



2020

EUCAR PROJECT BOOK



EUROPEAN COUNCIL FOR AUTOMOTIVE R&D



In the era of technological and societal change, pre-competitive research is crucial for the automotive industry in developing innovative mobility solutions. In your hands you are holding EUCAR's 2019 project book illustrating latest activities of collaborative, pre-competitive and innovative research.

Digitalisation and automation in road transport will play a vital role in shaping the transformation of our industry into a new age of mobility. This will change the way of moving from A to B and the way vehicles are used, sold and owned in the future. Connectivity will enable an entirely new level of co-operation between all participants in the road transport sector, including vehicles, road users and road authorities.

Our powertrains, for passenger cars as well as for commercial vehicles, will increasingly turn towards low/zero emissions. The diversified powertrain portfolio of 2030 including IC engines, different levels of electrification and alternative, sustainable fuels, will lead to a significant reduction of greenhouse gas emissions in agreement with the targets of the Paris climate change conference.

Within EUCAR in the last 25 years we strive for long-term collaboration by joining forces and benefitting from synergies. We seek to provide a common insight into current research and innovation projects tackling challenges in the fields of safe and integrated mobility, sustainable propulsion, virtual engineering and manufacturing and commercial vehicles. We need European solutions in a globalised world, enabling us to stay connected wherever we go. This is a matter of improving the quality of life for everyone.

New mobility systems require new technologies and together we keep on putting our efforts together to run the required research to create the future technologies. As the 2019 EUCAR chairman I am proud of being part of a team that aims to connect the dots between societal and environmental challenges, innovative technology and European standardisation in a dynamic way and by running ambitious projects.

Together we invent, create and shape the future.

Dr Axel Heinrich

EUCAR CHAIRMAN 2019
EXECUTIVE DIRECTOR GROUP INNOVATION
AT VOLKSWAGEN AKTIENGESELLSCHAFT

THE EUCAR STRATEGY FOR RESEARCH & INNOVATION

COMMERCIAL VEHICLES



SAFE & INTEGRATED MOBILITY



SUSTAINABLE PROPULSION



ENABLING TECHNOLOGIES & PROCESSES

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Version November 2019
for the last available Project Book,
please visit [EUCAR's web site](#)





STRATEGIC GROUP

SAFE & INTEGRATED MOBILITY

THE EUCAR STRATEGIC VISION

Smart and safe vehicles for all purposes, integrated into a secure and intelligent transport system, progressing towards seamless mobility for all, maximum efficiency and ever-fewer accidents.



SAFETY

Vehicles that protect their passengers, avoid accidents and dialogue safely with their drivers. Communications that enable cooperative safety for all road users. Safe application of increasing vehicle automation.

TRANSPORT / TRAVEL SYSTEM

An integrated system that provides comprehensive real-time actionable data, facilitates modal transitions and manages traffic for maximum mobility, efficiency and optimum use of infrastructure.

TRAFFIC EFFICIENCY

Substantially increased efficiency of passenger and goods traffic measured by time available for other purposes, consumption of individual vehicles and whole system efficiency.

VALUE ADDED CUSTOMER SERVICES

Highly valuable services, available to drivers and customers, that enhance the driving and mobility performance and experience, and provide additional business opportunities.

ICT & TELEMATICS

Vehicles that are integrated with the electronic information cloud, enabling a complete system approach for smart vehicles and intelligent transport.



DENSE

BUDGET	€14.5 million
FUNDING	€7.2 million
START	June 2016
DURATION	36 months
CALL	H2020-ECSEL-2015-1-RIA-two-stage
CONTRACT N°	692449
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PARTNERS	EUCAR members: Renault Group.

Other: Daimler, Autoliv, Cerema, Hitachi, Ibeo, Innoluce, Modulight, Oplatek, TU Tampere, Uv Ulm, Vaisala, VTT, XENICS.



www.dense247.eu



DENSE

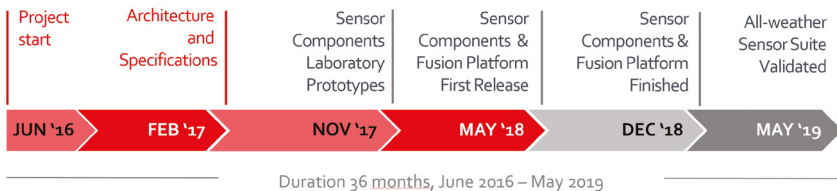
aDverse wEather eNvironmental Sensing systEm

MOTIVATION AND OBJECTIVES

Reliable detection of vehicles' surroundings is absolutely necessary for higher automation levels. Currently used sensors in the automotive domain show significant performance decreases under adverse weather conditions.

DENSE overall objective is to design, develop, and validate an all weather sensor suite for driver assistance and automated driving to enable operation especially in adverse weather like rain, snow and fog.

PROJECT PLAN, MILESTONES AND DELIVERABLES



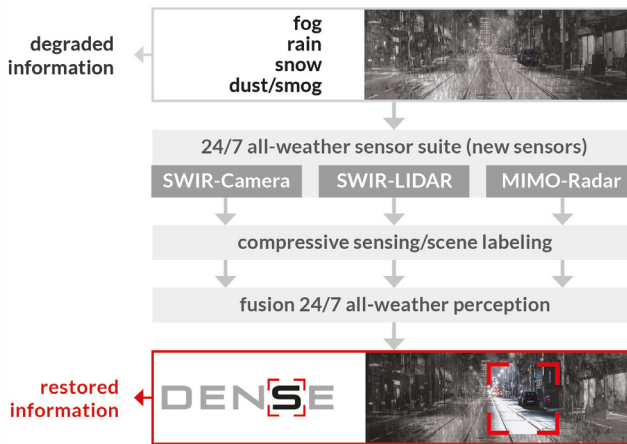
TECHNICAL APPROACH

The new sensor suite is based on a smart integration of three different technologies: High resolution radar (MIMO Radar), gated short wave infrared camera (SWIR) with pulsed laser illumination and short-wave infrared LiDAR (SWIR LiDAR). The sensor suite has to consist of a combination of these sensors due to redundancy requirements. Neither one of the sensors alone manages variable visibility conditions especially under high safety requirements for autonomous driving. In addition a mobile road state sensor will allow for the assessment of road surface conditions.



DENSE

DENSE SENSOR CONCEPT



ACHIEVEMENTS

DENSE finished the specifications and system architecture as well as first baseline tests. It is now focussing on the development of

- Radar concept for operating in 77-81 GHz automotive band
- Short Wave Infrared (SWIR) gated camera sensor and illumination
- Short Wave Infrared LiDAR as well as
- Road State Sensor
- Signal enhancement and fusion algorithms



BUDGET	€68 million
FUNDING	€36 million
START	September 2017
DURATION	48 months
CALL	ART-02-2016 – Automation pilots for passenger cars
CONTRACT N°	723051
COORDINATOR	Aria Etemad Volkswagen AG
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PARTNERS	EUCAR members: Volkswagen Group, BMW Group, Fiat Chrysler Automobiles, Daimler, Ford of Europa, Jaguar Land Rover, Opel Automobiles, PSA Peugeot Citroën, Renault Group, Toyota Motor Europe, Volvo Cars.

Other: 23 partners from well-known academia and research centres, as well as highly successful industries.



www.L3Pilot.eu



L3Pilot

Piloting Automated Driving on European Roads

MOTIVATION AND OBJECTIVES

L3Pilot tests the viability of Automated Driving as a safe and efficient means of transportation. The project focuses on large-scale piloting of SAE Level 3 functions, with additional assessment of some Level 4 functions. The functionality of the systems used is exposed to variable conditions in 10 European countries, 100 vehicles and 1,000 test drivers. The tested functions cover a wide range from parking to overtaking, and urban intersection driving.

EXPECTED IMPACT

The stringent user-centric approach of L3Pilot will lead to the optimal design and handling of Automated Driving functions and will generate knowledge about the most effective way of implementing these systems. Furthermore, it will contribute to knowledge about L4 function developments, and potential pitfalls while driving automatically.

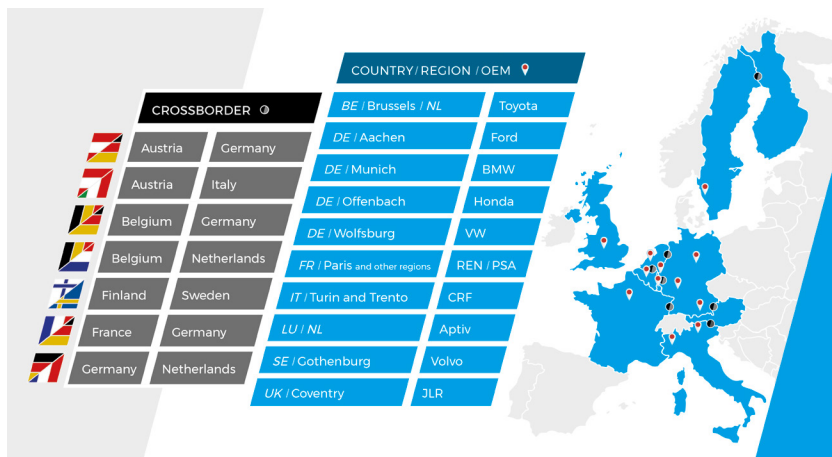
TECHNICAL APPROACH

- Create a standardised Europe-wide piloting environment for Automated Driving
- Define a common FESTA methodology and implement it on the test sites
- Coordinate pilot activities to acquire the required data
- Conduct Automated Driving tests in northern, central and south-western Europe, including cross-border activities
- Evaluate automated driving functions and connected automation



L3Pilot

PILOT REGIONS AND CROSS-BORDER TESTING



ACHIEVEMENTS

- European testing environment for Automated Driving created
- Valid data on impact of Automated Driving on safety and traffic efficiency
- Code of Practice for Automated Driving providing guidelines for systematic development of automated driving functions
- Evaluation of user experience and acceptance of the technology
- New service and innovation potentials



BUDGET	€9.6 million
FUNDING	€9 million
START	September 2016
DURATION	42 months
CALL	H2020-MG-3.6a-2015
CONTRACT N°	688900
COORDINATOR	Anna Anund VTI
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PARTNERS	EUCAR members: Ford of Europe, Scania (Volkswagen Group).

Other: VTI, CERTH, DENSO, VALEO, VEDECOM, DLR, TOMTOM, DAINESE, DUCATI, SMART EYE, AUTOLIV, STOCKHOLM UNIV, UPPSALA UNIV, NUI GALWAY, OSBORNE CLARKE, HUMANIST, IFSTTAR, IDIADA, ACASA, CTL, FORTH, UNIV. PATRAS, EPFL, CONTINENTAL, IAO FRAUNHOFER, RWTH, TU CHEMNITZ, NAVENTIK.



www.adasandme.com



ADAS&ME

Adaptive ADAS to support incapacitated drivers mitigate effectively risks through tailor made HMI under automation

MOTIVATION AND OBJECTIVES

ADAS&ME develops Advanced Driver Assistance Systems (ADAS) that incorporate driver/rider state, situational/ environmental context and adaptive interaction, to automatically transfer control between vehicle and driver/rider and thus ensure safer and more efficient road usage for all vehicle types (conventional and electric car, truck, bus, motorcycle).

EXPECTED IMPACT

- Improved efficiency, environmental impact, road safety and traffic flow through better use of the existing infrastructure capacity
 - Reduction of the automated driving systems' development costs
 - Enhanced robustness and performance of sensor and data analysis systems, optimised HMI and transition strategies
-

TECHNICAL APPROACH

The holistic approach of ADAS&ME considers automated driving/riding along with information on driver/rider state, to develop optimised HMI and support strategies, where automated and partly automated driving/riding is seen as, both an influencing factor, and a tool to affect driver/rider state.



ADAS&ME



ACHIEVEMENTS

- Adaptive architecture and technical implementation for all main systems/ components & all Use Cases developed and published
- Data collection for all targeted driver/riders states: sleepiness, visual distraction, rest, stress, thermal fatigue and emotions
- Multimodal adaptive HMI framework and personalised driver/rider profiles



BUDGET	€63.4 million
FUNDING	€33 million
START	May 2016
DURATION	36 months
CALL	H2020-ECSEL-2015-2-IA-two-stage
CONTRACT N°	692455
COORDINATOR	Andrea Leitner AVL List GMBH
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PARTNERS	EUCAR members: Renault Group, Toyota Motor Europe.

Other: 69 partners from well-known academia and research centres, as well as highly successful industries.



www.enable-s3.eu



ENABLE-S3

European Initiative to Enable Validation for Highly Automated Safe and Secure Systems

MOTIVATION AND OBJECTIVES

ENABLE-S3 aims at significantly raising the level of dependability of automated systems and keeping the effort and costs for testing at a reasonable level. This will be achieved by providing a comprehensive modular verification and validation framework. Methods and bricks will be developed to reduce the required test effort across six industrial domains (Automotive, Aerospace, Rail, Maritime, Health, Farming), fostering cross-domain reuse and knowledge exchange.

EXPECTED IMPACT

Automated cyber-physical systems (ACPS) are disruptive technologies that have the potential to change society with all benefits and risks, representing a major market potential for European companies. ENABLE-S3 will add important missing verification and validation technology bricks required to ensure the dependability (safety and security) of ACPS at affordable costs. ENABLE-S3 outcomes will facilitate the market introduction of automated systems in Europe.

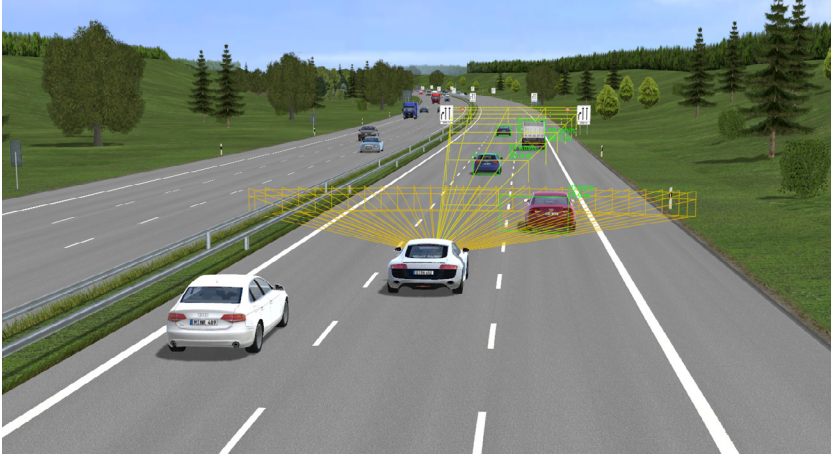
TECHNICAL APPROACH

ENABLE-S3 develops novel V&V technologies to assure the complex behaviour of highly automated systems is correct, reliable and in line with safety and domain-specific regulations. The technical approach covers the extraction of test scenarios (e.g. from road data), scenario-based V&V in virtual, semi-virtual, and real testing environments, environment and sensor models, sensor stimuli for MiL/SiL, HiL, ViL, integrated safety and security analysis approaches as well as test reduction of highly varying environmental conditions.



ENABLE-S3

ENABLE-S3 SCENARIO BASED VIRTUAL V&V



ACHIEVEMENTS

- Definition of 12 use cases to derive requirements for the test systems and demonstration of results
- Standardization activities for interface and scenario descriptions. Extraction of test scenarios (e.g. from vehicle road data, etc.)
- Approach for scenario-based verification & validation in virtual, semi-virtual, and real testing environments
- Environment and sensor models as well as sensor stimuli for MiL/SiL, HiL, ViL



BUDGET	€3.0 million
FUNDING	€3.0 million
START	October 2018
DURATION	36 months
CALL	H2020-DT-ART-2018
CONTRACT N°	824251
COORDINATOR	Stéphane Dreher ERTICO – ITS Europe
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PARTNERS	<p>EUCAR members: BMW Group, FIAT Chrysler Automobiles, Renault Group, Volvo Group.</p> <p>Other: ERTICO, APTI, ATE, BOSCH, CLEPA, DLR, FIA, ICCS, IDIADA, IKA, IRU, LEEDS, RDW, REN, RWS, SAFER, TNO, UITP, VDC, VTT</p>



www.connectedautomateddriving.eu



ARCADE

Aligning Research & Innovation for Connected and Automated Driving in Europe

MOTIVATION AND OBJECTIVES

ARCADE mission is to coordinate consensus-building across stakeholders to develop a common approach to development, testing, validation and deployment of Connected, Cooperative and Automated Driving (CAD) in Europe and beyond.

The main objectives of ARCADE are:

- Cooperation between all CAD stakeholders (e.g. industry, research, member states, European Commission and international partners) from the different sectors (e.g. automotive, infrastructure, ICT and service provisions)
- Coordination of cooperation efforts between all programmes, initiatives and projects, including national and European research programmes as well international cooperation activities
- Exchange of knowledge, lessons and experiences from past and ongoing activities at national, European and international level
- Consensus building on CAD deployment scenarios and research needs for connected and automated driving

EXPECTED IMPACT

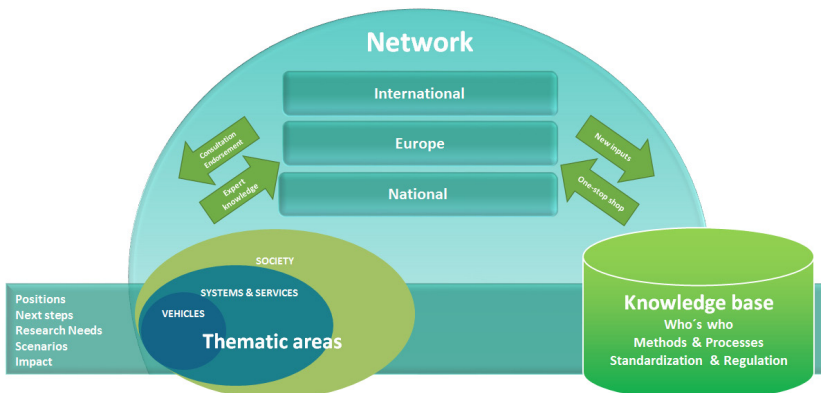
ARCADE will improve understanding of the factors and measures that can foster the adoption of connected, cooperative and automated vehicles. By fostering harmonised approaches to CAD deployment in Europe, the project aims to strengthen Europe's competitive edge and market penetration. ARCADE will also allow for better comparability and transferability of research and demonstration activities in Europe and worldwide.



ARCADE

TECHNICAL APPROACH

- Consolidate available knowledge (information, data, best practice, lessons learned) into a public database (Knowledge Base)
- Organise EU representation in the EU-US-JPN Tri-lateral WG on Automated Road Transport (ART), and extend international cooperation with other countries
- Clarify challenges, gaps and enablers for the main thematic areas related to the deployment and adoption of connected & automated driving
- Involve Industry, Public and Research stakeholders into concerted, consensus-based contributions to the STRIA roadmap on Connected and Automated Road transport and other Strategic Research Agendas
- Organise the bi-annual European conference and Interactive Symposium on CAD





BUDGET	€ 10,2 million
FUNDING	€ 7,9 million
START	September 2018
DURATION	36 months
CALL	H2020-ART-2017
CONTRACT N°	768953
COORDINATOR	Dr. Angelos Amditis, Institute of Communication and Computer Systems
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PARTNERS	EUCAR members: BMW Group, Fiat Chrysler Automobiles.

Other: ICCS, IBM, Nokia, WIND, T-Mobile, Bosch,
SWM, AirBus, ASFINAG, ATE, UULM, SEAB,
ISMB, ERTICO, COU, CDV, BRE, UFL.



www.ict4cart.eu



ICT4CART

ICT Infrastructure for Connected and Automated Road Transport

MOTIVATION AND OBJECTIVES

The main goal of ICT4CART is to design, implement and test in real-life conditions a versatile ICT infrastructure that will enable the transition towards higher levels of automation (up to L4) addressing existing gaps and working with specific key ICT elements, namely hybrid connectivity, data management, cyber-security, data privacy and accurate localisation. ICT4CART builds on high-value use cases (urban and highway), which will be demonstrated and validated in real-life conditions at the test sites in Austria, Germany and Italy. Significant effort will be put also on cross-border interoperability, setting up a separate test site at the Italian-Austrian border.

EXPECTED IMPACT

Through its ICT infrastructure architecture, integrating a hybrid communications approach and mechanisms for seamless exchange of data, ICT4CART will address the ICT infrastructure related challenges to enable the transition towards advanced levels of road vehicle automation. The ICT4CART infrastructure architecture for connected and automated traffic is anticipated to create a leap in the European competitiveness of the transport industry, while new market opportunities will arise for a wide set of stakeholders.

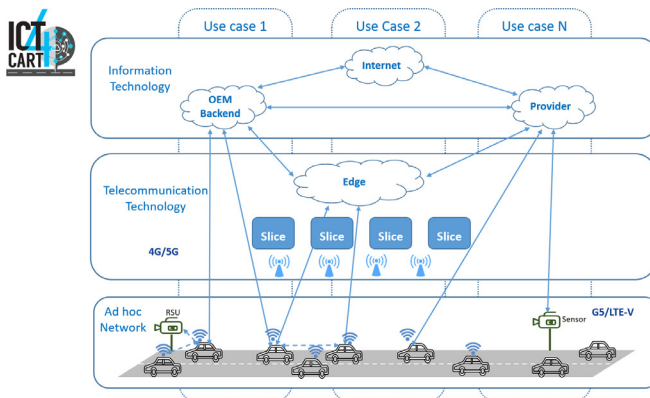


ICT4CART

TECHNICAL APPROACH

ICT4CART adopts a hybrid communication approach where all the major wireless technologies, i.e. cellular, ITS G5 and LTE-V, are integrated. On top of that, a distributed IT environment for data aggregation and analytics will be implemented. Cyber-security and data privacy aspects will be duly considered throughout the whole ICT infrastructure. ICT4CART developments will be demonstrated and validated under real-life conditions at the test sites in Austria, Germany, Italy and across the Italian-Austria border.

HIGH-LEVEL ARCHITECTURE



ACHIEVEMENTS

The project will officially launch its activities on September 2018. Initial achievements will be available after the first year of its runtime.



BUDGET	€6 million
FUNDING	€6 million
START	January 2019
DURATION	36 months
CALL	ART-01-2018
CONTRACT N°	824309
COORDINATOR	Mr. Álvaro Arrue Applus IDIADA
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PARTNERS	EUCAR members: FIAT Chrysler Automobiles, IVECO, Toyota Motor Europe Other: Applus IDIADA, ICCS, VICOMTECH, Pildo Labs, SAFER, Valeo, Virtual Vehicle, ika, ERTICO, VEDECOM, RDW, TNO, Bast, 4a Systems



www.headstart-project.eu



HEADSTART

Harmonised Solutions for Testing and Automated Road Transport

MOTIVATION AND OBJECTIVES

HEADSTART project aims to define testing and validation procedures of Connected and Automated Driving functions including key technologies such as communications, cyber-security and positioning. The tests will be in both simulation and real-world fields to validate safety and security performance according to the key users' needs.

EXPECTED IMPACT

The expected impact of HEADSTART project is based on three main action pillars:

- Testing and validation: Potentiation of development strategies bringing time and costs reduction
- Assessment: Creation of assessment protocols increasing vehicle safety awareness
- Certification: Support of regulations ensuring the safe introduction of CAD technologies to the market

TECHNICAL APPROACH

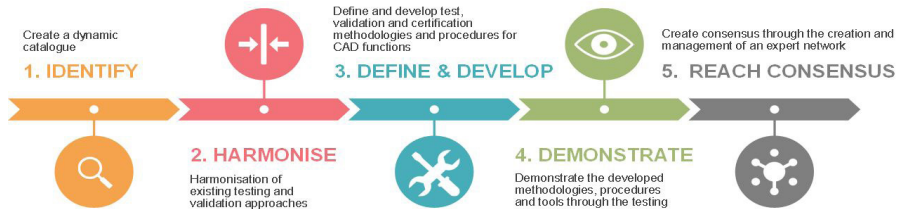
- Integration of positioning, communications and cyber-security in CAD test scenarios
- Comprehensive procedure for the allocation of test cases per testing platform
- Selection criteria and specification for proving ground test scenarios taking into account criticality
- Proving ground testing and validation



HEADSTART

- Correlation between simulation and proving ground results
- Harmonised, open result compilation and sharing
- Field trial test methodology description
- Cyber-security principles and integration in the testing methodology

HARMONISED SOLUTIONS FOR TESTING AND AUTOMATED ROAD TRANSPORT



ACHIEVEMENTS

During its initial months HEADSTART project has:

- Compiled worldwide state-of-the-art on scenario based validation and testing initiatives
- Analysed and summarised CAV testing needs of several stakeholders including: OEMs and TierXs, type approval authorities and technical services, commercial testing initiatives, academia
- Created the expert network with its 6 subgroups

In the following months a harmonised methodology that includes KETs will be finalised.



BUDGET	€18.5 million
FUNDING	€14.9 million
START	November 2018
DURATION	36 months
CALL	H2020-ICT-2018-2
CONTRACT N°	825012
COORDINATOR	Fondazione Bruno Kessler (FBK)
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PARTNERS	EUCAR members: BMW Group, Fiat Chrysler Automobiles

Other: Fondazione Bruno Kessler,
Autostrada del Brennero, D-Telekom, INWIT,
NEC, Nokia, Qualcomm, SWARCO, TIM,
T-Mobile, CommAgility, CyberLens, DriveSec,
Eight Bells, WINGS ICT, PIIU, CEA-LETI, CNIT,
IMEC, UniBol, Uni Valencia, Virtual Vehicle,
High Tech Marketing



www.5gcarmen.eu



5G-CARMEN

5G for Connected and Automated Road Mobility in the European union

MOTIVATION AND OBJECTIVES

Focusing on the Bologna to Munich corridor (600 km, over three countries) the objective of 5G-CARMEN is to leverage on the most recent 5G technology enablers providing Mobile Virtual Network Operators (MVNOs), Over-the-Top (OTT) providers, and service providers with a multi-tenant platform that supports the automotive sector transformation towards delivering safer, greener, and more intelligent transportation with the ultimate goal of enabling self-driving cars.

EXPECTED IMPACT

5G-CARMEN has planned to investigate four application scenarios: connected vehicle manoeuvre negotiation, connected and automated vehicle SAE L3/L4 manoeuvre negotiation, adaptive and prioritised QoE, and emission control in sensitive areas. Those use cases are expected to have a societal impact by improving both traffic safety, enabling coordinated driving by enhancing environment perception, as well as reducing emissions by aggregating heterogeneous information. Moreover, a commercial impact is expected laying automotive OEMs, the telecom operators, and the roadways operators on the global forefront of Safety and Driving Assistance Systems. Moreover, the 5G-CARMEN system is expected to have an impact on the over-the-top service providers, providing advanced content to passengers in cars and/or coaches.

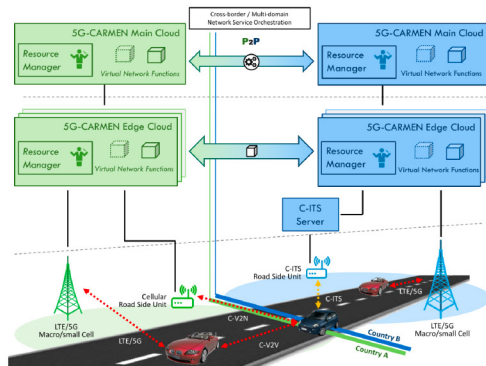
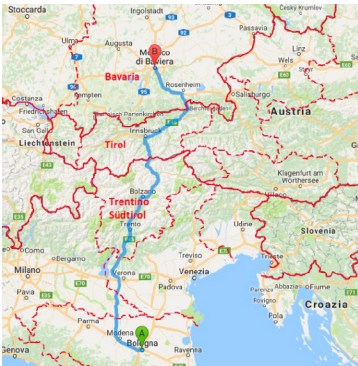


5G-CARMEN

TECHNICAL APPROACH

The key innovations proposed by 5G-CARMEN project are centred around a hybrid network, combining direct shortrange V2V and V2I communications, long-range V2N network communications and back-end solutions into a single platform capable to delivery telecom services over a combination of cellular and meshed networks, which can be operated by different M(V)NOs. The platform will employ different enabling technologies such peaceful coexistence and interworking between C-V2X and C-ITS and secure, multi-domain, and cross-border service orchestration to provide end-to-end network services.

THE 5G-CARMEN CORRIDOR AND CONCEPT OVERVIEW



ACHIEVEMENTS

The goal is to validate, evaluate and demonstrate a new generation of connected automated vehicles in different driving scenarios and road networks, including cross-border cases.



BUDGET	€17.1 million
FUNDING	€12.8 million
START	November 2018
DURATION	36 months
CALL	H2020-ICT-2018-2
CONTRACT N°	825050
COORDINATOR	Jesus Alonso-Zarate Centre Tecnològic de Telecomunicacions de Catalunya (CTTC)
CONTACT	coordinator@5gcroco.eu
PARTNERS	EUCAR members: PSA Group, Renault Group, Volkswagen Group, Volvo Cars Other: CTTC, Deutsche Telekom, POST Luxembourg, Ericsson, fortiss, Mobile World Capital, I2CAT Foundation, htw saar, Huawei, Nextworks, Nokia, Orange, Bosch, Eurecom, SANEF, SEC-Consult, TUM, Worldsensing, N.K.U.A.



www.5gcroco.eu



5GCroCo

Fifth Generation Cross-Border Control

MOTIVATION AND OBJECTIVES

Providing connected, cooperative and autonomous mobility (CCAM) services along different countries when vehicles traverse various national borders poses interesting technical challenges given the multi-country, multi-operator, multi-telco-vendor, and multi-vehicle-OEM scenario.

5GCroCo aims to define a successful path towards the provision of CCAM services along cross-border scenarios and reduce the uncertainties of a real 5G cross-border deployment.

EXPECTED IMPACT

5GCroCo aims at defining new business models that can be built on top of this unprecedented connectivity and service provisioning capacity, also ensuring that relevant standardization bodies from the mobile communications and automotive industries are impacted.

TECHNICAL APPROACH

- Validation will focus on three use cases: (1) tele-operated driving, (2) high definition maps for autonomous vehicles, and (3) Anticipated Cooperative Collision Avoidance (ACCA), but will also provide general recommendations for any other use cases
- Advanced 5G features validation, such as New Radio, MEC-enabled distributed computing, Predictive QoS, Network Slicing, and improved positioning systems, to enable innovative use cases for CCAM



5GCroCo

LARGE-SCALE TRIALS IN EU CROSS-BORDER CORRIDOR & SMALL SCALE PILOTS



ACHIEVEMENTS

- Large-scale trials of 5G technologies in the Metz-Merzig-Luxembourg cross-border corridor, traversing the borders between France, Germany and Luxembourg
- Small-scale pilots in geographically distributed locations. aim to select and fine tuning 5G capabilities before ntegrating them in large-scale trials
- New business models definition that can be built on top of the unprecedented connectivity and service provisioning capacity



STRATEGIC GROUP

SUSTAINABLE PROPULSION

THE EUCAR STRATEGIC VISION

Collaborative automotive R&I towards propulsion systems which are clean and energy-efficient over the full life cycle, with cost-effective technologies while maintaining customer priorities.



ICE BASED POWERTRAIN

Highly efficient and affordable powertrains with an internal combustion engine as the major propulsion unit, based on most advanced components, system architecture and operation strategies.

XEV* BASED POWERTRAIN

Highly efficient and affordable electrified powertrains, based on most advanced components and system architecture.

FUELS & INFRASTRUCTURE

Advanced fuels, including electricity, produced sustainably and under efficient processes including required infrastructure.

VEHICLE THERMAL & ELECTRIC ENERGY MANAGEMENT

Efficient management of thermal and electric energy flows in the vehicle.

*XEV+ HEV, PHEV, BEV and FCEV



BUDGET	€8.87 million
FUNDING	€7.15 million
START	October 2017
DURATION	42 months
CALL	GV-06-2017
CONTRACT N°	770019
COORDINATOR	CRF SCpA.
CONTACT	info@h2020-ghost.eu
PARTNERS	<p>EUCAR members: Fiat Chrysler Automobiles, IVECO, Toyota Motor Europe.</p> <p>Other: VUB, AVL, Infineon, Umicore, ENGIE, IK4 Ikerlan, EVE, Fraunhofer LBF and IISB, Valeo.</p>



www.h2020-ghost.eu



GHOST

InteGrated and PHysically Optimised Battery System for Plug-in Vehicles Technologies

MOTIVATION AND OBJECTIVES

The aim of the GHOST project is to contribute to enhancing the performance Battery Electric Vehicles (BEVs) and Plug-in Hybrid Electric Vehicles (P-HEVs) in terms of range, battery lifetime, functional safety and reliability. This will be achieved through a complete optimization of the electric, mechanical and thermal architecture of the on-board energy storage system.

EXPECTED IMPACT

The project aims to provide important contributions regarding innovative Battery System architectures based on next generation battery technologies, reducing the cost and complexity of the E/E architecture, while introducing improvements in terms of the energy density, efficiency, safety, scalability, and modularity.

TECHNICAL APPROACH

- Design of a novel and modular battery system with higher-energy density
- Develop of mass producible innovative and integrated design solutions to reduce the battery integration cost through smart design
- Define of new test methodologies and procedures to evaluate reliability, safety and lifetime of different BS
- Design novel prototyping, manufacturing and dismantling techniques for next generation of lithium-ion BS
- Demonstrate solutions in two demonstrators (BEV bus with ultrafast partial charge capability and P-HEV) and one lab demonstrator (module level) for the post Lithium-Ion technology



GHOST

DEVELOPING ADVANCED BATTERY SYSTEMS FOR ELECTRIFIED VEHICLES



ACHIEVEMENTS

Since the technologies developed in the project should have a significant impact on the performance of electrically chargeable vehicles (BEVs and P-HEVs), achieving these key innovations at affordable cost should strengthen the European technical and technological leadership in the field of Battery Systems which is crucial for electrified vehicles, and thus increase the competitiveness of European road vehicle manufacturers.



BUDGET	€7.8 million
FUNDING	€7.8 million
START	October 2016
DURATION	36 months
CALL	H2020-GV-2015
CONTRACT N°	713794
COORDINATOR	Dr. Angelos Amditis, Institute of Communication and Computer Systems
CONTACT	a.amditis@iccs.gr
PARTNERS	<p>EUCAR members: BMW Group, Fiat Chrysler Automobiles, Renault Group.</p> <p>Other: ICCS, City of Barcelona, Broadbit, ERTICO, FKA, GIREVE, Hubject, IBM, ICOOR, IDIADA, IREN, SingularLogic, Tecnositaf, TomTom, TUB, Verbund, MOSAIC FACTOR.</p>



www.nemo-emobility.eu



NeMo

Hyper-Network for electromobility

MOTIVATION AND OBJECTIVES

NeMo aims to make electromobility more attractive and facilitate its mass adoption, acting in a catalytic way across the entire energy management cycle of electromobility, including battery and smart grid recharging management. The project aims to facilitate increased service availability and the better planning and more secure electric grid operation, by making backend data and services accessible to the right actors and bringing down digital and physical barriers.

EXPECTED IMPACT

NeMo improves the attractiveness of EVs by: (1) providing EV users with a single method of identification, authorization and payment; (2) unifying charging infrastructures for all operators connected to its Hyper-Network; (3) providing access to a market of seamless innovative services; (4) establishing the means for integration of future smart-grid applications and services.

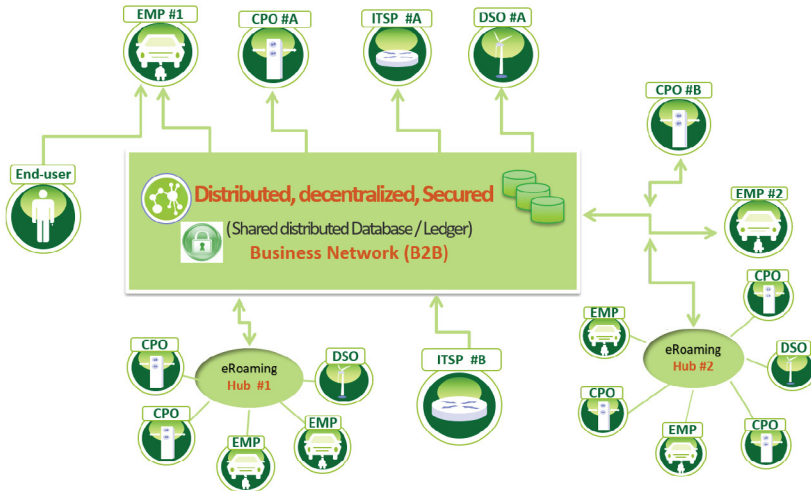
TECHNICAL APPROACH

The NeMo Hyper-Network is a distributed environment with open architecture based on standardised interfaces, in which all electromobility actors, physical (i.e. Charge Points, Power Grid, EVs) or digital (i.e. Charge Point Operators, Distribution System Operators, Service Providers, EV owners, etc.), can connect and interact seamlessly, exchanging data and providing improved electromobility ICT services.



NeMo

NEMO HYPER-NETWORK FOR ELECTROMOBILITY



ACHIEVEMENTS

- First version of the Hyper-Network is available. Service providers can register their existing services or create new complex electromobility services
- Common Information Models and software agents for easy translation of data from and to proprietary formats are ready
- The NeMo open Inter-Roaming protocol allows eRoaming platforms to exchange data and to make their data and services visible to other actors via the NeMo Hyper-Network



BUDGET	€10.1 million
FUNDING	€8.3 million
START	October 2016
DURATION	48 months
CALL	H2020-GV-03-2016
CONTRACT N°	724087
COORDINATOR	Rene Corbeij TNO
CONTACT	rene.corbeij@tno.nl
PARTNERS	EUCAR members: Fiat Chrysler Automobiles, IVECO, Volvo Group. Other: TNO, VUB, Valeo, JSR MICRO, Bosch, ALTRA, Fraunhofer.



www.h2020-orca.eu



ORCA

Optimised real-world cost-competitive modular hybrid architecture for heavy duty vehicles

MOTIVATION AND OBJECTIVES

The overall objectives of the ORCA project are to reduce the Total Cost of Ownership (TCO) to the same as diesel vehicle TCO level, targeting over 10% system cost premium reduction; to improve the hybrid powertrain efficiency up to 5% through optimized renewable energy sources (RES) selection & sizing and by improving the energy and Internal Combustion Engine (ICE) management; to reduce the fuel consumption by 40%; to downsize the ICE by at least 50%; to improve the electric range from 10km to 30km by adding the PHEV (Plugin Hybrid Electric Vehicle) capabilities and optimizing the RES capacity; and case study for Compressed Natural Gas (CNG) heavy-duty engines.

EXPECTED IMPACT

The objectives set in ORCA will impact on various factors such as environmental, European economic as well as the competitiveness of the OEMs.

The environmental impact refers to significant (tailpipe) CO₂ reduction, one of the main targets from the European Commission in Horizon2020. This impact depends on the progression of the growth of the market, market share of the hybrid HD vehicles and the improvement in fuel reduction performance from using the hybrid HD vehicles.

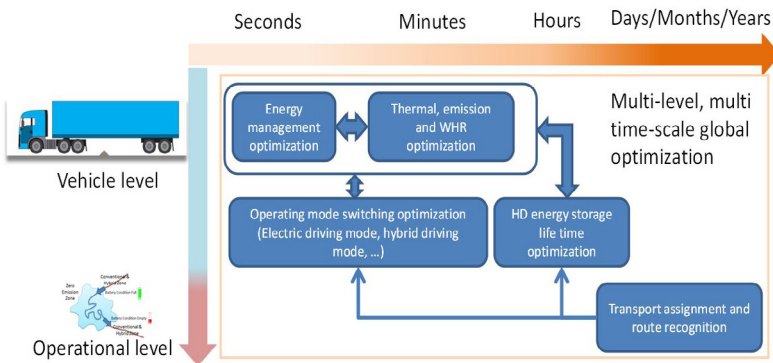


ORCA

TECHNICAL APPROACH

ORCA will be conducted by an 11-member consortium from 7 different European Member States representing all requested competencies in the field of powertrain optimization for Heavy Duty vehicles. The consortium comprises OEM with IVECO, Fiat Chrysler Automobiles and Volvo Group, suppliers with Valeo, Bosch and JSR MICRO, leading RTD organizations and Universities with TNO, Fraunhofer, and VUB. The majority are also members of ERTRAC and EGVA.

ORCA APPROACH TOWARDS SYSTEM OPTIMISATION



ACHIEVEMENTS

Achieving these key innovations at affordable cost will significantly strengthen the European technical and technological leadership in the value chain of heavy-duty vehicles, enabling a leading position in this crucial field of hybridised vehicles and increasing the competitiveness of European heavy-duty road vehicle manufacturers and suppliers. The optimised real-world cost-competitive modular hybrid architecture will be ready for its first market introduction between 2021 and 2022.



BUDGET	€11.7 million
FUNDING	€9.1 million
START	October 2016
DURATION	36 months
CALL	H2020-GV-3-2016
CONTRACT N°	724037
COORDINATOR	Stefania Zandiri Centro Ricerche FIAT S.c.p.A.
CONTACT	stefania.zandiri@crf.it
PARTNERS	<p>EUCAR MEMBERS: Fiat Chrysler Automobiles, Ford of Europe.</p> <p>Other: Borg Warner, BOSCH, Continental, EMITEC, Faurecia, POLIMI, RICARDO, Schaeffler, UNI Bath, UNI Berlin.</p>



www.thomson-project.eu



THOMSON

Mild Hybrid cost effective solutions for a fast market penetration

MOTIVATION AND OBJECTIVES

The project aims to the development of cost effective solutions, based on 48 V architectures, answering the need to reduce the environment impact of the transportation sector through a clever combination of advanced engine technologies, electrification and wider use of alternative/renewable fuels.

EXPECTED IMPACT

The project addresses very precise and consistent objectives to support a quick transition towards high efficient, cleaner and affordable electrified powertrains focusing on the 48V architectures, intended as key element to increase fuel economy and reduce environmental impact and to support a quick penetration on the market of the hybrid powertrains.

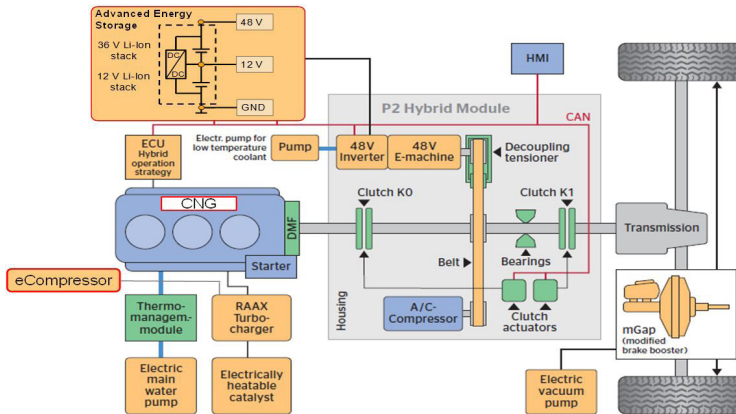
TECHNICAL APPROACH

The project will provide an exhaustive evaluation of the hybrid concept through the development of two different 48V architectures, one integrating the e-machine on the front belt drive, the other between engine and transmission and on two different engine families: a mid-size 1.6 Diesel engine and a small downsized Spark Ignited CNG engine with Direct Injection system.



THOMSON

TC CNG ENGINE 48V P2 ARCHITECTURE



ACHIEVEMENTS

During the first 18 months of the project, the following achievements have been reached:

- Global vehicle models, to optimise energy utilisation and emission control, developed
- Definition of the 48V mHEV configurations
- mHEV CNG 1,0L engine built-up – calibration ongoing at test bench
- mHEV Diesel 1,6L engine built-up – calibration ongoing at test bench



BUDGET	€ 9.1 million
FUNDING	€ 9.1 million
START	October 2017
DURATION	36 months
CALL	H2020-GV-2016-2017
CONTRACT N°	769506
COORDINATOR	Horst Pfluegl AVL List GmbH
CONTACT	horst.pfluegl@avl.com
PARTNERS	EUCAR members: Fiat Chrysler Automobiles, Ford of Europe, Renault Group. Other: AVL-SFR, Bosch, SIE-NV, SIE-SAS, UNR, Valeo, CEA, Fraunhofer-LBF, FHJ, NIC, UL, UNIFI, US, VIF, VUB.



www.obelics.eu



OBELICS

Optimization of scalaBle rEaltime modeLS and functional testing for e-drive ConceptS

MOTIVATION AND OBJECTIVES

OBELICS addresses the urgent need for new tools to enable multi-level modelling and testing of EV and their components in order to deliver more efficient vehicle designs faster while supporting modularity to enable mass production and hence improved affordability.

EXPECTED IMPACT

Using advanced heterogeneous model-based testing methods and tools; as well as scalable and easy to parameterize real-time models, OBELICS delivers

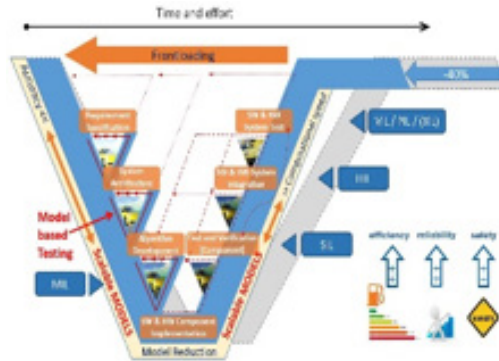
- Reduction in development and testing efforts for e-drivetrains by 40%
 - Improving efficiency of the e-drivetrain by 20%
 - Improving safety of electrified vehicles by a factor of 10
-

TECHNICAL APPROACH

With a comprehensive 'Frontloading' approach based on iterative model based design, development and testing - OBELICS enables engineers to readily understand design change impacts, validate and refine concepts at an early stage. Thus improving the performance, efficiency and safety, while reducing the time and efforts required for the EV development process.



OBELICS



ACHIEVEMENTS

- Development of novel methodologies for specifying and analyzing requirements with new models and testing methods
- Development of realistic use cases (four engineering domains) and metrics for guiding development of new tools for testing and modelling
- Advanced methodologies and strategies for assessing functional safety, reliability and safety



BUDGET	€23.4 million
FUNDING	€16.7 million
START	May 2015
DURATION	48 months
CALL	H2020 – GV.3 - 2014
CONTRACT N°	652816
COORDINATOR	Massimo Ferrera Centro Ricerche FIAT
CONTACT	massimo.ferrera@crf.it
PARTNERS	EUCAR members: Fiat Chrysler Automobiles, Ford of Europe, Renault Group, Volkswagen Group.

Other: AVL, CEA, Continental, CTU, Delphi,
Empa, ETH, FEV, IFPEN, Ricardo, Pierburg,
Schaeffler, POLITO, Poznan Uv., UPVLC.



www.gason.eu



GasOn

Gas-Only Internal Combustion Engines

MOTIVATION AND OBJECTIVES

In order to realize sustainable mobility in Europe, future vehicles for road transport have to be significantly more efficient by 2020. GasOn project aims to develop advanced CNG only, mono-fuel engines able to comply with post-2020 CO₂ emission targets, claiming the 20% CO₂ emission reduction compared to the current best in class CNG vehicle segment by segment, to fulfil the new homologation cycle and to guarantee a low fuel consumption even in real driving conditions.

EXPECTED IMPACT

New generation of CNG engines able to remove all gaps in comparison with conventional fuel engine/vehicle in terms of engine performance, fun to drive, driving range, trunk space and operating costs.

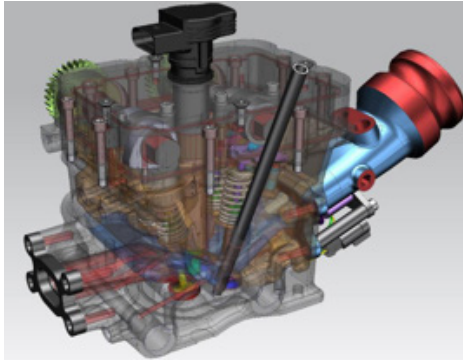
TECHNICAL APPROACH

GasOn is based on 3 parallel technology ways leading full development of demonstrator vehicles, all based on the integration of the gaseous direct injection system developed in the project matched with advanced variable valve actuation or advanced boosting system with variable compression ratio or lean burn/charge dilution combustion. The project is focusing also on innovative combustion approaches (like pre-chamber), advanced aftertreatments and fuel quality sensors.



GasOn

CNG DIRECT INJECTION ACTING ON AIR MOTION & COMBUSTION EFFICIENCY



ACHIEVEMENTS

- Demo vehicle equipped with CNG engine prototype with direct injection, fully flexible variable valve actuation and high compression ratio able to reduce more than 15% CO₂ emissions compared to conventional best in class bifuel models, complying with Euro6d limits and close to 600 km driving range
- CNG lean burn engine with pre chamber achieving 44% brake thermal efficiency with very low NO_x emissions
- CNG fuel quality sensor capable to detect the full spread of EU blends.



BUDGET	€9.9 million
FUNDING	€6.5 million
START	September 2016
DURATION	36 months
CALL	GV.6-2015
CONTRACT N°	713783
COORDINATOR	Dr. Alois DANNINGER AVL List GmbH
CONTACT	alois.danninger@avl.com
PARTNERS	EUCAR members: DAF Trucks, IVECO, Volvo Group. Other: AVL, FPT, Honeywell, SPOL, Bosch, Continental, FEV, Ricardo, Chalmers, CTU Prague, RWTH, POLIMI, POLITO, TU Eindhoven.



www.imperium-project.eu



IMPERIUM

Implementation of Powertrain control for Economic, low Real driving emissions and fuel Consumption

MOTIVATION AND OBJECTIVES

Fuel economy is a key aspect to reduce operating costs and improve efficiency of freight traffic, thus increasing truck competitiveness. The main objective of the IMPERIUM project is to achieve fuel consumption reduction of up to 20% (diesel and urea) whilst keeping the vehicle within the legal limits for pollutant emissions. The IMPERIUM consortium consists of major European actors and can provide a 100% European value chain for the development of future powertrain control strategies for trucks.

EXPECTED IMPACT

Targeted impact is to successfully market a new generation of optimally controlled Heavy Duty Vehicles in 2020 and beyond that are proved fuel efficient and compliant with Euro VI emissions limits under real driving conditions and attractive from a Total Cost of Ownership (TCO) perspective. For society, this leads to lower transport-related CO₂ emissions, improved (urban) air quality and lower noise levels. Results of IMPERIUM impacting >45% of European market share for HD trucks.

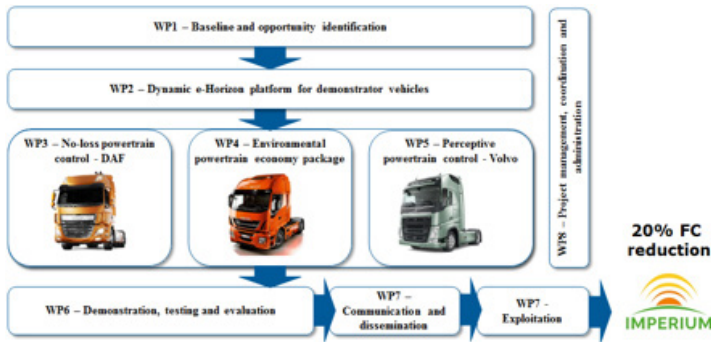


IMPERIUM

TECHNICAL APPROACH

The approach relies on the three following stages:

- Direct optimisation of the control of the main powertrain components (e.g., engine, transmission) to maximize their performances
- Global powertrain energy manager to coordinate the different energy sources and optimize their use depending on the current driving situation
- Provide a more comprehensive understanding of the mission (e.g., eHorizon, mission-based learning) to enable long- term optimization strategies



ACHIEVEMENTS

IMPERIUM's objectives, main innovations and targeted key results are:

- Obj. 1: Development of a methodology and simulation environment for assessing the performance of HD trucks in real-driving conditions
- Obj. 2: Development of Dynamic eHorizon system for Heavy Duty trucks
- Obj. 3: Three advanced fuel efficient Heavy Duty Demonstrators
- Obj. 4: Analysis and validation of the project outcomes by means of in-vehicle measurements integrated into the proposed simulation environment



BUDGET	€12.1 million
FUNDING	€9.95 million
START	October 2016
DURATION	36 months
CALL	H2020-GV-02-2016-INEA
CONTRACT N°	723954
COORDINATOR	Simon Edwards Ricardo
CONTACT	secretary@uniresearch.com
PARTNERS	EUCAR members: Jaguar Land Rover.

Other: Ricardo, Daimler, Bosch, FEV, Honeywell, Johnson Matthey, JRC, Uniresearch, IDIADA, Siemens, LOGE, ETH, UDE, RWTH, UFI Filters.



www.paregen.eu



PaREGEEn

Particle Reduced, Efficient Gasoline Engines

MOTIVATION AND OBJECTIVES

The overall objective of PaREGEEn is to demonstrate at up to TRL 7 a new generation of gasoline direct injection engines achieving a 15% reduction in CO₂ emissions via the optimal combination of advanced engine and robust aftertreatment technologies. Optical measurement will be made, simulation software verified and used to improve the design of the engines.

EXPECTED IMPACT

If successful and adopted across all light vehicle classes, these short-term gasoline engine developments are projected to reduce the European vehicle parc CO₂ emissions by about 2 Mtonnes in 2025 and up to 10 Mtonnes in 2030, together with around a 10% reduction in PN>10 nm. In addition, the new modelling & simulation tools will improve EU development competitiveness.

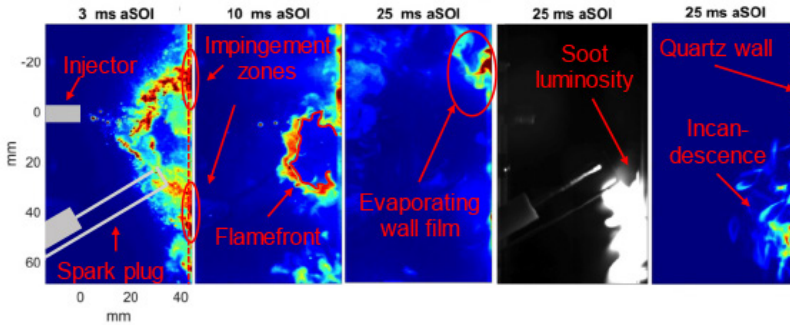
TECHNICAL APPROACH

The overall concept and technical approach comprises three major elements: Research for improved understanding; Innovation and demonstration of new technology combinations, where the developed know-how, software and control strategies are implemented in two novel optimised gasoline engines; Independent assessment of their impact to track the progress towards reaching the targets.



PaREGEN

LASER DIAGNOSTIC VISUALIZATIONS OF FUEL VAPOUR, IMPINGED LIQUID FUEL AND SOOT



ACHIEVEMENTS

A more fundamental understanding of the in-cylinder processes and their effects on emissions is being gained through optical measurements (see above) & simulation. New control models are being evaluated. For both demonstrators, the engines with their aftertreatment have been designed, built and are being tested: ready for installation in the vehicles and their assessment in 2019.



BUDGET	€9.5 million
FUNDING	€9.5 million
START	October 2016
DURATION	36 months
CALL	H2020-GV-2-2016
CONTRACT N°	724036
COORDINATOR	Stefania Zandiri Centro Ricerche FIAT
CONTACT	stefania.zandiri@crf.it
PARTNERS	EUCAR MEMBERS: Fiat Chrysler Automobiles, Volvo. Other: AVL, CHALMERS, IFPEN, JOHNSON MATTHEY, POLIMI, SCHAEFFLER, UNI GENOVA, UNI THESSALONIKI, VALEO.



www.upgrade-project.eu



UPGRADE

High efficient particulate free gasoline engines

MOTIVATION AND OBJECTIVES

The UPGRADE project aims to support the transition to high efficient, cleaner and affordable powertrain technology systems, based on Spark Ignited GDI (Gasoline Direct Injection) approach suitable for future Light Duty applications. The project also includes a deep analysis of the phenomenon of nanoparticles formation and the study and development of new Gasoline Particulate Filter (GPF) technologies.

EXPECTED IMPACT

- To lower the environmental and health impact of road traffic, by lowering emissions (nanoparticles down to 10 nm) especially in urban area and under Real Driving conditions
- The new engine platforms developed will allow a wider use of advanced biofuels and other alternative fuels like CNG and LPG

TECHNICAL APPROACH

To increase the engine efficiency under Real Driving conditions, the following steps will be carried out

- Address stoichiometric combustion approach on a «small» size engine and lean-burn combustion approach on a «medium-size» one
- Study and develop the best combination of technologies including advanced VVA/VVT capabilities, advanced boosting system, EGR and thermal management



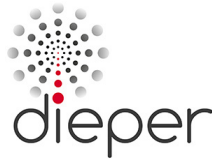
UPGRADE



ACHIEVEMENTS

During the first 18 months of the project, the following achievements have been reached:

- calibrated the pressure drop and filtration efficiency models with engine test performed for many different GPF samples
- development and integration of an efficient Electric Super Charger system
- development and integration of a Low voltage BSG system with passive and active belt tensioner



BUDGET	€8.6 million
FUNDING	€7.2 million
START	October 2016
DURATION	36 months
CALL	H2020-GV-02-2016
CONTRACT N°	723976
COORDINATOR	Herwig Ofner AVL List
CONTACT	herwig.ofner@avl.com
PARTNERS	EUCAR members: Fiat Chrysler Automobiles, CNH Industrial, Renault Group.

Other: AVL, IFPEN, JM, Continental, Bosch, FPT,
RIC, Siemens, ECN, VIF, CNR, UPV, UNR.



www.dieper-project.eu



dieper

Diesel engines efficiency improvement with particulates and emission reduction

MOTIVATION AND OBJECTIVES

Dieper is a logical continuation of European R&D programmes on diesel engines for passenger cars (such as the REWARD project) and light commercial vehicles. It contributes to the framework of sub 23 nm particles emissions with new technology for the reduction of sub 23 nm particles from diesel engines.

EXPECTED IMPACT

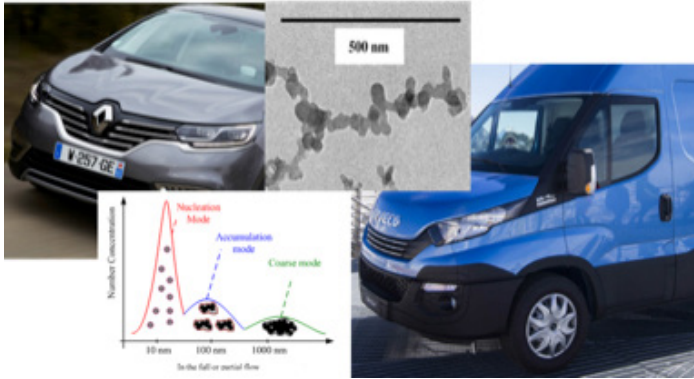
- Improved fuel economy compared to model year (MY) 2015 reference engines of the participating OEMs ($\geq 5\%$)
- Pollutant emissions that go to $\leq 50\%$ of EU VI directive, including particle emissions down to 10 nm in size
- The PN target is to go below 20% of the EU VI limit. The counting of particles will be carried out with improved techniques developed by DOWNTOTEN project

TECHNICAL APPROACH

Dieper develops advanced diesel engine technologies for passenger cars. These focus on fuel-efficient engine combustion with options such as VCR, advanced charging, EGR, thermal management and exhaust gas treatment concepts. Two demonstration vehicles (2,0L Renault Espace and 3,0L Iveco Daily) will contain the selected technologies.



dieper



ACHIEVEMENTS

Thermodynamic approach, Combustion system with VCR, sub 23nm PN source analysis and method to quantify sub 23 PN, NO_x aftertreatment combined with improved filter technologies; specification of new engine and FIE for Renault Espace, Layout EAS, combustion system, engine and EAS calibration on testbed; concept definition for LCV – combustion system, friction, ATS, technology screening; PN characterisation; experimental evaluation FIE on CO₂, simulation models for CO₂ and pollutants; measurement reference vehicles.



BUDGET	€6 million
FUNDING	€5 million
START	November 2018
DURATION	42 months
CALL	H2020-LC-GV-2018
CONTRACT N°	824295
COORDINATOR	Christof Schernus FEV EUROPE GMBH
CONTACT	schernus@fev.com
PARTNERS	EUCAR members: FIAT Chrysler Automobiles, Ford. Other: FEV, Bosch, IFPEN, RWTH, VUB, UNR, I2M, RBOS.



www.cevolver.eu



CEVOLVER

Connected Electric Vehicle Optimized for Life, Value, Efficiency and Range

MOTIVATION AND OBJECTIVES

CEVOLVER aims at achieving a leap forward in user's confidence, functionalities, and energy efficiency of future Electric Vehicles. One of the major EV cost drivers is battery size. For achieving affordable but comfortable EVs with less impact of weather conditions on range and usability, a step change in energy and thermal management, control strategies, functionalities and user friendliness is necessary.

CEVOLVER takes a user-centric approach for optimising the development and operation of electric vehicles and uses cutting edge technologies, components and systems for achieving the ambitious targets of the call topic. In both cases, the project exploits opportunities of connectivity to computational capabilities of big data. Firstly, as a source of data to support defining use cases that represent typical driving patterns and functionality. This will be used for developing optimal E/E architectures and rightsizing of components and optimising control strategies. Secondly, a dynamic connection to big data and computational capabilities in the cloud enables optimising the EV's energy and thermal management level. It leads to a Reliable Range Prediction, Eco-routing and Eco-driving as well as novel functionalities like Smart Fast Charging and Assured Charging.



CEVOLVER

EXPECTED IMPACT

The project will make a significant contribution to further the development of EVs and their market uptake by reversing the trend to the ever-increasing size of batteries, which drive up the cost of the vehicles. CEVOLVER will demonstrate that EV usability can be ensured and increased by adopting the innovations. Moreover, by establishing a new approach to developing EVs the project is perfectly situated to test and evaluate components and subsystems from other projects and benchmark them against existing project results.

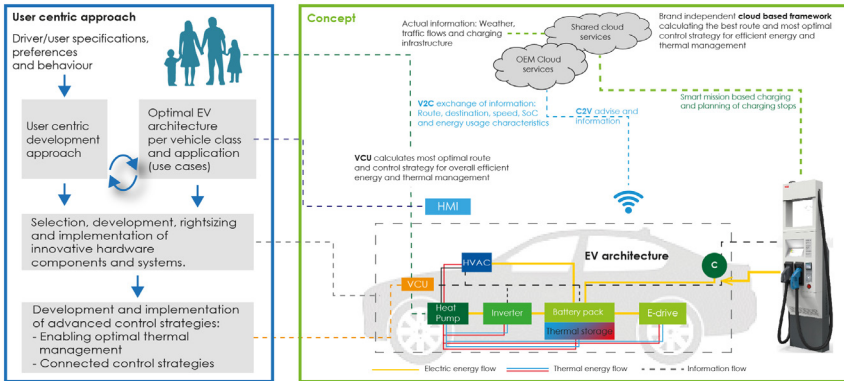
TECHNICAL APPROACH

The overall approach and concept of the CEVOLVER project, comprises the following conceptual elements: a user centric development approach in combination with connectivity and advanced control strategies. Together, this leads to optimal EV powertrain architectures, rightsizing and implementation of new/advanced components and systems and connected control features and functionalities. In terms of consumer's values, it brings reliability, user confidence and affordability in electro-mobility.



CEVOLVER

CEVOLVER CONCEPT OVERVIEW



ACHIEVEMENTS

CEVOLVER's objectives and targeted key-results are

- Ensuring a leap forward in user's confidence, functionalities and energy efficiency of future EVs
- Ensuring the affordability of future electric vehicles by a user centric development approach
- Validation of advanced components and systems, novel connected control strategies and functionalities
- Assessment of the impact of the technical advancements of CEVOLVER and their applicability in different EV types and vehicle classes



BUDGET	€11.7 million
FUNDING	€9.4 million
START	April 2017
DURATION	36 months
CALL	H2020-GV-2016
CONTRACT N°	724095
COORDINATOR	Lars-Olof Carlsson VOLVO Cars
CONTACT	lars-olof.carlsson@volvocars.com
PARTNERS	EUCAR members: FIAT Chrysler Automobiles, Volvo Cars.

Other partners: AVL, Virtual Vehicle, ALMA AUTOMOTIVE, CTU-Prague, FEV, Fraunhofer, GKN DRIVELINE, GM, IDEAS & MOTION, IDIADA, IESTA, IFPEN, INFINEON, SIEMENS, TECNALIA, UNIVERSITY OF SURREY, VALEO, RWTH AACHEN, AVL SCHRICK.



www.project-advice.eu



ADVICE

ADvancing user acceptance of general purpose hybridized Vehicles by Improved Cost and Efficiency

MOTIVATION AND OBJECTIVES

ADVICE aims at increasing the numbers of HEVs and P-HEVs up to 10% of all vehicles registered in the mid-term range. This will be achieved by focusing on a market segment called “premium class”, which covers medium class, upper medium class, luxury vehicles and SUVs. This segment is facing severe problems in reaching the more and more ambitious European CO₂ targets, when running on fossil fuel only, not the least due to the considerable vehicle weight.

In ADVICE three physical demonstrator vehicles are built, ranging from mild-hybrid to full plug-in hybrid and – concerning fuel type – from gasoline to diesel-driven.

It will be shown that the whole range in between these demonstrator vehicles can be well covered by means of validated simulation, yielding a complete coverage of the whole “premium class” segment.

Fulfilling the energy efficiency and emission requirements of the call and limiting additional costs to 5% with respect to the best in-class non-hybrid diesel and 15% premium for a P-HEV are key topics of the project.



ADVICE

EXPECTED IMPACT

- Cost premium of 5% for mild and full hybrid and 15% for PHEV compared to best in class non-hybrid diesel vehicles
- Reduction of fuel consumption by 20% and 25% increase in electric driving range for P-HEVs
- Demonstrating the vehicles' noxious emissions RDE compliance with a 1.5 compliance factor
- Improvement of vehicle performance according to proper performance index and the objective assessment of driveability
- Verification and assessment along 3 vehicle classes and 3 hybrid vehicle architectures

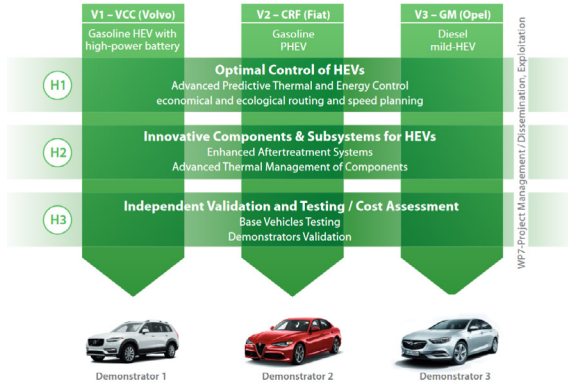
TECHNICAL APPROACH

In ADVICE three demonstrator vehicles are hybridized applying ADVICE innovations on component, control and vehicle level, namely VOLVO S90, Alfa Romeo Giulia and Opel Insignia. Prior to implementation and to assist powertrain architecture development and thermal system layout, the innovations are checked in a so-called level 0 demonstrator (i. e. co-simulation environment with validated models). The vehicle demonstrators are then built taking findings from the simulation into account (level 1 demonstrators). Some of the functionalities and controls are implemented in the level 1 demonstrators .



ADVICE

ADVICE METHODOLOGY, OBJECTIVES AND LEVELS OF DEMONSTRATION



ACHIEVEMENTS

- 3 demonstrator vehicles to be tested beginning of 2020
- HMI WITH ECO-DRIVING/ROUTING INFORMATION ADVISING THE DRIVER
- THERMAL MANAGEMENT WITH HEAT STORAGE
- Cost efficient scalable High Power battery, Hybrid post Lithium Ion Battery (high power, high energy)
- ELECTRICALLY HEATED CATALYST (EHC) CONTROLLER PROTOTYPE with high temperature electronics
- Waste heat recovery with electrical turbocharger
- Powertrain Energy Management strategy considering input from the optimized predictive control and driver request
- Downsizing of ICEs



BUDGET	€6.0 million
FUNDING	€6.0 million
START	May 2015
DURATION	48 months
CALL	H2020-LCE-2014-1
CONTRACT N°	640720
COORDINATOR	Hilke Heinke Volkswagen Aktiengesellschaft
CONTACT	hilke.heinke@volkswagen.de
PARTNERS	EUCAR members: Fiat Chrysler Automobiles, Volkswagen Group, Volvo Group.

Other: IFPEN, UU, UniBi, Imperial, UniFi, A4F,
Neste, KIT, SYNCOM.



www.photofuel.eu



Photofuel

Photofuel- Biocatalytic solar fuels for sustainable mobility in Europe

MOTIVATION AND OBJECTIVES

The motivation is to develop high quality, low impact transportation fuels by enabling phototrophic algae or cyanobacterial microorganisms to produce alkanes and alcohols, which are excreted to the culture broth for direct separation without cell harvesting. Objectives are:

- Advanced biocatalysts for the direct production of solar fuels.
- Upscaling of cultivation volume and raw fuel production.

Analysis of risks, economic efficiency and environmental impacts.

EXPECTED IMPACT

Long term impacts by advancement of solar fuel technology are:

- Highly sustainable production of drop-in fuels on arid or marginal land
- Economic and environmentally sustainable large-scale systems for conversion of solar radiation to fuels or chemical energy

Support rural communities and substitute fossil energy imports.

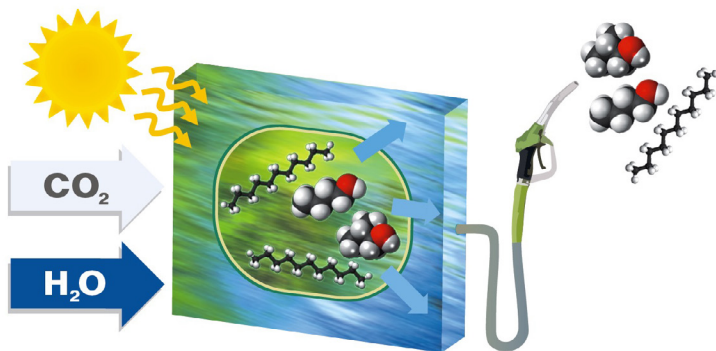
TECHNICAL APPROACH

The project addresses the complete value chain:

- Development of biocatalysts for production of butanol, undecane and bisabolene
- Upscaling to 5m³ outdoor production (pilot scale)
- Fuel blending for engine and vehicle tests (passenger + heavy duty)
- Analysis of risks, economic efficiency and environmental impact of the complete production pathway



Photofuel



ACHIEVEMENTS

The project is on track and important milestones were achieved:

- The butanol biocatalyst surpassed the target of 34 mg/L/day
- Production of free fatty acids for alkane are on similar order
- Production upscaling has reached 120L
- Fuel blending matrix and design of LCA-assessment are agreed



STRATEGIC GROUP

ENABLING TECHNOLOGIES & PROCESSES

THE EUCAR STRATEGIC VISION

New sustainable approach for developing and producing affordable and competitive vehicles in Europe to achieve mobility for all.





APPLICATION OF SUITABLE MATERIALS FOR FUTURE VEHICLES

Recyclable and reusable functional materials integrated into competitive design processes to manufacture future vehicles.

VIRTUAL ENGINEERING PRODUCT PROCESS INTEGRATED APPROACH

Innovative engineering solutions to guarantee and ensure the European automotive competitiveness for future vehicle generations taking circular economy into account from the early stages of design.

SUSTAINABLE AND FLEXIBLE MANUFACTURING

Efficient and effective manufacturing systems capable of integrating additive manufacturing and functional materials to produce affordable and competitive vehicles in Europe.



Affordable Lightweight Automobiles Alliance

BUDGET	€8.6 million
FUNDING	€8 million
START	October 2016
DURATION	36 months
CALL	H2020- NMBP-08-2016
CONTRACT N°	723893
COORDINATOR	Dr. Sama Mbang Daimler
CONTACT	sama.mbang@daimler.com
PARTNERS	EUCAR members: Fiat Chrysler Automobiles, Opel Automobiles, Toyota Motor Europe, Volkswagen Group, Volvo Cars. Other: Daimler, TKS, NOVELIS, BATZ, BENTELER, SWEREA, Inspire, Fraunhofer, IKA, KIT, UNIFI, Bax & Company, Ricardo.



www.lightweight-alliance.eu



ALLIANCE

AffordabLe Lightweight Automobiles AlliaNCE

MOTIVATION AND OBJECTIVES

There is an urgent need for increasing energy efficiency in both conventional and electric vehicles. To date, lightweighting initiatives have resulted in several innovative solutions. However, the majority of efforts have failed to reach widespread adoption due to high costs. Six European carmakers, four suppliers and eight knowledge partners have joined forces to commonly deal with the high cost of innovations in vehicle lightweighting.

EXPECTED IMPACT

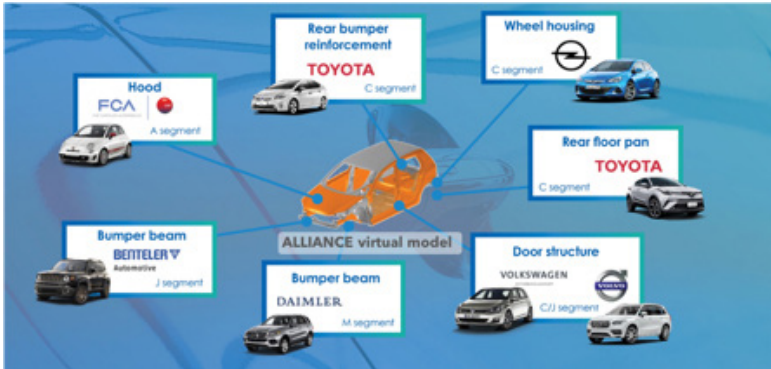
ALLIANCE aims to achieve a reduction of the automotive sector's environmental impact by decreasing the energy consumption of road vehicles by 10%, decreasing life-cycle environmental impact (GWP) by 6%, and ensuring that the developed technologies reach widespread adoption by keeping the cost of lightweighting <3€/kg saved. Furthermore, ALLIANCE will strengthen the competitiveness and growth of European players in the lightweighting field.

TECHNICAL APPROACH

ALLIANCE brings together partners from the lightweighting value chain, aiming at developing innovative materials and their respective manufacturing technologies using a holistic framework that will ensure their market viability. The consortium aims to tap into the innovation potential of Europe by mobilising the entire ecosystem of innovators in the field through a pan-European innovation challenge. The developed technologies will be validated in 8 demonstrator modules.



ALLIANCE



ACHIEVEMENTS

The activities in the first 18 months have mainly focused on the development/adaptation of high performing materials, on the conceptual design of exemplary demonstrators as well as on the development of methodologies to assess the impact of lightweight solutions and to accelerate the conceptual design. More specifically, for the assessment of the new technologies, a cost and environmental assessment for the reference ICE and BEV models has been carried out, and a target weighing approach and multi-parameter optimisation methodology have been developed. In the materials domain, production and characterisation of Q&P steel, new aluminium grades (6xxx) and PA-based composites and their bonding has been performed, and simulation of new manufacturing technologies for the relevant materials has been performed. Finally, an open innovation challenge took place, attracting innovative materials and manufacturing solutions from all over the world. The four winners of the competition will be presenting their innovations on September 20th in Aachen.



BUDGET	€3,9 million
FUNDING	€3,9 million
START	January 2019
DURATION	36 months
CALL	H2020 LC-GV-02-2018
CONTRACT N°	824314
COORDINATOR	Dr Reinhard Tatschl AVL List GmbH
CONTACT	reinhard.tatschl@avl.com
PARTNERS	EUCAR members: CNH Industrial, FIAT Chrysler Automobiles, Renault Group. Other: AVL, AUTH, FMF, CNR-IM, KTH, POLIMI, TUB, UPV, VUB, QP, UL, ZF.



www.vision-xev.eu



VISION-xEV

Virtual Component and System Integration for Efficient Electrified Vehicle Development

MOTIVATION AND OBJECTIVES

The adoption of digital twins of components and sub-systems is a major pre-requisite to efficiently cope with the increased complexity of electrified/hybrid powertrain development. To support the building and parameterization of such digital twins validated models of the relevant powertrain components and sub-systems as well as the related model coupling and interfacing methods are required. VISION-xEV investigates beyond the state-of-the-art modelling and simulation tools and methods for virtual component and sub-system development as well as for powertrain system integration to support the virtual assessment of electrified/hybrid vehicle energy efficiency and CO₂ emissions.

EXPECTED IMPACT

VISION-xEV facilitates an advanced development approach enabling the seamless search among different design variants for the discovery of innovative powertrain layouts and easy identification of optimal designs. The validated and scalable simulation models developed in VISION-xEV support the creation of a solid and robust approach for selection of system architectures and enable proper component sizing to ensure compliance with the system specifications. Furthermore, the outcome and knowledge gain of VISION-xEV is expected to facilitate the re-use of models ensuring fast feedback into the vehicle powertrain system development cycle.

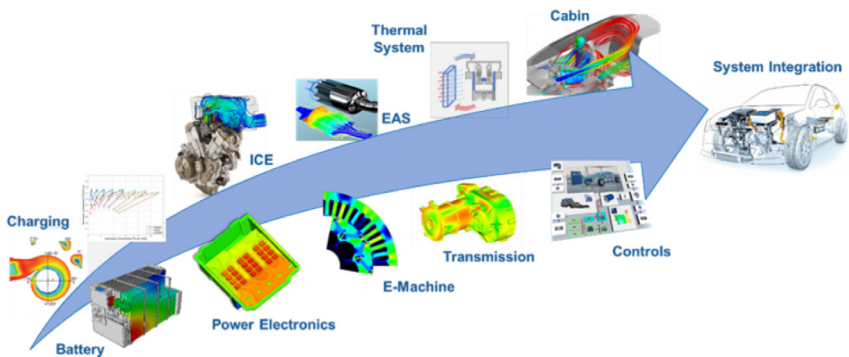


VISION-xEV

TECHNICAL APPROACH

- Development and validation of high-fidelity and reduced order models for accurate simulation of electrified/hybrid vehicle powertrain components and sub-systems
- Elaboration of efficient parameter identification methods for powertrain components performance/thermal models based on multi-physics simulation results
- Enhancement of coupling, interfacing and co-simulation technologies for high-fidelity and fast reduced order component and sub-system models.
- Unveiling of methods for the efficient simulation of electrified/hybrid vehicle powertrain thermal/energy management to coordinate the power split among the electrical and thermal components

THE VISION-XEV VIRTUAL COMPONENT DEVELOPMENT AND SYSTEM INTEGRATION APPROACH





VISION-xEV

ACHIEVEMENTS

- Generic driving mission profiles extracted from real world driving as basis for evaluation of different electrified powertrain configurations and assessment of component sizing in terms of energy efficiency
- Experimentally validated electrical energy storage and energy conversion performance/thermal models compatible with different high-fidelity and system simulation tools
- Validated models for analysing the thermo-fluid mechanisms responsible for losses in the exhaust manifold/turbine system
- Models of aftertreatment devices coupled with engine simulation models to simulate the species conversion under normal and zero flow conditions in electrified/hybrid powertrain systems
- Thermo-hydraulic network model for calculation of flow and heat losses as well as pump power, pressure, volumetric flows and temperatures



BUDGET	€4 million
FUNDING	€4 million
START	November 2018
DURATION	42 months
CALL	H2020-LC-GV-2018
CONTRACT N°	824306
COORDINATOR	Albert Rodriguez IDIADA AUTOMOTIVE TECHNOLOGY SA
CONTACT	albert.rdeliebana@idiada.com
PARTNERS	EUCAR members: FIAT Chrysler Automobiles, Volkswagen Group, Volvo Cars Other: IDIADA, ESI, Engys, Virtual Vehicle, VUB, Algorithmica, ARTS et METIERS. F. Iniciativas



under development



UPSCALE

Upscaling product development simulation capabilities exploiting artificial intelligence for electrified vehicles

MOTIVATION AND OBJECTIVES

UPSCALE is the first EU-project that has the specific goal to integrate artificial intelligence (AI) methods directly into traditional physics-based Computer Aided Engineering (CAE)-software and methods.

UPSCALE aims to reduce simulation times by orders of magnitude while maintaining or improving accuracy significantly.

The objective of the project is to apply AI-methods to reduce the development time (20%) and increase the performance of electric vehicles (EVs). Focused on vehicle aero/thermal- and crash modelling.

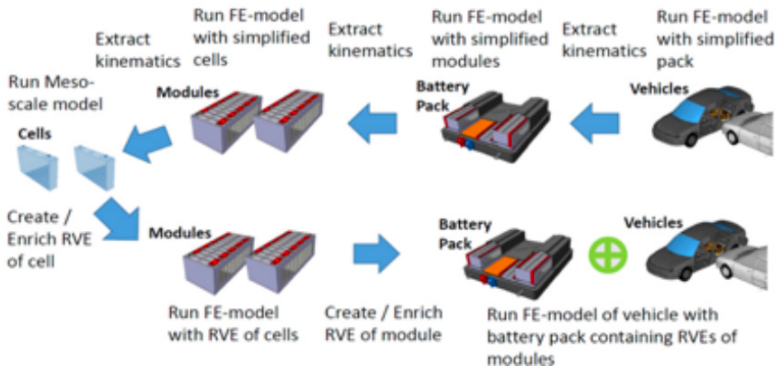
EXPECTED IMPACT

High performance computing (HPC) and CAE-software and -methods play a decisive role in vehicle development process. In order to make a significant impact on the development process, the two most HPC intensive CAE-applications have been chosen as use cases for the project: vehicle aero/thermal- and crash-modelling. When considering total automotive HPC usage, approximately 20% is used for aero/thermal simulations and up to 50% of HPC resources are utilized for crash simulations. By improving the effectiveness of these two areas, great increases in efficiency will lead to a 20% of reduction of product time to market. Other novel modelling approaches such as reduced order modelling will be coupled to the AI improved CAE-software and -methods to further reduce simulation time and ease the application of optimization tools needed to improve product quality. The UPSCALE project will provide a unique and effective environment to produce novel AI-based CAE-software solutions to improve European automotive competitiveness.



UPSCALE

BATTERY WORKFLOW TO BE USED BY UPSCALE IN THE AI APPLICATION INTO CRASH FEM



ACHIEVEMENTS

Upscale has just started, the different achievements of the project will be reported in the next updates of this Project Book.



DOMUS

BUDGET	€8.96 million
FUNDING	€8.96 million
START	November 2017
DURATION	42 months
CALL	H2020-GV-05-2017
CONTRACT N°	769902
COORDINATOR	Xavier Cort IDIADA
CONTACT	xcort@idiada.com
PARTNERS	EUCAR members: Fiat Chrysler Automobiles, Toyota Motor Europe, Volvo Cars. Other: IDIADA, AGC, Denso TS, Faurecia, Hutchinson, IEE, LIST, Coventry, Fraunhofer, IKA, Tecnalia, ViF, Uniresearch.



www.domus-project.eu



DOMUS

Design OptiMisation for efficient electric vehicles based on a USer-centric approach

MOTIVATION AND OBJECTIVES

Part of transforming the anticipated market for EVs into reality lies in the ability of the automotive industry to address consumer concerns regarding EVs to fulfil their expectations of e-Mobility. Range anxiety is a main barrier to EV adoption by the larger public; the ambient conditions profoundly affect the actual driving range which can be achieved. DOMUS aims to deliver solutions to lower the energy demand for cabin conditioning while improving the user experience by developing, validating and applying a user-centric approach to EV design.

EXPECTED IMPACT

DOMUS will achieve an increase of 25% of the electric drive range of EVs compared to their 2016 reference models across a wide extent of ambient conditions. This will contribute to a wider adoption of EVs by the public and accelerated transition towards the production of low and zero emission vehicles, battery EV and (plug in) hybrid EVs.

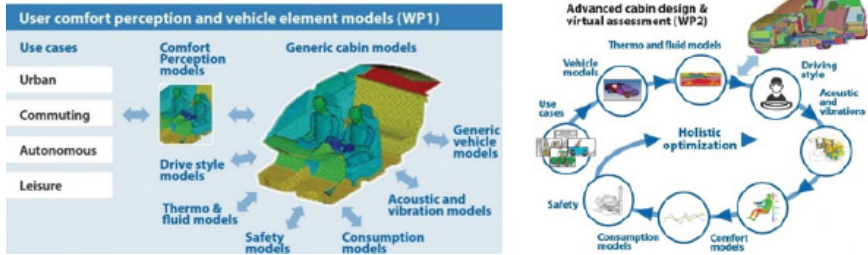
TECHNICAL APPROACH

The overall concept and technical approach comprises five elements: Understanding of all factors influencing comfort perception; Development of radical new cabin and EV designs and methodology for virtual assessment of cabin designs; Development of new cabin components, systems and control strategies and the implementation and validation of the above-mentioned components.



DOMUS

DOMUS MODELLING



ACHIEVEMENTS

The priority factors for estimating comfort have been researched and described. These factors will be used to create the DOMUS Comfort Model. Newer models, such as Local Mean Vote (LMV), ISO 14505, and the Berkeley Comfort Model (BCM) cater for substantially different thermal environments for different parts of the body. The trend in the built environment is to move away from PMV and towards adaptive comfort models that consider recent temperature history.



STRATEGIC GROUP

COMMERCIAL VEHICLES

THE EUCAR STRATEGIC VISION

An integrated approach for reliable,
clean, safe and efficient freight transport
and passenger mobility, through dedicated
vehicle concepts and effective logistics.



CONNECTED COMMERCIAL VEHICLE

Commercial vehicles that are connected to the infrastructure, operators and drivers, supporting an efficient and resilient transport system and effective logistics.

SAFE COMMERCIAL VEHICLE

Commercial vehicles that protect all road users and avoid and mitigate accidents through advanced vehicle technology, cooperative systems and increasing levels of automation.

EFFICIENT COMMERCIAL VEHICLE

Commercial vehicles with optimum efficiency and performance, making use of advanced propulsion and energy systems and dedicated vehicle configurations.



BUDGET	€23.7 million
FUNDING	€18.7 million
START	October 2017
DURATION	48 months
CALL	H2020-GV-2017
CONTRACT N°	769850
COORDINATOR	Prof. Omar Hegazy Vrije Universiteit Brussel (VUB)
CONTACT	omar.hegazy@vub.be
PARTNERS	EUCAR members: CNH Industrial, MAN Truck & Bus (VW Group), Volvo Group.

Other: VUB, UITP, SOLARIS, VECTIA, VDL, IRIZAR, TOFAS, SIEMENS, ALSTOM, ABB, HELIOX, SCHUNK, JEMA, ALTRA, Fraunhofer, FEV, AVL, AIT, ViF, ENGIE, IK4 Ikerlan, TNO, VTT, Polis, Rina-C Iberdrola, Enexis, ICCS, RC, IDIADA, Scholt, IAV, Polito PKM, TMB, SWO.



www.assured-project.eu



ASSURED

faSt and Smart charging solutions for full size Urban hHeavy Duty applications

MOTIVATION AND OBJECTIVES

Project will develop innovative heavy-duty and medium-duty vehicle solutions with interoperable charging infrastructure concepts, enhancing performances, comfort and safety while reducing the TCO and contributing to a competitive and sustainable mobility

Development of

- next generation modular high-power charging solutions (up to 600kW)
- interoperable and scalable high-power charging solutions
- innovative charging management strategies
- standardised conformance and interoperability test protocol
- efficient wireless charging solutions

Demonstration of

- efficient wireless charging solutions (up to 100kW)

ASSURED solutions (6 public buses, 2 trucks, and 1 VAN at TRL 7) in EU cities

- Evaluation and improvement of the cost, energy efficiency, impact of grid
- Support to the standardisation bodies (i.e. CEN-CENELEC, ISO, IEC)



ASSURED

EXPECTED IMPACT

ASSURED has the ambition to facilitate the following innovations to further promote full electric mobility through:

- Interoperable high-power charging systems with power levels up to 600 kW with high transfer efficiency
- Vehicle integration of cost-effective and industry-wide ASSURED fast charging solutions to enable the economic viability of urban heavy-duty and medium-duty vehicles also without government incentives
- Assessment of different fast charging options for opportunity charging considering operational costs and their impact on the power grid and battery ageing via ASSURED methods and tools for fleet level optimisation

ASSURED results will create benefits not only to the urban transport entities but will have a wider benefit for cities and their inhabitants. Indeed, the technical improvements are expected to result in a substantial reduction of emissions and noise without affecting the vehicles operation.

In addition, the close interaction with Standardisation Bodies in the frame of CEN-CENELEC, ISO, IEC will complete the picture towards the achievement of a full exploitation of the project outcomes and successful implementation.



ASSURED

TECHNICAL APPROACH

- ASSURED brings together 39 partners from 12 countries representing industry, research centres and local governments, ensuring that all stages of the value chain are covered
- The project is building on 4 phases:
 - Operational specifications & requirements and city needs
 - Standardisation support & Development of Conformance/ Interoperability Test Framework
 - Interoperability and conformance tests of charging solutions
- Use Cases on heavy, medium and light duty vehicles
- User Acceptance & Demonstration in Cities
 - Evaluation of Use Cases and Demonstration

INTEROPERABILITY ASSESSMENT OF HIGH-POWER CHARGING SOLUTIONS FOR DIFFERENT CHARGING CONCEPTS



ACHIEVEMENTS

- Strengthening the European technical and technological leadership in the value chain of electrified urban heavy, medium and light duty vehicles
- Further developing strong collaboration and interaction with Public Transport Organisations/Public Transport Authorities



AEROFLEX

BUDGET	€11.8 million
FUNDING	€9.5 million
START	01 October 2017
DURATION	42 months
CALL	H2020-GV-2017
CONTRACT N°	769658
COORDINATOR	Mr. Ben Kraaijenhagen MAN Truck & Bus SE
CONTACT	ben.kraaijenhagen@man.eu
PARTNERS	EUCAR members: MAN Truck & Bus, DAF Trucks, FIAT Chrysler Automobiles, CNH Industrial, Scania, Volvo Group. Other: Uniresearch, SCB, VEG, Tirsan, CREO, Michelin, Wabco, Chalmers, DLR, Fraunhofer, IDIADA, HAN, NLR, TML, TNO, MHH, UIRR.



www.aeroflex-project.eu



AEROFLEX

Aerodynamic and Flexible Trucks for Generation of Long Distance Road Transport

MOTIVATION AND OBJECTIVES

The aim of AEROFLEX is to develop and demonstrate new technologies, concepts and architectures for complete vehicles meeting future logistics and co-modality needs to be met for the different segments and markets. The optimal matching of novel vehicle concepts and infrastructures require the definition of smart performance-based standards for future trucks, load carriers and road infrastructures.

EXPECTED IMPACT

AEROFLEX will develop the knowledge, concepts and technology to improve the efficiency of long-range freight vehicles by 18-33% while drawing up recommendations for implementing the results within European regulations and in the transport & logistic industry.

TECHNICAL APPROACH

- Characterise the European freight transport market (map, quantify and predict), the drivers, the constraints, the trends, and the mode and vehicle choice criteria
- Develop new concepts and technologies for trucks with reduced drag, which are safer, comfortable, configurable and cost effective and ensure satisfaction of customer needs under varying transport tasks and conditions
- Demonstration and impact assessment of potential truck aerodynamics and energy management improvements
- Drafting of coherent recommendations for revising standards and legislative frameworks in order to allow the new aerodynamic and flexible vehicle concepts on the road



AEROFLEX

AEROFLEX DEMONSTRATOR VEHICLE



ACHIEVEMENTS

- Smart Loading Units: 4 - 5% energy saving by separate platforms and 4 - 6% energy saving by using loading space more effectively
- Vehicle Technologies; 5 - 12% energy efficiency from the integration of advanced powertrains; 5 - 10% energy saving through improved vehicle aerodynamics and front end designs to ensure survivability in crashes
- Standardised interfaces leading to higher economies of scale aerodynamics; front end designs to ensure survivability in crashes and standardised interfaces leading to higher economies of scale
- Front end in crashes end designs to ensure survivability in crashes up to 50 km/h for occupants and vulnerable road users



ENSEMBLE

BUDGET	€26.1 million
FUNDING	€19.8 million
START	June 2018
DURATION	36 months
CALL	H2020-ART-2017
CONTRACT N°	769115
COORDINATOR	Dr. Marika Hoedemaeker TNO
CONTACT	marika.hoedemaeker@tno.nl
PARTNERS	<p>EUCAR members: DAF Trucks, Daimler Trucks, CNH Industrial, MAN Truck & Bus, Scania, Volvo Group.</p> <p>Other: TNO, CLEPA, ERTICO, IDIADA, IFS, NXP, ZF, Wabco, KTH, VUB, Bosch, Continental, Brem.</p>



www.platooningensemble.eu



ENSEMBLE

ENabling Safe Multi-Brand pLatooning for Europe

MOTIVATION AND OBJECTIVES

The main goal of the ENSEMBLE project is to pave the way for the adoption of multi-brand truck platooning in Europe to improve fuel economy, traffic safety and throughput. This will be demonstrated by driving up to seven differently branded trucks in one (or more) platoon(s) under real world traffic conditions across national borders. Trucks can form platoons instantly on an ad hoc basis.

Significant advances in platooning technology have been made in the last decade, but to achieve the next step towards deployment of truck platooning, an integral multi-brand approach is required.

EXPECTED IMPACT

Aiming for Europe-wide deployment of platooning, 'multi-brand' solutions are paramount. It is the ambition of ENSEMBLE to realize pre-standards (i.e., mature input for standardization) for interoperability between trucks, platoons and logistics solution providers, to speed up actual market pick-up of (sub)system development and implementation and to enable harmonization of legal frameworks in the member states.

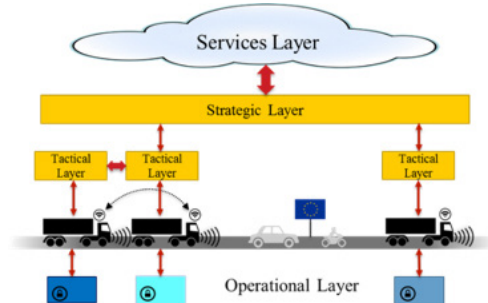


ENSEMBLE

TECHNICAL APPROACH

- During the first year, the project partners will concentrate on setting the specifications and developing a reference design with acceptance criteria
- This reference design will be taken up by the OEMs and suppliers for implementation on their own trucks during the second year, while the knowledge partners will perform impact assessments with several criteria
- Year three of the project will focus on testing the multi-brand platoons on test tracks and international public roads. The technical results will be evaluated against the initial requirements. Also, the impact on fuel consumption, drivers and other road users will be established

ENVISIONED TECHNOLOGY OF HIERARCHICAL PLATOONING WITH INTERACTING LAYERS



ACHIEVEMENTS

The project has reached its 18 months milestones. ENSEMBLE partners have reviewed and reported the requirements from EU projects in the field of platooning and communication. The project has developed the SOTIF Safety Concept while defining the Platooning usecases, the scenario and the Platooning Levels. The functional specification for white-label truck (including the Operational & Tactical layers) was also defined during this first 18 months of the project.