challenges related to the large scale application in field trials later on in the project. This is exactly why the technology partners in the i-DREAMS consortium have worked together closely on the definition, prototyping and initial testing of different hard- and software solutions under simulated and real-world conditions.

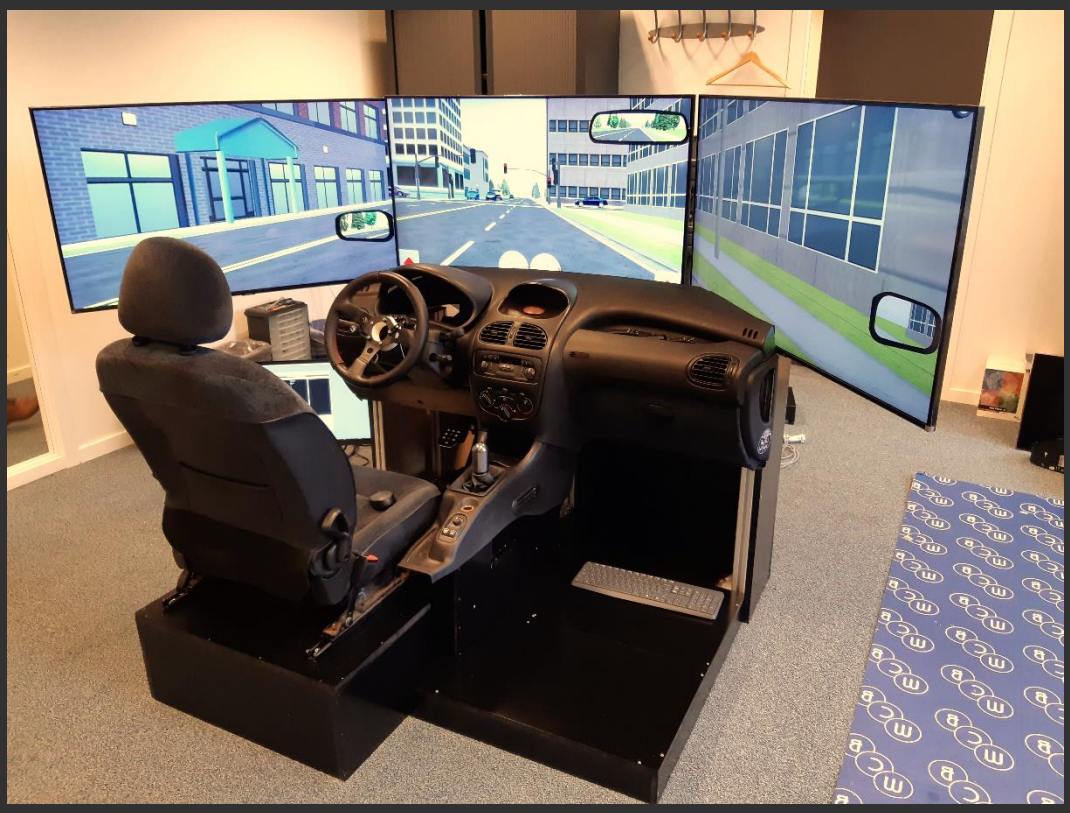


In-vehicle data transmission gateway

CardioID developed and prototyped an integrated suite of real-time monitoring technologies (OBD-II, Mobileye, CardioWheel, Dashcam) and an in-vehicle data transmission gateway for central cloud data storage and processing. The real time data originating from this set of monitoring technologies will be an important feed into the calibration and implementation of the Safety Tolerance Zone model.

"In the next step, we will investigate how real-time interventions can be communicated to the driver in the best way, including the selection of appropriate technologies. We will also be refining the hardware installation procedure, to make it as simple and efficient as possible."

ANDRÉ LOURENÇO , CARDIOID



DriveSimSolutions (DSS) developed a custom driving simulator system based on a real private vehicle mockup in which the *i-DREAMS* monitoring and intervention technology can be initially tested and optimized before its large scale adoption in the project's field trials.

"With the development of this simulator system, we provide a platform that matches as closely as possible the real-world conditions of the i-DREAMS field trials for early testing of the Safety Tolerance Zone model and to evaluate user experience and acceptance. In the next step, we will be preparing a heavy vehicle driving simulator for the project."

BART DE VOS, DSS

MEET THE EXPERT ADVISORY BOARD

The Expert Advisory Board (EAB) has an important role throughout the project in terms of quality control. Consulting with these experts is a crucial part of work package 9 ‘Stakeholder consultation and dissemination’. Five experts in the field of road safety, human factors and automation are part of the EAB and provide advice on strategic orientations within the project and reflect on the project progress. From their academic and industry expertise, these experts will provide useful input in terms of knowledge, network, policy orientations, exploitation strategies, etc.?

On 12 and 13 December 2019 the first Expert Advisory Board meeting was organized by the i-DREAMS Steering Committee in Munich . In these two days i-DREAMS was introduced to the EAB members in general, activities carried out so far were presented, progress, insights, ideas and realisations were discussed in-depth.

Prof. Judith Charlton
Monash University Accident Research Center, Australia

“I think what is really distinctive in your project is that you try to create the safest possible drivers, using the combination of real-time and innovative post-trip interventions. I think your project’s main contribution is to work towards 5 star drivers - on 5 star roads - in 5 star vehicles.”

Dr. Wael Alhajyaseen
Qatar Transportation and Traffic Safety Center, Qatar

“I learned a lot about i-DREAMS in the last two days and in my opinion the biggest added value of the system will be the predictive value.”

Prof. Samuel G. Charlton
School of Psychology, University of Waikato, New Zealand

“I believe that one of the big benefits of i-DREAMS is the diagnostic capability of the system.”

Prof. Carol Flannagan
University of Michigan Transportation Research Institute, USA

“The dynamic aspects of the system can be an impressive added value, just make sure that you make it as concrete as possible.”

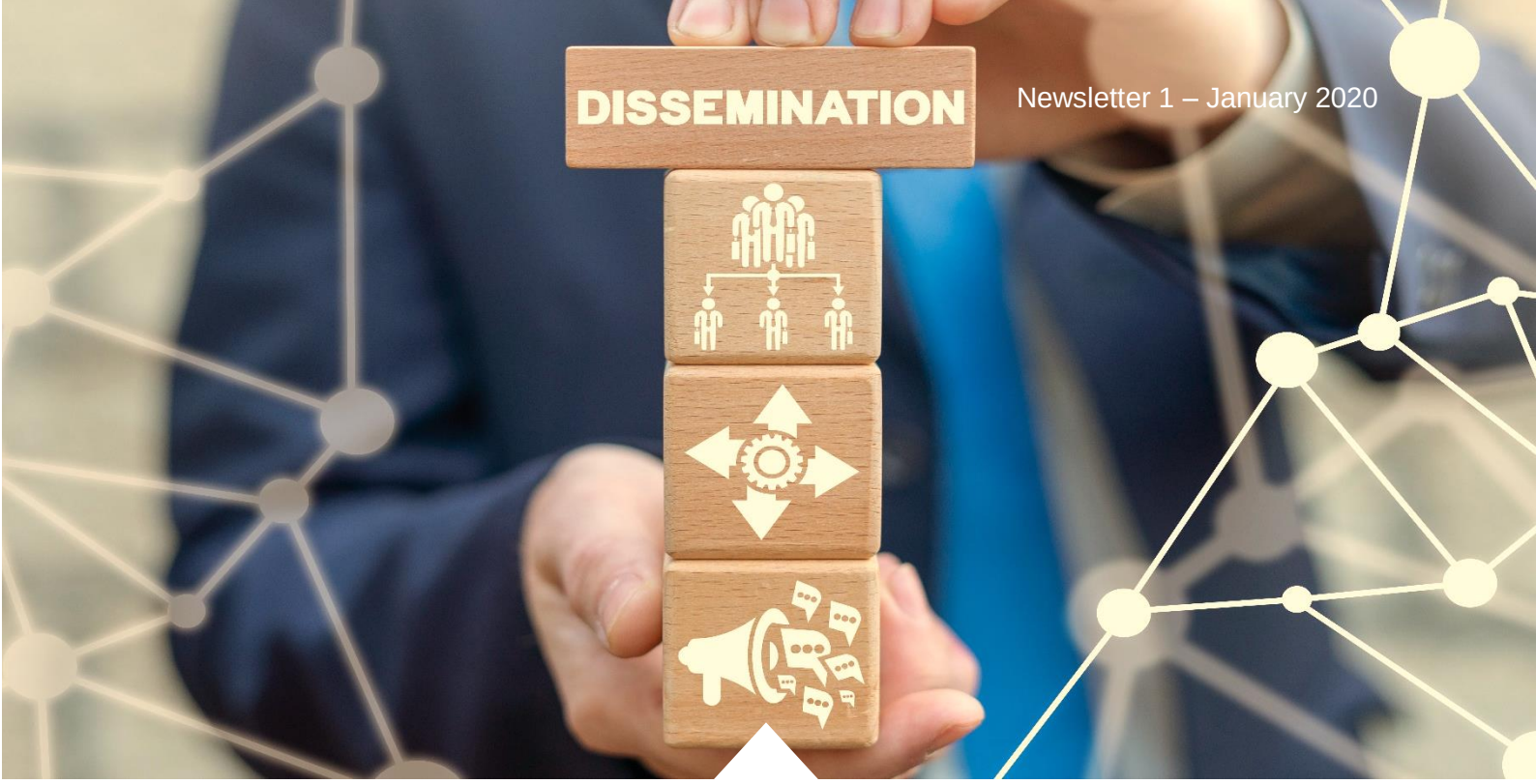
i-DREAMS MEETS MEDIATOR

MEDIATOR is a 4-year H2020 project, led by SWOV that also started on May 1, 2019. MEDIATOR will develop a mediating system for drivers in semi-automated and highly automated vehicles, resulting in safe, real-time switching between the human driver and automated system based on who is fittest to drive.

On October 16, 2019 team members[4] from *i-DREAMS* and MEDIATOR met up in The Hague to discuss possible collaboration. Given the link between the projects and their complimentarity, the teams are currently looking for opportunities to organise joint workshops and seminars. Tom Brijs, project coordinator *i-DREAMS*: *"It was a very interesting and inspiring meeting. We look forward to future collaborations with the MEDIATOR-team."*

More information about MEDIATOR on mediatorproject.eu.

[4] In the picture, from left to right: Prof. George Yannis (NTUA, i-DREAMS), Michiel Christoph (SWOV, MEDIATOR), Dr. ir. Nicole van Nes (SWOV, MEDIATOR), Prof. dr. Tom Brijs (UHASSELT-IMOB, i-DREAMS), Prof. Pete Thomas (LOUGH, i-DREAMS), dr. Eleonora Papadimitriou (TUD, i-DREAMS) Not in the picture: Prof. dr. Geert Wets (UHASSELT-IMOB, i-DREAMS)



i-DREAMS OUTPUT

Publications

- Brijs, T., Brijs, K., Kaiser, S., Talbot, R., Lourenço, A., Antoniou, C., Yannis, G., Avenoso, A. & Wets, G. (2020). i-DREAMS: an Intelligent Driver and Road Environdment Assessment and Monitorings System. Proceedings of 8th Transport Research Arena TRA 2020, April 27-30, 2020, Helsinki, Finland
- Ziakopoulos, A., Yannis, G., Kaiser, S., Furian, G., Senitschnig, N. & Brijs, T. (2020). State of the art on measuing driver state and technology-based risk prevention and mitigation: Findings from the i-DREAMS project. Proceedings of 8th Transport Research Arena TRA 2020, April 27-30, 2020, Helsinki, Finland

Press releases

20 May 2019	**KFV** EU-Projekt i-DREAMS: Wie kann Technologie helfen, die Verkehrssicherheit zu erhöhen? *Open here*
22 May 2019	**UHASSELT** IMOB monitort alertheid bestuurders en laat technologie ingrijpen tijdens autorit *Open here*
22 May 2019	**LOUGH** European-wide project to improve road safety launched today *Open here*
22 May 2019	**UM** Izboljšanje ciljev prometne varnosti EU s spremljanjem vedenja voznikov in ukrepov v realnem času in po opravljenem potovanju *Open here*

i-DREAMS CALENDAR

Internal activities

22-23 May 2019
i-DREAMS Kick-off meeting
hosted by UHASSELT in Holiday Inn Hasselt

26-27 Sep 2019
i-DREAMS First Steering Committee / First Data Knowledge & Management Committee
hosted by KFV at KFV

12-13 Dec 2019
i-DREAMS Second Steering Committee / Second Data Knowledge & Management Committee / First Expert Advisory Board
hosted by TUM at TUM

External activities

17 Jul 2019
NTUA presented the i-DREAMS project at a scientific workshop titled "Digitalisation and Road Safety Research". The workshop was organized within the Fifth UN Global Road Safety Week

3 Sep 2019
Lecture at a scientific conference: Defining driver state within a safety tolerance zone, by Rachel Talbot and Fran Pilkington-Cheney, LOUH

9 Sep 2019	Presentation of i-DREAMS at the European Mobility Week in Maribor by Chiara Gruden and Matjaž Šraml
15 Oct 2019	Presentation of i-DREAMS at the biannual HUMANIST VCE network meeting by Susanne Kaiser, KFV
16 Oct 2019	Meeting with MEDIATOR – discussion of possible collaboration

Upcoming Activities

11-12 Mar 2020	**i-DREAMS Third Steering Committee / First General Assembly / First User Advisory Board** hosted by BARRA
27-30 Apr 2020	**TRA2020 – Transport Research Arena** TRA is the largest European research and technology conference on transport and mobility. This years edition takes place in Helsinki and focuses on the topic 'Rethinking transport: Towards clean and inclusive mobility'. i-DREAMS will present 2 papers.
8-9 Jun 2020	**i-DREAMS Fourth Steering Committee** hosted by LOUGH

Published by

Hasselt University
Transportation Research Institute (IMOB)
Wetenschapspark 5 bus 6
3590 Diepenbeek
Belgium
On behalf of the i-DREAMS consortium

Contact

idreams-admin@uhasselt.be
www.idreamsproject.eu