

SPANISH AND PORTUGUESE RECOMMENDATIONS.

AUTOMATED ROAD TRANSPORT IN HORIZON 2020

26th JULY 2016

INTRODUCTION

The Horizon 2020 Spanish and Portuguese Delegation and Spanish and Portuguese stakeholders would like to acknowledge the opportunity to contribute and support the European Commission in the “Automated Road Transport” implementation.

Recalling that:

“Autonomous Vehicles” are identified as one of the “Ten technologies which could change our lives” (European Parliamentary Research Service) ([Ref 1](#))

“Autonomous Vehicles” are proposed as a potential solution to decrease the road accidents. *“EU Commissioner for Transport Violeta Bulc said.... Technology and innovation are increasingly shaping the future of road safety. In the medium to long term, connected and automated driving, for instance, has great potential in helping to avoid crashes, and we are working hard to put the right framework in place.”* ([Ref 2](#))

“Automated Road Transport” is a new call identified in Horizon 2020 Smart, green and integrated Transport in the Work Programme 2016/2017 respect to Work Programme 2014/2015 and it considered envisaged as an area of growing importance at EU level.

Emphasizing that to achieve the high challenging goals at European Level and Declaration of Amsterdam (Cooperation in the field of connected and automated driving 14-15 April 2016) only will be possible with a real and true collaboration of all involved actors, European Institutions and Member States including Spain and Portugal. In particular, as defined in the Declaration of Amsterdam and with the scope of Horizon 2020, Spain and Portugal are eager and have the regulatory and technical conditions *“to create possibilities for large-scale cross-border testing of connected and automated driving technologies, based on a common European approach”*

Stressing that testing, validation and certification activities can find an ideal scenario and competences thanks to our countries regulatory situation and the sector’s capacities, based on the following facts at policy and technical level:

Spain is a leading country in automated vehicles regulation after the Directorate-General of Traffic (DGT) issued a regulation to permit full automated driving test (16/11/15) ([Ref 3](#)). This regulation permits field operational test in all the territory; an example, the following test sites are already equipped to host field operational test like for example (controlled Test Sites, Urban and InterUrban): (1) Catalonia Region Living Lab with more than 6000Km of roads digitalized; (2) Spain/Portugal cross border testing is part of “SCOOP@FPart 2” ([Ref 4](#)) and relevant stakeholders are working in a close collaboration framework¹; (3) Madrid City urban/interurban test sites like the high occupancy lane (A-6 BUS VAO) and M-30 ring road; (4) Three different Living Labs in Vasque Country Region.

The “Spanish Strategy on Science, Technology And Innovation (2013-2020)” “(1) represents an effort to align Spanish policies with the RDI objectives pursued by the European Union; (2) it is fully aligned with the Horizon 2020 objectives and thematic areas; (3) it establishes challenging objectives to contribute to Horizon 2020 by all the Spanish R&D ecosystem and the objective to achieve the 10% of the call budget in 2020 ([Ref 5](#))

Spain is a Member State in which the automotive industry plays a major role in the economy: (1) 8th largest car maker in the world and 2nd in Europe. European leader in commercial vehicles; (2)

¹ CTAG Tec. Center (Galicia Region) has a Memorandum of Understanding with Circuit Vasco Sameiro at Braga (Portugal, [Ref 6](#))

83% exported to more than 130 countries; (3) 17 vehicle manufacturing plants are installed in Spain of the following EU and international major OEM: PSA Peugeot Citroën, NISSAN, Renault, Mercedes Benz, IVECO, VW, SEAT and GM; (4) More than 1000 automotive components companies implanted; (5) 6% of the industrial GDP 265,000 direct employments; (6) 3% of investment in R&D.

Portugal is a Member State in which the automotive industry has large weight in the economy: 4 vehicle manufacturing plants are installed in Portugal namely Autoeuropa (Palmela), PSA Peugeot Citroën (Mangualde), Mitsubishi Fuso Truck Europe (Tramagal), Toyota Caetano (Ovar); around 200 automotive components companies are implanted representing 4.6% of the industrial GDP, 42,000 direct employments, exporting 84% to more than 172 countries which represents 6.700 million Euros. This industry has increased around 5% with a business volume of 8.000 billion Euros. The investment in this sector is based on innovation regarding product development and engineering processes. As an example Bosch is represented in Portugal by Bosch Termotecnologia, S.A., in Aveiro, Bosch Car Multimedia Portugal, S.A, in Braga, and Bosch Security Systems S.A., in Ovar, developing and producing a wide range of products, namely hot water solutions, car multimedia, and security and communications systems, most of it exported to international markets. For instance, Bosch Braga is one of the main centres of the Bosch Car Multimedia Division in the world for R&D with 2.200 associates.

Information and communications technologies are areas where Spain has risen to the top in a number of these sectors, as Spain's information companies have provided international solutions for needs such as air and road traffic control, security in public spaces and digital ones, and mobile telecommunications. The ICT sector in Spain boasts a large group of solid and competitive companies that are favorably positioned internationally, and are leading in their activity areas. The digital security is a key area in Autonomous Driving, and Spain plays an important role in this area. According to ONTSI report ([Ref 7](#)), there are more than 530 companies working in Cybersecurity area with a turnover of 600 Million of Euros. This subsector has invested 79 Million of Euros in R&D.

Information and communications technologies are areas where Portugal has risen to the top in a number of these sectors, as Portugal's information technology companies have provided international solutions for needs such as air and road traffic control, security in public spaces and digital ones, and mobile telecommunications. The ICT sector in Portugal boasts a large group of solid and competitive companies that are favorably positioned internationally, and are leading in their activity areas. The ICT sector represents 6% of the Portuguese GVA, 3.7% of the business turnover, and 1.6% of professionals in the business sector (2014, "Estratégia Nacional de Especialização Inteligente, Tecnologias de Informação e das Comunicações" ([Ref 8](#)).

Infrastructures should be considered key enablers for the development of autonomous driving and Spanish stakeholders have the expertise and interest to develop solutions. For several years there has been a growing presence of Spanish companies in the annual ranking of the world's top transportation developers by the US publication Public Works Financing and Spain was the ranking leading country in 2013 ([Ref 9](#)). Spanish stakeholders can facilitate the necessary adaptation of infrastructures in different scenarios, including the complex urban arena, where technological approaches facilitating very high added value services and standardization activities are to be deployed to facilitate the successful introduction of safe autonomous driving

Infrastructures should be considered key enablers for the development of autonomous driving and Portuguese stakeholders have the expertise and interest to develop solutions. Portugal has a freeway network of around 3,065 km, operated by 15 companies, representing 20% of the National Highway Network with a density of 34 km/1000km², above the European average.

For instance, Brisa is a Portuguese leading company and one of the world's largest highway operators presented in the annual ranking of the world's largest transportation developers by the US publication Public Works Financing. This leadership company is focused on innovation

and is positioned as a transversal supplier of mobility solutions. That was the case of Via Verde solution that made Portugal the 1st country in the world with a non-stop integrated toll charge.

Space sector should play also a relevant role. In this sector, Spain ranks to the fifth position (seventh worldwide in satellite manufacturing in Europe) and employs more than 3,300 people. Spain participates successfully in vanguard projects such as EC Galileo and Copernicus and ESA Space Missions.

Today, more than half of the world's population lives in cities, and the world continues to urbanize rapidly. By 2050, two-thirds of the world's population will live in urban areas, according to the United Nations. Urban environment plays an important role to successfully introduce autonomous car in a safe and harmonious way. Portuguese municipalities are aware of these challenges. Lisbon was ranked as a Southern European city of the future by the *Di Intelligence Magazine* of the *Financial Times*. Porto is a living lab under the "Future Cities" project, which is an European Project of the 7th framework program, where researchers, companies and startups have been developing and testing technologies, products and services, exploring such subjects as sustainable mobility, urban-scale sensing, safety and privacy, as well as quality of life for citizens and their families.

Acknowledging the vital importance of a properly balanced participation between research activities and close to market actions is a key aspect for the autonomous road transport systems. Above all, together with automotive industry including OEM and bus industry, the universities and technological centers should also be considered relevant actors in the "automated road transport" projects and linked initiatives as they will be key enablers of the European Open science strategy. Previous initiatives like Green Cars in the 7th Framework Programme should be considered as a good example.

The Horizon 2020 Spanish and Portuguese Delegation and Spanish and Portuguese stakeholders recommend the following:

(ANNEX 1) STRATEGIC AND OPERATIONAL RECOMMENDATIONS for:

"Horizon 2020. Smart, green and integrated Transport" WP 2018, 2019 and 2020" that cover the following strategic areas:

VEHICLE / SIMULATION
VEHICLE / VALUE CHAIN
INFRASTRUCTURE / ROAD
INFRASTRUCTURE / SPACE
COMMUNICATIONS
INDUSTRY 4.0 & AUTONOMOUS DRIVING
LEGAL AND SOCIAL ISSUES

Based on the:

(ANNEX 2) "Spanish capacities catalogue" collected by the Spanish Technology Platform for Automotive and Mobility (Move2 Future)

AND

(ANNEX 3) "Portuguese capacities catalogue"

(ANNEX 1) STRATEGIC AND OPERATIONAL RECOMMENDATIONS for:

“Horizon 2020. Smart, green and integrated Transport” WP 2018, 2019 and 2020.

Id	RECOMMENDATION	Indicative Timing
VEHICLE / SIMULATION		
1	New functional safety and functional validation methodologies and tools for C&AD vehicles. Description: <i>The complexity of C&AD related technologies and functionalities has the potential risk of creating a big gap between developers and validators/certifiers. To avoid this risk, new harmonised methodologies and tools must be developed to be able to allow independent 3rd party certification of safety and performance of new and future technologies through a convergence of test track, simulation and FOTs.</i>	2018
2	Development of platooning of commercial vehicles and private passenger vehicle platooning. Demonstration pilot assessing risk scenarios, risk modelling, and reliability. Description: <i>Using the knowledge and experience of heavy vehicles, make the assessment of conditions, infrastructure and potential of this technology. Assessment of public acceptance of using private passenger vehicle in a platoon. (Taxis, Rental Cars,...)</i>	2018
3	Needs and development of V&V assessment tools and protocols for conditional to HAD vehicles levels Description: <i>The increasing vehicle automation lack nowadays of intensive, cost-effective and standardized methods and tools towards a complete V&V fail-safe operation product release.</i>	2018
4	Testing methodologies for validation and certification of control algorithms in Automated Vehicles Description <i>The modularity and adaptability should be considered in the new software tools for vehicle modelling. The Driver is always considered in the control loop (DIL).</i>	2019
VEHICLE / VALUE CHAIN		
5	Pre-crash adaptive technologies for a new generation of safe restrain systems on new interior design for HAD. Description <i>The challenge to reduce fatalities in AV implies the need to have new restraint systems capable of take advantage of pre-crash signals to cover the multi occupant poses and layouts.</i>	2018
6	BMS (Battery Management Systems) for AV Description <i>Gathering the information of driver needs and the environment can help to an optimal management of comfort parameters in order to supply the adequate conditions with adequate energy consumption.</i>	2018
7	Integration of key components and interfaces in Automation Road transport (Value Chain & Communications & Road) Description <i>The performance of the autonomous vehicles is highly dependent on the components they integrate. Although the autonomous vehicle has elements that has only sense at vehicle level (mapping, trajectory generation or tracking), they rest on lower level components that provide services to the upper level control systems.</i>	2018

Id	RECOMMENDATION	Indicative Timing
	<p><i>These components include:</i></p> <ul style="list-style-type: none"> • <i>Environment recognition (Sensor components)</i> • <i>Distributed actuation system</i> • <i>Connectivity</i> • <i>Human-Machine interaction</i> • <i>Systems architecture</i> • <i>Safety and Reliability</i> • <i>Electronic road signaling</i> • <i>High density navigational standard</i> <p><i>A correct design of these elements highly reduces the requirements for the upper level controller, facilitating the integration. So, interfacing all together in a common way should consider the following aspects:</i></p> <p><u><i>Environment recognition:</i></u> <i>The basis for “zero accidents” is the driver assistance systems with sensors that record the environment better than a person. For sensor fusion and the evaluation of the sensor data is investigating on the artificial intelligence, in whose development applies its extensive experience in sensor systems and control units. Additionally, the mirrors can be replaced by camera systems that not only increase safety, but also reduce CO2 emissions from road vehicles.</i></p> <p><u><i>Distributed actuation system:</i></u> <i>as it is the case with the modern vehicles, actuation systems already perform functions that remain transparent to the driver (like traction control or ABS in brakes, steering support, among others). Autonomous vehicle should maintain these functionalities at the time they require new ones for sharing the information (system status, monitorized or estimated data sharing –like road state...-) and for performing autonomous maneuvers in an efficient way. The development of these new components represents an important challenge both for the Tier 1 point of view, and also for the OEM, as coherent system architecture is finally required. In consequence, a tight communication between them and with RTDs is necessary. In this framework also the use of simulation techniques will be fundamental for assuring the final functionality.</i></p> <p><u><i>Connectivity:</i></u> <i>Internet and IoT (Internet of Things) will be the "sixth sense" of the vehicle. Thus, it is working on an effective back-end system with precise information on the traffic situation. It is based on the sensor data exchange among users of public roads and traffic mainframes. Data exchange increases the range of the sensors and allows the vehicle to "see what's around the corner". In case of road events like crash or restricted traffic of any case, a warning alert can be broadcasted to the road users, preventing other drivers to take pre-crash counter-measures like reducing speed or taking an alternative path. In case of post-crash events the aggregated information of a number of vehicles. Custom messages could automatically be presented into dashboard and even speed could be limited without driver intervention.</i></p> <p><u><i>Human Machine Interaction:</i></u> <i>If one vehicle reaches a motorway exit in fully automatic mode and e.g. the driver must take up the task of driving, what would be the strategy to follow? Some systems should be required to attend these cases, as well as for future general interaction between the vehicle and the driver. Moreover, testing new approaches for solutions to the changing demands in regard to HMI (Human Machine Interface) will be required.</i></p>	

Id	RECOMMENDATION	Indicative Timing
	<p><u>Systems Architecture:</u> Future system architectures for automated driving must manage safely the huge volume of data to be processed in the vehicle. In very short time must be processed one gigabyte of data from the sensors in real time. The increased power of sensors and the huge volume of data require powerful and reliable hardware (electronic) and software architectures. In this connection, the obtained information from the sensors should be efficiently merged by adequate state observers.</p> <p><u>Safety and reliability:</u> An automated vehicle must be no less safe than the human drivers of today's road transport system therefore research should be done to define the setting the safety requirement, and verifying that that safety requirement has been met by the specific vehicle system. Besides, the challenge to reduce fatalities and severe injuries with AV (Automated Vehicles) implies the need to have adaptive, intelligent, and active restraint systems capable of take advantage of pre-crash signals and be adaptive to cover the multi occupant poses and layouts.</p> <p>Today the driver assistance systems support the driver of the vehicle. In case of failure, the automated driving should allow the vehicle to safely continue the trip or finish it in a safe and controlled way. So, e.g. redundant systems and sophisticated brakes would be developed. It should also be taken into account security against possible manipulations. This type of security will require continuous updating of vehicle software, and so its technology will be always the last one.</p> <p><u>Electronic road signaling:</u> Conventional signaling of the current roads is a very limited set of information, difficult to change and maintain. Vision systems have to make a huge effort in terms of processing to translate this information into a digital one. Electronic signaling combined with in-board radar systems could increase the amount of information available for guiding automated driving. Moreover, the infrastructure could be adapted to variable traffic or meteorological conditions. There is an enormous potential to improve efficiency of traffic management in crossings and roundabouts if there existed a bidirectional communication between the vehicles and the infrastructure.</p> <p><u>High Density Navigational standard:</u> Current navigational standard messaging like NMEA (including AIS, ADS-B) is based on relatively low-rate exchanged and open information, mainly based in GPS position and vehicle speed with a precision of some few meters in the best-case. If it is required that the precision is increased in some particular areas to the order of centimeters and additional dynamic information is exchanged between vehicles, like acceleration or yaw rate, a new standard for navigational messaging will be required, improving synchronization performance and security.</p>	
8	Autonomous driving of heavy load transportation systems	2018
INFRASTRUCTURE / ROAD		
9	Road certification for HAD deployment. Description: <i>Validation and certification of existing and future roads to validate its suitability for different levels of connected and automated vehicles. Mapping of European roads and C&AD functionalities that can be used on them. Support the review and creation of road standards from a vehicle-infrastructure merged point of view.</i>	2018

Id	RECOMMENDATION	Indicative Timing
10	Needs and development of new road infrastructure Description <i>Infrastructure elements (as road markings, lighting, and signage, I2V and V2I communications,...), which increase scene understanding will be key to provide appropriate solutions for HAD vehicles.</i>	2018
11	Physical and virtual Road design needs for operational, safe and energy optimization in the context of HAD vehicles advent. Description <i>The advent of HAD vehicles raises the concept of virtual roads. In the mixing environment prone to be extended in next years, it is a challenge to make physical and virtual road design compatible.</i>	2018
12	Immediate integration of instant & foreseen hurdles on the road within dense urban areas.	2018
13	Infrastructure Based Radar Positioning System for Vehicular Guidance	2018
INFRASTRUCTURE / SPACE		
14	Improvement of positioning technologies facilitating Automated Driving Description: <i>Currently GNSS is not used as a core technology in AD due to limited performances, in terms of accuracy and reliability necessary for such applications. A dedicated approach is needed in the following research areas: -development of cost-effective solutions based on the use of GNSS (alone or combined with other space and non-space based technologies) which provide satisfactory performances for AD. -Improvement of cartography precision, necessary in different AD applications</i>	2018
COMMUNICATIONS		
15	Advanced interaction protocols between partially to fully automated vehicles. Description: <i>Further research on implementation and validation of HAD complex interactions is needed with higher integration of cooperative communications i.e. smart autonomous intersections, mid/long range traffic flow control, urban platooning, etc... and in a mixed scenario (with normal, cooperative and different levels of automation). Standardisation and interoperability is crucial to maximize impact and minimize vendor lock.</i>	2018
16	Deployment of C-ITS services to facilitate and validate the integration of the connected and automated vehicles in the urban environment. Description <i>This topic aims to overcome the gap between the C-ITS services and the connected and automated vehicles. Currently, Automated Road Transport has mainly been focused on the vehicle itself. Within this potential topic, the C-ITS services and the automated vehicle will be connected.</i>	2018
17	Cooperative control for Connected and Automated vehicles Description <i>Vehicle management is needed for complex cooperative situations including semi, highly and fully automated vehicles, based on: Extreme external conditions, Real-time software safety/verification and on-line fault detection. To maximize the benefits of automated vehicles they will need to be connected to enable two types of cooperation in the sensing and driving processes. Automated vehicles will need to cooperate in the sensing process to enable the real-time perception of the surrounding environment. Cooperative driving will be needed to enable efficient and safe coordinated driving maneuvers.</i>	2018

Id	RECOMMENDATION	Indicative Timing
18	New testing procedures & tools for the cybersecurity vulnerability assessment of the main transport agents. Description <i>Today's automobiles contain a significant number of different electronic components networked together that as a whole are responsible for monitoring and controlling the state and performances of the vehicle. In addition, the connected vehicle and automated driving is already a reality and its penetration rate will enhance exponentially in the next years. In the next future, it will not be able to guarantee safety without security. This is also one of the raising threats regarding user acceptance and the successful deployment of connected and automated vehicles. So, it is necessary to develop an objective security evaluation procedure in vehicles and in other transport elements, easy to reproduce, and to develop the needed testing tools to assess the degree of these agents protection and impact against these cyber attacks</i>	2018
19	Services for the Automated Vehicle Description: <i>Much research & development is being made in technologies which are making AD a reality. Automated Vehicles (which will also be connected vehicles) will lead to new services derived from the less relevant role of the driver in the driving task, oriented towards an increase of safety and driving efficiency.</i>	2019
INDUSTRY 4.0 & AUTONOMOUS DRIVING		
20	Automation pilots for the industry environments (Industry 4.0) Description <i>Automated vehicles should be part of the new concept "Industry 4.0". So, different industry environments (e.g. logistics, airports, ports, foundries, etc) could take advantage from automated industry vehicles which will improve efficiency, safety and competitiveness of the European industry.</i>	2018
21	Automated Driving in other environments Description: <i>Much effort is devoted to the development of AD for the mass market, for public transport and for commercial vehicles. AD can successfully be applied to very specific environments with clear benefits, but this might require the development of specific vehicles and/or infrastructure for the purpose.</i>	2019
LEGAL AND SOCIAL ISSUES		
22	Arbitration and Control sharing between the Driver and the Automated Vehicles Description <i>When the implementation of the different automation levels (SAE J3016) is implemented, there is still an open question: When should the drivers or the automated systems be able to take control of the vehicle?</i>	2018
23	Legal assessment and procedures for new ITS functions and HAD. Description: <i>Taking in advance future legal necessities such as new legal framework or needs of modifying the existing one.</i>	2018
24	Market deployment regulation and policy for C&AD vehicles. Description: <i>Consensus building among industry and policy makers to enable a harmonized and European level acceptance of an updated review of the current Type-approval process that allows market deployment of C&AD vehicles in European roads. Two way approach: Technical and legal looking to maximize safety and efficiency of these technologies.</i>	2018

Id	RECOMMENDATION	Indicative Timing
25	<p>Analysis of public acceptance and its associated environmental impact of the autonomous and self-driving vehicles in Europe</p> <p>Description</p> <p><i>Confidence in the technology used is the basis for acceptance of automated driving and this is achieved from the intelligent dialogue between the driver and the vehicle. So, the driver should know continuously what exactly is going to be the next maneuver of the vehicle. The growing expansion of these systems increases the acceptance of future automated driving functions.</i></p> <p><i>In order to gain a better understanding of acceptance of autonomous driving by average drivers around Europe, a survey (including also an assessment of ethical issues) should be done.</i></p>	2018
26	<p>Social inclusion: ensure mobility for all, including elderly and impaired users.</p> <p>Description</p> <p><i>It's a topic where robotic developments can be directly applied considering cybercar as transportation mean. In order to test the interaction with sensorial, control and communication with the infrastructure (V2I), a first demonstrator could be firstly implemented at reduced urban areas.</i></p>	2020


(ANNEX 2) “Spanish capacities catalogue” can be found in the following pages: Pages 10- 121.


(ANNEX 3) “Portuguese capacities catalogue” can be found in the following pages: Pages 122-184

(ANNEX 2) “Spanish capacities catalogue”

1. APPLUS laboratories
2. CIDAUT Foundation
3. AUTOPIA Program – Center for Automation and Robotics (UPM-CSIC)
4. CENTRO TECNOLÓGICO DE AUTOMOCIÓN DE GALICIA (CTAG)
5. Computer Vision Center (CVC) & Computer Science Dpt. of the Universidad Autónoma de Barcelona (UAB)
6. EURECAT
7. FRANCISCO ALBERO SAU
8. Ferrovial
9. Fico Mirrors S.A.
10. University of Alcala. Geintra Research Group
11. GMV
12. Instituto de Investigación en Ingeniería de Aragón. University of Zaragoza
13. Instituto de Biomecánica (IBV)
14. IDIADA Automotive Technology S.A.
15. CEIT-IK4
16. IMDEA Energy
17. Instituto de Robótica e Informática Industrial CSIC-UPC
18. ARAGON INSTITUTE OF TECHNOLOGY - ITAINNOVA
19. ITENE –PACKAGING, TRANSPORT AND LOGISTICS RESEARCH CENTER
20. Ixion Industry & Aerospace SL
21. SICE
22. Fundación Tecnalía Research & Innovation
23. Institute for the Vehicle Safety Assurance - ISVA (Universidad Carlos III de Madrid)
24. Intelligent Systems Lab - ISL (Universidad Carlos III de Madrid)
25. Escuela Politécnica Superior – Mondragon Unibertsitatea
26. Universidad Politécnica de Madrid (CEI - Center for Industrial Electronics)
27. Universidad Politécnica de Madrid (GATV - Visual telecommunication application group)
28. Universidad Politécnica de Madrid (GB2S - Group of Biometrics Biosignals and Security)
29. Universidad Politécnica de Madrid (INSIA - University Institute for Automobile Research)
30. Universidad Politécnica de Madrid (TRANSYT – Center for Transport Research)
31. MONDRAGON Automoción



APPLUS laboratories			
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<p>▲ Description</p> <p>Applus+ Laboratories (LGAi Technological Center S.A.) specializes in developing technical solutions to enhance product competitiveness and foster innovation. Our experience in testing and our leading and recognized laboratories allow us to participate throughout the whole product value chain, offering testing, product development, quality control and certification services.</p> <ul style="list-style-type: none">• We are your partners for preparing and adapting your product to the requirements and expectations of its target markets:• We guarantee its safety and quality• We speed up its time-to-market• We open doors to the global market• We foster customer trust• We help differentiate the product• We cooperate in its research and development			
<p>▲ Main activities and products</p> <p>System Integration Validation:</p> <ul style="list-style-type: none">• Functional testing• Functional safety• Control and performance• HIL simulation for ADAS system• C2C communication			


▲ Related projects		
HIL for LDWS validation Budget: Confidential Duration: 6 months Programme: development for OEM	SRA lines covered by the project:	
	1. Safety	
	2. Connected car	
Description and objectives: Develop a simulator to validate and homologate a lane departure warning system. This simulator is composed by an electronic platform with all the components of the vehicle and a software able to simulate vehicle environment (pedestrians, roads, traffic, etc...)		
Participants: A+ Laboratories		
Results: OK (homologation done thanks to this simulator)		

CIDAUT Foundation (Foundation for Research and Development in Transport and Energy)			
Parque Tecnológico de Boecillo, parc. 209 Boecillo Tel: 0034 983 548035 www.cidaut.es	47151 (Valladolid – Spain) Fax: 00 34 983 548062	Contact: Maite Fernandez Peña maifer@cidaut.es Javier Romo javrom@cidaut.es	
<p>▲ Description</p> <p>CIDAUT Foundation (Centre for Research and Development in Transport and Energy) is a non-profit making organisation intended to foster the competitiveness and the industrial development of the companies involved in the fields of Transport and Energy. The key element in order to reach this goal is the wide range of technical skills, knowledge, equipments, and human resources available in the Centre, which permit the tackling of complete R&D projects that include the whole value chain of a product from its conception and design to pre-industrialization, passing through material research, behaviour simulation, processing, design of prototypes and, finally, its validation. With more than €72 Million on R&D equipment and 224 researchers (70% industrial engineers and bachelor's degree). R&TD facilities: 23.305 m2 in 7 buildings. More than 400 Industrial clients. RTD associations: EARPA, North American institution TRB, ESIS, SPE, ASTM, ASM, AFS, SAE, SEM, ASA, IIAV, ISN. European Technology Platforms: EUMAT, ERTRAC, BIOFRAC, HFP and JTI on Fuel Cells and Hydrogen.</p>			
<p>▲ Main activities and products</p> <ul style="list-style-type: none">• Vehicle Design & Integration: Vehicle ecodesign (low cost/low weight) considering Vehicle Dynamics, NVH & Safety requirements (including preventive safety). HMI and comfort. ADAS. New advanced materials for structures (green materials). New joining technologies. Light alloys materials & technologies. New manufacturing processes. New development methodologies (virtual testing & manufacturing). Energy management & control of vehicle systems. Prototyping. Industrialization.• Road Infrastructure Safety: active & passive (signs, containment systems, etc.) preventive safety, road safety inspections, cost-benefit analysis.• Electronics: ITS development, signing inspection techniques,.• Accident Analysis: epidemiology, in-depth investigations of accidents, accident reconstruction.• Human Factor: Analysis of traffic conflicts, HMI, behavioural studies, systems usability, ergonomics.• Materials: plastics, composites, alloys, asphalt.• Vehicle safety: active & passive preventive safety (ADAS and IVIS systems), biomechanics, dummies. Materials-Product-Process. Acoustics and vibrations.• Vehicle - Vehicle – Infrastructure Interaction: Vehicle-vehicle (V2V) and vehicle-infrastructure (V2I) communication systems. Sensoring for interaction & communication. Traffic monitoring. Adaptive systems to advise optimal routes. Real time information for planning intelligent routes.• Field Operational Tests (FOTS): Vehicles prototypes prepared as systems evaluators. (Real time) monitorisation of vehicle on-board systems• Road Safety Testing Laboratory: Certified for UNE-EN 1317, UNE 135900 and UNE-EN 12767. Equipment for Vertical Signing Inspection. Equipment for Material characterization & processing. Testing Equipment for passive safety and vibro-acoustics testing, renewable energy, air pollution, fluid dynamics, etc.• Passive testing full-crash, subsystem and component testing laboratories: Equipped with latest technology, CIDAUT is able to perform R&D and validation activities within worldwide scope of automotive passive safety regulations and consumer protocols.			


▲ Related projects




UDRIVE eUropean naturalistic Driving and Riding for Infrastructure & Vehicle safety and Environment Budget: 10,616,955 € Duration: 10/2012 - 06/2017 Programme: FP7 www.udrive.eu	SRA lines covered by the project:		Description and objectives: In order to meet EU targets, both the number of road crashes and vehicle emission levels need to be reduced substantially. For identifying the next generation of measures that will enable us to actually reach these targets, a far more in-depth understanding of road user behaviour is needed. Participants: SWOV, BAST, CDV, CEESAR. FUNDACION CIDAUT, DLR, ERTICO, FIA, INSTYTUT BADAWCZY DROG I MOSTOW, IFFSTAR, KfV, LAB, LOUGHBOROUGH UNIVERSITY, Or Yarok association, SAFER, TECHNISCHE UNIVERSITAET CHEMNITZ, TNO, UNIVERSITY OF LEEDS y VOLVO TECHNOLOGY AB Results: Naturalistic data continuously collection on passenger cars, trucks and powered two-wheelers, including video data showing the forward view of the vehicle and a view of the driver, as well as geographic information system (GIS) data knowledge in the various research areas well beyond the current state-of-the-art. Definition of measurable safety and environmental performance indicators for monitoring developments over time improving existing models of driver behaviour to be used for e.g. predicting effect of safety and environmental measures, and traffic flow simulations applications in commercial transport, including driver support systems and targeted training for safer and more fuel efficient.
	1. Safety	✓	
	2. Connected car	✓	



VRUITS IMPROVING THE SAFETY AND MOBILITY OF VULNERABLE ROAD USERS THROUGH ITS APPLICATIONS Budget: 4,143,667 € Duration: 03/2013-03/2016 Programme: FP7 www.vruits.eu	SRA lines covered by the project:		Description and objectives: VRUITS will fulfil the following objectives: <ul style="list-style-type: none"> Assess societal impacts of selected ITS, and provide recommendations for policy and industry regarding ITS in order to improve the safety and mobility of VRUs; Provide evidence-based recommended practices on how VRU can be integrated in Intelligent Transport Systems and on how HMI designs can be adapted to meet the needs of VRUs, and test these recommendations in field trials. Participants: TEKNOLOGIAN TUTKIMUSKESKUS VTT, ECORYS NEDERLAND B.V., FACTUM Chaloupka & Risser OHG, LULEA TEKNISKA UNIVERSITET, FUNDACION CIDAUT, SOCIEDAD IBERICA DE CONSTRUCCIONES ELECTRICAS SA, POLIS - PROMOTION OF OPERATIONAL LINKS WITH INTEGRATED SERVICES, ASSOCIATION INTERNATIONALE, LOUGHBOROUGH UNIVERSITY, KITE SOLUTIONS SRL, NEDERLANDSE ORGANISATIE VOOR TOEGEPAST NATUURWETENSCHAPPELIJK ONDERZOEK – TNO, NXP SEMICONDUCTORS NETHERLANDS BV y PEEK TRAFFIC B.V. Results: Recommendations for ITS applications aimed at improving the safety, mobility and comfort of VRUs, leading ot a full integration of the VRUs in the traffic system.
	1. Safety		
	2. Connected car		



EVolution The Electric Vehicle revOLUTION enabled by advanced materials highly hybridized into lightweight components for easy integration and dismantling providing a reduced life cycle cost logic Budget: 13,378,118.66 € Duration: 01/11/2012 - 31/10/2016 Programme: FP7-2012-GC-MATERIALS FP7-314744 http://evolutionproject.eu/	SRA lines covered by the project:		Description and objectives: At this moment, hybrid vehicles in the market have been designed by substitution of ICE engine with electric powertrain. Evolution project pretends to change this tendency, removing the paradigm of nowadays B&W, developing new architecture and vehicle structures, with improved performance by means of new multimaterial structural components and strict safety standards compliance. Participants: ABN Pipe Systems, Cenareo, Centro Riserche Fiat, Cidaut, Danted Dynamics, DOW Europe, DTI Teknologisk Institut, Euro Master, FPK Lightweight Technologies, Icechim Bucuresti, Innovazione Automotive e Metalmeccanica, KGR, Pininfarina, Pohltec Metalfoam, Pôle Véhicule du Futur, Ritols, Tecnalía, Universidad de Aalborg, Universidad de Berlín, Universidad de Patras, Universidad de Pisa, Universidad de Sheffield, Universidad de Valladolid Results: Within Evolution, it's being developed five demonstrators of different vehicle parts and system. These demonstrators are proof of concept designs for weight reduction, manufacturing processes scalable to high volumes, and crashworthiness optimization. Within near term, these components will be tested separately and as a system, in order to validate both design criteria and safety and crashworthiness performance level.
	1. Safety		
	2. Connected Car		


ALIVE Advanced High Volume Affordable Lightweighting for Future Electric Vehicles Budget: 13,077,788 € Duration: 48 months 01/10/2012 - 30/09/2016 Programme: FP7-2012-GC-MATERIALS FP7-314234 http://www.project-alive.eu/	SRA lines covered by the project:		Description and objectives: ALIVE is developing exploitable knowledge on design concepts and materials, that generate an important and significative weight reduction and at the same time being affordable and viable for high series production, centred in next generation of electric vehicles. Participants: Austria Metall, Bax & Willems, Benteler, Centro Riserche Fiat, Cosma Engieneering Europe, Cidaut, Daimler, Faurecia, Fka, Fraunhofer, Georg Fischer Automotive, Jaguar Land Rover, LMS International, Magna Exteriors and Interiors, Magna Steyr, Porsche, Renault, Technische Universität Braunschweig, Thinkstep, Universidad de Leuven, Voestalpine, Volkswagen, Volvo Results: Starting point of ALIVE Project was ELVA structure partners and concepts. It has been developed new design strategies for optimization of crash behaviour, by means of materials research, development and engineering, to introduce new lighter materials (e.g. aluminium and magnesium alloys) manufactured by technologies that allow high production rates, and optimizing vehicle structure to achieve compliance with EuroNCAP requirements.
	1. Safety	✓	
	2. Connected Car		
PLUS-MOBY Premium Low weight Urban Sustainable e-MOBility Budget: 3,056,686 € Duration: 36 months 01/09/2013 - 31/08/2016 Programme: FP7-SST-2013-RTD-1 FP7-605502 http://www.moby-ev.eu/plusmoby/	SRA lines covered by the project:		Description and objectives: Low energetic impact and cost technologies implementation for the manufacturing of Premium micro electric vehicles that could be easily upgraded to M1 vehicle status. M1 EuroNCAP requirements compliance and fuel consumption lower than 65Wh/km. Participants: BAEPS, Bitron, Cidaut, ICPE, IMBGIS, IFEVS, Magneto Automotive, Polimodel, Torino e-District, Universidad de Surrey Results: Vehicle is planned to mount two electric vehicles, one for each axle. It's being developed a control system to permit software implementation of ABS and ESP functions, to achieve an important cost and weight savings; and it is being developed to achieve very high qualification assessment in EuroNCAP M1 targeted protocols. It's being developed a V2H communication system to maximize battery energy utilization, and to be able to use the vehicle for in hose energy installations under specific situations.
	1. Safety	✓	
	2. Connected Car	✓	


FREE-MOBY People centric easy to implement e-mobility Budget: 6,160,055 € Duration: 36 months 01/09/2013 - 31/08/2016 Programme: FP7-SST-2013-RTD-1 FP7-608784 http://www.moby-ev.eu/freemoby/	SRA lines covered by the project:		Description and objectives: Micro-vehicle based electric mobility implementation, centred in population urban mobility needs. The project is focused in both vehicle and infrastructure, using photovoltaic panels, partial battery interchange, and creating communication among home, infrastructure, vehicle and final driver and occupants users. Participants: BAEPS, Bitron, Cidaut, Cisc, Enel, ICPE, IMBGIS, IFEVS, Lithium Balance, Polimodel, Ricerca sul Sistema Energetico (RSE), ST Microelectronics, Torino e-District, Universidad de Surrey Results : <ul style="list-style-type: none"> • The Project is developing intelligent electrics and electronics architectures for all the actors and elements participating in the value chain: batteries, home, vehicle, and charging elements. • Main actors have been provided with communication systems to guarantee maximum exploitation of renewable energies and maximum efficiency of energy resources feeding the system. The Project is working also in authentication and authorization of users by means of different technologies as RFID and NFC.
	1. Safety		
	2. Connected Car		

URBAN-EV Super Light Architectures for Safe and Affordable Urban Electric Vehicles Budget: 3,617,496 € Duration: 36 months 01/09/2013 - 31/08/2016 Programme: FP7-SST-2013-RTD-1 FP7-605634 http://www.urban-ev.eu/	SRA lines covered by the project:		Description and objectives: Manufacturing innovative technologies application of advanced light materials to produce a urban electric vehicle, with high range, and high level occupant safety protection, comparable to conventional vehicles. The project is focusing as very important key enabling technology lightweight, extended range, ergonomics and economics from the point of view of energy and global product costs. Participants : Casple, Cidaut, Fraunhofer, Fonderia Maspero, Grupo Antolín Ingeniería, LKR – AIT, NBC, PST, Thinkstep, Tubitak Results : <ul style="list-style-type: none"> • Vehicle reduced size results in a low energy absorption capabilities. To manage this drawback, the Project is developing specific occupant restraint systems. • The Project is combining lightweight materials with innovative processes in structure development and vehicle energy absorbing systems. Aluminium and magnesium alloys extrusion, for tubular structure; structural thermoplastic for crash boxes; dye casting magnesium for node A; hidroformed aluminium for the relevant structural tubes; joints are being developed using electromagnetic processes without heating. In spite of vehicle being a quadricycle, L7e, target crash tests to comply with, are equivalent to M1 existing test protocols, to guarantee compatibility with any obstacle potential crash in normal traffic environment.
	1. Safety		
	2. Connected Car		
AGRAUTO Autonomous guided agricultural machine operation Budget: Internal Budget Duration : 01/2012 - 12/2015 Programme: Internal Programme	SRA lines covered by the project:		Description and objectives: Development of an autonomous guiding system, for driver assistance to machine operated agricultural works, which results in a higher quality and comfortable operation for the user. The generated system, by means of a GPS+TK system, local mapping, and mobile system control application (Android, IOS OS) and controlling algorithms and a physical system to permit the safe steering feed backed control, centimetre range accurate, which results in a comfortable and safe environment for the user. Participants: Fundación CIDAUT Results: HW/SW integral system for autonomous control and guiding of agricultural works operation.
	1. Safety		
	2. Connected car		



Blue-Parking Public parking and traffic flow data Management system in urban environment Budget: Internal Budget Duration: 01/12 - 12/15 Programme: Internal Programme	SRA lines covered by the project:		Description and objectives: Projec target is development of a highly urban centred and scalable system that favours time mobility savings and comfort for the drivers and urban congestion. It represents a cooperative operated system, for public parking management and traffic flow information within the integrated area. Driving users, public administrations and private operators are interconnected permitting a traffic information flows and free parking room. Participants: Fundación CIDAUT Results : Cooperative management system, highly scalable, for the provision of parking room available within the urban network assets and cooperative information on traffic flows.
	1. Safety		
	2. Connected Car		
AUSALUM AUSCULTACION DINÁMICA ALUMBRADO PÚBLICO Budget: Internal Budget Duration: 01/12 -12/2014 Programme: Internal Programme	SRA lines covered by the project:		Description and objectives: Mobile Vehicle system development for geolocalisation luminance values and parameters within the roads where the system drives, including tunnels. The system is composed of ad-hoc sensors, data synchronization, and software programming for urban environment and roads navigation, and for data post-processing. Participants: Fundación CIDAUT Results: Mobile systems with the capability to provide a service for automatic luminance and luminance measurement within global roads for automatic verification of light power adequation and related auditing within operations.
	1. Safety		
	2. Connected Car		




e-Vectoorc Electric-VEhicle Control of individual wheel Torque for On- and Off-Road Conditions Budget: 4,763,986 € Duration: 36 months 01/09/2011 - 31/08/2014 Programme: GC-ICT-2011.6.8 FP7-284708 http://www.e-vectoorc.eu/	SRA lines covered by the project:		Description and objectives: Development of individual control of four in-wheel electric motor vehicle traction torques, to improve safety and comfort. Development of control algorithms of yaw rate velocity and sideslip angle, based on combination of vehicle individual wheel traction control. In parallel, innovative strategies development to optimize energy recovery by means of regenerative braking, implementing antilock braking systems. Participants: Cidaut, Flanders Drive, Instituto Tecnológico de Aragón, Inverto, Jaguar, Land Rover, Skoda, TRW, Universidad de Ilmenau , Universidad de Surrey, VIF Results : <ul style="list-style-type: none"> • High capacity regenerative braking system. • ABS: Whole modulation system for antilocking brakes by means of electric motors control. • Dynamic behaviour enhancement by means of optimized traction control system. • Oscillations amplitude reductions of yaw rate velocity in high dynamic manoeuvres, and general improvement in control and active safety. • High quality reproduction and testing of different vehicle configurations, attending different vehicle motor operational combinations, by means of implementation of all the Project innovative solutions, in a real demonstrator.
	1. Safety		
e-light Advanced Structural Light-Weight Architectures for Electric Vehicles - E-Light Budget: 2,938,649 € Duration: 36 months 01/01/2011 - 31/12/2013 Programme: GC.SST.2010.7-5 FP7-266284 http://www.elight-project.eu/	SRA lines covered by the project:		Description and objectives: Develop and modular, specific and multimaterial architecture for electric vehicles, under weight optimization, providing high performance in ergonomics and crashworthiness. Participants : Cidaut, East4D, Pininfarina, Pôle Véhicule de Futur, Ricardo, Tecnia, The Advance Manufacturing Research Center with Boeing Results : <ul style="list-style-type: none"> • Design and development of BIW ultra-lightweight structure based on the introduction of carbon fibre composite material and components, with optimized behaviour in torsional and flexion stress. Carbon fibre structure was combined with aluminium energy absorbing elements, in order to guarantee correct frontal, side and rear vehicle crashworthiness.
	1. Safety		
	2. Connected Car		

OPTIVE Control Algorithms research for in-wheel motor vehicles optimization Budget: 374,594.12€ Duration: 24 months 01/01/2010 - 31/12/2011 Programme: Plan ADE – Nº exp.: CCTT/10/VA/0002	SRA lines covered by the project:		Description and objectives: Develop control algorithms that allow performance optimization of electric in-wheel motors. In order to validate the achieved results, it was developed a technological demonstrator vehicle, to physically Support the targets achieved by means of mathematical models. Participants : Cidaut Results : <ul style="list-style-type: none"> • New algorithms generation taking advantage of versatile location of in-wheel motors, that are allowed by hybrid and electric propulsion alternatives. With these algorithms, it was achieved the enhancement of dynamic behaviour, global safety and stability, comfort and vehicle fuel consumption. • Results are extensible to internal combustion engines that apply torque vectoring technologies. • Technological demonstrator available for verification and validation of main targets and dynamic testing.
	1. Safety:		
	2. Connected Car		

ISi-PADAS Integrated Human Modelling and Simulation to support Human Error Risk Analysis of Partially Autonomous Driver Assistance Systems Budget: 4,462,733 € Duration: 09/2008 - 09/2011 Programme: FP7 http://www.isi-padas.eu	SRA lines covered by the project:		Description and objectives: The main objective of the ISi-PADAS project was to provide an innovative methodology to support risk based design and approval of Partially Autonomous Driver Assistance Systems (PADAS) focusing on elimination and mitigation of driver errors by an integrated Driver-Vehicle-Environment modelling approach. Participants: OFFIS e.V., Commissariat à l'énergie atomique (CEA), Fundación para la Investigación y Desarrollo en Transporte y Energía (CIDAUT), CENTRO RICERCHE FIAT S.C.P.A. (CRF), Deutsches Zentrum fuer Luft- und Raumfahrt e.V. (DLR), Institut National de Recherche sur les Transports et leur Sécurité (INRETS), Kite Solutions s.n.c., Ecole Supérieure d'Electricité (SUPELEC), Università di Modena e Reggio Emilia, Visteon Systèmes Intérieurs y Technical University of Braunschweig Results: The Risk Based Design methodology has been developed with the aim of being able to create predictions of critical or error-prone situations for drivers, by a modelling and simulation approach. The activities performed in this context can be described as follows: <ul style="list-style-type: none"> • Analysis of the state of design practice and requirements for an improved Risk Based Design of PADAS. In particular, this activity included the critical review and analysis of current design processes of PADAS and driver support systems in general and the definition of user needs and requirements with respect to the implementation of a RBD approach. • Definition of a Human Error Risk Analysis based on driver models as a part of Risk Based Design. The final result of this activity has been the definition of a RBD methodology which relies on existing classical safety analysis techniques as well as human error risk assessment techniques. • Development of a software tool for guiding the designer in the implementation of the RBD approach. • Demonstration of the RBD methodology by analysing the PADAS target systems developed in ISi-PADAS and utilising the JDVE Simulation Platform with integrated driver models.
	1. Safety		
	2. Connected Car		



NCV2015 Networked Clean Vehicle 2015 Budget: 768,581 € Duration: 30 months 02/06/2008 - 31/12/2010 Programme: MITYC (cooperation project) - Nº exp: IAP-560410-2008-40	SRA lines covered by the project:		Description and objectives: The Project is an strategic initiative from three key Spanish technological centers within automotive sector. Targets were, technology research in systems and components applicable to future generations of low environmental impact vehicles, within a midterm dated, at that date as 2015. Participants: Cemitec, Cidaut, Tecnalía Results: <ul style="list-style-type: none"> • Prototyping of a range extended electric vehicle that uses environment data to minimize energy consumption. • Requirements definition of inter vehicle and infrastructure communication, providing environment information for optimization of vehicle energy consumption. • Communication Architecture development for on-board systems, favouring interaction with the environment. It was integrated vehicle communications powering the interface between ECU and environment. • Control algorithms definition, based in environment perception and plant capabilities to achieve energy savings within 23% range, with reference vehicles without the system under development.
	1. Safety		
	2. Connected Car	✓	
OASIS Operación de Autopistas Seguras, Inteligentes y Sostenibles Budget: 30 M € Duration: 01/2008 - 12/2011 Programme: CENIT	SRA lines covered by the project:		Description and objectives: Safety issues identification in highways that could be enhanced by means of ITS integration. New ITS highway systems definition. Research on human factors and its relation with road infrastructure by means of extensive Field operational testing. Driver Behaviour influence assessment of new information interchange models developed within the Project. Participants: 16 Companys, 15 Universities and Research Centers Results: <ul style="list-style-type: none"> • ITS systems development for intelligent management of highways • Human error analysis, as accident causation in highways Infrastructure provisioned safety design in highways
	1. Safety	✓	
	2. Connected Car	✓	



SAFESPOT Cooperative vehicles and road infrastructure for road safety Budget: 38 M € Duration: 01/2006 - 11/2010 Programme: SIXTH FRAMEWORK PROGRAMME http://www.safespot-eu.org/	SRA lines covered by the project:		Description and objectives: SAFESPOT project defined a new standard architecture for application development of integrated safety, by means of V2V and V2I communication, acting in combination with perception environment sensors, intra-vehicle sensors, and infrastructure installed elements. Project defines a common communication protocol among all components, working on a local dynamic map (LDM), for event and entities management, including communication system. Use cases were implemented as demonstrator of new technologies raised. Participants: 51 participants Results: New framework architecture to integrate communication technologies with other information from perception and intra-vehicular networks, within integrated safety application.
	1. Safety		
	2. Connected Car		

AUTOPIA Program – Center for Automation and Robotics (UPM-CSIC)			  	
Carretera de Campo Real, km 0,200 La Poveda. Arganda del Rey. Tel: 0034 91 871 19 00 www.car.upm-csic.es/autopia		28500 Madrid Fax: 0034 91 871 70 50		Contact: Rodolfo Haber Chief Researcher rodolfo.haber@car.upm-csic.es
<p>▲ Description</p> <p>This institution has been working since 1996 in autonomous vehicles, firstly in the instrumentation with appropriate sensing systems and in the automation of vehicle actuators (both in hardware and algorithmic aspects), and more recently in the development of cooperative maneuvers among different vehicles. The group has proven experience – very significant paper record in highly ranked publications and the participation in several national and European projects- in advanced control design, localization, path and speed planning, navigation, V2V and V2I communications.</p>				
<p>▲ Main activities and products</p> <ul style="list-style-type: none">• Research line focused on Intelligent Transportation Systems.• Decision systems based on artificial intelligence for autonomous driving on semi-controlled environments.• Coordination between vehicles and infrastructure for cooperative maneuvers management (merging, roundabouts, intersections, platooning).• Own infrastructure and facilities for testing and deployment: 5 automated vehicles and test track with traffic lights and V2X communications.				
<p>▲ Related projects</p>				
GUIADE Automatic guidance of public transport vehicles based on multimodal perception of the environment Budget: 584,328 € Duration: 2008 - 2011 Programme: Plan Nacional I+D	SRA lines covered by the project:		Description and objectives: The GUIADE Project (Ministerio de Fomento T9/08) had the purpose of building a positioning system and an autonomous guidance system based on multimodal perceptions from the environment. The ultimate goal is to optimize the traffic efficiency, environmental impact, safety and quality of public transport services. Participants: Albentia, SICE, UAH, URJC, IAI (CAR) Results: Development of a platform for information exchange among the vehicles present on the nearest environment. Construction of dynamic maps for efficient routing of public transport. Demonstration of the developed system. A real experiment combining the information exchange platform, the routing system, the automatic guidance systems and the ADAS systems with V2I communications	
	1. Safety	✓		
	2. Connected car	✓		

ONDA-F ON Demand Autonomous Fleet in dedicated areas Budget: 107,000 € Duration: 01/2012 - 12/2014 Programme: Plan Nacional I+D	SRA lines covered by the project:		Description and objectives: The global and main objective of ONDA-F project is to make a significant contribution in the development of dedicated lines of public transport services, able to perform autonomous navigation in dedicated areas corresponding to urban environments. Participants: CAR, UAH Results: <ul style="list-style-type: none"> • Simulation platform for cooperative manoeuvres with several vehicles. • Interaction platform for information exchange between vehicles and infrastructure. • Cooperation between real and virtual entities (vehicles and infrastructure) • Automatic guidance system based on reinforcement learning techniques.
	1. Safety	✓	
	2. Connected car	✓	
DECAUTO Automatic guidance of vehicles on interurban roads Budget: 27,000 € Duration: 2012 Programme: Plan Nacional I+D	SRA lines covered by the project:		Description and objectives: <ul style="list-style-type: none"> • Show the capability of the autonomous guidance system implemented on prototype vehicles with real traffic conditions. • Carry out the first Spanish demonstration on open roads, comparable to similar experiments carried out on other countries. Participants: CAR Results: Autonomous driving demonstration carried out on June 12th, 2012: 100 km on autonomous mode with a maximum speed of 100 km/h
	1. Safety		
	2. Connected car	✓	
EMC2 Embedded Multi-Core systems for Mixed Criticality applications in dynamic and changeable real-time environments Budget: 180,000 € Duration: 2014 - 2017 Programme: Artemis http://www.artemis-emc2.eu/	SRA lines covered by the project:		Description and objectives: Develop and validate a decision system able to identify the vehicle context, evaluating collision risk in real time and planning the optimal route for obstacle avoidance. Participants: More than 12 partners in Spain and 89 in total. Results: In process.
	1. Safety		
	2. Connected car	✓	

NAVEGASE Assisted navigation by natural language Budget: 25,000 € Duration: 2015 - 2017 Programme: Plan Nacional I+D+I	SRA lines covered by the project:		Description and objectives: The general goal of the project is subsystems integration to allow improving security in road vehicles circulation. In this sense, work will be carried out on the development of risk situations detection systems, decision making assistance systems in such circumstances ante communication between vehicle and human so it can be established in the most likely natural language approach. Participants: CAR, GTH, RoboticsLab Results: In process.
	1. Safety	✓	
	2. Connected car		
IoSense Flexible FE/BE Sensor Pilot Line for the Internet of Everything Budget: 400,000 € Duration: 2015 - 2018 Programme: ECSEL 2015	SRA lines covered by the project:		Description and objectives: IoSense will address high-end design methods for “More than Moore” technologies as well as for software components of IoSense Smart Systems. The novel design methodology wants to bridge the gap between the system requirements (see WP1), simulation and the integration. Results: In process.
	1. Safety	✓	
	2. Connected car	✓	
TCAP-Auto Familia de Tarjetas Compactas de Altas Prestaciones para Aplicaciones de Automoción Budget: 165,000 € Duration: 2015 - 2017 Programme: Retos Colaboración	SRA lines covered by the project:		Description and objectives: This project aims to develop a set of tools for implementing, combining, integrating and validating different optimized functionalities for Advanced Driver Assistance Systems on-board, implemented on hybrid chipsets with multiple cores, MPSoC (Multi-Processor System on Chip). Participants: CAR, IXION, Universidad de Alicante Results: In process.
	1. Safety	✓	
	2. Connected car		

CENTRO TECNOLÓGICO DE AUTOMOCIÓN DE GALICIA (CTAG)			
Polígono Industrial A Granxa Calle A, parcelas 249-250 Porriño 0034 986 900 300 www.ctag.com	E36400 Pontevedra 0034 986 900 301	Contact: Francisco Sánchez Pons Ana Paul Tomillo Electronics & ITS Director Technologic Innovation Director francisco.sanchez@ctag.com ana.paul@ctag.com	
▲ Description CTAG is a technological centre whose mission is to make automotive companies more competitive through the implementation of new technologies and the encouragement of research, development and innovation, applying to product and process. It has a team over 400 people and a wide amount of advanced facilities with several laboratories that can address the different fields of competence in which the centre is working: safety, new materials and processes, environment, electronics and ITS systems, and innovation and knowledge management. The field of electronics and intelligent transport systems is one of the principal activities of CTAG in research and innovation. In this sense, CTAG has focused its activities on the application of electronics to new safety systems, autonomous driving, communication and information, comfort and sustainable mobility.			
▲ Main activities and products In the area of safety and autonomous driving, CTAG has been working for several years on the following activities: development of new functions of connected and automated driving, HMI (Human Machine Interface), system validation in laboratory, in driving simulator, in proving grounds and in roads, and evaluation & impact assesment.			
▲ Related projects			
AdaptIVe Automated Driving Applications and Technologies for Intelligent Vehicles Budget: 25,000,000 € Duration: 01/2014 - 06/2017 Programme: VII Framework Programme www.adaptive-ip.eu	SRA lines covered by the project:		Description and objectives: The project is focused in the development and test of different automated driving functions for the daily traffic, trying to dynamically adapt the automation level depending on the situation and the driver condition. These applications aim to improve safety, energy efficiency, reliability and autonomous driving acceptance. Participants: Volkswagen AG, BMW Group, Centro Ricerche Fiat SCpA,Daimler AG, Adam Opel AG, PSA, Renault, Volvo, Ford, Bosch, Continental, Delphi, Bast, DLR, ICCS, TNO, CTAG, Chalmers, IKA, University of Leeds, Lund University, University of Trento, Universitaet Wuerzburg, WIVW, Alcor & EICC Results: In process.
	1. Safety		
	2. Connected car		




DRIVE C2X DRIVing implementation and Evaluation of C2X Communications technology in Europe Budget: 18,000,000 € Duration: 01/2011 - 06/2014 Programme: VII Framework Programme www.drive-c2x.eu	SRA lines covered by the project:		Description and objectives: The project focuses in the implementation of several field tests to carry out an exhaustive evaluation of cooperative systems in different European countries (Finland, France, Germany, Italy, Netherlands, Spain and Sweden). This effort looks for the creation of a test environment at European level and obtain an evaluation of benefits. The results will be used for catching the attention of the public and provide feedback to standardization bodies. Participants: Opel, Audi, BMW, Fiat, Daimler, Ford, Honda, PSA, Renault, Volvo, Yamaha, Continental, Delphi, Denso, Hitachi, Neavia, NEC, Renesas, Bosch, Testing Technologies, Vector, YGOMI, PTV, Bundesanstalt für Strassenwesen, CTAG, Chalmers, Deutsches Zentrum, Facit REsearch, Hochschule für Technik und Wirtschaft Saarland, Institut français des sciences et technologies des transports, de l'aménagement et des réseaux, Institut Nationale de Recherche en Informatique et en Automatique, Interuniversity Microelectronics Centre, Karlsruhe Institute of Technology, Lindholmen Science Park, Nederlandse Organisatie voor Toegepast Natuurwetenschappelijk Onderzoek, Universitatea Tehnica Cluj-Napoca, University of Surrey, Technical Research Centre of Finland, Technische Universität Graz, Autostrada del Brennero, City of Tampere, Hessen Mobil, Rijkswaterstaat, Trafikverket, EICT, ERTICO, ETSI and Nokia. Results: The project provided a comprehensive, Europe-wide assessment of cooperative systems through field operational tests. The field trials involving seven test sites all across Europe proved the safety and efficiency benefits of cooperative systems. For the first time, more than 750 drivers successfully tested eight safety-related functions of cooperative systems all over Europe. A common reference system for C2X communication was rolled out - the respective standards were set. Technical tests indicate that the system is mature for deployment as was shown by the faultless performance of the functions during extensive field trials in seven European countries.
	1. Safety		
	2. Connected car		

eCoMove Cooperative Mobility Systems and Services for Energy Efficiency Budget: 22,700,000 € Duration: 01/2010 - 01/2013 Programme: VII Framework Programme www.ecomove-project.eu	SRA lines covered by the project:		Description and objectives: eCoMove had as main objective the improvement of energy efficiency in road transport with the help of the latest C2X technologies in order to create an integrated solution which understand the driver support and traffic management. Quantitatively, the main objective was to reduce more than 20% the fuel consumption. Participants: Ertico, BmW, Autoroutes, AVL, Boch, CGI, Continental, CRF, CTAG, DAF, DRL, Ford, Go Green, Gemeente Helmonkd, IKA, Magneti Marelli, MAT.traffic, NEC, PTV, QFREE, RACC, tecnaia, Technolution, Tomtom, Telecom, TNO, TUM, Viali, volvo, Here and Imtech Results: The driver support systems developed in the project could achieve a reduction between 4 and 25% in the fuel consumption. Globally, in urban environment a fuel reduction over 10% was demonstrated. These effects depend on the traffic, road and driver situation. Respect to the reduction obtained related with the traffic management and routing applications, the results depended on the network load, obtaining in low or moderate traffic reductions over 4% and in networks with lot of traffic up to 12%.
	1. Safety		
	2. Connected car	✓	
CO-GISTICS Cooperative loGISTICS for sustainable mobility of goods Budget: 7,492,000 € Duration: 01/2014 - 01/2017 Programme: Competitiveness and innovation Framework programme. www.cogistics.eu	SRA lines covered by the project:		Description and objectives: CO-GISTICS is the first European project fully dedicated to the deployment of cooperative intelligent transport Systems (C-ITS) applied to logistics. The objective of the project is the deployment of pilot tests in 7 European cities (Arad, Bordeaux, Bilbao, Frankfurt, Thessaloniki, Trieste and Vigo) in which the impacts and benefices of these services will be evaluated. Participants: ERTICO, Ayu. Bilbao, Ayu. Vigo, Región Central de Macedonia, Terminal Trieste, Auta Marocci, DHL, AZDAR, WEST EUROTRANS, IRU, SAMER & CO, SEAWAY, ATOS SPAIN, T-SYSTEMS, TELEVET, ETRA, Pluservice, Novacom, AGUILA Technologie, M3S, Geoloc Systems, Teamnet, TREDIT, CERTH, CTAG, ICOOR, CEAGA, HOLM, MLC-ITS Euskadi, UNITS, POLIBA y FRAPORT. Results: In process.
	1. Safety		
	2. Connected car	✓	



Compass4D Cooperative Mobility Pilot on Safety and Sustainability Services for Deployment Budget: 10,000,000 € Duration: 01/2013 - 01/2016 Programme: Competitiveness and innovation Framework programme. www.compass4d.eu	SRA lines covered by the project:		Description and objectives: Execution of several pilot test in seven European cities (Bordeaux, Copenhagen, Helmond, Newcastle, Thessaloniki, Verona and Vigo) in which three cooperative services were tested in urban environment. The objective of this project is to demonstrate the benefits of such services and ensure its continuity and implementation. Participants: ERTICO, Copenhagen, Helmond, Newcastle, Verona, Vigo, Región central Macedonia, MINISTERE DE L'ECOLOGIE, DU DEVELOPPEMENT DURABLE ET DE L'ENERGIE, VOLVO, SWARCO MIZAR, PEEK TRAFFIC B.V., SIEMENS, VIALIS, ESYCSA, INFOTRIP, TELECOM, Federación Internacional de l'automobile, CERTH, CTAG, TNO, University of Newcastle, ICCS, Institut Francais des sciences et technologies des transports, de l'aménagement et des reseaux, Geoloc Systems, IDIADA, VITRASA, Mathias Paul Ewald, TOPOS, VTRONN and EUROTAXI. Results: In process.
	1. Safety		
	2. Connected car	✓	
Plataforma Co2perautos2 Plataforma de comunicaciones infraestructura-vehículo para Servicios Cooperativos y de Conducción Semi-automatizada en Entornos de Ciudades inteligentes Budget: 1,612,896 € Duration: 04/2013 - 12/2014 Programme: Interconecta	SRA lines covered by the project:		Description and objectives: Develop an integrated platform for communications infrastructure-vehicle which can integrate new cooperative services and semi-autonomous driving in smart cities to achieve a more efficient, safe and sustainable mobility. Participants: Esycsa, Rodriguez López Auto, Little Cars, Autelec, CTAG and Vitrasa Results: An integrated platform composed by: onboard communication unit; infrastructures equip with cooperative communication (traffic lights, charging locations and parking areas); mobility management and fleet management centres; cooperative applications (preventive safety cooperative warnings, cooperative applications for vulnerable users, cooperative applications for emergency vehicles, cooperative applications for electric vehicles recharging, cooperative Floating Car Data, cooperative applications for parking management and semi-autonomous cooperative applications).
	1. Safety	✓	
	2. Connected car	✓	


FOT-Net Data Field Operational Test Netorking and Data Sharing Support Budget: 1,800,000 € Duration: 01/2014 - 01/2017 Programme: VII Framework Programme www.fot-net.eu	SRA lines covered by the project:		Description and objectives: Support action which offers a common forum to the FOTs network in order to share their experiences and offer new perspectives relating wit the exchange and reuse of the available data. The aim is to analyze how to share valuable data sets collected over the years during many projects to analyze them again and achieve more results. Participants: VTT, ERT, SAFER, IKA, CTAG, UNIVLEEDS, CEESAR and DAIMLER AG Results: In process.
	1. Safety	✓	
	2. Connected car		
INTERACTIVE Accident avoidance by active intervention for Intelligent Vehicles Budget: 28,690,000 € Duration: 01/2009 - 12/2013 Programme: VII Framework Programme www.interactive-ip.eu	SRA lines covered by the project:		Description and objectives: Development of safety systems that support the driver and take control in case of dangerous situations helping to mitigate the impact of collisions in accidents which cannot be avoided. Participants: Ford, BMW, FIAT, DAIMLER, VOLVO, Volkswagen, Autoliv, Continental, Delphi, Here, TRW, Bast, CTAG, DLR, ICCS, IKA, TNO, VTT, Lund University, Université Joseph Fourier, Chalmers Univesity, Universty of Passau, Czech Tecnical University in Prague, University of Trento, Allround Team, Alcor and EICT Results: The main result of the project is the creation and evaluation of ADAS integrated systems, characterized by supporting the driver in a variety of traffic scenarios, specifically to avoid critical situations. The developed functions are based on the elaborated information for the perception layer and the warning strategies and actions defined in order to help the driver with warning, active braking and action of the wheel when necessary. The developed functions were integrated in 6 cars and 1 truck. Un the final phase of the project these functions were evaluated showing the great potential in the improving of safety topics.
	1. Safety	✓	
	2. Connected car	✓	



VRA Vehicle and Road Automation Budget: 1,685,000 € Duration: 03/2013 - 12/2016 Programme: VII Framework Programme www.vra-net.eu	SRA lines covered by the project:		Description and objectives: The objective is to create a network of experts and several stakeholders to work on the implementation of autonomous vehicles and its associated infrastructure. In order to achieve that, needs are identified and research in this field is promoted. Participants: ERTICO, Abertis autopistas, DENSO, CTAG, eentro di Ricerca per il trasporto e la Logistica, VOLVO, DLR, UniversitÄt, ICCS, Applus IDIADA, IFSTTAR, IKA, Inria, VeDeCoM, University of Leeds, Michelin, Racc Tecnalia, Traman, TNO TRL, Vislab, Chalmers University, Vialis, Üniversitesi Tuzla Kampüsü, Mouchel, Jaguar, ICOOR, Universidad de Eindhoven, HERE, Imtech, KeyResearch, earpa, Transport for London, CETH, BRSI, Austriatech and Renault Results: In process.
	1. Safety	✓	
	2. Connected car	✓	
P4ITS Public procurement of innovation FOR cooperative ITS Budget: 442,500 € Duration: 12/2014 - 05/2016 Programme: VII Framework Programme. www.p4its.eu	SRA lines covered by the project:		Description and objectives: P4ITS is a thematic network gathering contracting authorities experienced or planning to shortly embark on deploying Cooperative ITS (C-ITS), and willing to improve the market roll-out of innovative transport systems and services through Public Procurement of Innovation (PPI). Participants: ERTICO, North Denmark Region, Astriatec, ASFINAG, VLAAMS GEWET, Ayuntamiento de Vigo, CTAG, LIKENNE VIRASTO, VTT, EARDA, ITS Bretagne, Comune di Verona, LIST, ITS Sweden, Trafikverket, Regione Liguria, OHL and TOPOS Results: In process.
	1. Safety	✓	
	2. Connected car	✓	


DESERVE Development platform for Safe and Efficient dRiVE Budget: 25,300,000 € Duration: 09/2012 - 09/2015 Programme: ARTEMIS www.deserve-project.eu	SRA lines covered by the project:		Description and objectives: Design and development of a tools platform for ADAS systems in order to exploit the benefits of reuse SW, standardized interfaces and the easy and safe compatible integration of heterogeneous modules to address the increased complexity of the engine and the cost reduction Participants: VTT, FIAT, Continental, FICOSA, AVL, BOSCH, NXP, INFINEON, DAIMLER, VOLVO, ICOOR, RE:LAB, ViSLAB, IRSEEM, Dspace, Inria, ASL, IKA, CTAG, ARMINES, TTS, INTEMPORA, Technolution and IMS. Results: In process.
	1. Safety		
	2. Connected car		
ARTRAC Advanced Radar Tracking and Classification for Enhanced Road Safety Budget: 4,022,500 € Duration: 11/2011 - 11/2014 Programme: VII Framework Programme www.artrac.org	SRA lines covered by the project:		Description and objectives: Develop, test and demonstrate an active system for vehicles to protect the vulnerable road users (VRU), being as well economically viable in the market. The high cost of the available advanced driver assistance systems (ADAS) is the main reason they are only in use in a few top-of-the-range models, and the EU penetration target is still far. Participants: Volkswagen, FIAT, CTAG, VTT, TUHH, UPT and SMS. Results: A sensor was successfully developed and integrated in test vehicles. The results of its validation were satisfactory.
	1. Safety		
	2. Connected car		

RobutSENSE Robust and Reliable Environment Sensing and Situation Prediction for Advanced Driver Assistance Systems and Automated Driving Budget: 10,415,000 € Duration: 09/2015 - 09/2018 Programme: ECSEL- 2014-1 Research and Innovation Actions.	SRA lines covered by the project:		Description and objectives: The objective is to develop a sensor platform for automated driving, that overcomes the limitations of existing sensors and provides improved detection capabilities and greater robustness and reliability. Participants: DAIMLER, AVL, AVLDE, BOSCH, FIAT, CTAG, EICT, FICOSA, FOKUS, FZI, HIAMS, Modulight, SICK AK, Universität ULM and Teknologian Tutkimuskeskus VTT. Results: In process.
	1. Safety	✓	
	2. Connected car		
EuroFOT European Large-Scale Field Operational Tests on In-Vehicle Systems Budget: 21,500,000 € Duration: 05/2008 - 07/2012 Programme: VII Framework Programme www.eurofot-ip.eu	SRA lines covered by the project:		Description and objectives: EuroFOT established a technical and socio/economic comprehensive evaluation program to assess the impact of intelligent transport systems about safety, environment and driver efficiency. The project focused on evaluating several technical mature systems (Adaptive Cruise Control (ACC), Forward Collision Warning (FCW), Speed Regulation System (SRS), Blind Spot Information System (BLIS), Lane Departure Warning (LDW), Curve Speed Warning (CSW), safe human/machine interface and Fuel Efficiency Advisor (FEA)) in passenger cars and trucks in several European countries by carrying out field test during a year. Participants: Ford, BMW, DAIMLER, FIAT, MAN, VOLVO, BMW, AUDI, BOSCH, CONTINENTAL, DELPHI, Harman International, Chalmers, ICCS, IKA, IZVW, Politecnico di Torino, University of Leeds, Bast, Ceesar, CTAG, IFSTTAR, TNO, Allianz, ADAS Management-Consulting, Alcor, EICC and ERTICO. Results: During 12 months, 1000 cars and trucks equipped with driving assistance systems were monitored, recording more than 100TB of data which were analysed to evaluate the impact of these systems in our roads
	1. Safety	✓	
	2. Connected car	✓	

SCOOP@F Part 2 Test deployment of cooperative intelligent transport systems. Budget: 20,000,000 € Duration: 01/2016 - 12/2018 Programme: Connecting Europe Facility	SRA lines covered by the project:		Description and objectives: SCOOP@F is a project in which cooperative systems implemented in 3000 piloted vehicles are connected along 2000 km of roads linking the countries of Austria, France, Spain and Portugal. Its main objective is to improve the safety of road transport and of road operating staff during road works or maintenance. Participants: French Ministry of Transport, Conseils généraux des Côtes d'Armor, du Finistère, d'Ille et Vilaine, de l'Isère, Conseil régional de Bretagne, City of Saint-Brieuc, PSA, Renault, CEREMA, IFSTTAR, GIE RE PSA-Renault, Université de Reims Champagne-Ardenne, Telecom, ORANGE, DGT, CTAG, IMT, Estradas Portugal, Brisa, Auto-Estradas Norde Litoral and ASFINAG Results: In process.
	1. Safety		
	2. Connected car		




Computer Vision Center (CVC) & Computer Science Dpt. of the Universidad Aut3noma de Barcelona (UAB)			 Universitat Aut3noma de Barcelona
Edificio O, Campus UAB, 08193 Bellaterra, Tel: 0034 935811828, www.cvc.uab.es	Barcelona Fax: 0034 935811670	Dr. Antonio M. L3pez, IP Grupo Advanced Driver Assistance Systems (ADAS) antonio@cvc.uab.es , www.cvc.uab.es/~antonio	
<p>▲ Description</p> <p>The CVC is a non-profit research center with an independent legal status, established in 1995 by the Generalitat de Catalunya and the Universidad Aut3noma de Barcelona (UAB). Our mission is to carry out cutting-edge research that has the highest international impact in the field of computer vision. We also promote the transference of knowledge to industry and society. Finally, we strive to prepare and form researchers of the highest European level. Thanks to our good working practices, the CVC has positioned itself as a specialist in the field of computer vision and is considered a reference in the creation of knowledge towards society. One of the main lines of work in the CVC consists in the use of computer vision systems for driving assistance and autonomous driving. We have an automated electric car for testing.</p>			
<p>▲ Main activities and products</p> <ul style="list-style-type: none">• Training of students of all levels (undergraduate, master, doctorate) in the field of computer vision and their application to driving assistance and autonomous driving.• Development of prototypes and proofs of concept with the industry (VW, SEAT, IDIADA, Samsung, Xerox, etc.).• Development of research projects achieved on a competitive basis.• Publication in top journals and conferences in the field of transportation systems, artificial intelligence and computer vision.• Organization of international workshops.			
<p>▲ Related projects (excluding contracts from companies because of confidentiality issues and reporting just the last three competitive projects)</p>			
ACDC - Perception Automated and Cooperative Driving in the City – Perception Budget: 62,400 € Duration: 06/2015 – 12/2017 Programme: RETOS (MEC), TRA2014-57088-C2-1-R http://adas.cvc.uab.es/projects/ACDC/	SRA lines covered by the project:		Description and objectives: Development of a 360º vision system for perception of the environment of a vehicle, with the aim of performing autonomous driving. Participants Researchers from CVC and Computer Science Dpt. at UAB. PI: Dr. Antonio M. L3pez Results: Demonstration vehicle, PhD dissertations, relevant publications, organization of workshops, contracts with companies.
	1. Safety	✓	
	2. Connected car		

ViDAS-UrbE Vision-based Driver Assistance for Urban Environments subproject of the project eCo-DRIVERS lead by the CVC Budget: 87,120€ Duration: 01/2012 - 12/2014 Programme: Non-oriented basic research (MICINN), TRA2011-29454-C03-01 http://www.cvc.uab.es/adas/projects/eco-drivers/	SRA lines covered by the project:		Description and objectives: Developing a computer vision system for perception in the forward direction of the vehicle, detecting pedestrians, vehicles and road free navigable space, with the aim of performing emergency brake or giving warnings to the driver under dangerous situations. Participants: Researchers from CVC and Computer Science Dpt. at UAB. PI: Dr. Antonio M. López Results: Demonstration vehicle, PhD dissertations, relevant publications, organization of workshops, contracts with companies.
	1. Safety		
	2. Connected car		
MAPEA2 Movimiento Acostumbrado de los Peatones: Estudio para Atajar los Atropellos Budget: 48,841 € Duration: 10/2014- 10/2015 Programme: DGT, SPIP2014-01352 http://mapea2.cvc.uab.es/	SRA lines covered by the project:		Description and objectives: Developing risk maps of vehicle-pedestrian collisions by the detection and geo-localization of pedestrians from a car that captures data with a vision system and a GPS/IMU. Participants: Researchers from CVC and Computer Science Dpt. at UAB. PI: Dr. Antonio M. López Results: Web that allows queries on OpenStreet map to see information about the behavior of the pedestrians captured from the test vehicle.
	1. Safety		
	2. Connected car		

EURECAT			 Centre Tecnològic de Catalunya
Plaça de la Ciència, 2 Manresa Tel: 0034 93 877 73 73 www.eurecat.org	08242 Barcelona Fax: 93 877 73 74	Contact: Alfred Beltran Manager Automotive Industry alfred.beltran@ce.eurecat.org	
▲ Description EURECAT is a private non-profit organization dedicated to applied industrial research and the transfer of technological knowledge. It has its own technical and human resources to develop these activities and focuses in all the interested companies, people and entities, in order to promote competitiveness. EURECAT brings together the expertise of 450 professionals who generate an income of 40 million € per year and provide technological services to more than 1,000 companies. It is participating in 160 highly strategic R&D projects at national and international level, and has 73 patents and 7 spin-off. The added value provided by EURECAT accelerates innovation, eliminates the expenditures in scientific and technological infrastructures, reduces the risk and provides specialized and customized knowledge to each company.			
▲ Main activities and products Eurecat offers experience on providing recommender systems applied to mobility solutions, extending the results obtained in projects like SUPERHUB. In the topic of journey planning, Eurecat is focused on the development of solutions that are able to customize and enrich the mobility experience, by learning from the actual mobility patterns of the citizens, taking in consideration their needs and preferences. Moreover, by applying context-aware recommendation techniques, our recommender systems are able to adapt the mobility to every situation, including contextual information that can be relevant in the mobility domain, like weather or traffic status and combining it with the context of the citizens themselves, like for example the companionship, the purpose of their trips, etc. In addition to this customization of the mobility solutions, our recommendation systems can also deliver related suggestions of Points of Interest, among others, that can enrich the journeys planned with additional information, and can enable the development of new services around the mobility of the cities, by combining mobility with other sectors like retail or tourism. Beyond the personalization technologies above mentioned, Eurecat can also contribute with other components that can be useful in the context of Mobility as a Service, like for example, social innovation toolboxes, predictive user behaviour modelling, GPS tracking, mobility pattern extraction or destination tagging techniques that are being developed in the Social Car project. Eurecat also offers to the consortium our experience and the design and development of the technological infrastructure required to operate all the data and services that will be included in platforms like those described in the call, including Big Data Analytics capabilities. On the other hand, the division of Robotics and Automation provides high experience on providing technologies for safe and reliable automation, mechatronics, human-vehicle interaction, autonomous navigation, control and navigation systems, positioning (Outdoors and indoors by combining GNSS with INS). Moreover, Eurecat has a GNSS simulator for diverse scenarios. Finally, it is important to highlight the participation of Eurecat in the development of the CVC-UAB autonomous vehicle (http://www.uab.cat/web/noticias/detalle-de-noticia/el-cvc-uab-presenta-su-coche-autonomo-en-el-salon-del-automovil-de-barcelona-1345468738526.html?noticiaid=1345684871573), and the developed work regarding cybersecurity solutions to minimize vulnerabilities in the autonomous vehicle ("security by design" in hardware and software for V2X).			


▲ Related projects


SUPERHUB Sustainable and persuasive human users mobility in future cities Budget: 10 M € Duration: 09/2011 - 11/2014 Programme: FP7 http://superhub-project.eu	SRA lines covered by the project:		Description and objectives: The SUPERHUB project aims at providing an integrated toolkit able to stimulate citizens and goods transport companies to use alternative mobility resources. Several partners from all over Europe are engaged in the realization of a user-centric, integrated approach to multi-modal smart metropolitan mobility systems. SUPERHUB promotes the creation of a new urban mobility services ecosystem, where all actors are represented and the take-up of virtuous behaviours is facilitated by the development of an open platform able to: <ul style="list-style-type: none"> gather real-time data from all possible mobility sources provide matchmaking and negotiation capabilities between providers and consumers of mobility offers for better routing decisions enable the development of mobility services able to fulfil users' needs and stimulate behavioural changes. Participants: GFI, CREATENET; XRADE, FLA, Uni Aberdeen, Uni Helsinki, UPC, CVUT, ASCAMM,... Results: Platform of mobility services with Andorid app tested with more than 3k citizen in 3 cities in Europe.
	1. Safety	✓	
	2. Connected car	✓	

Mobility2.0 Co-operative ITS Systems for Enhanced Electric Vehicle Mobility Budget: 2.6 M € Duration: 09/2012 - 02/2015 Programme: FP7 http://mobility2.eu/	SRA lines covered by the project: 1. Safety  2. Connected car 	Description and objectives: Mobility2.0 will develop and test an in-vehicle commuting assistant for FEV mobility, resulting in more reliable and energy-efficient electro-mobility. In order to achieve a maximum impact, Mobility2.0 takes an integrated approach of addressing the main bottlenecks of urban FEV mobility: 'range anxiety' related to the limited FEV range, scarcity of parking spaces with public recharging spots, and the congestion of urban roads. Our integrated approach means the application developed by Mobility2.0 will utilise co-operative systems to simultaneously consider these bottlenecks, so that such an optimisation can be achieved which still guarantees reliable transportation for each FEV owner. Mobility2.0 will focus on assisting the daily urban commute, which represents the bulk of urban mobility. Participants: BROADBIT SLOVAKIA SRO, ETRA INVESTIGACION Y DESARROLLO SA, FUNDACIO PRIVADA BARCELONA DIGITAL CENTRE TECNOLOGIC, INSTITUTE OF COMMUNICATION AND COMPUTER SYSTEMS ICCS, COMUNE DI REGGIO EMILIA – MRE, ARMINES, UNIVERSITEIT TWENTE, PRIVE' SRL, NEC EUROPE LTD. Results: Android app with multimodal journey planner connected to the EV by an OBDII connector, tested in Barcelona and Reggio Emilia.
EVIC A step further to Vehicle-to-Infrastructure Budget: 800 K € Duration: 05/2012 - 05/2014 Programme: Nucli ACCIÓ Generalitat of Catalonia financed by European FEDER funds http://w41.bcn.cat/en/el-projecte-evic-dona-solucions-a-la-gestio-de-recarrega-i-la-localitzacio-dels-vehicles-electrics/	SRA lines covered by the project: 1. Safety 2. Connected car 	Description and objectives: The EVIC project aims to cover one of the biggest needs of companies that offer products and/or related electric vehicle services: control of load balancing electricity to the grid through intelligent management of demand in real time. To achieve this, EVIC has considered the geographic distribution of electric vehicles in real time and updated energy needs. Participants: FICOSA, GDT, Edenway, ASCAMM Results: Module shipped into the electric vehicle that provides the position and battery status ubiquitously (GNSS+WiFi)


GNSSmeter GNSSbased metering for vehicle applications Budget: 615 K € Duration: 2010 - 2011 Programme: FP7 GSA http://www.gsa.europa.eu/gnss-based-metering-vehicle-applications-and-value-added-road-services	SRA lines covered by the project:		Description and objectives: GNSSmeter develops a road pricing and pay per use insurance application system based on satellite navigation technology. Within GNSSmeter, the existing system concept is extended by integrating EGNOS/EDAS integrity and augmentation data as well as Galileo measurements. Participants: ASCAMM, Aichhorn Klaus Teleconsult Austria, DKE, skymeter Results: On board unit (OBU) for an integrity application tolling.
	1. Safety		
	2. Connected car	✓	
PARKINETICS Electromobility Living Lab Budget: 1.2 M € Duration: 2010 - 2012 Programme: Nucli ACCIÓ Generalitat of Catalonia financed by European FEDER funds http://www.parkinetics.com/proyecto/?lang=en	SRA lines covered by the project:		Description and objectives: ParKinetics is a new Living Lab for electric mobility and at the same time, demonstration area pioneer in Spain, located within a radius of 30 km from Cerdanyola del Valles, Sant Cugat del Valles Technology Park, UAB , Esade -Creapolis and Synchrotron , with more than 50,000 potential users. Participants: Tradisa, Simon, Grupo AIA, ASCAMM, Centro de Innovación del Transporte (CENIT), el Puerto de Información Científica (PIC) de la UAB y la UPC. Results: Ontological definition of the different factors involved in electric mobility to systematize their study. On the other hand there has been a first study of mobility in the area covered by the project.
	1. Safety		
	2. Connected car	✓	
MOLECULES Mobility based on electric connected vehicles in urban and interurban smart, clean environments Budget: 4.3 M € Duration: 2012 -2 015 Programme: FP7 http://www.molecules-project.eu/	SRA lines covered by the project:		Description and objectives: MOLECULES is a demonstration project with three large scale pilots in Barcelona, Berlin and Grand Paris aiming to use ICT services to help achieve a consistent, integrated uptake of Smart Connected Electromobility (SCE) in the overall framework of an integrated, environmentally friendly, sustainable mobility system. Participants: ETRA, ASCAMM, MOPeasy, DLR, Berlin Senate Dpt of urban development, Ajuntament de BCN, Going Green, Polis, WMZ Results: Online platform of electromobility related services
	1. Safety		
	2. Connected car	✓	




Ground robot RHO3 Unmanned ground vehicle Budget: 300 K € Duration: 2013 - 2014 Programme: Internal project https://rhocubed.wordpress.com/about-4/	SRA lines covered by the project:		Description and objectives: Implementation of a robust and assured navigation solution for GNSS-challenged environments (i.e. under foliage, urban and indoor) based on the integration of GNSS with INS, vision and laser range scanner sensors. The demonstration will use an unmanned ground vehicle to complete a single trajectory with paths through both an outdoor (GNSS available) and indoor environment while maintaining a seamless navigation solution. Participants: ASCAMM and Avionics Engineering Centre from Ohio University. Results: Navigation solution for GNSS-challenged environments.
	1. Safety		
	2. Connected car	✓	
ICARUS Unmanned Search and Rescue Budget: 17.5 M € Duration: 2012 - 2015 Programme: FP7 http://www.fp7-icarus.eu/	SRA lines covered by the project:		Description and objectives: The overall purpose of the ICARUS project is to apply its innovations for improving the management of a crisis and by doing so to reduce the risk and impact of the crisis on citizens. The use of unmanned search and rescue devices embedded in an appropriate information architecture and integrated into existing infrastructures will help crisis personnel by providing detailed and easy to understand information about the situation. The proposed system will inform crisis personnel about real dangers present on the ground, and will thus increase their performance in resolving the situation. Participants: Ecole Royale Militaire, Space Applications Services, Estudios GIS, ASCAMM, Fraunhofer IZM, IMM, JMDTHEQUE, TU Wien, Integrasys, Skybotix, Quobis, INESC Porto, Université de Neuchatel, ETH, ATOS, RRLAB, CMRE, CALZONI, Matelliance, ESRI Portugal, Escola Naval, BFAST, EPFL Results: Toolbox of integrated components for unmanned Search and Rescue.
	1. Safety	✓	
	2. Connected car	✓	



FRANCISCO ALBERO SAU			
Rafael Barradas 19 Hospitalet de Llobregat Tel: 0034 932618500 www.fae.es	08908 Barcelona	Francisco Ramos Pérez R&D&Innovation Manager f.ramos@fae.es	
<p>▲ Description</p> <p>FAE - Francisco Albero S.A.U. – designs and produces electrical and electronic products for the automotive market. It offers its customers a wide range of products with over 3,000 references delivering equivalent performance and quality to that of OEM parts. As an innovation-oriented organization since its inception, FAE has consolidated its position in the field of multilayer ceramic application design, the development of ceramic substrates and implementation of microelectronic systems. The FAE product range includes Oxygen Sensors, MAP Sensors, Timing and Revolution Sensors, Oil Pressure Switches and Transmitters, Temperature and Pressure Sensors, Stop-Light and Reversing Light Switches, Temperature and Radiator Fan Transmitters, Ignition Coils, Ignition Leads, Glow Plugs, Thermostats, Knock Sensors and Solenoids. With more than 60 years’ experience and based in Barcelona, FAE exports 75% of its turnover and is currently present in more than 80 countries, including a sales office in Miami, United States.</p>			
<p>▲ Main activities and products</p> <ul style="list-style-type: none">• Circulator prototypes for S band and X band• Occupancy sensor			
<p>▲ Proyectos relacionados</p>			
LOCCIMIM Budget: 1,260,000 € Duration: 2012 - 2015 Programme: EURIPIDES-EUREKA http://www.euripides-eureka.eu/projects	SRA lines covered by the project:		Description: Development of circulators based on LTCC technology for radar application. Participants: International consortium of companies. Results: Circulator prototypes for S band and X band
	1. Safety	✓	
	2. Connected car		
DINNAMIC Budget: 310,000 € Duration: 2012 - 2014 Programme: MINECO-INNPACTO	SRA lines covered by the project:		Descripción y objetivos: Development of occupancy sensors based on flexible polymeric multilayer structures. Transduction based on electrical resistance variations Resultados obtenidos: Occupancy sensors.
	1. Safety	✓	
	2. Connected car		

Ferrovial			
St. Príncipe de Vergara, 135 Madrid Tel: 0034 91 5862500 http://www.ferrovial.com/es/	28002 Madrid Fax: 0034 91 5862677	Contact: Rafael Fando Mestre ITS and Centre for the Innovation In Smart Infrastructures (CI3) Director rfando@ferrovial.com	
▲ Description <ul style="list-style-type: none">• The company's activity is carried out through four business lines:• Services: efficient provision of urban and environmental services and maintenance of infrastructures and facilities.• Toll Roads: promotion, investment and operation of toll roads and other infrastructures.• Construction: the design and construction of infrastructures in the areas of civil engineering work, building and industrial construction.• Airports: airport investment and operation.			
▲ Main activities and products <p>Ferrovial, as infrastructure manager, aims to ensure that these infrastructures are becoming safer and more respectful with the environment, improving the user experience. To do this we work on several research and innovation seeking new models, methods and technologies to reduce traffic congestion in cities and highways, identify new patterns of mobility to adapt services and infrastructure management to the needs of users. Some of the related projects are:</p> <ul style="list-style-type: none">• Managed lanes: In order to give a better service to our customers, we have launched in our highways specific lanes where a minimum speed is guaranteed based on a dynamic fare depending on the congestion levels that we have in the corridor ensures a proper fluidity on the road as well as a higher quality of customer service.• DriveOn TEXpress: This project developed in the USA consists about the development of a mobile APP that encourages sharing vehicles on highways getting increasing vehicle occupancy obtaining discounts on tolls. In this way we reduce road congestion and greenhouse gas emissions.• Satelise: A project where the customers pay depending on the use they do in the infrastructure by an application for smartphones, where the charging system is based on satellite positioning (virtual tolls) without necessity of physical infrastructure on the road or in your own vehicle. Additionally updated information of itineraries is provided, as well as road accidents, weather, discounts in gas stations, etc. In this way it seeks to minimize congestion in the payment of our highways providing security and fluidity to our users.• Big Data: A clear example of the study about mobility on our highways is the use of information that mobile telephony offers. With these information and with external data from the highway as traffic counters and tolls will be possible to obtain the mobility patterns of our users. In this sense we will know the most demanded routes on our roads and the study of mobility for future business opportunities• Plan 20.16: It is an internal Project in Ferrovial which aims to improve competitiveness, sustainability and protect its reputation. Among its main priorities is the mobility, which included plans to reduce the impact of the mobility of people who use the infrastructures managed by Ferrovial.			


▲ Related projects		
INTEL VIA Comprehensive System Control, Signaling and Communication for Safe and Intelligent Traffic Management Operational Infrastructure and Services Budget: 7,4 M € Duration: 06/2008 - 03/2012 Programme: ERDF and Ministry of Industry, Energy and Tourism https://intelvial.wordpress.com/	SRA lines covered by the project:	
	1. Safety	✓
	2. Connected car	✓
	Description and objectives: The main objective of the project is the development, validation and implementation of a new integrated system for an efficient operational management, safe and intelligent traffic infrastructure by integrating elements of control, signaling and communication. Participants: Ikusi (leader), Applus+Idiada, Libera Networks, Ingeniería y Consultoría para el control Automático (ICCA), NTS, Dirección General de Tráfico, Ferroviaria, Clúster de Movilidad y Logística (ITS Euskadi), VICOMTech, Universitas Miguel Hernández, Lissit – Universitat de Valencia Results: Technologies and designed products, such as communication systems, beacons, smart vision sensors and system management algorithms based on vision, were tested in field trials. The project has provided technologies and products that can be transferred directly to marketing departments based on pilot systems tested and properly field validated products under all weather conditions	
SOFIA Multidimensional Information Management System for Intelligent Infrastructure Budget: 700,000 € Duration: 2011 - 2013 Programme: INNPACKTO http://proyectosofia.com/	SRA lines covered by the project:	
	1. Safety	✓
	2. Connected car	
	Description and objectives: The platform integrates information from heterogeneous wireless sensor systems and allows the process and real time analysis of the recorded data in order to help optimize the operation of infrastructure. Ferroviaria Agroman's objective in this project is being able to offer to their customers the added value of including intelligence infrastructure in the design phase and construction, so that these infrastructures have the necessary equipment for intelligent management as a one more element integrated during their construction Participants: Ferroviaria Agroman, Universitat Oberta de Catalunya, Worldsensing, Exitdesign Results: Apart from the development of a platform for intelligent information management, it has been achieved; identify cases of use of sensor networks to improve the management, maintenance and operation of the infrastructure, incorporating sensors on construction phases, identify business models that enable us to exploit the platform and transfer it from the builder to the operator, identifying new models use of information and cost optimization	


CIUDAD 2020 Towards a new model of smart and sustainable city Budget: 16.3 M € Duration: 10/2011 - 12/2013 Programme: INNPRONTA http://www.innprontaciudad2020.es/	SRA lines covered by the project:		Description and objectives: <p>The aim of the CIUDAD 2020 Project has been to define a model city equipped with advanced intelligent mobility management systems, energetically efficient and sustainable economically, socially and environmentally. The research applied to different aspects of intelligent city and the development of technological services have been tools that have enabled the achievement of the overall objective.</p> Participants: INDRA (leader), Ferrovial Agroman, Atos, Fagor electrónica, GFI Informática, Fractalia, iSOCO, Daedalus, Tekia ingenieros
	1. Safety		
	2. Connected car		
			Results: <p>The 33 experimental technological assets developed in CIUDAD 2020 have shown that smart cities technology already exists and is progressively incorporated into the range of solutions for companies participating in the project. After completion of the R+D, the next step is to implement the solutions developed on real projects with these innovations to the cities and to inform citizens their existence so they can use them and become aware of their leading role in improving their city. Likewise it also aims to improve access to data through Open Data to structure and advance the potential of Big Data and the Internet of Things. Thus it can be improved the potential of smart cities to generate business and wealth in cities.</p>

OUTSMART Provisioning of urban / regional Smart services and business models enabled by the Future Internet Budget: 5 M € Duration: 04/2011 - 03/2013 Programme: Funded by CE http://fi-ppp-outsmart.eu	SRA lines covered by the project: 1. Safety  2. Connected car	Description and objectives: OUTSMART project aims to create services and pilot applications that optimize and improve the sustainability of supply and access to resources in urban areas, by creating five ecosystems connected to the Internet of the Future. Each ecosystem or cluster covers an urban service and takes place in a European city; Waste management - Berlin (Germany) Water and sanitation - Aarhus (Denmark), transport and environment - Birmingham (UK), Smart metering and street lighting - Santander (Spain), water and environment - Trento (Italy). Participants: Alcatel-Lucent Italia, AMEy Limited, Amplex A/S, ATOS Origin, Aarhus Vand A/S, Banco Santander, Berliner Stadtreinigungsbetriebe, CEA (Commissariat á l'énergie atomique et aux énergies alternatives), CI3 (Centro de Innovación de Infraestructuras Inteligentes), Coronis/Elster SAS, CREATE-NET, Dolomiti Reti (grupo Dolomiti Energia), EMCANTA, Engineering, E.ON España, Ericsson d.o.o. for Telecommunications, Fraunhofer FOKUS, Municipality of Santander, Orange Labs/Bizz, Telefonica I+D (TID), TTI, Universidad de Cantabria, University of Luxembourg, University of Surrey, Worldsensing Results: Each of five clusters that was developed for this project has been significantly improved its efficiency, and therefore its economic model. It has also been improved citizens' behavior in relation to the consumption of each ecosystem directly improving the environmental impact that they have.
FOTSIS European Field Operational Test on Safe, Intelligent and Sustainable Road Operation Budget: 14 M € Duration: 04/2011-09/2014 Programme: FP7 http://www.fotsis.com/	SRA lines covered by the project: 1. Safety  2. Connected car 	Description and objectives: The FOTSis European project has the objective of developing new technologies for road transport to enhance the communication and collaboration between vehicles and infrastructure, in order to improve safety and traffic flow. Participants: Iridium, OHL Concesiones, Planestrada, Marestrada, Nea Odos, SICE, Indra, GMV skysoft, Transver, terna, Orange-France Telecom, UPM Telco, IL, Aalto, CERTH, Geoville, CI3, ERF, GMV sistemas, FIA, Optimus, Asecap Results: The services developed in FOTSis provide more information in real time, resulting from the connection of three items automatically: vehicles, infrastructure and road control centers. Also systems improve the fluidity, safety and sustainability of the road where it has been installed; M -12 and A -2 highways.

Fico Mirrors S.A. (Entity)			
P.I. Can Mitjans Viladecavalls www.ficosa.com	E08232 Barcelona	Contact: José Mª Álvarez Technical Manager - ADAS Business Unit jalvarez@ficosa.com	
<p>▲ Description</p> <p>FICO MIRRORS S.A. is part of FICOSA, an independent industrial group devoted to the research, development, production and commercialization of automotive systems and components. Based in Barcelona (Spain), the Group has a global team of more than 8500 professionals and presence in 19 countries around the world. FICOSA is a technological partner of some of the world’s major car manufacturers. From July 1st 2015, FICOSA group is participated at 49% from Panasonic. In particular, FICO MIRRORS S.A. is one of the three major worldwide rear and side mirror suppliers. It pioneered in the group the incorporation in its products of ADAS systems based on camera technology (blind spot detector, parking cameras, multi-functional frontal camera system) and bird-eye view systems. Specific teams in the company are developing camera systems for rear and surround-view applications and on working driver status monitoring, through the analysis of the driver behavior and by measure of biological parameters by cameras.</p>			
<p>▲ Main activities and products</p> <p>Parking cameras; Bird-eye view systems.</p> <p>Camera-Monitor Systems for the replacement of rear-view mirrors; Blind Spot Detector (BSD) ; Lane Change assistant (LCA)</p> <p>Frontal camera systems, Traffic sign recognition; Lane Departure Warning; Pedestrian Detection;</p> <p>Driver Drowsiness Detection;</p> <p>Driver Status Monitoring. Systems (stereo Infrared cameras)</p>			
<p>▲ Related projects</p>			
DESERVE D Development platform for Safe and E fficient dRiVE Budget: 25.3 M€ Duration: 09/2012 - 02/2016 Programme: ARTEMIS / ECSEL http://www.deserve-project.eu/	SRA lines covered by the project:		Description and objectives: A Tool Platform for embedded ADAS exploiting cross-domain software reuse, standardized interfaces, and easy and safety-compliant integration of heterogeneous modules. The DESERVE Platform will provide the environment for ADAS design, development and pre-validation. Participants: VTT (Coordinator), CONTINENTAL FICO MIRRORS, AVL, BOSCH, NXP, INFINEON, DAIMLER, VOLVO, ICOOR, RE:LAB, VISLAB, IRSEEM, dSPACE, INRIA, ASL, IKA, CTAG, CRF, ARMINES, INTEMPORA, RAMBOLL, TECHNOLUTION, IMS. Results: Project completed. Demo of the platform during Final event at Ulm on December 16th, 2015.
	1. Safety		
	2. Connected car		

SafeAdapt Safe Adaptive Software For Fully Electric Vehicles Budget: 9.25 M€ Duration: July 2013 - June 2016 Programme: [FP7/2007-2013] [FP7/2007-2011]); grant agreement n° 608945. http://www.safeadapt.eu/	SRA lines covered by the project:		Description and objectives: To develop novel architecture concepts based on adaptation to address the needs of a new E/E architecture for FEVs regarding safety, reliability and cost-efficiency . Reduce the complexity of the system and the interactions by generic, system-wide fault and adaptation handling. Enable extended reliability despite failures, improvements of active safety, and optimized resources. This is especially important for increasing reliability and efficiency regarding energy consumption, costs and design simplicity. Participants: CEA-LIST, DELPHI, DuraCar, FICO MIRRORS, Fraunhofer ESK (Coordinator), Tecnalia, Pininfarina, Siemens, TTTech. Results: In process.
	1. Safety	✓	
	2. Connected car		
RobustSENSE Robust and reliable environment sensing and Situation Prediction for advanced Driver Assistance Systems and Automated Driving Duration: 06/2015 - 05/2018 Programme: ECSEL 2014-1 RESEARCH AND INNOVATION ACTIONS http://www.eict.de/en/RobustSENSE_en.html	SRA lines covered by the project:		Description and objectives: The main objective of the project is to develop a new architecture of cooperating sensors to make them able to work in harsh environment for automatic vehicles Participants: Daimler (Coordinator) AVL, Bosch, CRF, CTAG, EICT, Fico Mirrors; Fraunhofer, FZI, Hitachi Automotive systems, Modulight, Oplatek, SICK, Ulm University, VTT. Results: Project started.
	1. Safety	✓	
	2. Connected car		

University of Alcalá. Geintra Research Group			
Escuela Politécnica Superior. Campus Universitario Alcalá de Henares Tel: 0034 91 885 6545 http://www.geintra-uah.org/	28871 Madrid 91 885 6591	Contact: Felipe Espinosa Lecturer and Researcher felipe.espinosa@uah.es	
▲ Description The research group in Electronics Engineering applied to Smart Spaces and Intelligent Transportation Systems (Geintra) is formed by professors and researchers from the Department of Electronics at the University of Alcalá, and is located in the Polytechnic School. It has laboratories, instrumentation and human resources to support the following areas of research: a) sensory-based audio and video, ultrasound and radio frequency, and infrared; b) network control systems; c) design, implementation and testing of electronic systems; and d) support systems dependency.			
▲ Main activities and products The group's activities in the indicated area are summarized as: sensor networks, sensor integration and sensor fusion; location and positioning systems; mobile robotics; man-machine interfaces; e-health and independent living; intelligent transportation systems and infrastructure; distributed automation; embedded, SoC and co-design digital systems.			
▲ Related projects			
ALCOR Optimization of wireless sensor network and network control systems for cooperation of mobile units in intelligent environments Presupuesto: 229,900 € Duración: 01/2014 -12/2016 Programa: MINECO – Society Challenges	SRA lines covered by the project:		Description and objectives: Optimization of local and shared resources in environments with multiple sensorial modules which service multiple robotic mobile units, using a wireless communication network as link. Participants: University of Alcalá (Geintra Research Group) and University of Córdoba (Prinia Research Group) Results: http://www3.uah.es/alcor .
	1. Safety		
	2. Connected car	✓	

GMV			
11 Isaac Newton str., PTM Tres Cantos Tel: 0034 91 807 21 00 www.gmv.com	28760 Madrid Fax: 0034 91 807 21 99	Contact: Sara Gutiérrez Lanza. Business Development Executive. Transport and Mobility Services sgutierrez@gmv.com	
▲ Description GMV is a privately owned technological enterprise group with an international presence. Founded in 1984, GMV mainly operates in eight large sectors for both public and private organisations including Space, Security and Transportation. GMV is a pioneering company worldwide in developing and implementing intelligent transport systems based on GPS, mobile communications and GIS technology. In the automotive sector, GMV implements on board telematics units and has extensive experience in the development and validation of ECUs (Electronic Control Units). Furthermore, current activities into safety and security of cooperative automotive systems (systems of systems), provide GMV with the necessary know-how to work on enabling internal and external ECU communication security. GMV is a national reference in safety and security management, particularly in cybersecurity both for the Public Administration, telecommunications or banking with relevant pioneer products such as Checker ATM Security. Moreover, GMV Earth observation and meteorological satellite deep knowledge allows us to complement our ITS (Intelligent Transport System) solutions with essential added value services seeking ART (Automated Road Transport) safety.			
▲ Main activities and products <ol style="list-style-type: none">GMV designs, develops and manufactures OEM and aftermarket equipment for the automotive sector, targeted at applications like fleet Management; car-sharing solutions (conventional cars and EVs); car-pooling solutions; remote diagnosis and vehicle health report; multimedia and Infotainment; eCall; stolen Vehicle Tracking (SVT); tow notification; burglar warning and remote door lock/unlock; curfew alert; geofencing; speed alertDevelopment of embedded software (including safety-critical software) for in-vehicle equipment (ECUs and telematics onboard units)Telematics services for the connected vehicle, including services such as Pay per Use services (UBI, Congestion Charging, EFC); safety & security (eCall, bCall, Emergency services management); highway services and tolling (Electronic Fee Collection, HOV Declaration, Smartphone-based tolling); services for the Electric Vehicle (EV Charging Scheduler, Navigation to charging station etc.); maintenance (Preventive Maintenance, Remote diagnosis), new mobility concepts (eco-coaching, eco-driving, dynamic parking solutions ...); other solutionsAdvanced positioning technologies: GMV has developed in the last 10 years several Advanced GNSS processing technology covering different techniques such as PPP, map-matching and, very in particular, positioning integrity in ITS environment based on IBPL and KIPL technologies. GMV has several patents and patent requests related to these technologiesServices dealign with all Cybersecurity lifecycle: security planning [regulation compliance, analysis and Specific environments diagnosis (compliance and adherence to National Security Scheme, Critical Infrastructure Protection, ..., adaptation to ISO 27001); development of security directive plans; development of business continuity plans]; security operational Management [security technical offices; security Operation Centres, security incident Management; digital Surveillance]; security audits [technical security audits; vulnerabilities detection, analysis and Management; forensic analysis]; deployment and Configuration of secure infrastructures [NGF, Application Delivery Controller, IDS/IPS Platforms, WAF, SIEM,...]High added value services based on latest available Earth Observation and Meteorological satellite sensors and fusion with in-situ sensors networks information. In particular, GMV provides services of high temporal and spatial resolution for thematic digital mapping –including DEM (Digital Elevation Models) - generation and update, monitoring traffic, monitoring roads or associated critical infrastructures such as bridges, raising alarms due to extreme weather events such as flash floods over roads and providing near real-time nowcasting meteorological services including temperature, clouds, precipitation, winds and thunderstorms			

▲ Related projects



Analysis and Development of Demonstration Centres for the benefit of the downstream GNSS stakeholders Budget: 1 M € Duration: 01/2016 - 07/2017 Programme: ESA - Invitation to Tender AO/1-8319/15/F/MOS	SRA lines covered by the project:		Description and objectives: Development of a centre of excellence providing different services to the automotive sector. These services are oriented to give an answer to the needs identified in the new Autonomous Driving and Connected Vehicle applications in relation to test and validation, high precision positioning, safety & security and assessment of vulnerabilities which have an impact on these applications. Participants: GMV (coordinator), CTAG and VVA Results: At present, the Project is on-going and progresses towards the completion of PHASE 1, which will conclude with a feasibility assessment of exploitation of the Centre of Excellence for the Autonomous and Connected Vehicle.
	1. Safety	✓	
	2. Connected car	✓	

SafeCOP Safe Cooperating Cyber-Physical Systems using Wireless Communication Budget: 299,806.25 € (total eligible costs for GMV) Duration: 04/2016 - 03/2019 Programme: ECSEL http://www.ecsel-ju.eu	SRA lines covered by the project:		Description and objectives: SafeCOP (Safe Cooperating Cyber-Physical Systems using Wireless Communication) will establish a safety assurance approach, a platform architecture, and tools for cost-efficient and practical certification of cooperating cyber-physical systems (CO-CPS). SafeCOP targets safety-related CO-CPS characterized by use of wireless communication, multiple stakeholders, dynamic system definitions, and unpredictable operating environments. In this scenario, no single stakeholder has the overall responsibility over the resulted system-of-systems; safe cooperation relies on the wireless communication; and security and privacy are important concerns. Participants: Alten (Coordinator), Technical University of Denmark, Teknologisk Institut, Mobile Industrial Robots, Odense Universitetshospital, Technicon ApS, Finnish Meteorological Institute, Mobisoft, M-Motion, UNIVERSITA DEGLI STUDI DELL'AQUILA, National Research Council of Italy, Intelligence Behind Things Solutions S.r.l., Impara, Politecnico di Milano, Thales Italia spa, AITEK, RO technology, Intecs, DNV GL ASA, Maritime Robotics AS, Stiftelsen SINTEF, Instituto Superior de Engenharia do Porto, GMV (GMVIS SkysoftS.A.), TEKEVER Autonomous Systems, Mälardalen University, Qamcom Research & Technology AB, KTH Royal Institute of Technology Results: In process. SafeCOP will provide an approach to the safety assurance of CO-CPS, enabling thus their certification and development. The project will define a platform architecture and will develop methods and tools, which will be used to produce safety assurance evidence needed to certify cooperative functions. SafeCOP will extend current wireless technologies to ensure safe and secure cooperation. SafeCOP will also contribute to new standards and regulations, by providing certification authorities and standardization committees with the scientifically validated solutions needed to craft effective standards extended to also address cooperation and system-of-systems issues. SafeCOP brings clear benefits in terms of cross-domain certification practice and implementations of cooperating systems in all addressed areas: automotive, maritime, healthcare and robotics. The advantages include lower certification costs, increased trustworthiness of wireless communication, better management of increasing complexity, reduced effort for verification and validation, lower total system costs, shorter time to market and increased market share.
	1. Safety	✓	
	2. Connected car	✓	



ENABLE-S3 European Initiative to Enable Validation for Highly Automated Safe and Secure Systems Budget: 595,937.50 € (total eligible costs for GMV) Duration: 05/2016 - 04/2019 Programme: ECSEL http://www.ecsel-ju.eu	SRA lines covered by the project:		Description and objectives: ENABLE-S3 will pave the way for accelerated application of highly automated and autonomous systems in the mobility domains automotive, aerospace, rail and maritime as well as in the health care domain. Virtual testing, verification and coverage-oriented test selection methods will enable validation with reasonable efforts. The resulting validation framework will ensure Europeans Industry competitiveness in the global race of automated systems with an expected market potential of 60B€ in 2025. Participants: AVL List GmbH (Coordinator), Aalborg University, AIRBUS DEFENCE AND Space GmbH, AIT Austrian Institute of Technology GmbH, AVL DEUTSCHLAND, AVL SFR, BTC EMBEDDED SYSTEMS AG, Cavotec Germany GmbH, Creanex, Czech Technical University, DLR, DNDE, Dr. Steffan Datentechnik GmbH, DTU, EVI, FZI, GMV A&D, GMVIS SKYSOFT, POLITECHNIKA GDANSKA, Hella Aglaia Mobile Vision GmbH, IBM IRELAND LIMITED, IMINDS, INRIA, ISEP, ITI, IXION INDUSTRY AND AEROSPACE SL, JOHANNES KEPLER UNIVERSITÄT LINZ, JKU, LCM, Magillem Design Services, Magneti Marelli, MASER, MDAL SARL, Model Engineering Solutions GmbH, MAGNA STEYR Engineering, Nabto, NAVTOR AS, NM Robotic GmbH, NXP, OFFIS EV, PHILIPS MEDICAL SYSTEMS NEDERLAND, Rohde&Schwarz, REDEN, RENAULT SAS, Rugged tooling, Serva transport systems, SISW, Sky Watch, University of Southampton, SafeTRANS, TAS-E, TECNALIA, THALES, THALES AT, The Motor Insurance Repair Research Centre (Thatcham), Tieto, TME, TNO, TTControl, TTTECH COMPUTERTechnik AG, TU/e, TECHNISCHE UNIVERSITÄT DARMSTADT, TU GRAZ, TWT GMBH SCIENCE & INNOVATION, UCD, UNIVERSIDAD DE LAS PALMAS, University of Modena, UPM, Valeo Autoklimatizace k.s., VCDA, Vector Fabrics, VIC, VIF, VIREs, VTT TECHNICAL RESEARCH CENTRE OF FINLAND Results: In process. Project results will be used to propose standardized validation procedures for highly automated systems (ACPS). Some of the technical objectives addressed are: <ul style="list-style-type: none"> • Provision of a test and validation framework • Promotion of a new technique for testing of automated systems • Raising significantly the level of dependability of automated systems • Provision of a validation environment for rapid re-qualification, • Creation of an eco-system for the validation and verification of automated systems in the European industry. ENABLE-S3 is strongly industry-driven. Realistic and relevant industrial use-cases from smart mobility and smart health will define the requirements to be addressed and assess the benefits of the technological progress.
	1. Safety		
	2. Connected car	✓	



CONTRIBUTION TO IGS REAL-TIME (RTIGS) PROJECT Duration: 2007 - currently Programme: IGS http://www.igs.org/rtg http://magicgnss.gmv.com/	SRA lines covered by the project:		Description and objectives: GMV has been contributing to the IGS Real Time Project (RTIGS) since its beginning, with a solution based on its proprietary suite magicGNSS, which includes a GNSS POD package. Furthermore, GMV is the sole private company contributing as Analysis Centre (AC) to RTIGS and therefore being put to the test against the well-known IGS ACs which define the GNSS state-of-the-art. GMV contributes with a real-time solution, providing precise GPS and GLONASS orbits updated every 15 minutes and GPS and GLONASS clocks estimated every second with around 6-sec of latency. Participants: GMV Results: GMV's solution has typically around 2 cm RMS orbit accuracy and 0.06 ns sigma clock accuracy when compared with the IGS rapid products (IGR).
	1. Safety	✓	
	2. Connected car	✓	
Technical support for space based meteorological monitoring Duration: 1998 - 2016 Programme: EUMETSAT SAF	SRA lines covered by the project:		Description and objectives: Support to Spanish Meteorological Agency (AEMET) in the development, maintenance and operations of the EUMETSAT's Satellite Application Facility to support NowCasting and very-short range Forecasting (SAFNWC). The project is led by AEMET and focus in the development and provision of software packages for the operational generation of meteorological products obtained from MSG or other geostationary satellite data to provide nowcasting and very short-range forecasting. The deployment of the SAF is over the whole Europe. Participants: GMV Results: <ul style="list-style-type: none"> • Service to end-users to support operational activities in different markets through high resolution meteorological products related to clouds, precipitation, winds and thunderstorms. • Advanced driver assistance systems (ADAS). Evolution towards a more autonomous driving • New service platforms for connected car
	1. Safety	✓	
	2. Connected Car	✓	


OSIRIS (Open Services and network Infrastructure for Risk Management based on In-Situ sensors) Duration: 2006 - 2009 Programme: EC FP6	SRA lines covered by the project:		Description and objectives: It improved the efficiency of the overall environmental risk / crisis management by: 1/ designing and setting the basis for an in-situ heterogeneous sensors network infrastructure, 2/ studying all the possible in-situ sensors and their complementarity (including those based on satellites and unmanned aerial vehicles), and 3/ assessing the technological developments in three different experimental scenarios. The city monitoring scenario, in Valladolid, made use, inter alia, of near real-time air pollution based mobile sensors which were mounted in municipal buses fleet. GNSS based geo-positioned sensors data were fused (i.e. streets temperature, noise, pollution, etc.) and raise of early warning alarms, when needed, were performed by the automatic control center for citizens information. An accident provoked by dangerous substances transportation was simulated for demonstration purposes including the propagation/evolution of air contaminants considering the weather conditions. Participants: GMV, et al. Results: <ul style="list-style-type: none"> • Open and interoperable architecture for municipal monitoring air pollution in urban streets and supporting operations related to the environmental pollution emergency. • Security applications of cooperative systems (V2X) • New service platforms
	1. Safety	✓	
Security Managed Services for INCIBE and Red.es Budget: 750,000 € Duration: 01/2016 – 12/2017 Programa: Public tender	2. Connected Car	✓	Description and objectives: Provisioning 7x24 security managed services allowing for capabilities of detection, prevention and response against cyberattacks, incidents or intrusions which might occur in INCIBE and Red.es infrastructures. Participants: GMV Results: Deployment of needed security measures (tools, security Infrastructure) for providing security to INCIBE and Red.es against threats to which these organizations might be exposed to.
	1. Safety	✓	

Instituto de Investigación en Ingeniería de Aragón. University of Zaragoza			 Instituto Universitario de Investigación en Ingeniería de Aragón Universidad Zaragoza	 1542
Edificio I+D+i, St. Mariano Esquillor Zaragoza Tel: 0034 976 762 707 http://i3a.unizar.es/es	50018 Zaragoza Fax: 0034 976 762 043	Contact: Juan Ignacio Garcés Gregorio Director ngarces@unizar.es		
<p>▲ Description</p> <p>The I3A is a University Research Institute of the University of Zaragoza with 10 years of activity. Its strengths are the ability to bring together research on different aspects of engineering, outstanding ability to obtain funds from competitive calls and its privileged relationship with the productive environment. Since its inception, the I3A has grown both nationally and internationally, consolidating a shared vision between scientists and technicians and gaining recognition as a point of reference in many fields of engineering research.</p>				
<p>▲ Main activities and products</p> <p>They concentrate in this one area the lines of investigation of road safety that possess the support of the infrastructure of the laboratory of impact located in the technological park TECHNOPARK and of groups of robotics and perception as ROPERT wide experience in the autonomous navigation of vehicles.</p>				

▲ Related projects		
BIOADVANCE Advancing traffic safety through the investigation of human tolerance to impact Budget: 170,000 € Duration: 07/2012 - 06/2014 Programme: 7PM People http://cordis.europa.eu/result/rcn/157126_en.html	SRA lines covered by the project:	
	1. Safety	✓
	2. Connected car	
	Description and objectives: The BIO-ADVANCE project aims to develop and implement an ongoing program of research through trials with human corpses at the University of Zaragoza, while research into a complete characterization of the kinematics of the spine in purely frontal and oblique impacts. Participants: I3A (Francisco López Valdés) Results: The following lines of research developed contents in BIO-ADVANCE are summarized below: <ul style="list-style-type: none"> • Creating your own protocol for handling human tissues. • Staff TESSA to ensure proper management of human tissues, including ethics and personal protection procedures. • Building a preroom dedicated to the preparation of bodies and evaluation of the experiment results. • Update available instruments, including a system of 3D motion capture. • Realization of 19 mock tests using the THOR with three different types of restraints (seatbelts). One of the restrictions was a concept prototype, not in production yet. • Carrying four PMHS test to evaluate the performance of three different safety belts. • The publication of four papers in indexed journals. • Take part in five international conferences on automobile safety. • Outreach: interviews on radio and television, newspapers, meetings with students of engineering, tissue donor associations, etc ... 	
Titam ie Autonomous intelligent technologies for autonomous transport (interior, exterior). Budget: Confidential Duration: 2011 - 2013 Programme: CDTI	SRA lines covered by the project:	
	1. Safety	
	2. Connected car	✓
	Description and objectives: The project objective is the development of robust technologies for locating, mapping and autonomous navigation of mobile robots for transport. A real prototype will be built and the experimental validation will take place in an industry park in scenarios both indoors and outdoors Participants: ACCIONA INFRAESTRUCTURAS/GRUPO ROBERT I3A Results: A prototype has been built, being able to transport objects (indoor and outdoor)	

Instituto de Biomecánica (IBV)			 <div>INSTITUTO DE BIOMECAÁNICA DE VALENCIA</div>
Universidad Politécnica de Valencia – Edificio 9C Camino de Vera Tel: 0034 96 111 11 70 www.ibv.org	46022 Valencia Fax: 0034 96 387 91 69	Contact: José S. Solaz Head of Innovation. Automotive and Mass Transport Jose.solaz@ibv.upv.es	
▲ Description The Instituto de Biomecánica (IBV) is a technological center that studies the behavior of the human body and its interaction with products, environments and services. Founded in 1976, the Institute is currently coordinated under the agreement of the Valencian Institute of Business Competitiveness (IVACE) and the Universitat Politècnica de València (UPV). With the aim to improve competitiveness among the business sector, the IBV promotes people’s well-being through the combination of knowledge in areas such as biomechanics, ergonomics and emotional engineering, and its application to diverse sectors.			
▲ Main activities and products IBV asses companies that manufacture on board technology in the design and validation of the ADAS, detection of driver state (for example by means of cameras) and human machine interfaces. By means of heuristic analysis, measurement of psychophysiological parameters and analysis of the subjective response, the reliability of the active safety systems is determined. With that purpose, tests in bench, in driving simulator with the participation of users and trials under controlled situations in a closed track with volunteers and professional drivers. IBV also designs algorithms for the detection and interpretation of human behavior and physiological response, which can be implemented by the manufacturers of components in their products in order to improve the safety of the vehicles.			
▲ Related projects			
HARKEN Heart and respiration in-car embedded nonintrusive sensors Budget: 1,360,045 € Duration: 06/2012-05/2014 Programme: http://cordis.europa.eu/result/rcn/156259_en.html	SRA lines covered by the project:		Description and objectives: The HARKEN project goal is to create a physiological monitor integrated in the car. This system is in constant contact with the driver’s body through the car seat cover and the safety belt, and it monitors the physiological, mechanical activity related to respiration and the cardiac cycle. Redundant measures of vibrations and artefacts that may distort these signals are used to improve their quality by means of adaptive filters, programmed in a signal processing unit. Participants: BORGSTENA , FICOSA, PLUX, ALATEX, SENSINGTEX, IBV, University of Manchester, EII Results: System composed by a safety belt and a textile seat cover with capacity of detecting heart rate and breathing that also includes the electronics of amplification and adaptive filters.
	1. Safety		
	2. Connected car		


SOMNOADAS Development of a system of on-board cameras for the detection of driver drowsiness Budget: 815,148 € Duration: 11/2014 - 10/2015 Programme: CDTI	SRA lines covered by the project:		Description and objectives The Project has, as a main goal, the design and manufacturing of a contactless drowsiness detection system by means of a technology based on cameras that detect the involuntary movement of the driver provoked by breathing. The system has to be robust, adapted to the variety of subjects (type of clothing, body dimensions) and conditions that can affect (temperature and light inside the vehicle). Participants: FICOMIRRORS S.A., INTEKIO, IBV. Results: High resolution camera integrated in the cockpit, focused in the upper torso of the driver, and an algorithm for movement detection.
	1. Safety		
	2. Connected car		
PAY-PER-USE-SIM Pay per Use for a Sustainable Intelligent Mobility: Development of pay-per-use functionalities in a communicated vehicle and incorporation of the interface in the cockpit by means of new structural solutions Budget: 111,109 € Duration: 01/2013 - 12/2013 Programme: Programme IITT of IVACE. Cooperative RTD projects. http://www.ivace.es	SRA lines covered by the project:		Description and objectives: Pay-per-use SIM establishes, as main goal, the development of the pay-per-use function in an automobile and its physical integration in the cockpit. The main result of the project is a physical prototype of the module, together with the equipment to guarantee the communication with the payment infrastructure. Participants: AIMME, AIMPLAS, IBV, ITE, ITI Results: Prototype of cockpit module that incorporates a HMI that allows the execution of the pay-per-use function and includes the necessary elements for communicating with the infrastructure.
	1. Safety		
	2. Connected car		


IDIADA Automotive Technology S.A.			
PO Box 20 - L'Albornar Santa Oliva Tel: 0034 977 16 60 00 www.applusidiada.com	43710 Tarragona 0034 977 16 66 05	Contact: Álvaro Arrúe Project Manager ITS alvaro.arrue@idiada.com José Manuel Barrios Manager, Innovation josemanuel.barrios@idiada.com	
<p>▲ Description</p> <p>IDIADA Automotive Technology, S.A., as a global partner to the automotive industry, provides complete solutions for automotive development projects worldwide. IDIADA's Technical Centre is located 70 km south of Barcelona (Spain), having subsidiaries and branch offices in several European, American and Asian countries with a total work force of more than 1,800 employees worldwide in 20 countries. The core services IDIADA provides are: Engineering, Proving Ground and Homologation. Main fields of engineering activity are power train, emissions, noise & vibration, vehicle dynamics, electronics, fatigue & durability and active and passive safety.</p>			
<p>▲ Main activities and products</p> <p>IDIADA has experience in defining systematic methodology that unifies the criteria for evaluating and validating active safety systems. This means designing and performing evaluation tests under controlled conditions. The execution of these methodologies together with IDIADA's proving ground, give true potential to the development the testing and improvement of their clients systems and prototypes.</p> <p>IDIADA develops a major role under the frame of Euro NCAP, representing the Catalan Government in the Board of Directors and being the only laboratory fully accredited for executing all tests under the safety programme.</p> <p>Among the active safety engineering services provided by the company it must be emphasized:</p> <ul style="list-style-type: none">• Complete set of proving grounds and tools (differential GPS, driving robots) for all active safety functionalities development.• Complete set of laboratories for chassis systems development (kinematics and compliance test rig, brakes dynos, HiL and SiL benches for electronic chassis control systems validation).• Access to EMC laboratory as well as climatic chambers for vehicle and component certification.			

▲ Related projects

COMPANION COoperative dynamic forMation of Platoons for sAfe and eNergy-optImized gOods transportation Budget: 5.4 M € Duration: 01/2014-12/2016 Programme: FP7 www.companion-project.eu	SRA lines covered by the project:		Description and objectives: Development and implementation of an European wide control platform for the dynamic coordination of truck platoons. Participants: SCANIA CV AB, Cerezuela, IDIADA, KTH, OFFIS, S&T, Volkswagen Research. Results: <ul style="list-style-type: none">• Fault tolerant, scalable off-board decision-making system to determine the optimal coordination of platoons, under current infrastructure state, in order to improve the energy effectiveness and safety of road transportation systems.• Fault tolerant, scalable on-board system for coordinated heavy-duty platooning.• In-vehicle and coordination centre user interfaces to safely and effectively inform and interact with platooning drivers and transport planners.• Analysis of standardization and legislative gaps and the proposal of legal solutions and new technological standards to advance the large-scale adoption of platooning technologies.• Demonstration of platooning operations on European roads in multiple countries.
	1. Safety	✓	
	2. Connected car	✓	
	i-GAME Interoperable GCD C (Grand Cooperative Driving Challenge) AutoMation Experience. Budget: 3.7 M € Duration: 10/2013-09/2016 Programme: FP7 www.gcdc.net		SRA lines covered by the project:
1. Safety	✓		
2. Connected car	✓		

VRA Vehicle and Road Automation Budget: 1.7 M€ Duration: 07/2013 - 12/2016 Programme: FP7 www.vra-net.eu	SRA lines covered by the project:		Description and objectives: VRA – Vehicle and Road Automation is a support action funded by the European Union to create a collaboration network of experts and stakeholders working on deployment of automated vehicles and its related infrastructure. IDIADA is leading the Roadworthiness Testing Working Group which promotes and searches EU-US-Japan international collaboration. Participants: ERTICO, Abertis Autopistas, DENSO, CTAG, CTL (UNIROMA), VOLVO, DLR, Universität Passau, ICCS, IDIADA, IFSTTAR, IKA, Innia, VEDECOM, University of Leeds, MICHELIN, Okan Üniversitesi, RACC, TECNALIA, TRAMAN 21, TNO, TRL, VISLAB, ICOOR, University of Chalmers, Vialis, ADAS Management Consulting, TU Delft, Jaguar-Land Rover, Mouchel. Results: <ul style="list-style-type: none"> Active European network of Vehicle and Road Automation experts and stakeholders Contribution to EU-US-Japan international collaboration on Vehicle and Road Automation. Identification of deployment needs for the different domains of Vehicle and Road Automation. Innovative set of dissemination tools for the European Research.
	1. Safety	✓	
	2. Connected car	✓	
SARTRE SAfe Road TRains for the Environment Budget: 6.4 M € Duration: 09/2009 - 09/2012 Programme: FP7 www.sartre-project.eu	SRA lines covered by the project:		Description and objectives: Develop strategies and technologies to allow vehicle platoons to operate on normal public highways with significant environmental, safety and comfort benefits. Participants: Ricardo UK, Tecnalia, IKA, IDIADA, SP, Volvo Car, Volvo Technology Results: <ul style="list-style-type: none"> Platooning system. Systems facilitating the safe adoption of road trains on un-modified public highways with interaction with other traffic. Demonstrators.
	1. Safety	✓	
	2. Connected car	✓	


PROSPECT PROactive Safety for Pedestrians and Cyclists Budget: 6.9 M € Duration: 05/2015 - 05/2018 Programme: H2020 www.prospect-project.eu	SRA lines covered by the project:		Description and objectives: Development of ADAS systems for the protection of VRUs. Development of test and assessment methods for evaluating the protection of VRUs, suitable for regulatory testing and consumer assessment. Participants: IDIADA, Audi, BMW, Daimler, TME, Volvo Cars, Bosch, Continental, BME, BAST, Chalmers, IFSTTAR, TNO, VTI, University of Nottingham, University of Amsterdam, 4active systems. Results: <ul style="list-style-type: none"> • Better understanding of relevant VRU accident scenarios. • Improved VRU sensing and situational analysis. • Advanced HMI and vehicle control strategies. • Four vehicle demonstrators, one transportable mobile driving simulator and realistic VRU dummy specimen provided by leading EU industry partners for validation and effectiveness analysis. • Testing in realistic traffic scenarios, system performance assessment of the novel VRU active safety functions and user acceptance study.
	1. Safety		
	2. Connected car		




CEIT-IK4			 IK4 Research Alliance
Pº de Manuel Lardizabal 15 San Sebastián Tel: 0034 943 21 28 00 www.ceit.es	20018 Gipuzkoa	Contact: Alfonso Brazalez Director of ITS Group. abrazalez@ceit.es	
<p>▲ Description</p> <p>Asociación Centro Tecnológico Ceit-IK4 (“Ceit-IK4”) is a private multidisciplinary non-profit RTO closely connected to TECNUN, the Faculty of Engineering of the University of Navarra (Spain). Its mission is to provide the industry with services through the development of technical research projects and to form young researchers and PhD students. Ceit-IK4 promotes excellence in applied research by publishing non confidential results and participating in scientific and technical forums. This RTO also has a comprehensive doctoral teaching program in the industrial area. Ceit-IK4 understands all aspects of the client’s position and therefore can seek out the best possible collaborations across the industry. Ceit-IK4 promotes high added value solutions through research projects and by training young researchers within a commercially productive framework. Ceit-IK4 has a staff of 249 employees and 51 PhD students and an annual budget over 15 M€. Ceit-IK4 consists of three vertical divisions (Materials and Manufacturing, Transport and Energy, Water and Health) and a fourth additional horizontal division (ICT).</p> <p>The IK4 Alliance was formed in 2005 in line with a federal model, whereby its members share strategies and combine capacities without giving up their sovereignty. Through a shared strategy, the sum of the capacities of the nine RTO’s provides the alliance with the flexibility it needs to adapt to the characteristics of any company. Today, IK4 is a benchmark on the European scene and is among the continent's main private, scientific and technological corporations. Attention should be drawn to IK4's leading role in the European Union's 7th Framework Programme, in which it has participated in over 200 research projects and led 63 of them.</p>			
<p>▲ Main activities and products</p> <ul style="list-style-type: none">• Design of Safety-critical electronic devices for the automotive sector.• Digital design methodologies to fulfill the specifications of the automotive sector.• Implementation of digital processing algorithms in reconfigurable embedded systems for electric vehicles.• Implementation in FPGAs, microprocessors and embedded systems for driver assistance systems.• Schematic design and PCB layout for Safety-critical electronic devices.• Design of low-power and low-cost integrated circuits.• Design of test platforms to validate automotive electronic prototypes• Real time HW and SW• In vehicle communications			

▲ Related projects		
IAB The Irizar Assisted Bus Budget: 6,6 M € Duration: 06/2013 - 12/2015	SRA lines covered by the project:	
	1. Safety	✓
	2. Connected car	
	Description and objectives: The main objective of the project is to develop an assisted bus equipped with new sensing technology able to monitor both the environment of the vehicle and the driver. Moreover, new algorithms are proposed to infer the context of the vehicle in real time and, thus, assist the driver in case of risky situations. Participants: Irizar, Datik, Transportes Pesa, Vicomtech-IK4, CEIT-IK4 Results: <ul style="list-style-type: none"> • Line departure warning system • Driver drowsiness detection system 	
REDAS Reconfigurable Embedded Driver Assistance Systems Budget: 83,500 € Duration: 01/2014 - 12/2016 Programme: Retos- MINECO	SRA lines covered by the project:	
	1. Safety	✓
	2. Connected car	
	Description and objectives: The state of the art of advance driving assistance systems (ADAS) has experienced a remarkable progress over the past decade. This evolution has resulted in an increasing number of prototypes circulating in roads and urban areas, with a wide range of ADAS modules integrated inside. However, in general, there is a big difference between the experimental equipment used for image processing in these prototypes and the hardware that can be integrated in a final vehicle, due to cost and power consumption constraints. Thus, the main objective of this project is to research new strategies, both at algorithmic and at hardware implementation level, to adapt these image processing algorithms into a real device that can be accepted by the automotive industry. Participants: CEIT-IK4 Results: <ul style="list-style-type: none"> • A reconfigurable embedded vision system for advance driver assistance 	


HeERO Harmonized eCall European Pilot Budget: 10 M € Duration: 01/2011 - 12/2014 Programme: Retos - FP7 http://www.heero-pilot.eu/view/en/home.html	SRA lines covered by the project:		Description and objectives: HeERO is an international pilot project preparing the general roll-out of the EU-wide seamless eCall service. In running national and cross-border pilot projects, HeERO will prove that eCall is operational and ready for becoming a reality for all European citizens. HeERO's consortium includes 8 EU Member States (Czech Republic, Finland, Germany, Greece, Italy, the Netherlands, Romania and Sweden) and Croatia. In cooperation with Croatia, Finland and Romania, the Russian Federation will demonstrate in cross-border trials that eCall and its ERA-GLONASS emergency call service can interplay without any friction. Participants: CEIT-IK4 Results: <ul style="list-style-type: none"> • A reconfigurable embedded vision system for advance driver assistance
	1. Safety	✓	
I_HeERO Infrastructure Harmonised eCall European Pilot Budget: 30 M € Duration: 01/2015 - 12/2017 Programme: Retos- CEF http://iheero.eu/	SRA lines covered by the project:		Description and objectives: <ul style="list-style-type: none"> • Prepare the necessary PSAP infrastructure • Boost Member States investment in the PSAP infrastructure and interoperability of service • Prepare for deployment for eCall for HGV (including Dangerous Goods), Buses and Coaches • Prepare eCall for Powered two wheeled vehicles • Define and then perform PSAP Conformity Assessments • Look at management of data and next generation 112 • Provide Associate Partnership Participants: CEIT-IK4 Results: Infrastructure for eCall
	1. Safety	✓	
	2. Connected car	✓	

EBSF_2 Infrastructure Harmonised eCall European Pilot I_HeERO Budget: 30 M € Duration: 05/2015 - 04/2018 Programme: Retos- H2020 http://iheero.eu/	SRA lines covered by the project:		Description and objectives: The European Bus System of the Future 2 (EBSF_2) project is led by UITP and co-funded by the European Union's Horizon 2020 research and innovation programme. To produce breakthrough changes in the existing bus scenario, the project consortium has identified six key research areas with the highest potential to impact cost effectiveness as well as users' acceptance of buses, namely: <ul style="list-style-type: none"> • Energy management strategy and auxiliaries • Green driver assistance systems • Vehicle design • IT Standard introduction in existing fleets • Intelligent garage and predictive maintenance • Interface between the bus and urban infrastructures Participants: CEIT-IK4 Results: Technological innovations will be tested in 12 European cities.
	1. Safety	✓	
	2. Connected car	✓	


IMDEA Energy			
Avenida Ramón de la Sagra, 3 Móstoles Tel: 0034 917371120 www.energy.imdea.org	28935 Madrid, Spain Fax: 0034 917371140	Contact: Félix Marín Andrés Responsible for Development and Technology Transfer felix.marin@imdea.org	
<p>▲ Description</p> <p>IMDEA Energy Institute was created in 2006 by the Regional Government of Madrid “Comunidad de Madrid” to promote and carry out R&D activities for the development of a sustainable energy system with special emphasis on renewable and clean energy technologies.</p> <p>IMDEA Energy is strongly committed to close collaboration with industry that enables effective knowledge transfer of R&D of advanced energy technologies to the productive sector. IMDEA Energy also seeks joint efforts with other technology research centers and universities to promote excellence in research on energy issues.</p>			
<p>▲ Main activities and products</p> <p>Advanced filters to selectively remove VOC. Catalytical systems to convert NOx.</p>			


Institut de Robòtica e Informàtica Industrial CSIC-UPC			 Institut de Robòtica i Informàtica Industrial   UNIVERSITAT POLITÈCNICA DE CATALUNYA BARCELONATECH
St. Llorens Artigas 4-6 Barcelona Tel: +34 93 4015751 www.iri.upc.edu	08028 Barcelona Fax: +34 934015750	Contact: Juan Andrade Cetto Director chetto@iri.upc.edu	
<p>▲ Description</p> <p>The Institut de Robòtica i Informàtica Industrial (IRI, www.iri.upc.edu) is a Joint University Research Institute participated by the Spanish Council for Scientific Research (CSIC) and the Technical University of Catalonia (UPC) that conducts basic and applied research in human-centered robotics and automatic control. The institute, founded in 1995, is a key player in the Spanish robotics and automatic control scenes, and a valued participant in a large number of international collaborations.</p> <p>The Institute's research activities are organized in four research lines: Kinematics and Robot Design, Mobile Robotics and Intelligent Systems, Perception and Manipulation, and Automatic Control.</p>			
<p>▲ Main activities and products</p> <p>Its mobile robotics group, led by Prof. Alberto Sanfeliu coordinated an FP6 project to create robots able to navigate and interact with people in urban pedestrian areas. He has also led several national research projects aimed at robot navigation and human transportation on urban pedestrian areas. Juan Andrade leads the contribution of IRI on two EU projects for the autonomous driving of trucks and other heavy vehicles for the transportation of cargo containers in ports and terminals. With these projects, the group has initiated a line of research on autonomous driving which has catapulted research opportunities in the automotive sector currently being explored.</p>			

▲ Related projects		
Cargo-ANTs Cargo handling by Automated Next generation Transportation Systems for ports and terminals Budget: 2.49M € Total (333 K € IRI CSIC) Duration: 09/2013 - 08/2016 Programme: FP7-SST-2013-RTD-1-605598 http://www.cargo-ants.eu/	SRA lines covered by the project:	
	1. Safety	✓
	2. Connected car	✓
	Description and objectives: Cargo-ANTs aims to create smart Automated Guided Vehicles (AGVs) and Automated Trucks (ATs) that can co-operate in shared workspaces for efficient and safe freight transportation in main ports and freight terminals. The specific objectives are: <ul style="list-style-type: none"> • Increase performance and throughput of freight transportation in main ports and freight terminals and maintain a high level of safety. • Develop an automated shared work yard for smart AGVs and ATs. • Develop and demonstrate a robust grid-independent positioning system and an environmental perception system that oversees safety of operations. • Develop and demonstrate planning, decision, control and safety strategies for Automated Next generation Transportation systems (ANTs), i.e. smart AGVs and ATs. Participants: TNO Netherlands, IRI CSIC, Halmstad Univ, ICT Automatisering, Volvo. Results: Autonomous driving of trucks and AGVs for the handling of cargo containers in ports and terminals. IRI's contribution: Robust Simultaneous localization and mapping of trucks and AGVs in these scenarios. Object detection, and tracking for situation awareness and risk assessment.	
LOGIMATIC Tight integration of EGNSS and on-board sensors for port vehicle automation Budget: 2 M € Total (328 K € IRI CSIC) Duration: 01/2016 - 12/2018 Programme: H2020-Galileo-2015-1-687534	SRA lines covered by the project:	
	1. Safety	✓
	2. Connected car	✓
	Description and objectives: <ul style="list-style-type: none"> • To develop an advanced automated navigation solution based on the integration of Global Navigation Satellite Systems (GNSS) and sensors onboard the SC vehicles. • To implement a GIS-based control module compatible with existing Terminal Operating Systems (TOS) for optimized global (yard level) route planning and fleet management. • To implement security mechanism in order to detect and avoid spoofing and/or jamming attacks • To assess the impact of application of such automated approach at large scale through simulation • To integrate, validate and demonstrate the proposed solution in a real port yard Participants: EURECAT Spain, TREDIT Greece, CERTH Greece, IRI CSIC Spain, D'Appolonia Italy, Emerson Spain, Aenor Spain. Results: In process.	

ARAGON INSTITUTE OF TECHNOLOGY - ITAINNOVA			
St. María de Luna, 7-8 Zaragoza Tel: 0034 976 01 00 00 www.itainnova.es	50018 Zaragoza Fax: 0034 976 01 18 88	Contact: Joaquín Gómez Marketing and Business Development Unit - Automotive jgomez@itainnova.es	
▲ Description ITAINNOVA is the Aragon Institute of Technology, a public Technology Centre, with a team of more than 200 multidisciplinary professionals and singular advanced equipment, that enable it to develop R&D&i projects for new products and/or processes: design of components and systems (advanced characterisation and modelling of materials behaviour, intensive application of computational simulation for functional analysis of components and systems, development of new materials), experimental validation (test laboratories for structural integrity, durability/fatigue, NVH, environmental tests, EMC; specific test benches), process/operations engineering (consultancy on improvement of production and logistics processes, robotics and automation, analysis and visualization of information).			
▲ Main activities and products Design and development of new components and systems for active safety (braking and steering systems): <ul style="list-style-type: none">• Mechatronic systems design for keeping comfort, safety and driveability: virtual prototyping and application of multidomain and multiphysic modelling for efficiency, robustness, size, power-class, weight and cost in new electrified components and systems.• Analysis of NVH effects and control development for active vibration control.• Structural integrity and fatigue behaviour considering complex time-history loads.• Functional validation: electromagnetic compatibility, vibrations resistance and product functioning in aggressive environments. Evaluation procedures and tests.• Design and integration of high dynamic and/or precision test stations including design of algorithms and control software and development of advanced electronic systems for monitoring, automation and communications Autonomous driving and connected vehicle <ul style="list-style-type: none">• Development of vehicle mathematical model (complete vehicle dynamics) and state estimators.• Path planning. Vehicle control and trajectory tracking.• Cooperative systems for efficient traffic management and safety (V2X): embedded systems, real-time communications and software. Usage of de decisional systems in advanced traveller information system, advanced traffic management systems, emergency management system and travel time prediction.• Facial and state of mind recognition. Multimedia interfaces.			



▲ Related projects		
EVE Innovative Engineering of Ground Vehicles with Integrated Active Chassis Systems Budget: 571,500 € Duration: 01/2015 - 12/2017 Programme: H2020-MSCA-RISE-2014 Research and Innovation Staff Exchange (RISE) http://www.eve-project.eu/	SRA lines covered by the project:	
	1. Safety	✓
	2. Connected car	
	Description and objectives: Development of (i) experimental tyre database that can be used in the design of new chassis control systems and subjected to inclusion into Horizon 2020 pilot on Open Research Data, (ii) advanced models of ground vehicles and automotive subsystems for real-time applications, and (iii) novel integrated chassis control methods. Participants: TECHNISCHE UNIVERSITAET ILMENAU, TENNECO AUTOMOTIVE EUROPE BVBA, INSTITUTO TECNOLÓGICO DE ARAGON, TECHNISCHE UNIVERSITEIT DELFT, DSPACE DIGITAL SIGNAL PROCESSING AND CONTROL ENGINEERING GMBH, SKF BV, CHALMERS TEKNISKA HOEGSKOLA AB, AKTIEBOLAGET SKF Results: <ul style="list-style-type: none"> • Experimental tyre database that can be used in the design of new chassis control systems and subjected to inclusion into Horizon 2020 pilot on Open Research Data • Advanced models of ground vehicles and automotive subsystems for real-time application • Novel integrated chassis control methods 	
RAMPAWARE Development of a robust cost-effective collision awareness and avoidance system for ground support equipment operating on the airport ramp Budget: 1,236,896 € Duration: 03/2013 - 08/2015 Programme: FP7-SME-2012 Research for the benefit of specific groups http://rampaware.eu/	SRA lines covered by the project:	
	1. Safety	
	2. Connected car	✓
	Description and objectives: Development of a novel system for sensing the location of the vehicle in relation to an aircraft and avoiding collisions by the correct brake control. This system comprises: short range radar with vehicle orientation detection, a GSE positional tracking system with high accuracy and the vehicle control unit. Participants: MALLAGHAN ENGINEERING LIMITED, NAVTECH RADAR LIMITED, WLB LIMITED, NUEVAS SOLUCIONES VIRTUALES SL, AER LINGUS LIMITED, THE UK INTELLIGENT SYSTEMS RESEARCH INSTITUTE LIMITED, INSTITUTO TECNOLÓGICO DE ARAGON, INNORA PROIGMENA TECHNOLOGIKA SYSTIMATA KAI YPIRESIES AE Results: <ul style="list-style-type: none"> • Short range radar with vehicle orientation detection • GSE positional tracking system with high accuracy • Vehicle control unit. 	


eVectooreC Electric Vehicle Control of Individual Wheel Torque for On- and Off- Road Conditions Budget: 3.094.997 € Duration: 01/09/2011 - 01/09/2014 Programme: FP7-2011-ICT-GC Small or Medium Scale Focused Research Projects (STREP) http://www.e-vectoorec.eu/	SRA lines covered by the project:		Description and objectives: Individual control of the electric motor torques of fully electric vehicles to enhance safety, comfort and fun-to-drive in both on- and off-road driving conditions. To do that: development and demonstration of yaw rate and sideslip angle control algorithms, development and demonstration of novel strategies for the torque modulation. Participants: UNIVERSITY OF SURREY, KOMPETENZZENTRUM • DAS VIRTUELLE FAHRZEUG, FORSCHUNGSGESELLSCHAFT MBH, FLANDERS' DRIVE CVBA-SO , INVERTO NV, SKODA AUTO A.S., TECHNISCHE UNIVERSITAET ILMENAU, LUCAS VARITY GMBH, INSTITUTO TECNOLÓGICO DE ARAGON , FUNDACION CIDAUT, LAND ROVER, JAGUAR LAND ROVER LIMITED Results: <ul style="list-style-type: none"> • Yaw rate and sideslip angle control algorithms. • Novel strategies for the torque modulation to enhance brake energy recuperation, Anti lock Brake function and Traction Control function • EMC characterization
	1. Safety		
	2. Connected car		

ITENE –PACKAGING, TRANSPORT AND LOGISTICS RESEARCH CENTER			
Albert Einstein, 1 Paterna Tel: +34 961 820 000 www.itene.com	46980 Valencia Fax: 961 820 001	Contact: Emilio González Viosca Head of R&D in Logistics and Transport egonzalez@itene.com	
<p>▲ Description</p> <p>Packaging research is one of the main fields where ITENE is offering shippers and logistics companies cost reduction in the distribution just acting in the packaging design and materials. More than 100 shippers have used our transport simulation center to reproduce hazards and warehousing and transport conditions in large routes, in order to make the appropriate choice in the packing system (primary, grouping, pallet mosaic). Regarding automated vehicles, research and development of new packaging adapted to a more autonomous driving could involve important reduction on cost materials for load protection.</p>			
<p>▲ Main activities and products</p> <ul style="list-style-type: none">• Leverage the know-how and resources in transport simulation to program automated driving styles depending on the load, protection and risk level• Monitoring of loads in order to guarantee security in autonomous vehicles for perishable, valuable cargo, etc.• Study the impact on packaging: design, protection, communication, in the case of loads in autonomous vehicles• Our contact with the transport sector can allow us to work in the areas of technology assessment and rate the different degrees of autonomy of the vehicles, supporting companies during testing of technologies.• Participate in pilots for comparative performance / impact autonomous and non-autonomous vehicle, leveraging our expertise in FREVUE or PROEBIKE EU projects• Development of capturing and sending parameters from driving vehicles in real-time or historical data in order to evaluate and compare performance with autonomous vehicles.• Provide tools and studies for environmental assessment, LCA, carbon footprint on the Demonstration Projects			


▲ Related projects

FREVUE Freight Electric Vehicles in Urban Europe Budget: 14,251,642 € Duration: 2013-2017 Programme: 7 FP http://frevue.eu/	SRA lines covered by the project:		Description and objectives: Eight of Europe's largest cities, will demonstrate that electric vehicles operating "last mile" freight movements in urban centres can offer significant and achievable decarbonisation of the European transport system. Demonstrators will be deployed in Amsterdam, Lisbon, London, Madrid, Milan, Oslo, Rotterdam and Stockholm. The demonstrators have been designed to ensure FREVUE covers the breadth of urban freight applications which occur across Europe. Participants: Westminster City Council, City of Amsterdam, City of Rotterdam, Stockholm, Oslo, Madrid City Council, Lisbon, Milan, Heineken, TNT, UPS, SEUR, CTT, Bring Express, Leche Pascual, UKPN, Fortum, ARUP, Renault , Smith EV, Nissan, ITENE, Imperial College, SINTEF, TNO, HyER , Polis, Swedish Transport Administration, ATOS, City of Lisbon Results: A fleet management solution developed by ITENE (ON-FLEET) adapted for electric fleet. This internet subscription-based solution allows transport companies to track the fleet location and monitoring of key indicators (battery consumption, speed, km ...), helping traffic manager to identify and improve driving behavior to optimize energy consumption and costs.
	1. Safety		
	2. Connected car	✓	

Ixion Industry & Aerospace SL			
St. Julián Camarillo 21B Madrid Tel: 0034 91 440 18 33 www.ixion.es	28037 Madrid Fax: 0034 91 304 54 10	Contact: Jorge Villagra Head of Automotive Systems Engineering jvillagra@ixion.es	
<p>▲ Description</p> <p>IXION is a highly innovative SME that develops automation solutions and assimilates the most advanced and efficient technologies. Our products are directed to the industrial sector, also linked with robotics and unmanned-vehicle solutions.</p> <p>Our aim is to provide industries and organizations with systems that will allow them to incorporate the advances of the newest technologies in an easy way. As a result, they will increase their efficiency and safety, and will also reduce costs and risks.</p>			
<p>▲ Main activities and products</p> <p>IXION actively works to have a highly configurable automotive qualified embedded system for the ADAS and Highly Automated Driving (Levels 2-4) markets. Co-design techniques will be used within an easy-to-use SW tool that uniquely addresses the challenge of an intelligently fusion of heterogeneous information from a number of close-to-production sensors.</p> <p>Localization, perception, situation understanding and risk assessment IP blocks will be combined under a probabilistic and sensor-agnostic setting to produce optimized functionalities, highly tailorable to the customer’s needs and constraints.</p>			
<p>▲ Related projects</p>			
e-Awake New Generation ADAS for Enhanced Driving Experience (Phase I) Budget: 50.000€ Duration: 07/2015 - 12/2015 Programme: SME Instrument (IT-1-2015-1)	SRA lines covered by the project:		Description and objectives: The overall goal of the project is to integrate, test, standardize and industrialize a high performance embedded system that will allow vehicle integrators to easily design and tailor their solutions to the challenging new trends and demands in ADAS and HAD markets. e-Awake will rely on in-house developed algorithms for ADAS and HW/SW co-design methods under a new paradigm, where instead of several dedicated chips, a single device supports a homogeneous software-centric architecture with optimal hardware and software partitioning for functional acceleration Participants: IXION Results: The ongoing activities for the feasibility study carried out during this Phase I aim at <ul style="list-style-type: none">Reducing uncertainty in hypothesis formulation with a market researchDeepening in risks for Standardization compliance through a consistent technical feasibility studyExploring the IPR of the proposed solution to properly define the targets/stakeholders
	1. Safety		
	2. Connected car		

3CCAR Integrated Components for Complexity Control in affordable electrified cars Budget: 684.875€ Duration: 6/2015-5/2018 Programme: EU ECSEL (ECSEL-01-2014) www.3ccar.eu	SRA lines covered by the project:		Description and objectives: <p>The 3Ccar project will provide highly integrated ECS Components for Complexity Control in thereby affordable electrified cars. The new semiconductors for Complexity management will offer the next level of energy efficiency in transportation systems. 3Ccar's impact is maximizing a pragmatic strategy: use semiconductor technology innovations to manage functionality & complexity increase. This leads also to cheaper, efficient, robust, comfortable, reliable and usable automotive systems. This strengthens Europe as a whole (OEM, Tier1, Semiconductor) generating economic growth and new jobs in Europe. The impact of 3Ccar is driven vertically by innovations and horizontally enabling growth and deployment in the industry based on what we see as European Values.</p> Participants: 50 partners of 14 different countries (4 OEM, 10 Tier 1, 22 Tier 2, 14 academic partners). Representative partners: Daimler, BMW, FICOSA, Infineon, NXP, ST, AVL
	1. Safety		
	2. Connected car		Results: An ADAS demonstrator will be placed on a real instrumented vehicle in order to show the effectiveness of the designed model-based workflow and the intelligent assistant able to significantly enhance driver awareness in urban scenarios. The system to be showcased aims to properly integrate sensors and MPSoCs computing platforms (CPU+FPGA) able to automatically identify the environment layout, analyse the driving context, perceive the presence of potentially dangerous agents and estimate its evolution, using last generation occupancy grid-based Bayesian methods for objects detection, identification and tracking in a multi-sensor setting.

EMC2 Embedded multi-core systems for mixed criticality applications in dynamic and changeable real-time environments Presupuesto: 1.010.343 € Duración: 4/2014-3/2017 Programa: EU ARTEMIS (SP1-JTI-ARTEMIS-2013-AIPP5) www.artemis-emc2.eu	Líneas API cubiertas por el proyecto:		Description and objectives: EMC ² finds solutions for dynamic adaptability in open systems, provides handling of mixed criticality applications under real-time conditions, scalability and utmost flexibility, full scale deployment and management of integrated tool chains, through the entire lifecycle. The objective of EMC ² is to establish Multi-Core technology in all relevant Embedded Systems domains, focusing special attention to the automotive field. Participants: 99 partners from 19 countries covering the whole value chain of embedded systems market. Representative partners: Volvo, BMW, Fiat, Denso, TomTom, AVL. Results: IXION is leading the Highly Automotive use Case within the automotive Living Lab. We are investigating, implementing and evaluating a system architecture that best exploits the potential of existing technologies around highly automated driving. To that end, the EMC2 architecture and tools enable the scheduling of time-critical and less time-critical high-performance functionalities on the same system, which will be tested in real driving scenarios. A urban commuting scenario has been identified, where safety for driver/passengers and predictability for other road users can be guaranteed. Both simulation and real-life experiments are under preparation to show the potential of multi-core new service oriented architectures in the context of highly automated and connected driving.
	1. Safety	✓	
	2. Connected car		



SICE			
St. Sepúlveda, 6 Alcobendas Tel.: (+34) 91 623 22 00 www.sice.com	28108 MADRID Fax: (+34) 91 623 22 01	Contact: Tomás Paadín Manager I+D tpaadin@sice.com	
<p>▲ Description</p> <p>SICE is a systems integration technology company dedicated to addressing and resolving market needs. Its key value lies in the technological know-how and professional experience of its more than 2500 employees, along with almost 100 years in the industry.</p> <p>With a presence in 49 countries across 5 continents, SICE has the capacity to work on all phases of a project, from design to operation. This knowledge, along with a consolidated group of products and a wide range of services has allowed SICE to position itself as an international benchmark for the development, construction, maintenance and operation of systems in different types of infrastructure. SICE is one of the main players in the smart cities market and ITS industry.</p>			
<p>▲ Main activities and products</p> <ul style="list-style-type: none">• Compatible communication infrastructures that allow vehicle-infrastructure (V2I and I2V). Deployment of new services that help route decisions of drivers on the basis of geolocation systems (GNSS-EGNOS / Galileo), wireless communications networks (under CALM) and information exchange between vehicle and infrastructure• Connected intersection by pedestrian application to improve road safety (I2P, P2I / I2V)• IoT devices as data sources for safety scenarios• Public transport priority through standardized communication under MAP / SPAT protocol			

▲ Related projects

FOTSIS European Field Operational Test on Safe, Intelligent and Sustainable Road Operation Budget: 13,800,000 € Duration: 04/2011-03/2015 Programme: FP7 www.fotsis.com	SRA lines covered by the project:		Description and objectives: The FOTSis Project is the large-scale field testing of the road infrastructure's capability to incorporate the new cooperative systems technology, facilitating the exchange of information between vehicles and the infrastructure to improve road safety and traffic management. Participants: OHL Concesiones, Iridium, Planestrada, Marestrada, Nea Odos, SICE, Indra, ACB Systems, GMVIS Skysoft, Transver, Terna Energy, GMV Sistemas, France Telecom, Optimus, Universidad Politécnica de Madrid, CERTH, Aalto University Foundation, Universidad de Murcia, Federation International de l'automobile, European Union Road Federation, ASECAP, ASM Market Research and Analysis Centre Results: Seven close-to-market services tested (Emergency Management, Safety Incident Management, Intelligent Congestion Control, Dynamic Route Planning, Special Vehicle Tracking, Advanced Enforcement and Infrastructure Safety Assessment) in four separate test communities in Spain, Portugal, Germany and Greece and conclusions concerning the market potential. The services include I2V communication, nomadic devices applications, OBUs development.
	1. Safety	✓	
	2. Connected car	✓	


VRUITS IMPROVING THE SAFETY AND MOBILITY OF VULNERABLE ROAD USERS THROUGH ITS APPLICATIONS Budget: 4,143,667.00 € Duration: 04/13-04/16 Programme: FP7 www.vruits.eu	SRA lines covered by the project:		Description and objectives: <ul style="list-style-type: none"> Assess societal impacts of selected ITS, and provide recommendations for policy and industry regarding ITS in order to improve the safety and mobility of VRUs; Provide evidence-based recommended practices on how VRU can be integrated in Intelligent Transport Systems and on how HMI designs can be adapted to meet the needs of VRUs, and test these recommendations in field trials. Participants: VTT Technical Research Centre of Finland (FI), ECORYS (NL), FACTUM (AT), Luleå Tekniska Universitet (SE), CIDAUT (ES), SICE (ES), POLIS (BE), Loughborough University (UK), KITE Solutions (IT), TNO (NL), NXP (NL), PEEK traffic(NL) Results: VRUITS recommends ITS meeting the needs of VRUs. Ex-ante and ex-post assessments form input to these recommendations. Assessment methodologies have been modified to account for specific user behavior of VRUs. Specifications for ITS applications have been developed, culled from focus group assessments per VRU group. VRUITS recommended best practices to address HMI development for VRUs. Field trials in the Netherlands and Spain for a select number of applications have been taken place.
	1. Safety	✓	
	2. Connected car	✓	
HeERO 2 Harmonised eCall European Pilot Budget: 6,000,000 € Duration: 01/13-12/14 Programme: CIP – ICT-PSP www.heero-pilot.eu	SRA lines covered by the project:		Description and objectives: HeERO addresses the pan-European in-vehicle emergency call service "eCall" based on 112, the common European Emergency number. For three years (January 2011 to December 2013), the nine European countries forming the HeERO 1 consortium (Croatia, Czech Republic, Finland, Germany, Greece, Italy, The Netherlands, Romania and Sweden) carried out the start-up of an interoperable and harmonised in-vehicle emergency call system. In the second phase of the HeERO project (HeERO 2) 6 new countries (namely Belgium, Bulgaria, Denmark, Luxembourg, Spain and Turkey) joined the other 9 pilot sites of HeERO 1. Participants: In HeERO 2: ERTICO, OECON, TEAMNET, NavCert, EENA Belgium, ICOOR, FIA, ISMB, ITSBE, ASTRID, MOBISTAR, NXP, TESTRONIC, TU Sofia, DGT, Telefonica, Ericsson, GMV, CTAG, CARTIF, FICOSA, SICE, RACC, NZI, CEIT, DENSO, DEKRA Results: The HeERO consortium has tested and validated in real conditions pilots the common European eCall standards defined and approved by the European Standardisation Bodies
	1. Safety	✓	
	2. Connected car	✓	



MOVEUS ICT CLOUD-BASED PLATFORM AND MOBILITY SERVICES: AVAILABLE, UNIVERSAL AND SAFE FOR ALL USERS Budget: 4,637,056 € Duration: 10/2013 - 09/2016 Programme: FP7 http://www.moveus-project.eu/	SRA lines covered by the project:		Description and objectives: The main goal of the MoveUs project is to design, implement, pilot, evaluate, disseminate and exploit a number of novel ICT tools for smart mobility in the context of smart cities, directly addressing real users' needs while promoting a habit-change in their daily lives. Participants: ATOS Spain SA, Sociedad Iberica de Construcciones (SICE), TECNALIA, Quaeryon SRL, Empresa municipal de Transportes de Madrid SA (EMT), Ayuntamiento de Madrid, Comune di Genova, TTY-Saatio (University of Tampere), Softeco SISMAT SRL, Tampereen Kaupunki. Results: Pilot including priority for public transport, using standardized communication under MAP / SPAT protocol and based on a cloud-based platform.
	1. Safety		
	2. Connected car	✓	

Fundación Tecnalia Research & Innovation			
Parque Científico y Tecnológico de Gipuzkoa - Mikeletegi Pasalekua, 2 Donostia-San Sebastian Tel: +34 902 76 00 00 www.tecnalia.com	E-20009 Gipuzkoa	Contact: Jesús Murgoitio Larrauri Project Director in Automated Driving Area jesus.murgoitio@tecnalia.com	
▲ Description Fundación Tecnalia Research & Innovation (www.tecnalia.com) is the largest private Research & Development centre in Spain and one of the leading ones in Europe, with a staff of over 1,400 people. Its mission is to transform knowledge into GDP, improving people's quality of life by generating technology based business opportunities for companies. The Industry and Transport Division focuses its efforts on two major societal challenges: Factories of the Future (Flexible, Automatic, Intelligent, Connected, Sustainable and Social factories, following Industry 4.0 approach) and Sustainable Transport. The Automotive Area focuses its activity in the following technological lines: 1. Advanced Manufacturing Processes for Automotive Components (multimaterial structures, hybrid joints and powertrain forging processes) 2. Electronics and control systems (automated driving, powertrain and eDrives control).			
▲ Main activities and products TECNALIA masters advanced technologies in many areas, but those more connected to mobility and automated systems are the following ones: <ul style="list-style-type: none">• Intelligent Transport Systems.• Electronics for transport.• Automated Driving (lined with the 'Automated Driving Roadmap' that has been launched in the frame of the European Road Transport Research Advisory Council (www.ertrac.org, ERTRAC) in July 2015). Technological assets in Tecnalia's portfolio include advanced simulation platforms for transport means (Dynacar) and several vehicles for demonstration of automated driving.			
▲ Related projects			
SARTRE Safe Road Trains for the Environment Budget: 6,41 M€ Duration: 09/2009 - 08/2012 Programme: FP7-SUSTAINABLE SURFACE TRANSPORT http://www.sartre-project.eu/en/Sidor/default.aspx	SRA lines covered by the project:		Description and objectives: Developing strategies and technologies to allow vehicle platoons to operate on normal public highways with significant environmental, safety and comfort benefits. Participants: RICARDO UK LTD, VOLVO TECHNOLOGY AB, SP SVERIGES TEKNISKA FORSKNINGINSTITUT AB, IDIADA AUTOMOTIVE TECHNOLOGY SA, FUNDACION ROBOTIKER (TECNALIA), RHEINISCH-WESTFAELISCHE TECHNISCHE HOCHSCHULE AACHEN, VOLVO PERSONVAGNAR AB Results: Development of one platooning solution formed by a truck leader manually guided (Volvo cars: S60, V60 and XC60) and several vehicles linked to the set being the road platoon in order to be guided up to 90 km/h and with a gap of no more than 4 meters.
	1. Safety		
	2. Connected car		

PRT MIRAMON Personal Rapid Transit System with automatic guided vehicle in the Miramón technology park Budget: 1.25 M€ Duration: 07/2011 - 12/2014 Programme: INNFACTO	SRA lines covered by the project:		Description and objectives: The goal of the project is to create a prototype and carry out a pilot of a public transport system following the PRT (Personal Rapid Transit) concept based on commercial vehicles and without its own infrastructure, in the scientific and technologic park of Miramón (San Sebastian). It is oriented to create the technologic products needed to constitute a technologic company for the commercial exploitation of the PRT transport systems. Participants: LOGICA, TECNALIA, NOVADAYS Results: This project has carried out a pilot of a PRT service in a concrete geographic place: The scientific and technologic park of Miramón (San Sebastian), which has supported this initiative with great interest: firstly, because it is a solution for the important problem of internal mobility into the park; and, on the other hand, it will provide a reference image in Europe as the innovation space.
	1. Safety		
	2. Connected car	✓	
ADAM Desarrollo de Automatización para Movilidad Autónoma Budget: 18,99 M€ Duration: 09/2011 - 12/2014 Programme: INNPRONTA	SRA lines covered by the project:		Description and objectives: The ADAM (Automation Development for Autonomous Mobility) initiative is focused on the science and technology for autonomous mobility, i.e. on the study of the industrial interest of several autonomous systems which elements or sub-systems are partially or fully embedded into the vehicles moving within a geophysical context. Participants: Boeing, Elecnor-Deimos, Azkar, Maser, Indra, Ficos, INTA, Tecnalia, ... Results: Two prototypes related to automated driving in road transport has been obtained. The first one has been a PRT service and the second one a platooning application.
	1. Safety		
	2. Connected car	✓	

CITYMOBIL2 Cities demonstrating cybernetic mobility Budget: 15.65 M€ Duration: 09/2012-08/2016 Programme: FP7-SUSTAINABLE SURFACE TRANSPORT http://www.citymobil2.eu/en/	SRA lines covered by the project:		Description and objectives: The CityMobil2 goal is to address the following three barriers and finally to remove them: the implementation framework, the legal framework and the unknown wider economic effect. Participants: UNIVERSITA DEGLI STUDI DI ROMA LA SAPIENZA, INRIA, POLIS, TECNALIA, ERTICO, etc. Results: The final demonstrator formed by three ARTS (Automated Road Transport System) will be deployed in the technology park of San Sebastian in 2016, when the city will be the European capital of culture.
	1. Safety		
	2. Connected car	✓	
AUTOPORT Carga Automatizada en Terminales Portuarias Ro-Ro Budget: 1.67 M€ Duration: 01/2013 - 12/2014 Programme: INNTERCONECTA	SRA lines covered by the project:		Description and objectives: The general objective of the project is the development and demonstration of new technologic concepts and solutions oriented to the full deployment of the automation for Ro-Ro (Roll on-Roll off) operations in maritime ports. Participants: TERMICAR, IMATIA, GALMAN, TECNALIA, Universidad de Vigo. Results: One terminal tractor for Ro/Ro (Roll on-Roll off) movements was automated and the corresponding prototype has been deployed at the maritime port terminal in Bouzas-Vigo (Spain).
	1. Safety		
	2. Connected car	✓	
AIRPORTS Airport Improvement Research on Processes & Operations of Runway, TMA and Surface Duration: 05/2015 - 12/2018 Programme: CIEN	SRA lines covered by the project:		Description and objectives: Initiative oriented to the development of critical technologies and capacities for the future transport systems focused on airport environment as a paradigmatic example of complexity and opportunity to be applied. Participants: Boeing, Ikusi, Maser, Tecnalia, Crida, Carbures, Skylife, etc. Results: In process.
	1. Safety		
	2. Connected car	✓	




UNCOVERCPS Unifying Control and Verification of Cyber-Physical Systems Budget: 4.93 M€ Duration: 09/2014 - 12/2018 Programme: H2020-IL-LEIT-ICT	SRA lines covered by the project:		Description and objectives: The proposed research effort provides methods for a faster and more efficient development process of safety- or operation-critical cyber-physical systems in (partially) unknown environments. Cyber-physical systems are very hard to control and verify because of the mix of discrete dynamics and continuous dynamics. Participants: TECHNISCHE UNIVERSITAET MUENCHEN, TECNALIA, UNIVERSITE JOSEPH FOURIER GRENOBLE 1, UNIVERSITAET KASSEL, POLITECNICO DI MILANO, General Electric Deutschland Holding GmbH, ROBERT BOSCH GMBH, ESTEREL TECHNOLOGIES SA, DEUTSCHES ZENTRUM FUER LUFT - UND RAUMFAHRT EV, R.U.Robots Limited. Results: In process.
	1. Safety		
	2. Connected car		



Institute for the Vehicle Safety Assurance - ISVA (Universidad Carlos III de Madrid)			 
Avda de la Universidad 30 Leganés Tel: 0034 91 624 9185 http://isva-cyn.in.sel.inf.uc3m.es/	28911 Madrid 0034 91 624 94 30	Contact: José Luis San Román García Full Professor. Director jlsanro@ing.uc3m.es	
<p>▲ Description</p> <p>The Institute for the Vehicle Safety Assurance, belonging to the Carlos III University of Madrid, is active in various areas within the automotive and transport sector. Among its activities there are R&D projects related to the automotive field, especially with aspects related to road safety, scientific research reflected on various international papers, doctoral theses and research, service and consultancy activities to companies in the sector and postgraduate training and refresher courses. One area of the Institute has been researching on topics related to Intelligent Vehicles for more than 20 years. Several systems have been developed for the perception, in roads and urban environments, of traffic signs and road markings and all the types of obstacles that a vehicle can face: other vehicles, pedestrians, cyclists, motorists and generic obstacles. In order to do that, the group has been researching on several kinds of sensors like visible spectrum and infrared cameras, lasers, radars and on how to fuse the sensorial information from different types. Other area of the Institute is specialized in software development for automotive, among which are several initiatives related to collaboration between vehicles each other, infrastructure and drivers through integration of architectures Internet of the Things and mass analysis data. Presently, the ISVA has two autonomous vehicles available, so it is developing communication and cooperation modules between them. The Intelligent Systems Lab has got funding from several government agencies as well as collaboration projects with different private companies.</p>			
<p>▲ Main activities and products</p> <p>The Intelligent Systems Lab carry on several research activities in multiple fields related to autonomous vehicles, ground as well as aerial. Several of the developed systems are:</p> <ul style="list-style-type: none">• Vehicle, motorcycle and pedestrian detection and classification fusing sensorial information from cameras and lasers.• Pedestrian detection using visible and far infrared cameras• Traffic sign detection and classification.• Road marking detection and classification.• Software Architectures for autonomous vehicles.• Path planning and navigation for autonomous vehicles.• Communication and manoeuvres cooperation among autonomous vehicles.• Architectures based on Internet of the Things for the integration of sensor networks of autonomous vehicles.• Systems of inspection and maintenance management for vehicles based on the Internet of the Things.			



▲ Related projects		
Advance Driver behavior Analysis Budget: 22,600 € Duration: 2015 - 2016 Programme: Ministerio del Interior - DGT www.uc3m.es/islab	SRA lines covered by the project:	
	1. Safety	✓
	2. Connected car	
Description and objectives: The driver behaviour is analysed with great detail using a fusion based system which uses the sensorial information provided by the own vehicle through the CAN bus as well as an inertial sensor unit and GPS. Special care has been done to choose electronic devices easily integrated on board a vehicle. Participants: UC3M Results: Driver monitoring module.		
SEGVAUTO-TRIES Vehicle Safety: efficient and sustainable transport Budget: 65,000 € Duration: 2014 - 2018 Programme: Comunidad de Madrid http://www.segvauto.es/	SRA lines covered by the project:	
	1. Safety	✓
	2. Connected car	✓
Description and objectives: The main objective is the harmonic develop of research and innovation activities within the field of intelligent, efficient, clean, accessible to all and safe transportation systems developing actions on Intelligent Transportation Systems, Sustainable and Efficient Transport and Safety. Participants: UC3M, UPM, UAH, UCM, UEM, CSIC Results: Traffic sign and recognition detection module, obstacle detection module		
ADAS-ROAD Advanced Driver Assistance System for Road Environments Budget: 72,000 € Duration: 2014-2016 Programme: Plan Nacional I+D+i www.uc3m.es/islab	SRA lines covered by the project:	
	1. Safety	✓
	2. Connected car	✓
Description and objectives: The project main goals are Safety and Efficiency. In order to do that, the development and implementation of an advanced driver assistant system is proposed. This system works in interurban environments and it is based on the most advance techniques of sensorial perception and V2V and V2I communications.. Participants: UC3M, UPM Results: Collision prevention in intersections and roundabouts module. Vehicle detection module.		

FEDORA Sensorial Fusion for the Maneuver Analysis in Urban Environments for ADAS Budget: 60,000 € Duration: 2012 - 2014 Programme: Plan Nacional I+D+i www.uc3m.es/islab	SRA lines covered by the project:		Description and objectives: The project has developed a pedestrian run-over avoiding system in complex urban environment. In order to get that, an environment perception system based on sensor fusion, computer vision and laser, has been designed. Participants: UC3M, UPM Results: Obstacle detection module, free space detection module.
	1. Safety	✓	
	2. Connected car	✓	
	SRA lines covered by the project:		Description and objectives: Within the SEGVAUTO project, several driver assistant systems were designed in order to identify and analysed road information with the goals of detect dangerous manoeuvres done by the driver, as well as distraction and drowsiness situations. Participants: UC3M, UPM, UAH, UCM, UEM, CSIC Results: Traffic sign and recognition detection module. Driver monitoring module.
SEGVAUTO Vehicle Safety Budget: 70,000 € Duration: 2010 - 2013 Programme: Comunidad de Madrid http://www.segvauto.es/	1. Safety	✓	
	2. Connected car	✓	
VISVIA Onboard Sensorial System for Advanced Driver Assistance Systems Budget: 50,000 Euros Duration: 2008 - 2010 Programme: Plan Nacional I+D+i www.uc3m.es/islab	SRA lines covered by the project:		Description and objectives: The developed system deals with the problem of the identification of risky driving situations from a synthesis of information related to the environment (electronic maps, image processing, radar based obstacle detection) and the own vehicle (speed, accelerations, pitch angle, etc). Participants: UC3M, UPM Results: Road environment perception and obstacle identification systems.
	1. Safety	✓	
	2. Connected car		

3-DS Driver Distraction Detector System Budget: 59,290 € Duration: 1/2012 - 6/2015 Programme: Plan Nacional I+D+i TRA2011-29454-C03-02 www.uc3m.es/islab	SRA lines covered by the project:		Description and objectives: The project has developed several systems for driver monitoring and measuring its attention degree. Different kind of approaches have been evaluated: visual monocular systems, stereo cameras and 3D, in order to obtain the driver gaze and decide if some warning has to be done because of drowsiness, distraction or fatigue state. Participants: Universidad Carlos III de Madrid Results: Driver monitoring and drowsiness detection module.
	1. Safety	✓	
	2. Connected car		
SC2-V2 Cooperative Control of Vehicle Speed Budget: 13,420 € Duration: 1/2008 - 12/2008 Programme: CAM y la Universidad Carlos III de Madrid CCG07-UC3M_DPI-3196-2 www.uc3m.es/islab	SRA lines covered by the project:		Description and objectives: The proposed system works as a common ACC but with the additional features of a common decision-making and the autonomous control of the vehicles. This way, when one vehicle detects other driving at a lower speed, a cooperation process is initiated between both vehicles exchanging the information related to speed, intentions, etc. Participants: Universidad Carlos III de Madrid Results: Communications and cooperation among vehicles.
	1. Safety	✓	
	2. Connected car	✓	
POCIMA Pedestrians, Cyclists and Motorists Detection Budget: 36,300€ Duration: 9/2007 - 10/2010 Programme: Plan Nacional I+D+i CICYT TRA2007-67374 -C03-01 www.uc3m.es/islab	SRA lines covered by the project:		Description and objectives: The driver assistant system watches the frontal and blind spot of the vehicle. Three different kinds of sensors are used: a visible spectrum stereo vision system, a far infrared stereo vision system and a scanner radar. The use of different sensors provides complementary information in order to detect obstacles. Participants: Universidad Carlos III de Madrid Results: Pedestrian detection module.
	1. Safety	✓	
	2. Connected car		

PAPMI Active Pedestrian Protection based on Infrared Vision Budget: 8,500 € Duration: 1/2007 - 12/2007 Programme: CAM y la Universidad Carlos III de Madrid, CCG06-UC3M/DPI-CP06 www.uc3m.es/islab	SRA lines covered by the project:		Description and objectives: The goal of this project is the detection of pedestrian Through the analysis of images captured by Far Infrared cameras. The research made the most of the advantage of this kind of cameras during the night or adverse weather conditions. Participants: Universidad Carlos III de Madrid Results: FIR computer vision, Pedestrian detection module
	1. Safety		
	2. Connected car		
ASITENTUR Advanced Driver Assistance System for Urban Environments Budget: 49,525 € Duration: 12/2004-12/2007 Programme: Plan Nacional I+D+i CICYT-TRA2004-07441-C03-01 www.uc3m.es/islab	SRA lines covered by the project:		Description and objectives: Several driver assistant systems for urban environments were designed. In order to do that, they evaluate the driver maneuverers and warn him/her if the driver is making a imprudence or the possible danger is highlighted. Two basic perception modules were developed for pedestrian and traffic sign detection. Participants: Universidad Carlos III de Madrid Results: Traffic sign and recognition detection module, Pedestrian detection module
	1. Safety		
	2. Connected car		
SAVVA Active Security System for Vehicles based on Artificial Vision Budget: 14,684 € Duration: 10/2003 - 9/2004 Programme: Autonomous Government of Madrid www.uc3m.es/islab	SRA lines covered by the project:		Description and objectives: The vehicle developed during the project has new perceptual systems for vehicle, obstacle and road perception. In order to achieve this, the car has a stereovision system and several networked computers on-board. Participants: Universidad Carlos III de Madrid Results: Stereo vision module, Road detection module, Vehicle detection module
	1. Safety		
	2. Connected car		

fBrake Budget: 36,000 € Duration: 01/2013 a 01/2014 Programme: Comunidad Extremadura	SRA lines covered by the project:		Description and objectives: The goal of this project is to develop a model for brake testing in the field of technical inspections of commercial vehicles. Also, it has been developed a comparative model relating to the status of vehicle fleet and effectiveness of brake testing in the area of inspections ITVs. Participants: Universidad Carlos III de Madrid Results: Model fBrake, Module software for developing braking tests, Comparative analysis module.
	1. Safety		
	2. Conneted Car		
mCityJourney4All Budget: 50.000 € Duration: 12/2014 - 12/2015 Programme: FINODEX	SRA lines covered by the project:		Description and objectives: The goal of this project is to develop a mobile service to manage various accessible routes in several public transport infrastructures based on real-time operating status of the devices that reduce the architectural barriers available in the public transport infrastructure (buses, stairs, elevators, ramps, streets, parking access, etc.). Participants: Universidad Carlos III de Madrid Results: Mobile multi-platform application for an accessible urban transport.
	1. Safety		
	2. Conneted Car		


Intelligent Systems Lab - ISL (Universidad Carlos III de Madrid)				
Avda de la Universidad 30 Leganés Tel: 0034 91 624 59 26 www.uc3m.es/islab	28911 Madrid Fax: 0034 91 624 94 30	Contact: José María Armingol Moreno Full Professor armingol@ing.uc3m.es		
▲ Description The Intelligent Systems Lab is a Research Group of the Universidad Carlos III de Madrid and has been researching on topics related to Intelligent Vehicles for more than 20 years. Several systems have been developed for the perception, in roads and urban environments, of traffic signs and road markings and all the types of obstacles that a vehicle can face: other vehicles, pedestrians, cyclists, motorists and generic obstacles. In order to do that, the group has been researching on several kinds of sensors like visible spectrum and infrared cameras, lasers, radars and on how to fuse the sensorial information from different types. Presently, the group has two autonomous vehicles available, so it is developing communication and cooperation modules between them. The Intelligent Systems Lab has got funding from several government agencies as well as collaboration projects with different private companies.				
▲ Main activities and products The Intelligent Systems Lab carry on several research activities in multiple fields related to autonomous vehicles, ground as well as aerial. Several of the developed systems are: <ul style="list-style-type: none">• Vehicle, motorcycle and pedestrian detection and classification fusing sensorial information from cameras and lasers.• Pedestrian detection using visible and far infrared cameras• Traffic sign detection and classification.• Road marking detection and classification.• Software Architectures for autonomous vehicles.• Path planning and navigation for autonomous vehicles.• Communication and manoeuvres cooperation among autonomous vehicles.				

▲ Related projects		
Advance Driver behavior Analysis Budget: 22,600 Euros Duration: 2015 - 2016 Programme: Ministerio del Interior - DGT www.uc3m.es/islab	SRA lines covered by the project:	
	1. Safety	✓
	2. Connected car	
	Description and objectives: The driver behaviour is analysed with great detail using a fusion based system which uses the sensorial information provided by the own vehicle through the CAN bus as well as an inertial sensor unit and GPS. Special care has been done to choose electronic devices easily integrated on board a vehicle. Participants: UC3M Results: Driver monitoring module.	
SEGVAUTO-TRIES Vehicle Safety: efficient and sustainable transport. Budget: 65,000 Euros Duration: 2014 - 2018 Programme: Comunidad de Madrid http://www.segvauto.es/	SRA lines covered by the project:	
	1. Safety	✓
	2. Connected car	✓
	Description and objectives: The main objective is the harmonic develop of research and innovation activities within the field of intelligent, efficient, clean, accessible to all and safe transportation systems developing actions on Intelligent Transportation Systems, Sustainable and Efficient Transport and Safety. Participants: UC3M, UPM, UAH, UCM, UEM, CSIC Results: Traffic sign and recognition detection module, obstacle detection module	
ADAS-ROAD Advanced Driver Assistance System for Road Environments Budget: 72,000 Euros Duration: 2014 - 2016 Programme: Plan Nacional I+D+i www.uc3m.es/islab	SRA lines covered by the project:	
	1. Safety	✓
	2. Connected car	✓
	Description and objectives: The project main goals are Safety and Efficiency. In order to do that, the development and implementation of an advanced driver assistant system is proposed. This system works in interurban environments and it is based on the most advance techniques of sensorial perception and V2V and V2I communications. Participants: UC3M, UPM Results: Collision prevention in intersections and roundabouts module. Vehicle detection module.	

FEDORA Sensorial Fusion for the Maneuver Analysis in Urban Environments for ADAS Budget: 60,000 Euros Duration: 2012 - 2014 Programme: Plan Nacional I+D+i www.uc3m.es/islab	SRA lines covered by the project:		Description and objectives: The project has developed a pedestrian run-over avoiding system in complex urban environment. In order to get that, an environment perception system based on sensor fusion, computer vision and laser, has been designed. Participants: UC3M, UPM Results: Obstacle detection module, free space detection module.
	1. Safety	✓	
	2. Connected car	✓	
SEGVAUTO Vehicle Safety Budget: 70,000 Euros Duration: 2010-2013 Programme: Comunidad de Madrid http://www.segvauto.es/	SRA lines covered by the project:		Description and objectives: Within the SEGVAUTO project, several driver assistant systems were designed in order to identify and analysed road information with the goals of detect dangerous manoeuvres done by the driver, as well as distraction and drowsiness situations. Participants: UC3M, UPM, UAH, UCM, UEM, CSIC Results: Traffic sign and recognition detection module. Driver monitoring module.
	1. Safety	✓	
	2. Connected car	✓	
VISVIA Onboard Sensorial System for Advanced Driver Assistance Systems Budget: 50,000 Euros Duration: 2008 - 2010 Programme: Plan Nacional I+D+i www.uc3m.es/islab	SRA lines covered by the project:		Description and objectives: The developed system deals with the problem of the identification of risky driving situations from a synthesis of information related to the environment (electronic maps, image processing, radar based obstacle detection) and the own vehicle (speed, accelerations, pitch angle, etc). Participants: UC3M, UPM Results: Road environment perception and obstacle identification systems.
	1. Safety	✓	
	2. Connected car		




3-DS Driver Distraction Detector System Budget: 59,290 € Duration: 01/2012 - 06/2015 Programme: Plan Nacional I+D+i TRA2011-29454-C03-02 www.uc3m.es/islab	SRA lines covered by the project:		Description and objectives: The project has developed several systems for driver monitoring and measuring its attention degree. Different kind of approaches have been evaluated: visual monocular systems, stereo cameras and 3D, in order to obtain the driver gaze and decide if some warning has to be done because of drowsiness, distraction or fatigue state. Participants: Universidad Carlos III de Madrid Results: Driver monitoring and drowsiness detection module.
	1. Safety	✓	
SC2-V2 Cooperative Control of Vehicle Speed Budget: 13,420€ Duration: 01/2008 - 12/2008 Programme: CAM y la Universidad Carlos III de Madrid CCG07-UC3M_DPI-3196-2 www.uc3m.es/islab	2. Connected car		Description and objectives: The proposed system works as a common ACC but with the additional features of a common decision-making and the autonomous control of the vehicles. This way, when one vehicle detects other driving at a lower speed, a cooperation process is initiated between both vehicles exchanging the information related to speed, intentions, etc. Participants: Universidad Carlos III de Madrid Results: Communications and cooperation among vehicles.
	1. Safety	✓	
POCIMA Pedestrians, Cyclists and Motorists Detection Budget: 36,300€ Duration: 09/2007 - 10/2010 Programme: Plan Nacional I+D+i CICYT TRA2007-67374 -C03-01 www.uc3m.es/islab	2. Connected car		Description and objectives: The driver assistant system watches the frontal and blind spot of the vehicle. Three different kinds of sensors are used: a visible spectrum stereo vision system, a far infrared stereo vision system and a scanner radar. The use of different sensors provides complementary information in order to detect obstacles. Participants: Universidad Carlos III de Madrid Results: Pedestrian detection module
	1. Safety	✓	

PAPMI Active Pedestrian Protection based on Infrared Vision Budget: 8,500€ Duration: 01/2007 - 12/2007 Programme: CAM y la Universidad Carlos III de Madrid, CCG06-UC3M/DPI-CP06 www.uc3m.es/islab	SRA lines covered by the project:		Description and objectives: The goal of this project is the detection of pedestrian Through the analysis of images captured by Far Infrared cameras. The research made the most of the advantage of this kind of cameras during the night or adverse weather conditions. Participants: Universidad Carlos III de Madrid Results: FIR computer vision, Pedestrian detection module
	1. Safety	✓	
ASITENTUR Advanced Driver Assistance System for Urban Environments Budget: 49,525 € Duration: 12/2004 - 12/2007 Programme: Plan Nacional I+D+i CICYT-TRA2004-07441-C03-01 www.uc3m.es/islab	SRA lines covered by the project:		Description and objectives: Several driver assistant systems for urban environments were designed. In order to do that, they evaluate the driver maneuvers and warn him/her if the driver is making a imprudence or the possible danger is highlighted. Two basic perception modules were developed for pedestrian and traffic sign detection. Participants: Universidad Carlos III de Madrid Results: Traffic sign and recognition detection module, Pedestrian detection module
	1. Safety	✓	
SAVVA Active Security System for Vehicles based on Artificial Vision Budget: 14,684 € Duration: 10/2003 - 9/2004 Programme: Autonomous Government of Madrid www.uc3m.es/islab	SRA lines covered by the project:		Description and objectives: The vehicle developed during the project has new perceptual systems for vehicle, obstacle and road perception. In order to achieve this, the car has a stereovision system and several networked computers on-board. Participants: Universidad Carlos III de Madrid Results: Stereo vision module, Road detection module, Vehicle detection module
	1. Safety	✓	
	2. Connected car		



Escuela Politécnica Superior – Mondragon Unibertsitatea			 MONDRAGON UNIBERTSITATEA GOI ESKOLA POLITEKNIKOA ESCUELA POLITÉCNICA SUPERIOR
Loramendi 4 Mondragón Tel: 0034 943 79 47 00 www.eps.mondragon.edu	20500 Guipuzcoa Fax: 0034 943 71 19 06	Contact: Zigor Azpilgain Research Coordinator in Automotive zazpilgain@mondragon.edu	
<p>▲ Description</p> <p>Mondragon Goi Eskola Politeknikoa, "Arizmendiarrjeta" S. COOP., located in Mondragon (Guipúzcoa) is a non-profit integral education cooperative, declared of public utility. It is the legal owner of the Faculty of Engineering of Mondragon Unibertsitatea and its main activities include education, research and technology transfer to companies and other public or private entities.</p> <p>The Research and Transfer activity (R & T) of EPS-MU covers from fundamental applied research (in which are framed up the 130 doctoral theses running nowadays) to experimental development and innovation activities, also covering other industrial research activities. There are 16 research groups, grouped into 5 units: Mechanical behaviour and product design, Science, technology and transformation processes of materials, Design and industrial management processes, Embedded systems and information systems and Electric power.</p>			
<p>▲ Main activities and products</p> <p>Design and Development of ECUs and their interconnection and Real-Time Distributed Control. ECUs for wiper, central locking, power windows,...</p> <p>Remote diagnostic and update in production/manufacturing and their use in electronic devices.</p> <p>Design and development of energy management ECUs in hybrid or full electric vehicles using fuzzy logic. Connectivity to the vehicle interior and the outside for obtaining optimization parameters in real time.</p> <p>Communication vehicle to vehicle (V2V) and vehicle to infrastructure (V2X)</p> <p>Integration of Sensors, Capture and Processing of Information for Diagnosis and Prognosis of vehicle condition.</p>			

▲ Related projects


DEWI Dependable Embedded Wireless Infrastructure Budget: 39,6 M € Duration: 03/2014 - 02/2018 Programme: FP7 - JTI http://www.dewiproject.eu/	SRA lines covered by the project:		Description and objectives: DEWI will provide key solutions for wireless seamless connectivity and interoperability in smart cities and infrastructures, by considering everyday physical environments of citizens in buildings, cars, trains and aeroplanes, thereby significantly contributing to the emerging smart home and smart public space. Participants: VALTION TEKNILLINEN TUTKIMUSKESKUS, ACCIONA INFRAESTRUCTURAS S.A. "SOFTEC INTERNET, S.L.", Adevice Solutions S.L., AVL LIST GMBH, CENTRIA AMMATTIKORKEAKOULU OY, COMMISSARIAT A L ENERGIE ATOMIQUE ET AUX ENERGIES ALTERNATIVES, CORK INSTITUTE OF TECHNOLOGY, CRITICAL MATERIALS SA, ELEKTRONIKAS UN DATORZINATNU INSTITUTS, EpiSensor Ltd, ETIC-EMBEDDED TECHNOLOGIES INNOVATION CENTER S. COOP, "FAGOR ELECTRONICA, S. COOP.", FLANDERS' MECHATRONICS TECHNOLOGY CENTRE VZW, FTW FORSCHUNGSZENTRUM TELEKOMMUNIKATION WIEN GMBH, FUNDACION TECNALIA RESEARCH & INNOVATION, FUNDACION TEKNIKER, HI IBERIA INGENIERIA Y PROYECTOS SL, HOGSKOLAN I HALMSTAD, IMINDS VZW, INDRA SISTEMAS S.A., INSTALACIONES INABENSA SA, INSTITUTO SUPERIOR DE ENGENHARIA DO PORTO, INSTITUTO TECNOLÓGICO DE INFORMÁTICA, INTEGRASYS SA, LATVIJAS UNIVERSITATES MATEMATIKAS UN INFORMATIKAS INSTITUTS, SIEMENS INDUSTRY SOFTWARE NV, MONDRAGON CORPORACION COOPERATIVA SCOOP, MONDRAGON GOI ESKOLA POLITEKNIKO J.M.A. S.COOP., NXP SEMICONDUCTORS AUSTRIA GMBH, NXP SEMICONDUCTORS BELGIUM NV, NXP SEMICONDUCTORS NETHERLANDS BV, OUMAN OY, PHILIPS ELECTRONICS NEDERLAND B.V., PHILIPS LIGHTING B.V., POLITECHNIKA GDANSKA, REALTIME EMBEDDED AB, SIGARDEN SA, SILVERSKIN INFORMATION SECURITY OY, SIRRIS HET COLLECTIEF CENTRUM VAN TECHNOLOGISCHE INDUSTRIE VZW, SPACEFOREST SPZOO, SPICER OFF-HIGHWAY BELGIUM NV, STICHTING IMEC NEDERLAND, TECHNISCHE UNIVERSITAET GRAZ, TECHNISCHE UNIVERSITEIT EINDHOVEN, Teknologian tutkimuskeskus VTT Oy, THALES ALLENIA SPACE ESPANA, SA, THALES COMMUNICATIONS & SECURITY SAS, UNIVERSITAET KLAGENFURT, UNIVERSITAT LINZ, VALEO COMFORT AND DRIVING ASSISTANCE, VEMCO SP ZOO, VOLVO TECHNOLOGY AB, WooX InnovationsBelgium NV, ISA ENERGY EFFICIENCY SA, GMVIS SKYSOFT SA, AIRBUS DS SAS, LASSILA & TIKANOJA OYJ
	1. Safety	✓	
	2. Connected car	✓	


Universidad Politécnica de Madrid (CEI - Center for Industrial Electronics)			  
ETSI Industriales. José Gutiérrez St. Abascal, 2 MADRID Tel: +34 91 336 31 91 http://www.cei.upm.es/	28006 Madrid	Contact: Félix Moreno Associate Professor Felix.moreno@upm.es	
<p>▲ Description</p> <p>Universidad Politécnica de Madrid (UPM) is the largest Spanish technological university. Its research stands out thanks to its highly-qualified professionals and its competitiveness at an international level. UPM headed the Spanish University participation in the 7th European Framework Program with more than 83M€ funding. Center for Industrial Electronics, CEI. is a UPM Research Center located in Industrial School integrating interdisciplinary research groups (Electronics, Power Quality and Telecommunication), motivated to educate engineers and develop new concepts, to be transferred to the Industry. The main research lines are: power electronics, digital embedded systems, power quality and radio engineering.</p>			
<p>▲ Main activities and products</p> <p>CEI applies this expertise to autonomous driving by:</p> <ul style="list-style-type: none">• Out-of-lane detection and prediction (image processing)• Tiredness and low attention detection (image processing)• Detection, identification and alert of objects (other vehicles, pedestrians, etc.) (low-range radar)• Visual, hearing or physical impaired assistance systems alerting vehicles of their presence in zebra crossing. On the other hand the system warns the pedestrian where the crossing point is and the availability to cross.• Vehicle instrumentation. Sensor control, signal processing, communications... <p>This solid expertise in the electronic systems design field is applied to vehicle active safety facilities.</p>			



▲ Related projects		
Sistema hardware avanzado de asistencia a la conducción para entornos urbano Budget: 88,825 € Duration: 2004 - 2007 Programme: Ministerio de Ciencia e Innovación http://www.idi.mineco.gob.es/	SRA lines covered by the project:	
	1. Safety	✓
	2. Connected car	
	Description and objectives: The proposed system checked the maneuvers indicating a possible negligent driving or informing about possible dangers. For such purpose, two basic perception modules will be made: detection of pedestrians and identification of traffic signals Participants: Universidad Carlos III, INSIA (Universidad Politecnica de Madrid) Results: To achieve the proposed objectives, new technologies were developed to detect, identify and implement the algorithms in specific hardware.	
TECALUM Sistema de identificación de objetos móviles basado en radar Budget: 196.859,00€ Duration: 2011 - 2014 Programme: Ministerio de Ciencia e Innovación. http://www.idi.mineco.gob.es/porta/site/MICINN/	SRA lines covered by the project:	
	1. Safety	✓
	2. Connected car	✓
	Description and objectives: Smart and green cities are hot topics in current research because people are becoming more conscious about their impact on the environment and the sustainability of their cities as the population increases. Many researchers are searching for mechanisms that can reduce power consumption and pollution in the city environment. This project addresses the issue of public lighting and how it can be improved in order to achieve a more efficient city, making the process of turning the streetlights on and off more intelligent so that they consume less power and cause less light pollution. Participants: Luix Iluminación inteligente, CEI (Universidad Politécnica de madrid), FUNDACIÓN TECNALIA RESEARCH & INNOVATION Results: A new embedded intelligence system, based on a microcontroller and a low-cost radar, were developed.	

Universidad Politécnica de Madrid (GATV - Visual telecommunication application group)			 
E.T.S.I. Telecomunicación Avda. Complutense 30, 0034 Tel: 913367344 www.gatv.ssr.upm.es	28040 Madrid - Spain Fax: 0034913367350	Contact: José Manuel Menéndez Professor jmm@gatv.ssr.upm.es	
▲ Description Universidad Politécnica de Madrid (UPM) is the largest Spanish technological university. Its research stands out thanks to its highly-qualified professionals and its competitiveness at an international level. UPM headed the Spanish University participation in the 7th European Framework Program with more than 83M€ funding. Visual telecommunication application group (GATV) is a research group in the Universidad Politécnica de Madrid (UPM) focused on Visual communications, Video coding, Telecommunications Systems, Computer vision, Digital video processing, Audio and video, technologies, Management and description of audiovisual contents, Audiovisual applications in smart house and smart industry, Signal and Communications Applications in Intelligent Transportation Systems, Remote Sensing for Environmental Applications.			
▲ Main activities and products The capabilities of GATV in relation to safety Autonomous Driving are focused in: <ul style="list-style-type: none">• Automatic detection of lanes (artificial vision)• Integration of video sensors• Lidar and radar for the estimation of de peripheral environment around the vehicle• FOTs (Field operational Tests)• Involvement in specification of harmonized/standardized traffic and public transport information datasets.			

▲ Related projects



OPTICITIES Optimise Citizen Mobility and Freight Management in Urban Environments. Services Budget: 13 M € Duration: 2013 - 2016 Programme: FP7 EC www.opticities.com	SRA lines covered by the project:		Description and objectives: The OPTICITIES project aims at the development of a smart urban mobility strategy addressing European cities' mobility challenges in three key aspects: <ul style="list-style-type: none">• Optimisation of transport networks based on the development of ITS services, supported by integrated multimodal information and transport control tools.• Integration of passenger transport and urban freight approaches.• Development of an innovation policy in partnership with the private sector. Participants: Le Grand Lyon (FR), SPIE (FR), CRTM (ES), Ayuntamiento de Madrid (ES), ICCA (ES), Universidad Politécnica de Madrid (ES), CSI Piemonte (IT), Citta di Torino (IT), 5T SRL (IT), Politecnico di Torino (IT), Goteborgs Kommun (SWE), Chalmers University of Technology (SWE), Wroclaw Miasto (POL), Neurosoft (POL), Birmingham City Council (UK), Algoé (FR), EUROCITIES (BEL), UITP (BEL), Volvo (SWE), CITYWAY (FR), VeDeCoM (FR), HACON (DE), BERENDS (DE), ERT (BE), CNRS (FR) Results: OPTICITIES is still an ongoing project, and has just crossed half of its duration. The results are thus more related with the establishment of the specifications and the preliminary deployment activities. <ul style="list-style-type: none">• The architecture of the multimodal dataset and its interfaces and implementation guidelines for the cities has been proposed.• The definition of the key OPTICITIES services: multimodal information service, decision support tools and freight information services have been established, together with a first approach to the specification of deployment guidelines for those services. Most importantly, a close interaction with the standardization groups related with public transport and traffic data exchanges has been promoted from the beginning of the project to ensure that the projects' developments were aligned with the latest initiatives in those groups, but also that the project could actively contribute to those activities. The position of the project in relation to the multimodal dataset has been adopted by the standardization groups, thus allowing the project the rare opportunity to actively influence the development of standards.
	1. Safety		
	2. Connected car		

FOTSIS European Field Operational Test on Safe, Intelligent and Sustainable Road Operation Budget: 14.1 M € Duration: 2011 - 2015 Programme: FP7 EC www.fotsis.com	SRA lines covered by the project:		Description and objectives: FOTSis is a large-scale field testing of the road infrastructure management systems needed for the operation of a set of close-to-market Cooperative Services, in order to assess in detail both 1) their effectiveness on the selected areas of road safety, mobility efficiency and environmental sustainability, and 2) their potential for a full-scale deployment in European roads. Participants: OHL (ES), Iridium (ES), Planestrada (PT), Marestrada (PT), NEA ODOS (GR), SICE (ES), Indra (ES), ACB Systems (DE), GMV SKYSOFT (PT), TRANSVER (DE), TERNA (GR), FT (FR), Universidad Politécnica de Madrid (ES), Finnish Meteorological Institute IL (FI), AALTO (FI), CERTH (GR), GeoVille (AT), CI3 (ES), ERF (BE), GMV (ES), FIA (FR), OPTIMUS (PT), ASECAP (FR), Universidad de Murcia (ES), ASM POLAND (POL) Results: Through the stages of tests' design, execution and evaluation and assessment, FOTSis has achieved its initial objectives of: <ul style="list-style-type: none"> • Specification of an interoperable communications architecture for Cooperative ITS services support, following the latest initiatives in standardization at ISO and CEN. • Validation of measurable impacts on road safety, mobility and environmental sustainability of the proposed FOTSis Cooperative services. Selected results are: <ul style="list-style-type: none"> • Reduction of response times of emergency services through smart navigation and continuous information exchange with the road operator teams and infrastructure. • Improvement of traffic mobility through effective implementation of variable speed limits applications. • Proposal of a series of guidelines for the acceleration of the large-scale deployment of Cooperative ITS, both promoting the technical solutions and integration of different technological components, as well as providing a practical framework for business model development based on the FOTSis Cooperative services.
	1. Safety		
	2. Connected car		

Universidad Politécnica de Madrid (GB2S - Group of Biometrics Biosignals and Security)			 	
CeDInt (Research Centre for Smart Buildings and Energy Efficiency) Campus de Montegancedo Pozuelo de Alarcón Tel: 0034 914524900 (Ext 1723) www.gb2s.es	28223 Madrid Fax: +34913364501	Contact: Carmen Sánchez Ávila Professor carmen.sanchez.avila@upm.es		
▲ Description Universidad Politécnica de Madrid (UPM) is the largest Spanish technological university. Its research stands out thanks to its highly-qualified professionals and its competitiveness at an international level. UPM headed the Spanish University participation in the 7th European Framework Program with more than 83 M € funding. Group of Biometrics, Biosignals and Security (GB2S) is a UPM research group working on Biometrics and Cryptography, Biosignals (Stress Detection or biometric identification). Furthermore, the GB2S owns several multimodal and monomodal biometric Databases gathering different biometric characteristics (Iris, Face, Gait, Hand or Gestures), publicly available for research purposes.				
▲ Main activities and products <ul style="list-style-type: none">• Driver stress monitoring through physiological sensors in the steering wheel.• Driver status perception through the analysis of images captured from a camera in the dashboard, through the analysis of the Heart Rate obtained from a video of the face.• Fatigue detection through physiological signals or blinking rate analysis.• Driver attention through the analysis of the gaze of the driver's face to calculate if the driver is getting distracted and not looking to the road.• Driving style, aggressiveness through inertial sensors(accelerometers and gyroscopes) and GPS.• Simple Human Machine Interaction in the car through gestures.				

▲ Related projects

Personalized Centralized Authentication System, PCAS Budget: 3,249,851 € Duration: 36 Months 10/2013 - 09/1016 Programme: FP7 https://www.pcas-project.eu/	SRA lines covered by the project:		Description and objectives: PCAS aims at providing an innovative, trustworthy, handheld device. The Secured Personal Device (SPD) will allow users to securely store their data, to share it with trusted applications, and to easily and securely authenticate him. The SPD will recognize its user using multiple biometric sensors, including a stress level sensor to detect coercion. Participants: AFCON, MAXDATA, LETI, UPM, NR, OS NEW HORIZON, INESC-ID Results: Biometric, Liveness and Coercion detection systems based on cameras.
	1. Safety		
	2. Connected car	✓	

Universidad Politécnica de Madrid (INSIA - University Institute for Automobile Research)			  POLITÉCNICA INSIA
Campus Sur UPM. Carretera de Valencia (A3) km.7 Tel: +34 91 336 53 00 Web: http://www.insia-upm.es	28031 Madrid. ESPAÑA Fax: 91 336 53 02	Contact: Felipe Jiménez Alonso Head of Intelligent Systems Unit felipe.jimenez@upm.es	
<p>▲ Description</p> <p>INSIA is a centre dedicated to scientific and technical research, which also perform educational activities and training in specialized areas, while providing technological support to companies and public administrations. The main activities of the Institute are :</p> <ul style="list-style-type: none">• The Research and Development in the field of road vehicles and their impact on safety and the environment. Currently we are working in eight research areas.• The technological support to companies and governments, providing technology services that materialize in further R & D, testing and certification• Postgraduate training.			
<p>▲ Main activities and products</p> <p>The main lines in the field of automation and wireless communications to improve safety are:</p> <ul style="list-style-type: none">• Development and testing of ADAS assistance systems, focusing research into the speed control systems and environment recognition systems.• Development of solutions based on automating the controls of the vehicles.• Introduction of communication technologies in order to extend the information to the driver and the "electronic horizon" using the vehicle positioning in digital maps.• Optimization of the methods for obtaining valid digital maps for ADAS applications.• Analysis of user interfaces <p>The INSIA has the following material resources within the framework of autonomous vehicles:</p> <ul style="list-style-type: none">• 2 fully automated vehicles (Citroen C3 and Electric Mitsubishi iMiEV)• Vehicles instrumentation (CAN bus signals and external sensors) and 1 instrumented motorcycle• Sensors monitoring the vehicle environment, highlighting a 3D laser scanner• Satellite positioning systems• Communication modules developed in INSIA for V2V and V2I communications <p>Several low-level control architectures have been developed that control the vehicle and allow interaction with other systems that generate high level control orders using Artificial Intelligence techniques:</p> <ul style="list-style-type: none">• GPS tracking path• monitoring lines on the road• collision avoidance maneuvering• Driving using devices like laptops or iPhones• cooperative driving through V2V communications <p>PATENT: equipment for automatically controlling the steering of a vehicle. Reference: P201330627</p>			


▲ Related projects



SAMPLER Pre-Crash Measures to prevent accidents in urban environments. Budget: 50,000€ Duration: 2011 - 2013 Funding: MICINN	SRA lines covered by the project:		Description: Within the project, reliable detection obstacles algorithms have been tested and automation of vehicles in order to be able to perform autonomously manoeuvres for collision avoidance have been implemented. Participants: INSIA-UPM. UC3M, UEM Results: Regarding obstacle detection, the following issues could be highlighted: information fusion of a laser scanner with a positioning system for identifying obstacles in the path, improved criteria for locating obstacles, overcoming limitations of other approaches that ignore the influence of the orientation of the obstacle, and the method of defining the characteristic axes of the obstacles. It has also developed the low-level control layer on the vehicle controls. Automation includes speed control, through action on the accelerator and the brake pedals and the direction through the steering wheel action.
	1. Safety	✓	
	2. Connected vehicle		

ADAS-ROAD Advanced system for driving assistance for inter-urban environments. Budget: 72,600 € Duration: 2014-2016 Funding: MINECO	SRA lines covered by the project:		Description: This project is the continuation of the previous one oriented to interurban environments mainly conventional roads. A collision avoidance system and assistance automatic actions based on information including vehicle mounted sensors and V2X communications have been developed. Participants: INSIA-UPM. UC3M Results: In this project the limitations of only information from onboard sensors or only inter-vehicle communication systems have been overcome, merging both sources and implementing the following applications: <ul style="list-style-type: none"> • Cooperative adaptive cruise control with optimization of consumption with high reliability even in the presence of vulnerable road users (cyclists and motorcyclists) and considering the road orography. • Overtaking assistance System at conventional roads that considers the optimal speed and ideal stretch for overtaking, from the point of view of efficiency and safety. • Intersections assistance with speed control during approach. • Collision avoidance system with the possibility of automatic braking and evasive manoeuvres, as appropriate, paying particular attention to vulnerable road users such as pedestrians, cyclists and motorcyclists.
	1. Safety	✓	
	2. Connected vehicle	✓	
Guidance and control of a passenger car prototype: Instrumented Vehicle for Autonomous Driving Guidance and control of a passenger car prototype: Adapting a vehicle for driving in electric mode Budget: 45,000€ Duration: 2008 - 2009 Funding: Siemens	SRA lines covered by the project:		Description: In this project, a passenger vehicle has been automated for propulsion using magnetic induction, and guided by tracking infrastructure lines. Participants: UPM Results: As results of the project, a vehicle has been automated, developing a low-level control layer acting on the vehicle controls and open to interact with any high-level control layer including mobile phones, computers, obstacle detection, lines monitoring, GPS tracking, etc.
	1. Safety	✓	
	2. Connected vehicle		

Instrumented commercial vehicle for autonomous driving Budget: 57,000 € Duration: 2009 - 2011 Funding: Siemens	SRA lines covered by the project:		Description: As a continuation of the previous project, it has developed the automation of a large commercial vehicle for propulsion using magnetic induction, and guided by tracking infrastructure lines. Participants: UPM Results: With an architecture similar to the one implemented in the previous project, a universal automation solution for steering automation of road vehicles, valid regardless of the type of assistance system in each vehicle has been proposed.
	1. Safety	✓	
	2. Connected vehicle		
IVIEW Feasibility study for the implementation of Cooperative Systems Duration: 2010 - 2011 Funding: Ministerio de Industria, Turismo y Comercio. Plan Avanza	SRA lines covered by the project::		Description: The objective of this project is to assess the feasibility of implementing cooperative systems and services in Spain, analyzing barriers, entities involved and next steps. Participants: INSIA-UPM, ITS España Results: Within this project, undertaken at the initiative of ITS Spain, different entities related to the deployment of cooperative systems in Spain have been involved, in order to discuss the issues that can slow or enhance its presence in the Spanish roads. The Green Paper of Cooperative Systems was published.
	1. Safety		
	2. Connected vehicle	✓	

IVANET Mesh communications for intelligent vehicles and infrastructure Budget: 37,000€ Duration: 2011 –2014 Funding: MICINN	SRA lines covered by the project:		Description: The objective of this project is the establishment of a communications architecture that supports the deployment of some applications of cooperative systems. Within this project, a communications module is developed to provide V2X connectivity, at both hardware and software levels. Participants: INSIA-UPM Results: The modules of short-range communications DSRC ITS- INSIA have been developed entirely in the INSIA , both hardware and software and are low cost, modular, low-power and follow all standards and regulations for installation in any road vehicle or infrastructure, being able to support communications between vehicles (V2V), with infrastructure (V2I) and personal (V2P). Its main features are: <ul style="list-style-type: none"> • Communications IEEE 802.11p • Communications IEEE 802.11n (to convert the module into a WiFi access point) • GPS • Bluetooth • CAN Bus (and OBDII) • RJ -45 LAN Connectivity • 3G Connectivity
	1. Safety	✓	
	2. Connected vehicle	✓	
AVESE Realtime safe speed warnings according to type of vehicle and road conditions with mobile phones: development and impact analysis Budget: 37,000€ Duration: 2014 - 2015 Funding: Ministerio de Interior. Dirección General de Tráfico (DGT)	SRA lines covered by the project:		Description: This project aims to develop a system of warning the driver of the safe speed in each road section, taking into account the characteristics of the vehicle, road, weather and traffic, using short- and long-range communications. Participants: INSIA-UPM Results: The warning system developed is based on a mobile phone that receives information from a server on road conditions and communications modules developed in the previous project for more local circumstances of each road section through V2I wireless communications. The system is valid for passenger cars and commercial vehicles and generates target safe speeds at each moment.
	1. Safety	✓	
	2. Connected vehicle	✓	





REMOTE DRIVE Drive -By -Wire for conventional vehicles in exploration mission of the terrain and driving through preprogrammed waypoints Budget: 226,700 € Duration: 2015 - 2017 Funding: Ministerio de Defensa	SRA lines covered by the project:		Description: The objective of this project is the development of a tele -operated vehicle , with the option of tracking paths through waypoints, including obstacle detection to recalculate the trajectory Participants: INSIA-UPM. ITM-INTA Results: The end product of this project will be a tele operating military vehicle that allows active prospecting of conflict areas without endangering troops, assessing the danger and the viability of the convoy of troops cross that area. For this purpose, it will be equipped with vision systems and laser obstacle detection scanner and a TV remote operation system including system display and control interface.
	1. Safety		
	2. Connected vehicle		

Universidad Politécnica de Madrid (TRANSYT – Center for Transport Research)			 	
ETSI Caminos, Canales y Puertos St. Profesor Aranguren Madrid Tel: 0034 91-336-6656 www.transyt.upm.es	28040 Madrid Fax: 91 336 5362	Contact: Andrés Monzón de Cáceres Head of TRANSYT andres.monzon@upm.es José Manuel Vassallo Magro Professor josemanuel.vassallo@upm.es		
<p>▲ Description</p> <p>Universidad Politécnica de Madrid (UPM) is the largest Spanish technological university. Its research stands out thanks to its highly-qualified professionals and its competitiveness at an international level. UPM headed the Spanish University participation in the 7th European Framework Program with more than 83 M € funding. Transport Research Center is a UPM Research Center located in Civil Engineering School, aiming at generating management capacity and participation in programs, transferring knowledge to the scientific community and the society as a whole within the transport sector, serving as a link between universities and different transport authorities, etc.</p>				
<p>▲ Main activities and products</p> <p>The Transport Research Centre has two main research areas:</p> <ul style="list-style-type: none">• The first group covers the analysis of urban mobility, energy efficiency of the transport sector, public transport, users’ acceptability of transport policy measures, etc. The expertise of this branch would be essential to evaluate the consequences of introducing the autonomous vehicle from a variety of perspectives: potential reductions on CO2 emissions and pollutants, impacts on alternative transport systems for both light and heavy vehicle demand (bus, taxi, rail), expected technology-penetration rate, recommendations to improve users’ perceptions towards highly-automated vehicles, changes in travel behaviour, etc.• The second branch especially focuses on economic evaluation, transport financing tools and road demand estimates. In this respect, a variety aspects regarding the introduction of autonomous vehicles could be analysed: business models to be followed in order to achieve a successful implementation of the policy, financing mechanisms to be applied, transport demand evolution over time due to the introduction of autonomous vehicles, etc.				

▲ Related projects		
ICT Emmisions Budget: 2.9 M € (Transyt-UPM: 15%) Duration: 10/2011 - 03/2015 Programme: FP7 http://www.ict-emissions.eu/	SRA lines covered by the project:	
	1. Safety	
	2. Connected car	✓
	Description and objectives: This project aims at developing a novel methodology to evaluate the impact of ICT related measures on mobility, vehicle energy consumption and CO2 emissions of vehicle fleets at the local scale, in order to promote the wider application of the most appropriate ICT measures. UPM'S role is to simulate the traffic behavior of the different ICT measures analyzed in the project, as well as to coordinate the definition of the different case studies (Madrid, Turin and Rome) and the simulations of all the ICT measures simulated by the different partners. Participants: 11 – AUTH, CRF, AVL, BM, UPM, 5T, POLIS, IVECO, RSM, MAD, JRC Results: A methodology to calculate and upscale the impacts on traffic and emissions of several ICT measures (Green navigation, eco-driving, variable speed limits, urban traffic control, ADAS and Start&Stop) Impacts of these measures at both micro and macro scale, considering different traffic situations and penetration levels.	
City-HUB Budget: 1.3 M € (Transyt-UPM: 15%) Duration: 09/2012 - 02/2015 Programme: FP7 http://www.cityhub.imet.gr	SRA lines covered by the project:	
	1. Safety	
	2. Connected car	✓
	Description and objectives: This project aims at contributing to the design and operation of seamless, smart, clean and safe intermodal public transport systems, addressing, at the same time, how these interchanges should be designed in order to ensure that “vulnerable” target groups, i.e. the elderly, youth, physically and mentally handicapped people can adequately benefit from these interchanges. Participants: 9 -(TRANSyT-UPM, KTI, TOI, CERTH, NEA (PANTEIA), TRL, VTT, IFSTTAR, CDV) Results: Development of an integrated business model. This integrated model has been validated through a set of European case studies. Set of methodological guidelines addressing different aspects of an urban interchange and promoting public transport. The methodological guidelines will be fully exploited through a European transferability exercise and dissemination initiatives to target groups throughout Europe.	

ASCIMER Budget: 0.3 M € (Transyt-UPM: 100%) Duration: 01/2014 - 01/2017 Programme: EIBRUS http://eiburs-ascimer.transyt-projects.com	SRA lines covered by the project: 1. Safety 2. Connected car	Description and objectives: The overall goal of this project is to develop a comprehensive framework to help public and private stakeholders to make informed decisions about Smart City investment strategies and to build skills to evaluate and prioritize these kinds of projects, including solving difficulties regarding deployment and transferability. Participants: 1 (UPM) Results: project In process.
Road Infrastructure Design for Optimizing Sustainability Budget: 47,060 € (Transyt-UPM: 100%) Duration: 11/2012 -11/2013 Programme: STAREBEI http://www.starebeiupm.transyt-projects.com/	SRA lines covered by the project: 1. Safety 2. Connected car	Description and objectives: This research lies in the theoretical that, for each road, there is an optimum design that optimizes the life-cycle cost. The core objective of this research is to develop an instrument to help decision-makers select the most adequate road infrastructure design from the point of view of sustainability –social, environmental and economic across the life-cycle. Participants: 1 (UPM) Results: A complete review on the current assessment tools of sustainability applied to transport infrastructure projects. It includes an explanatory and comparative analysis of the tools and methods in terms of their effectiveness to appraise sustainability. A new methodology to set the weights of the sustainability criteria used in the multi-criteria decision analysis in order to reduce subjectivity and imprecision. Criteria weights were obtained based on both expert preferences and the importance that the sustainability criteria have in the geographical and social context where the project is developed. A novel methodological approach that combines the cost-benefit analysis (CBA) and the multi-criteria decision analysis (MCDA) to accurately appraise the sustainability of road projects. This model is called STAR (Sustainability Tool for the Appraisal of Road Projects).

TECHNOLOGY OPTIONS FOR THE EUROPEAN ELECTRONIC TOLL SERVICE: Budget: 40,000 € (Transyt-UPM: 75%) Duration: 11/2013 - 03/2014 Programme: European Parliament Think Tank http://www.europarl.europa.eu/thinktank/en/document.html?reference=IPOL_STUD%282014%29529058	SRA lines covered by the project:		Description and objectives: The overall goal of this project is to review current and future technological options for the European Electronic Toll Service (EETS). It discusses the strengths and weaknesses of each of the six technologies currently in existence. It also assesses on- going technological developments and the way forward for the European Union. Participants: 2 (Steer Davies Gleave, UPM) Results: project: Analysis of the performance of current and emerging electronic toll collection systems from different points of view: accuracy, data protection, evaluation of costs, interoperability, etc. Identification of the areas in which technological developments can contribute to progress in non-technical areas: stakeholder acceptance, ownership cost, demand for interoperability, etc. Set of proposals for developing the implementation of a harmonized ETC approach. Design of a framework for progress for EETS, and policy recommendations on a European EFC strategy.
	1. Safety		
	2. Connected car	✓	

MONDRAGON Automoción			
Uribarri Etorbidea, 19 Mondragon Tel: 0034 943719188 www.mondragon-corporation.com	20500 Gipuzkoa Fax: 0034 943719189	Contact: Mikel Uribe-Altuna Mikel@mondragonautomocion.com Technical Director	
<p>▲ Description</p> <p>MONDRAGON Automoción is a group of companies supplying the world’s main automotive manufacturers and Tier 1 companies. We collaborate with clients at the design and development, manufacturing and supply stages in two main activities: 1) Modules and Components: Development of products ranging from components to automotive modules using iron and aluminium casting and plastic and composite technologies. Companies: FAGOR Ederlan Group, Mapsa, Ecenarro, MAIER Group, Cikautxo, FPK Lightweight, BATZ Systems, FAGOR Electronics, and 2) Machinery and Tools for advanced manufacturing: Design, production and start-up of automation solutions such as Stamping, Foundry, Assembly, Tool and die manufacturing systems including Turnkey projects. Companies: Matrici, Batz Troquelería, MB Sistemas, Aurrenak, Loramendi and Fagor Arrasate.</p>			
<p>▲ Main activities and products</p> <div><div><p>Fagor Electrónica</p></div><div><p>With an industrial experience of more than 25 years in automotive electronics, with Homologation approved on all EU and USA Automotive OEMs, our products in Automotive Electronics for electric and hybrid vehicles include: 1) EPS Electric Power Steering complete solutions, on ISO26262 with HMI-EV-PHEV, V2V, V2I, 2) Electric Powertrain for EVs and PHEVs, 3) Charging stations, from 3kw to 72kw, and 4) Electronics for parts and components with ECU Electronic Control Units.</p><p>Contact: Francisco Javier Acinas. Business Unit Director. Email: fjacias@fagorelectronica.es</p></div></div> <div><div></div><div><p>We are specialists in all KEY-SAFETY components of Brake-Suspension systems. Capable of offering the best option concerning innovation, key weight, material, process and cost for both components and modules within the global dimension required by the market. We make knuckles and arms, Brake Discs, Brake Calipers and Modules, Front corners and Rear axles. We are experts in the complete product value chain, consequently we offer the best product solutions in different technologies and materials.</p><p>Our latest electromobility products include niche eL6, eL7 and N1 Electric Vehicles.</p><p>Contact: Jesús Fernández. Promotion and Innovation Director. Email: j.fernandez@fagoredelerlan.es</p></div></div> <div><div></div><div><p>We provide and manufacturing, updated technology used mainly for safety-related parts based on hardening boron steel. We also supply Worldwide to the most important OEMs SAFETY Systems like PEDAL BOXES, customized by platforms, with the highest ratings from EuroNCAP and USNCAP SAFETY standards using our patents and cutting edge technologies.</p><p>Contact: Jatsu Intxaurbe. Promotion and Innovation Director.Email: jintxaurbe@batz.es</p></div></div>			



European leader in automotive decoration, Engineering Novel Multi-technologies to give high aesthetic value to the product and Mastery of Parts with a High Functional Complexity. Decorative Front Grilles, Air inlet grilles, Decorative external Lateral PILLARs, etc, A wide range of products with stringent engineering requirements and advanced SAFETY Functions like pedestrian impact.

Turning design trends into industrial technologies, inspiring details, Coloured clear coat on chrome plating, UV Varnish, Durable High gloss aspect, Laser Marking on Plastic Substrates, Laser Marking on Painting, etc. MAIER's approach to nanotechnology with Bulk thermoplastic nanoreinforced compounds and Nanotechnology applied to functionalise surface properties, Anti-scratch, Self-cleaning, paintability for low surface-energy thermoplastics.


Contact: Ibon Miranda. R&D&I Director. Email: ibomir@mtc.maier.es

▲ Related projects

SPECTRA Smart personal CO2-Free transport in the city, EXTENDED RANDE through regenerative charging and energy efficiency. HMI-EV-PHEV, V2V, V2I Budget: 8,600,000 € Duration: 09/2015 - 10/2018 Programme: CIEN	Líneas API cubiertas por el proyecto:		Description and objectives: CIEN National Project for Electric Vehicles energy efficiency. SMART personal CO2-Free transport in the city, EXTENDED RANDE through regenerative charging and energy efficiency. HMI-EV-PHEV, V2V, V2I. Objectives: Communications inside the vehicle (HMI) and outside the vehicle (V2V-V2I), and ELECTRIC EXTENDED RANGE management through Regenerative charging and Energy efficiency with external CHARGING stations for urban car-sharing. Participants: AYESA, EXIDE, ANTOLIN, JOFEMAR, FAGOR ELECTRONICA.
	1. Safety	✓	
	2. Connected car	✓	

(ANNEX 3) “Portuguese capacities catalogue”


- 32. Brisa Inovação e Tecnologia (Brisa Innovation)
- 33. Cintra (FERROVIAL)
- 34. FEUP - Faculdade de Engenharia da Universidade do Porto
- 35. INESC-ID - Instituto de Engenharia de Sistemas e Computadores, Investigação e Desenvolvimento em Lisboa
- 36. University of Aveiro
- 37. SYSTEC - Research Center for Systems and Technologies/ Faculdade de Engenharia da Universidade do Porto
- 38. LSTS – Laboratory for Underwater Systems and Technologies/ Faculdade de Engenharia da Universidade do Porto
- 39. Instituto de Telecomunicações
- 40. Instituto Pedro Nunes
- 41. Universidade do Minho (Guimarães)
- 42. Institute of Systems and Robotics (ISR), University of Coimbra
- 43. CEiiA – Centro de Engenharia e Desenvolvimento de Produto



Brisa Inovação e Tecnologia (Brisa Innovation)			
Lagoas Park, Edifício 15 - Piso 4 Porto Salvo Tel.: (+351) 214 233 400 www.brisainnovation.com	2740-262 (Porto Salvo - Portugal) Fax: (+351) 214 233 499	Contact: Lara Moura Research and Innovation Manager ext_lmoura@brisa.pt Tel.: (+351) 214 233 418 Mobile: (+351) 967 859 163	
<p>▲ Description</p> <p>Brisa Inovação e Tecnologia (Brisa Innovation) is a BRISA Group company and leading provider of technology, engineering solutions and product innovation to the Brisa's world of concessions and to the market. BRISA Group was established in 1972 and in nearly 40 years, it became one of the largest motorway operators in the world and the biggest transport infrastructure company in Portugal. Currently, in Portugal, BRISA holds six road concessions, operating 17 motorways and covering 1678 km.</p> <p>Brisa Innovation is the company from the Group that is dedicated to research and implementation of innovative solutions that enhance mobility. Brisa Innovation provides a wide range of professional solutions including the design, development, integration and support of critical systems of high availability adjusted to the technological needs of mobility and transport infrastructures' operators. In the last 10 years, our team designed and built intelligent transport systems, information management systems and control systems that enable efficient management of traffic on motorways, tunnels and bridges, under any operating conditions. We envision ourselves enabling efficiency in mobility and transport infrastructure management and operation.</p> <p>Brisa Innovation is strongly committed towards the promotion of mobility as a driver to create important economic and social benefits for the activities and the communities that it serves. In the new Integrated Mobility context, we ambition being a partner in excellence for the development of mobility, transport engineering, ITS solutions and services. Brisa Innovation mission is to research, develop, integrate, install and maintain technological solutions for ITS (Intelligent Transportation Systems), acting as competence centre of state-of-the-art technology, with a view to ensure maximum quality and efficiency in deployed solutions.</p> <p>On par with our duties and responsibilities specifically associated to the operation of the road business, we seek to ensure a strategic and efficient vision of the value chain as a whole, in order to take advantage of in-house skills in know-how, innovation and technology exist.</p>			
<p>▲ Main activities and products</p> <ul style="list-style-type: none">• Mobility: Concepts such as mobility services, congestion management, value added services, cashless tolling, dynamic pricing, automatic incident detection, and interoperable systems are increasingly being implemented as an instrument for enhancing capacity and safety, reducing congestion, improve travel time, and in promoting the use of alternative modes of transport. Brisa Innovation has the capabilities, skills and competencies to apply the integrated mobility concept as part of an overall long-term strategy of initiatives.• Tolling Road-side solutions: Brisa Innovation designs, develops, installs and supports a complete suite of tolling solutions. These allow managing and operating highways toll collection, including single dedicated lanes and multilane systems such as Open-road tolling (ORT, also known as Multilane Free-Flow) or our Automated			

Toll Booths.

- Tolling management systems: We deliver a complete end-to-end solution, from the road-side equipment up to the central systems, such as operational and commercial backoffices.
- ITS and telematics solutions: We plan, develop, install and maintain ITS and telematics solutions for the management and operation of highways' traffic. This includes: video-surveillance and detection systems; variable message signs; weather and environmental stations; traffic counting; and emergency call systems (SOS); among others.
- Traffic management and information systems: Brisa Innovation designs and develops advanced systems and solutions for traffic management, control and information dissemination. This includes: telematics management; monitoring and detection; incident management; and traffic control using several communication channels and media.
- Electronic payment: Developing integrated solutions for extending OBU capabilities to Electronic Payment in areas such as parking lots; fuel stations, car washing and restaurant's drives, such as McDonald's™.
- Automatic access control: We design and implement advanced solutions for public and private zones' access management and control for private areas, logistics platforms and historic districts.
- Maintenance services: By ensuring a professional service line for routine and corrective maintenance of the transport and technological solutions in place, we allow the value chain to be fed with valuable inputs that promote optimal products and systems' design. The gains are mutually achieved as the client optimises the entire file cycle and fewer reinvestments are needed.
- Consultancy services: Our Consultancy service line provides expert advisory to Organisation struggling with Tolling and ITS operation in mobility and transport systems. We benefit from a consolidated technical expertise, delivering conceived optimal solutions' configuration and design.

▲ Related projects

ICSI – Intelligent Cooperative Sensing for improved traffic Efficiency Budget: 4,5 M€ Duration: 11/2012 – 12/2015 Programme: FP7-ICT-2011-8 http://www.ict-icsi.eu/	SRA lines covered by the project:		Description and objectives: The goal of the project is to define a new architecture to enable cooperative sensing in intelligent transportation systems and to develop a reference end-to-end implementation. The results will enable advanced traffic and travel management strategies, based on reliable and real-time input data. The effectiveness of such new strategies, together with the proposed system, will be assessed in two field trials, one in an urban scenario and the other in the highway environment. Participants: INTECS Informatica e Tecnologia del Software S.p.A, Brisa Inovação e Tecnologia, Consorzio Nazionale Interuniversitario per le Telecomunicazioni, National Research Council of Italy – Institute of Information Science and Technologies, University of Deusto, Forthnet S.A., Faculty of Traffic and Transport Sciences,
	2. Safety		
	3. Connected car 4. ...		

			<p>University of Zagreb, Ikusi – Angel Iglesias S.A., Instituto de Telecomunicações, ObjectSecurity Ltd.,</p> <p>Results:</p> <p>The ICSI system is able to demonstrate the feasibility of an extremely flexible and innovative platform from the architectural point of view, that has been specialized for the ITS context but generally applicable in other contexts and compatible with the IOT paradigm. As a central objective it can be considered the fact of having implemented a distributed intelligence that through the use of local areas allows the process of data and to apply at local level, strategies and algorithms allowing considerable flexibility and scalability of the system.</p>
<p>SCOOP@F Part 2</p> <p>Test deployment of cooperative intelligent transport systems.</p> <p>Budget: 20,000,000 €</p> <p>Duration: 01/2016 - 12/2018</p> <p>Programme: Connecting Europe Facility</p> <p>http://www.scoop.developpement-durable.gouv.fr/en</p>	SRA lines covered by the project:		<p>Description and objectives:</p> <p>SCOOP@F is a project in which cooperative systems implemented in 3000 piloted vehicles are connected along 2000 km of roads linking the countries of Austria, France, Spain and Portugal. Its main objective is to improve the safety of road transport and of road operating staff during road works or maintenance.</p> <p>Participants:</p> <p>French Ministry of Transport, Conseils généraux des Côtes d'Armor, du Finistère, d'Ille et Vilaine, de l'Isère, Conseil régional de Bretagne, City of Saint-Brieuc, PSA, Renault, CEREMA, IFSTTAR, GIE RE PSA-Renault, Université de Remis Champagne-Ardenne, Telecom, ORANGE, DGT, CTAG, IMT, Infraestruturas de Portugal, Brisa Inovação e Tecnologia, Auto-Estradas Norte Litoral and ASFINAG.</p> <p>Results: In progress.</p>
	1. Safety		
	2. Connected car		

Cintra (FERROVIAL)			
Postal Address : Av. Duque d'Ávila, 46 – 8º Tel.: +351.21.351.21.50 URL: www.cintra.es	Post Code: 1050-083 City: Lisboa Fax.: +351.21.315.14.62	Contact: Name: Mafalda Evaristo Job description: Head of IT Email: mafalda@cintraportugal.pt Tel.: +351.21.351.21.50 Mobile: +351 91.724 98 28	
<p>▲ Description</p> <p>CINTRA, FERROVIAL subsidiary, is one of the leading private developers of transport infrastructure in the world in terms of number of projects and investment volume.</p> <p>We manage a portfolio of 26 concessions with a total of 1,242.7 miles. Nowadays, we operate in Canada, United States, Spain, United Kingdom, Portugal, Ireland, Greece, Colombia and Australia. Thanks to our innovative projects and quality standards we have become one of the strongest multinationals in the sector.</p> <p>In Portugal we operate 3 Concessions, namely:</p> <ul style="list-style-type: none">- Via do Infante highway is 129.8 km in length, of which 95 km are refurbished and 35 km on new construction. Connects Lagos with Vila Real de Santo Antonio, via the Portuguese towns of Portimão, Loulé, Faro and Tavira- Norte Litoral Highway runs along the northwest coast of Portugal, from Oporto to Caminha, near the Spanish border, with a branch towards the interior between Viana do Castelo and Ponte da Lima. This highway is 119 km long, and has an electronic toll system with total absence of obstacles for users.- The Euroscut Açores highway, located in the São Miguel Island, is 93.7 km long and is designed on three main axes: The southern axis connects the airport with the south of the Island. The northern axis improves the connection between the Island's two biggest towns. And lastly the north-eastern axis improves connection with São Miguel's less developed population centers.- <p>And a Toll Operator, Vialivre, that assure the MLFF (Multi Lane Free Flow) toll operation of Norte Litoral and Via do Infante. Vialivre originated as a response to the need to change Cintra's highway management model from the shadow toll system to an explicit system. This new model owes its existence to the Portuguese Government's reform of the funding system for transport infrastructures in 2008.</p> <p>At the moment, in Portugal, we are participating in the SCOOP@F – Part 2, with Norte Litoral being one of the Portuguese stakeholders in the Cross Site Tests area of this Project.</p> <p>Every year, CINTRA invests part of its resources in research, development and innovation (R&D&I) in order to implement state-of-the-art technology in its infrastructures. The free-flow concept, together with vehicle fingerprinting, the Tollflow® system and DAVAOPlus project, are clear examples of our vocation for innovation.</p>			

Also, **Cintra** and **Ferrovial**, have been submitting projects to the several **H2020** Programs, related to Autonomous Driving, Connected Infrastructures and Vehicles.

▲ Main activities and products

See above.

▲ Related projects

Title: See above. Budget: Duration: Programme:	SRA lines covered by the project:		Description and objectives: Participants: Results:
	5. Safety	Yes/No	
	6. Connected car		

FEUP - Faculdade de Engenharia da Universidade do Porto			
Postal Address: FEUP - Faculdade de Engenharia da Universidade do Porto Tel.: +351 22 508 2177 URL: www.fe.up.pt	Post Code: 4200-465 Porto City: Porto, Portugal Fax.: +351-22-508 1538	Contact: Name: Pedro Coelho Job description: Coordinator of IDI Email: pcoelho@fe.up.pt ; idi@fe.up.pt Tel.: +351 22 508 2177 Mobile:	
<p>▲ Description Research carried out in the Transport Engineering Unit, integrated in CITTA (Research Centre for Territory, Transports and Environment) spans across a wide range of topics ranging from Traffic Engineering and Safety, with a special emphasis over urban environment related problems, to Management Systems including Intelligent Transport Systems.</p> <p>Expertise Transport Infrastructure Design (Roads and Railways) Transport Economics Traffic Control Traffic Modelling Intelligent Transport Systems Public Transport Planning Railway Operation Road Safety Driver Behaviour (DriS – Driving Simulator) GIS-Transportation Software development: (micro simulation models, traffic control, ...) Data Collection (Instrumented vehicle) Visual Mining and Data Mining of large traffic data sets</p> <p>European Level Projects LIVE - tooLs to Injury preVEntion (2012/15); Call DG MOVE CIVITAS ELAN - Mobilising citizens for vital cities (2008/2012); FP7 ARTISTS - Arterial Streets Towards Sustainability (2001/2004); FP5 PORTAL - Promotion of Results in Transport Research and Learning (2000/2003); FP5</p>			


MUSIC - Management of Traffic Using Traffic Flow Control and Other Measures (1996/1999); FP4
VRUTOO - Vulnerable Road User Traffic Observation and Optimization (1992/1994); FP3

▲ **Main activities and products**

See above.

▲ **Related projects**

Title: See above. Budget: Duration: Programme:	SRA lines covered by the project:		Description and objectives: Participants: Results:
	7. Safety	Yes/No	
	8. Connected car		

INESC-ID - Instituto de Engenharia de Sistemas e Computadores, Investigação e Desenvolvimento em Lisboa			
Postal Address: Rua Alves Redol, 9, Lisbon, Portugal Tel.:Tel. +351.213100300 URL: www.inesc-id.pt	Post Code: 1000-029 City: Lisbon Fax.: +351.213145843	Contact: Name: Ilda Ribeiro Job description: European Projects Email: ilda.ribeiro@is.inesc.pt Tel.: +351.213100424 Mobile:	
<p>▲ Description</p> <p>INESC-ID, is a not for profit, privately owned institution of public interest, dedicated to advanced research and development in the domains of electronics, telecommunications and information technologies.</p> <p>Researchers at INESC-ID are in their vast majority university staff and graduate students. INESC-ID initiated activity in the year 2000 as a result of a reorganization of INESC. The principal objectives of INESC-ID are to conduct cutting-edge research in the fields of information technology and to transfer technology to the industry by means of R&D contracts and training courses. Innovation and Technological Transfer has always been considered as a key field of INESC-ID's actions. It is well known for its importance in creating and increasing the value of the Portuguese SME's, with which the institution maintains close links through various contracts of technical and specialized assistance. In fact, INESC-ID combines an entrepreneurial management with academic creativity, which results in a special institutional flexibility. Since 2004 INESC-ID is one of the few Portuguese Associate Labs “Laboratório Associado” funded partially by the Portuguese government.</p> <p>INESC-ID has about 225 researchers. Of these, at least ninety are senior researchers holding a PhD degree or equivalent, and the remaining are preparing their PhD or Master’s dissertations. Since IST is the main owner of INESC-ID, the majority of researchers also have teaching positions at IST. On the whole, INESC-ID has about 150 graduate students, who receive grants from the Portuguese Foundation of Science and Technology (FCT), or are supported by research contracts.</p>			
<p>▲ Main activities and products</p> <p>INESC-ID activity covers a broad range of topics making the institution particularly well suited for multidisciplinary projects. Its activity is organized in five major areas:</p> <ul style="list-style-type: none">• Interactive Intelligent Systems, which includes topics such as the spoken language systems, intelligent agents and multimodal interfaces.• Information Systems and Decision Support, which includes topics such as knowledge discovery and bioinformatics, information systems, data management and information retrieval.• Computer Systems and Communication Networks, which include topics such as software engineering, distributed systems, mobile systems and communication networks.• Embedded Electronic Systems encompassing topics as signal processing systems; the design of digital, analog and mixed circuits; hardware / software co-design; the automation of electronic systems design; algorithms for optimization and simulation; and algorithms and tools for solving systems with restrictions.			




- Energy Systems, which includes issues such as control of dynamical systems, alternative energies, the electromechanical energy conversion, electronic power, power systems and energy policy.

During the period of 2010 to 2015, INESC-ID participated in 162 projects, leading 78 of them. From the 162 projects, 30 were funded by International and European Program, 96 were funded by the National Scientific Foundation (FCT- Fundação para a Ciência e Tecnologia) and 36 are bilateral projects, funded by industrial partners, with a total funding around 18.5 M€.


▲ Related projects

Title: TRACE - Opening The cycling and walking tracking potential Budget: 2.896k€ Duration: 2015-2018 Programme: H2020	SRA lines covered by the project:		Description and objectives: This project will explore the potential of walking and cycling tracking services to promote walking and cycling mobility. We will focus on established walking and cycling promotion measures and thoroughly assess the potential of ICT based tracking services to overcome barriers to implementation and finding new factors driving the effectiveness of those measures. Through specific research, the related ICT challenges like scheme dynamics, privacy, trust, low-cost, interoperability and flexibility will be tackled for each type of measure. The measures to target will be established to promote walking and cycling travel to workplace, shopping, school and leisure promotion measures. We will investigate both the ability that tracking tools may have to address traditional challenges of these measures and their potential to bring new features in the fields of awareness raising, financial/tax incentives, infrastructure planning and service concepts. A common, flexible and open access tool will be developed to provide an ICT input and output platform that addresses the related ICT challenges. Participants: Energy Agency of Plovdiv (Other), Faculty of Traffic and Transport Engineering (University), INESC-ID (Other), Ljsberg Consultants (Company), LuxMobility (Company), MOBILE 21 (Company), Municipality of Águeda (Other), Municipality of Breda (Other), POLIS (Other), Southend on sea Borough Council (Other), SRM reti e Mobilità Bologna (Other), TIS, (Other) and University of Belgrade (University). Results: In progress.
	9. Safety	✓	
	10. Connected car		
Title: FIOFM - Vehicular Network for Bus Transportation Services Budget: 38k€	SRA lines covered by the project:		Description and objectives: The project aims to design and implement a vehicular network for a fleet transportation operator so that different type of information (tex, images or short video) can be sent and delivered to the operational center, using connectivity among bus to transfer data and delivery it to the operational centre. Participants: INESC-ID, INOV, TECMIC
	1. Safety	✓	
	2. Connected car 3. ...	✓	

Duration: 2013-2014 Programme: Bilateral cooperation - Industrial Partner Funding			Results: Vehicular Ad-Hoc Network (VANET) based on On-board Units (OBUs), integrated with OBD-2 bus, with Vehicle-to-Vehicle and Vehicle-to-Infrastructure communication and QoS support.
Title: I2D - Intelligence to Drive Budget: 132k€ Duration: 2011-2016 Programme: Bilateral cooperation - Industrial Partner Funding	SRA lines covered by the project:		Description and objectives: This project aims to develop a device able of collecting, on-board of a vehicle, a set of data that is usable for various applications: estimation of fuel consumption and emissions, production of indicators in terms of safety and comfort, maintenance and fault records, or simply to obtain data for the evaluation and qualification of driving behavior. The device processes the collected information, stores it in flash memory and transmits it via a bidirectional link data via mobile network (GPRS) using IP (Internet Protocol) to a server on the Internet. The device is connected to the OBD port, from which receives power supply and collects the information available in accordance with the standard EOBD. It also has additional sensors to measure atmospheric pressure (altimeter), vehicle acceleration in three axes and a GPS receiver. The device also supports Bluetooth and USB connectivity and it can operate autonomously in the event of loss of power supply from the OBD port. Participants: INESC-ID, AID-FCT, CMU, IT, Portugal Telecom, Priberam Informática Results: OBUs with real-time communication capabilities. ...
	1. Safety		
	2. Connected car 3. ...	✓	
Title: ISTS Shared Mobility Services Budget: 50k € Duration: 2015-2016 Programme: Bilateral cooperation – academic partner	SRA lines covered by the project:		Description and objectives: This project aims at providing a real-time platform for the support of shared mobility within the IST community. The platform manages booking and access control of the IST shuttle service and provides traffic and geo-referenced information. Participants: INESC-ID, IST Results: IST Shared mobility platform. ...
	1. Safety	✓	
	2. Connected car 3. ...	✓	

University of Aveiro			
Campus de Santiago +351 234 370 200 www.ua.pt	3810-193 Aveiro	Contact: Vitor Santos Associate Professor vitor@ua.pt +351 234 370 828 +351 927 992 318	
▲ Description The University of Aveiro (UA) is among the most dynamic and innovative universities in the country. UA has around 15000 students and a unique model of governance (16 Departments, 4 Polytechnic Schools and various training centres) and seeks to develop and maintain a supportive research environment, where researchers can count with a solid and experienced administrative, financial and legal structure. (more details in http://www.ua.pt/page/14556)			
▲ Main activities and products UA has a strong research profile contributing to the progression of science and technology, and a privileged partner to companies and other national and international organizations with which cooperate in numerous projects, providing important consultancy and services. UA is also an actor as a regional network for education and training by promoting strong links with the surrounding community. During 2013, 501 projects were active in UA, of which 71 were financed by international and European Programs. In FP7, UA is/was involved in 52 projects. These projects are developed by 18 research centres of several scientific areas (environmental and marine sciences; materials; nanoscience and nanotechnologies ; telecommunications; electronics; telematics; mechanical technology; automation; geosciences; cellular biology; organic chemistry of natural products; mathematics; education; behavioral sciences; languages and cultures; technologies and communication sciences; governance, competitiveness and public policy; politics for higher education; music and design).			
▲ Related projects			
ATLASCAR Budget: +100 k€ Duration: 2010-2016 Programme: Multiple sources (internal budgets, sponsors,	SRA lines covered by the project:		Description and objectives: ATLASCAR is an Autonomous Car project that evolved from the original ATLAS project created in 2003 where autonomous robots have been developed for competitions in Autonomous Driving Challenges (http://web.atlas.ua.pt). The ATLAS autonomous robots were national champions in those competitions for 6 successive years, and then focused on the development of the ATLASCAR whose main objectives are the development of
	11. Safety		
	12. Connected car		

governmental funds)			<p>Autonomous Driving and Driving Assistance Solutions (ADDAS). One of the main focus has been on rich and redundant sensorization or a real car for the purpose of environment perception and local navigation.</p> <p>Participants:</p> <ul style="list-style-type: none"> • Department of Mechanical Engineering (DEMUA); • Center for Mechanical Technology and Automation - TEMA (2010-2012); • Institute for Electronics and Informatics Engineering of Aveiro - IEETA (2014-...). <p>Results:</p> <p>The most visible result is an adapted real car duly instrumented and computer-actuated for environment perception and autonomous navigation, becoming the first, and so far unique system of the kind in Portugal.</p> <p>Many engineering, technical and scientific challenges were overcome, not only on advanced perception and autonomous manoeuvring, but also in concepts of assisted and shared driving where commands to operate the car can be shared among computers and human driver simultaneously. The project also achieved the first prize in the Freeboots national competition that took place in 2011. Additionally, many journal and conference publications originated from the activity in this project, mainly related to perception, sensor fusion and sensor calibration.</p> <p>Between 2011 and 2016 the project has given support to the conclusion of:</p> <ul style="list-style-type: none"> • 1 Post doc fellowship. • 3 European PhDs Thesis. • 20 Masters Thesis in Mechanical Engineering and in Electrical Engineering.
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SYSTEC - Research Center for Systems and Technologies/ Faculdade de Engenharia da Universidade do Porto			<div><div>SYSTEC</div><div>RESEARCH CENTER FOR SYSTEMS & TECHNOLOGIES</div></div> <div><div><div>U.PORTO</div><div>FEUP FACULDADE DE ENGENHARIA UNIVERSIDADE DO PORTO</div></div><div></div></div>	
Rua Roberto Frias, s/n, i218 Tel: +351 22 041 3211 http://systec.fe.up.pt	4200-465 Porto Fax: +351 22 508 1443	Contact: Fernando Manuel Ferreira Lobo Pereira Full Professor flp@fe.up.pt		
<div><div>▲</div><div>Description</div></div> <p>SYSTEC is hosted at FEUP and uses existing infrastructures and resources to promote: (i) academic excellence, (ii) worldwide networking with institutions and researchers with opportune scientific affinities to ensure the critical mass, (iii) interaction with end-users and stakeholders to promote the tuning with challenge-driven innovation dynamics, and (iv) integration with advanced formation activities. To efficiently affirm the purpose of SYSTEC, the research center is organically integrated into a framework designed to address real world challenges by articulating the theoretical and applied developments in 3 Thematic Lines (TL):</p> <ul style="list-style-type: none">• SYSTEC-CONTROL: Systems, Control, Optimization, and Estimation Technologies,• SYSTEC-NET: Networked Robotic Vehicles and Systems Technologies,• SYSTEC-ENERGY: Smart Energy Systems and Technologies. <p>The TL SYSTEC-CONTROL is focused on providing fundamental results on optimal control theory, optimization-based control, application driven control strategies, modeling and estimation, large scale, distributed (including multi-dimensional) and structured systems. Another important role is to develop dedicated stand-alone estimation, optimization and control algorithms and prototypes for a wide range of applications, and environments providing not only methods and tools for the other 2 TLs, but also in other application fields (e.g., health care, agriculture).</p> <p>SYSTEC-NET is highly interdisciplinary by combining and exploiting key developments in systems and control theory, optimization and optimal control, hybrid systems, verification and reachability, networked control systems, computational architectures for consistent information flow and deliberative capabilities, and mobile robotics with the goal of developing, promoting and transferring advanced engineering systems and technologies, with special focus on networked operations of multiple remotely operated, and autonomous aerial, surface and underwater robotic vehicle systems.</p> <p>SYSTEC-ENERGY is highly focused on challenges arising in the emerging concepts and technologies encompassing new renewable generation systems, new electric traction systems, distributed and smart energy systems, incorporating electronic and advanced processing technologies into all energy systems in order to benefit of any primary renewable power source and optimize societal utilization of energy.</p> <p>Along the thematic lines, challenges from real-world are extracted and give rise to the formulation pertinent research challenges to the scientific areas. This bidirectional interaction - (i) research excellence at the service of real-world problems, and (ii) real-world challenges inspiring breakthroughs in fundamental research - promotes the regional smart specialization agenda through cooperation between SYSTEC and companies, particularly SMEs and other societal organizations.</p>				

This structure is designed to promote the progress towards a unifying long term vision in which theoretical developments will evolve in such a way as to match the complex requirements of the emerging challenges inherent to the complexity of the real-world systems, notably, the various classes of complex, large scale and structured networked systems.


▲ Main activities and products

The Research Center for Systems and Technologies (SYSTEC) sets forth the key goals of:

- performing fundamental and applied research and development to deepen the knowledge in the areas of systems, control, optimization, estimation, robotics, networked and vehicle systems, and power electronics for transport & energy driven by high impact academic, societal, industrial, and entrepreneurial challenges, and
- contributing to the valorization and transfer of the generated knowledge and products to society.

▲ Related projects




Safe-DuST - Support for Safety-Critical Applications in Dual-Scheduled TDMA-based Networks	SRA lines covered by the project:		Description and objectives:
Budget: 60,000 €	1. Safety	✓	Main Research Area: Computer Engineering
Duration: 04/2013 - 12/2015	2. Connected car	✓	Keywords: Fault-tolerance; Safety-critical systems; Distributed systems; Embedded systems Reference: <i>PTDC/EIA/74313/2006</i>
Programme: FCT			Participants: IDMEC, FEUP, ISR
https://www.fct.pt/apoios/projectos/consulta/vglobal_projecto?idProjecto=74313&idElemConcurso=895			Results:
SELSUS - Health Monitoring and Life-Long Capability Management for SELF-SUSstaining Manufacturing Systems	SRA lines covered by the project:		Description and objectives:
Budget: 5,397,345.00€	1. Safety	✓	SelSus is an industrial driven project that aims to develop innovative solution for health monitoring and life-long

<p>Duration: 2013 - 2016</p>	<p>2. Connected car</p>		<p>capability management for SELF-SUSstaining manufacturing systems. The Consortium is constituted on the basis of the project's needs and provides excellent coverage both in terms of industrial and scientific competences and complementarity. The SelSus consortium bases upon a thoroughly chosen group of 15 industrial and scientific partners from 6 European member states. Assuring the objectives of SelSus the consortium offers valuable experiences in the following fields: Life-Cycle Assessment and Simulation, Self-health monitoring Devices, Multi-modal data acquisition and analysis, Self-Diagnosis models and algorithms and Engineering Methodologies.</p> <p>The vision of SelSus is to create a new paradigm for highly effective, self-healing production resources and systems to maximise their performance over longer life times through highly targeted and timely repair, renovation and up-grading. These next generation machines, fixtures and tools will embed extended sensory capabilities and smart materials combined with advanced ICT for self-diagnosis enabling them to become self-aware and supporting self-healing production systems.</p> <p>Distributed diagnostic and predictive repair and renovation models will be embedded into smart devices to early prognosis failure modes and component degradations. Self-aware devices will built on synergetic relationship with their human operators and maintenance personnel through continuous pro-active communication to achieve real self-healing systems. This will drastically improve the resilience and long term sustainability of highly complex manufacturing facilities to foreseen and unforeseen disturbances and deteriorations thereby minimising energy and resource consumption and waste.</p> <p>The SelSus vision will be achieved by the development of a new synergetic diagnostic and prognosis environment which is fully aware of the condition and history of all the machine components within a system or factory and is in constant knowledge enriched dialogue with their human personnel. The SelSus project will adopt a systematic approach, supported by a well-defined work plan. The work plan comprises nine carefully defined work packages. In order to guarantee fully committed teams towards comprising goals, the number of individual work packages is kept clearly constrained. The strong industrial pull for the project will be translated into a clear set of industrial requirements aimed at well-defined demonstration scenarios from the automotive and white goods industry.</p>
<p>Programme: European Commission, FP7-NMP</p>			<p>Participants: FRAUNHOFER, THE UNIVERSITY OF NOTTINGHAM; THE MANUFACTURING TECHNOLOGY CENTRE LIMITED LBG; HARMS & WENDE GMBH & CO KG; ELECTROLUX ITALIA S.P.A.; XETICS GMBH; IEF WERNER GMBH; Advanced data processing GmbH; GAMAX Számítástechnikai Kft; HUGIN EXPERT AS; INSTITUTO DE SISTEMAS E ROBOTICA; FORD MOTOR COMPANY LIMITED; CENTRE FOR ENGINEERING AND MANUFACTURING EXCELLENCE LTD LBG; INOTEC LTD; LOUGHBOROUGH UNIVERSITY; HSSMI LIMITED</p>
<p>http://www.selsus.eu</p>			<p>Results:</p> <p>The vision of SelSus is to create a new paradigm for highly effective, self-healing production resources and systems to maximize their performance over longer life times through highly targeted and timely repair, renovation and up-grading. These next generation machines, fixtures and tools will embed extended sensory capabilities and smart materials combined with advanced ICT for self-diagnosis enabling them to become self-aware and supporting self-healing production systems. Distributed diagnostic and predictive repair and renovation models will be embedded into smart devices to early prognosis failure modes and component degradations. Self-aware devices will build on</p>

			synergetic relationship with their human operators and maintenance personnel through continuous pro-active communication to achieve real self-healing systems. This will drastically improve the resilience and long term sustainability of highly complex manufacturing facilities to foreseen and unforeseen disturbances and deteriorations thereby minimizing energy and resource consumption and waste.
MICROGERAÇÃO “Aproveitar a MicroGeração Acrescentando Valor à Energia Produzida e Qualidade de Serviço à Rede Eléctrica”.	SRA lines covered by the project:		Description and objectives:
Budget: 191,328.00€	1. Safety	✓	<p>Renewable energy generation is an area which demands for new studies due to extension of its application domain to low/medium power sources that have caused and keep on causing an evolution following two significant orientations, in next future: power of the renewable plants, wind, solar, and others has come down, appearing the valued concepts of micro-generation and dispersed generation – being attributed economical worth to any site able of generating power to small consumers; and so, interconnection with the grid is multi-point and at low voltage. For small producers, analysis of the energy potential of a site é performed taking into consideration renewable alternative sources. So, within micro-generation and dispersed generation they appear new issues associated with specific problems of this domain: How to optimize simultaneous energy sources, keeping on MPPT operation for each one and considering their stochastic primary energies; How to contract a nominal power to be delivered to the grid; How to keep high standards for energy quality, in conditions of low voltage grid/very low short-circuit power and large dissemination of renewable sources in the sector of the network. Grid connection of renewable sources based on power conversion has been studied in its technical consequences to electrical grid since a lot of years, namely harmonic content and active and reactive power flow.</p> <p>These issues associated to grid connection are the frame to formulate this project, now extending the domain to the new domain – low power /low voltage grid/ simultaneous generation/ dispersed generation/ dissemination of the generating plants. So, they are objectives of the Project to get knowledge and to develop technologies that support development of the micro-generation, namely:</p> <ol style="list-style-type: none"> 1. Topologies to integrate and to optimize integrated generation of several renewable energy sources; namely: 2. Analysis and optimization – Through developing very short-term forecasting methods, of operation conditions for simultaneous optimum generation of dispersed sources, namely wind ones, photovoltaic and hydrogen based ones; 3. Operational analysis of storing energy, as method to improve generated energy quality; 4. Experimental validation of results to carry out;
Duration: 06/2010 - 05/2013	2. Connected car		
Programme: FCT			
http://sigarra.up.pt/ant/feup/projectos_geral.mostra_projecto?P_ID=1575			
			Participants: FEUP / ISR
			Results: Generalization of results, from scalable prototype and dissemination of results. To accomplish these objectives demands for developing and applying model s and computational tools – some of them already carried out by previous work of the research team, as well as to design and build a prototype putting available in the lab

			experimental conditions to validate the project results and taking in consideration the prototype scalable power to generalize conclusions to higher power domain.
ASSESSMENT AND DEVELOPMENT OF INTEGRATED SYSTEMS FOR ELECTRIC VEHICLES	SRA lines covered by the project:		Description and objectives:
Budget: 56,964.00 € of 471,465.00 €	1. Safety	✓	<p>The work is based on 3 universities and 4 industrial partners: SIMOLDES, EFACEC, CEIIA and INTELI.</p> <p>During the project prototypes will be built, based on the previous development program involving numeric modelling: the control system of the vehicle; the connection for fast/slow re-charging; and a motor-in-wheel unit. This design will also be incorporated into the test of a (mule) vehicle.</p> <p>The testing will take place at a test track facility near Braga.</p> <p>The potential use of bio-composites materials in automotive components, based in biodegradable polymers and natural reinforcements is being made and a case study, involving an interior door module, will be carried out. A wide study of sustainability will be conducted, with the global electric vehicle concept in mind. Studies of the effect of different concepts will be carried out in order to evaluate the compromises at different scenarios of use. A life cycle analysis will be conducted, as well as an analysis of car owner behavior concerning battery recharging periods and electric energy needs.</p> <p>Participants: UMinho, FEUP, UTL/IST</p> <p>Results: The outcome of this project is the design, assembly, test and evaluation of sustainability and manufacturability of prototypes of various systems to be included in Electric Vehicles. For this objective, the following tasks will be completed: Development of theoretical models for powertrain and energy generation/storage system Laboratory/prototype implementation/test of that system Mechanical design, design for manufacture and test of unit motor-in-wheel Design of manufacturing solutions enabling the use of (green) bio-composites Assessment, design and implementation of a prototype of power grid – electric vehicle connection Sustainability assessment (including life cycle analysis) of different design solutions of different electrical vehicles</p>
Duration: 2009 – 2013	2. Connected car	✓	
Programme: Compete			
http://sigarra.up.pt/ant/feup/projectos_geral.mostra_projecto?p_id=1367			
Optimal Control for Constrained Hybrid Systems	SRA lines covered by the project:		Description and objectives:
Budget: 75,792.00€	1. Safety	✓	<p>This project aims at:</p> <ol style="list-style-type: none"> 1. Address the increasingly important class of Hybrid Systems (HS) using Optimal Control (OC) methodologies, in particular the paradigms of multiprocesses and impulsive systems. 2. Continue to develop fundamental tools and results in OC for constrained and nonlinear systems, with specific focus on results with interest to HS.
Duration: 01/2010 - 01/2013	2. Connected car		

			3. Show the importance and potential benefits of optimal control tools to a wider research community. Virtually any control problem that is challenging to the research community is nonlinear and has constraints in the inputs and/or states. Many of the complex problems that are the focus of attention of the control community nowadays fall within the so-called Hybrid Systems (HS).
Programme: FCT			Participants: FEUP, UMINHO, ISR
www.fe.up.pt/~faf/ProjectFCT2009			Results: Robotic systems are an illustrative example of these two statements: most are nonholonomic and therefore intrinsically nonlinear (cannot be dealt with linear control methods); have constraints on the inputs (limits on the actuators) and on the states (obstacles in the path, safe distances, velocity limits); the description of their evolution is best modeled combining continuous-time dynamical systems (describing physical laws, energy transfers) and discrete-event driven systems (describing the logic of higher level control layers and mission events).
OCHERA- Optimal Control: Health, Energy and Robotics Applications	SRA lines covered by the project:		Description and objectives:
Budget: 163,920.00€	1. Safety	✓	Optimal control has been a fundamental tool of engineering design and operation for several decades. Today optimal control is an important tools in different areas including robotics, traffic flow control, power systems, biological systems or virtual economic systems relating management decisions to economic consequences over time. The need to solve real life problems formulated, as optimal control problem has been a driving force not only for the optimal control theory community but also for the numerical analysis and computational community. The literature is rich on optimal control techniques designed to extract information useful to choose the right solvers and to help characterizing the solution of the problems.
Duration: 01/2012 - 12/2015	2. Connected car		
Programme: FCT			
http://paginas.fe.up.pt/~faf/ProjectFCT2012/			Participants: FEUP, UMINHO, UAVEIRO, INESCPORTO, ISR
			Results: Driven by applications it is our aim to contribute with theoretical results in areas like normality of the maximum principle, regularity of solutions and multipliers associated with the solutions of our problems and optimization based control.
REBORN - innovative Reuse of modular knowledge Based devices and technologies for Old, Renewed and New factories	SRA lines covered by the project:		Description and objectives: The vision of ReBORN is to demonstrate strategies and technologies that support a new paradigm for re-use of production equipment in old, renewed and new factories; maximizing the efficiency of this re-use and making the factory design process much easier and straight forward, shortening ramp-up times and increasing production efficiency and flexibility. This paradigm will give new life to decommissioned production systems and equipment, making it possible their “reborn” in new production lines.
Budget: 6,099,933.00	1. Safety	✓	Integration of ReBORN results will extend production equipment life cycle and contribute to economic and

Duration: 09/2013 - 08/2016	2. Connected car		environmental sustainability of production systems without jeopardizing European machinery industry. This new modular production equipment will be re-used between production systems but will require servicing and upgrading. For that European machinery industry will move from an equipment-based business to a value added business, where equipment servicing and equipment knowledge are main business drivers. The proposed paradigm builds on self-aware and knowledge-based equipment that need functionalities to collect and manage information regarding their capabilities and their evolution over time, maintenance, upgrade or refurbishment operations over it lifetime; and information of use and wear. To do so, versatile and modular, task-driven plug&produce devices, with built-in capabilities for self-assessment and optimal re-use will be implemented, along with strategies for their re-use and models for factory layout design and adaptive configuration. ReBORN will demonstrate the technologies for intelligent repair, upgrade and re-use of equipment, the (re-)design of factory layouts and flexible & adaptable production on shopfloor within several industrial demonstration scenarios. Having ReBORN technology available, significant reduced efforts when setting-up and ramping-up production systems will be achieved and a significant step towards 100% re-use will be done.
Programme: FP7			Participants: Harms & Wende, FAGOR, Critical Manufacturing, Centro Ricerche Fiat, IEF Werner GmbH, Fraunhofer IPA Steinbeis-Europa-Zentrum, University of Applied Sciences, University of Oulu, University of Loughborough, GAMAX, Institute of Systems and Robotics, ISG-Industrielle Steuerungstechnik GmbH, Polytechnic University of Madrid, PARO AG, Z.E.C. AG, TECHNAX
http://www.reborn-eu-project.org			Results: A study to assess the relevance of the re-use of existing equipment for manufacturing industry was performed as one of the first project activities. In order to assure that the project ambitions and eventually results find broad acceptance, the external industrial view is of paramount importance. According to the survey the current level of equipment reuse is smaller than 25% in almost 9 of 10 factories, while the potential of equipment re-use within a factory is generally rated in the middle range of total factory equipment.
URready4OS - Autonomous underwater vehicles ready for oil spill	SRA lines covered by the project:		Description and objectives:
Budget	1. Safety		The general aim of this project, co-financed by Directorate-General Humanitarian Aid and Civil Protection of the European Commission, is to join forces to make available to European Civil Protection a fleet of autonomous underwater vehicles (AUVs), unmanned aerial vehicles (UAVs) and unmanned surface vehicles (USVs) with operational capability to intervene against oil spills in European Seas using new cooperative multivehicle robotic technologies. Surface oil is not the only effect of an oil spills. Underwater oil plumes can come from bottom leaks and from surface patches forming subsurface plumes as recently been brought into the public eye during the 2010 Deepwater Horizon incident. This approach will allow us to use relatively lowcost standard sonar and oil-in water sensors, with novel
Duration: 01/2014 - 12/2015	2. Connected car		

			advanced algorithms to get the most out these devices. The distributed intelligence of these devices across the spill will then be able to build up a highly accurate and dynamic image of the spill. The robotic system will also be able to self-organise to improve the monitoring of the oil spill. Ultimately, this cooperating multivehicle robotic technology will allow a cheap, flexible, expandable, precise and rapid decision support system for Civil Protection decision makers, improving the capacity of responding to these events.
Programme: European Comission			Participants: Universidad Politécnica de Cartagena , University of Zagreb , Oceanography Center – University of Cyprus, Spanish Maritime Safety Agency (SASEMAR)
http://www.upct.es/urready4os			Results: The distributed intelligence of the devices across the spill, developed under the URREADY4OS project, will then be able to build up a highly accurate and dynamic image of the spill. The robotic system will also be able to self-organise to improve the monitoring of the oil spill. Ultimately, this cooperating multivehicle robotic technology will allow a cheap, flexible, expandable, precise and rapid decision support system for Civil Protection decision makers, improving the capacity of responding to these events.
PITVANT - Programa de investigação e tecnologia em veículos aereos não tripulados	SRA lines covered by the project:		Description and objectives:
Budget: 2,000,000.00€	1. Safety	✓	PITVANT is a joint project between the University of Porto (UP) and Portuguese Air Force Academy (AFA). This research and development effort is supported by the Portuguese Defense Ministry. The primary goals of this project are: Generation of operational know-how on UAS operations for the Portuguese military and security forces; Development of technological know-how on UASs, their subsystems, and UAS integration; Development of fully operational UASs; Definition, testing, and validation of UAS ConOps; Development of state-of-the-art UAV flight controllers for multiple and heterogeneous vehicles' operations; Development of mixed initiative control of heterogeneous vehicles over inter-operated networks. The project began at the end of 2008 with a projected 8 year runtime. Currently the PITVANT project operation statistics count with a total of more than 700 flights and 320 hours of accumulated flight time.
Duration: 09/2008 - 11/2015	2. Connected car	✓	
Programme: MDN - Ministério da Defesa, Investigação e Tecnologia			Participants: UPorto, FEUP, AFA
http://www.emfa.pt/www/po/unidade/es/subPagina-10D00-019.005.003.004-pitvant			Results: The PITVANT is funded by the Ministry of National Defense, its overall budget is 2 million Euros, and it achieved the following objectives: Development of technology in several areas, for autonomous aerial vehicles unmanned small and medium size,

			<p>develop new concepts of operation for this type of vehicle, test the use of systems and technologies developed a broad spectrum of missions, both military and civilian (dual use) and train staff capable of defining requirements, operation and maintenance of such systems.</p> <p>In the context of cooperation between the AFA and the University of Munich, the Air Force and Portugal have the opportunity to be embroiled in pioneering test evaluation of precision Global Navigation Satellite System Galileo in relation to aerial platforms, a system of particular importance strategic for Europe, and which will be connected to Air Force and Portugal, as they will be used for this purpose, Air unmanned Autonomous Vehicles developed under the PITVANT project.¹</p>
SEAGULL - Sistemas Inteligentes de Suporte ao Conhecimento Situacional Baseados em Veiculos Aereos Nao Tripulados	SRA lines covered by the project:		Description and objectives:
Budget: 1.128.946,52€	1. Safety	✓	<p>The Seagull project aims to research and develop intelligent systems associated with unmanned autonomous vehicles (UAVs), which can contribute significantly to the generation of maritime situational awareness. These systems will address issues such as: detection, identification and tracking of targets, recognizing behavior patterns and planning, commanding and controlling missions collaboration with several autonomous vehicles. The project will be led by CRITICAL Software, in coordination with the Portuguese Air Force, the Faculty of Science and Technology, the LSTS and ISR / IST Lisbon. The Portuguese Navy will also be part of the consortium, as the main beneficiary of the knowledge acquired through the project.</p> <p>Participants: CRITICAL Software; FEUP, ISR-IST-UTL, Marinha Portuguesa, FAP</p> <p>Results:</p> <p>The Seagull project aims to research and develop intelligent systems associated with unmanned autonomous vehicles (UAVs), which can contribute significantly to the generation of maritime situational awareness.</p>
Duration: 07/2013 - 07/2015	2. Connected car	✓	
Programme: QREN			
http://www.criticalsoftware.com/pt/seagull			
NOPTILUS - autoNomous, self-Learning, OPTImal and complete Underwater Systems	SRA lines covered by the project:		Description and objectives:
Budget: 3,779,711.00€	1. Safety	✓	<p>NOPTILUS main objective is to determine – fully-autonomously & in real-time – the AUVs’ trajectories/behavior that maximizes the situation awareness under severe communication, sensing & environmental limitations. Crent multi-AUV systems are far from being capable of fully autonomously taking over real-life complex situation-awareness operations. As such operations require advanced reasoning and decision-making abilities the current designs have to heavily rely on human operators. The involvement of humans, however, is by no means a guarantee of performance; humans can easily be overwhelmed by the information overload, fatigue can act detrimentally to their performance, properly coordinating vehicles actions is hard, and continuous operation is all but impossible. Within NOPTILUS we take the view that an effective fully-autonomous multi-AUV concept/system, is capable of</p>
Duration: 04/2011 - 03/2015	2. Connected car		

			<p>overcoming these shortcomings, by replacing human-operated operations by a fully autonomous one. To successfully attain this objective, significant advances are required, involving cooperative & cognitive-based communications and sonars (low level), Gaussian Process-based estimation as well as perceptual sensory-motor and learning motion control (medium level), and learning/cognitive-based situation understanding and motion strategies (high level). Of paramount importance is the integration of all these advances and the demonstration of the NOPTILUS system in a realistic environment at the Port of Leixões, utilizing a Team of 6 AUVs that will be operating continuously on a 24hours/7days-a-week basis. As part of this demonstration another important aspect of the NOPTILUS system – that of (near-) optimality – will be shown. Evaluation of the performance of the overall NOPTILUS system will be performed with emphasis on its robustness, dependability, adaptability and flexibility especially when it deals with completely unknown underwater environments and situations “never taught before” and its ability to provide arbitrarily-close-to-the-optimal performance.</p>
Programme: European Commission, FP7			Participants: CERTH , FEUP, Georgia Tech Lorraine, TU Delft, TSI, IMPERIAL, OMST, APDL
www.noptilus-fp7.eu			<p>Results:</p> <p>Achieving the, rather ambitious, goals set in the NOPTILUS project, and before the aforementioned benefits can be reaped, significant advances beyond the state of the art are required in a number of areas. For this reason the NOPTILUS consortium comprises members that are world leaders and have demonstrated excellence in their respective areas. The fruitful interactions and crosspollination of ideas that led to this research project proposal will continue more vigorously upon funding and commencement of the proposed work. An “extrovert approach” will be taken in communication of the findings and sharing of the developed tools to researchers, students, endusers, and operators. A comprehensive dissemination plan along with the diverse research group and effective communication strategies will lead to integrated and consolidated scientific foundations for engineering cognitive systems under a variety of physical instantiations.</p>
NETMAR - Networked systems for situational awareness and intervention in maritime incidents	SRA lines covered by the project:		Description and objectives:
Budget: 1,826,309.52	1. Safety	✓	<p>The project concerns the demonstration, evaluation and dissemination of new robotic systems, sensors and networking technologies in maritime incidents endangering human life, the environment and economic activities. The project is organized around demonstrations led by the operational partners for 3 types of maritime incidents: harbor in the proximity of a metropolitan area, estuary and open sea. Universities and R&D institutions will demonstrate new tools and technologies and evaluation methodologies.</p> <p>Participants: FEUP, FUAC, PG - Portos de Galicia (SP), TECNALIA, ENSTA, Bretagne, UL – University of Limerick (IRL), NMCI - National Maritime College of Ireland (IRL), UKSpill – UK Spill Association (UK)</p>
Duration: 03/2011 - 03/2014	2. Connected car	✓	
Programme: Atlantic Area			
www.project-netmar.eu			Results:

			Planning and return on experience workshops will contribute to transition tools and technologies to operational practice and to companies, local, regional, national and EU authorities; technological and business challenges will be presented to EU networks of Excellence and funding agencies.
DAEDALUS-Design, implementation and flight testing of advanced control and coordination techniques for unmanned aircraft	SRA lines covered by the project:		Description and objectives:
Budget: 98,112.00€	1. Safety	✓	<p>The main objective of the Daedalus project is to design and flight test advanced control and coordination techniques for Unmanned Air Vehicle Systems (UAS) with applications in environmental and surveillance applications. The control and computation literature is rich in advanced control and coordination techniques for UAS. Few of these techniques are ever transitioned into UAS. Typically, computational simulations are the last development stage for majority of these techniques.</p> <p>Flight testing and evaluation is typically expensive and involves detailed knowledge of these techniques, as well as of flight operations, vehicles, sensors and on-board computational systems. The mapping of advanced coordination and control techniques into real a UAS creates intricate relations between hardware and software which generate rich behaviors that are difficult to model mathematically.</p> <p>Participants: FEUP, Força Aérea Portuguesa</p> <p>Results:</p> <p>However, predictable behavior and guaranteed performance are one of the main obstacles in the path to the certification of UAS for operation in non-segregated air space. This is especially important in trajectory optimization, obstacle avoidance and coordinated control, three of thrusts of the project.</p>
Duration: 01/2012 - 12/2014	2. Connected car	✓	
Programme: FCT			
www.fe.up.pt/~plopes/daedalus			
PERSISTE - Modeling and control of Networked vehicle systems in persistent autonomous operations	SRA lines covered by the project:		Description and objectives:
Budget: 199,104.00€	1. Safety	✓	<p>A number of human controlled systems operate 24/7 (24 hours per day, 7 days a week). Examples include transportation and surveillance systems, or military operations. 24/7 system level properties, such as the weekly schedules provided by an airline, arise from the human-operated coordination and control of a set of resources which typically do not have 24/7 availability, due to operational constraints such as maintenance. These properties persist over time and space, independently of the resources used to guarantee their validity.</p> <p>With recent advances in unmanned vehicles, we are able to form a networked vehicle system (NVS) that can be deployed to perform 24/7 persistent operations in autonomous fashion, i.e. without the intervention of human operators (with the exception of maintenance activities). However, the state-of-the-art in NVS is still far from</p>
Duration: 06/2010 - 06/2013	2. Connected car	✓	


			<p>providing tools and technologies to design an autonomous NVS with 24/7 persistence in a systematic manner and within an appropriate scientific framework. This is because we lack models and control methods for systems of dynamic networks of interacting vehicles. In these systems, information and commands are exchanged among vehicles, and the roles, relative positions and dependencies of those vehicles change during operations. The main objective of this project is to develop modeling and control methodologies for a NVS in persistent autonomous operations.</p>
Programme: FCT			<p>Participants: FEUP, APDL, Institutions Royal Institute of Technology (KTH), University of California at Berkeley (UCB), Politecnico di Milano (POLInternational)</p>
www.fe.up.pt/~plopes/persiste			<p>Results:</p> <p>We build on the experience of the research team in the design and deployment of NVSs for oceanographic studies, air traffic management, transportation, telecommunications, and sensor networks.</p>
XTREME - LAUV Extreme Version	SRA lines covered by the project:		Description and objectives:
Budget: 265,184.00€	1. Safety	✓	<p>The OceanScan wants to diversify the supply of its catalogue of products, including the series of autonomous vehicles surface. Since some time that invests in a new range of vehicles, the Light - Autonomous Underwater Vehicle (LAUV), which are little more than platforms with capabilities of underwater navigation, with low costs of production and operation. Today provides a platform basis (winner of the prize Innovation BES), but customers demand new features and characteristics. Thus the work of OceanScan has been directed towards the development of this platform, which intends to present to customers in 4 different versions: OEM, INSTITUTIONAL, PROFESSIONAL and EXTREME. Since the version EXTREME (Xtreme) an evolution of other 3 earlier. Catalogue LAUV: http://www.oceanscan-mst.com/downloads/lauv-flyer.pdf Co-promotion, proposed in this application, with the entity FEUP, builds on previous projects where it has been demonstrated the ability of this entity in the area of the underwater system. This nomination, also wants to use the synergies with other entities (Portuguese Navy of War, and APDL, SA), which may well contribute to the success of this project, in an area of great development potential, as evidence the market studies carried out</p>
Duration: 02/2009 - 02/2012	2. Connected car	✓	
Programme: ADI – Agência de Inovação – QREN - SI I&DT - FEDER - Programa Operacional do Norte			<p>Participants: FEUP, OMST</p>
http://sigarra.up.pt/ant/feup/projectos_geral.mostra_projecto?p_id=1350			<p>Results:</p> <p>The work of OceanScan has been directed towards the development of this platform, which intends to present to customers in 4 different versions: OEM, INSTITUTIONAL, PROFESSIONAL and EXTREME.</p>
XPRESS - Flexible production experts for reconfigurable assembly	SRA lines covered by the project:		Description and objectives:

technology			
Budget: 7,999,325.00€	1. Safety	✓	<p>The goal of XPRESS is to establish a breakthrough for the factory of the future with a new flexible production concept based on the generic idea of “specialised intelligent process units” (“Expertons”) integrated in cross-sectoral learning networks for a customised production.</p> <p>This knowledge based concept integrates the complete process chain: production configuration (decrease of ramp-up time of at least 50%), multi-variant production line (varying types&volumes on a single line) and 100% quality monitoring.</p> <p>This concept is demonstrated in the automotive, aeronautics and electrical industry but can be transferred to nearly all production processes.</p> <p>XPRESS meets the challenge to integrate intelligence and flexibility at the “highest” level of the production control system as well as at the “lowest” level of the singular machine.</p> <p>The radical innovations of the “Expertonic networked factory” are knowledge and responsibility segregation and trans-sectoral process learning in specialist knowledge networks.</p> <p>The concept is built on co-ordinated teams of specialised autonomous objects (Expertons), each knowing how to do a certain process optimally. They have the intelligence to choose the best known production parameters for a given task.</p> <p>Assembly units composed of Expertons can flexibly perform varying types of complex tasks, whereas today this is limited to a few pre-defined tasks.</p> <p>Communicating machines will be developed using self-organising and self-learning algorithms, data mining and common interfaces.</p> <p>By sharing the specific knowledge of each Experton in a network, other Expertons are able to learn from each other in one production line, but also between different lines as well as different production units.</p> <p>This architecture allows continuous process improvement. XPRESS will be able to anticipate and to respond to rapidly changing consumer needs, producing high quality products in adequate quantities while reducing costs.</p>
Duration: 01/2007 - 06/2011	2. Connected car	✓	
Programme: FP6-2004-NMP-NI-4 - NMP-2004-3.4.3.1-2 - Next generation of flexible assembly technology and processes			
http://www.xpress-project.eu/			<p>Participants: KUKA, BROETJE AUTOMATION, CENTRO RECERCHÉ FIAT, AIRBUS, TECHNAX, GAMAX, FRAUNHOFER IPA</p>
			<p>Results:</p> <p>XPRESS will be able to anticipate and to respond to rapidly changing consumer needs, producing high-quality products in adequate quantities while reducing costs.</p>

NETVEHICLE - Framework for the systematic design and deployment of networked vehicle and sensor systems in novel applications with strong societal impact	SRA lines covered by the project:		Description and objectives:
Budget: 50,000.00€	1. Safety	✓	<p>The main objective of this project is to contribute to the development of a scientific framework for the systematic design and deployment of deploy networked vehicle and sensor systems (NVSS) in new applications with strong societal and scientific impact such as oceanographic or environmental surveys with high temporal and spatial resolution.</p> <p>To achieve this objective we propose an interdisciplinary approach with a technology push driven by researchers in control, computation, communications, sensing and vehicle design from the Universities of Porto and Minho in Portugal, from the Swiss Federal Institute of Technology in Switzerland, from the Royal Institute of Technology in Sweden, from the University of California at Berkeley in the USA and from the Porto Polytechnic Institute; and an application pull driven by earth and environmental scientists from CIIMAR (the largest Portuguese Institute devoted to marine and environmental research) and Porto University.</p>
Duration: 05/2008 - 04/2011	2. Connected car	✓	
Programme: FCT https://sigarra.up.pt/feup/pt/PROJECT_OS_GERAL.MOSTRA_PROJECTO?P_ID=63624			
			Participants: FEUP, CIMAR, ISR, FCUP
			Results: <p>The project will actively pursue cross-disciplinary interactions with European Networks of Excellence such as Euron (Robotics research), Artist (Embedded Systems Design), and Marbef (Marine Biodiversity and Ecosystem Functioning) and with the Control and Dynamic Systems Alliance (Caltech, Santa Barbara, Princeton, Porto, Campinas and Lund universities).</p>
CON4COORD (C4C) - Control for Coordination of Distributed Systems	SRA lines covered by the project:		Description and objectives:
Budget: 2,900,000.00€	1. Safety	✓	<p>Abstract Control for coordination of distributed systems is motivated by the case studies of control for underwater vehicles, for aerial vehicles, for a road control and communication network, for automated guided vehicles, and for complex machines.</p> <p>The research thrust is in control design and control synthesis. In particular, control synthesis of a global coordinator of a distributed system, in communication for control, in informatics for control, and in tools for control design. Control design for the case studies based on the research thrust will form the main effort of the project and will be disseminated to the user partners.</p> <p>The contribution to the European Commission Work Program are in control of large-scale complex distributed systems (ICT-2007.3.7.(c)).</p>
Duration: 05/2008 - 04/2011	2. Connected car	✓	
Programme: European Commission,			
			Participants: Centrum Wiskunde & Informatica (Netherlands), Center for R&D Hellas (Greece), Delft Univ. of

FP7			Technology (Netherlands), Eindhoven Univ. of Techn. (Netherlands), University of Cyprus (Cyprus), Ghent University (Belgium), University of Porto (Portugal), University of Verona (Italy), Hesse-Noord Natie (Belgium), Marine Systems Technology (Portugal), Océ (Netherlands), Trinité Automatisering B.V. (Netherlands)
www.c4c-project.eu			Results: <p>The expected impacts are in:</p> <ul style="list-style-type: none"> • enabling low cost monitoring for the environment and natural resources by underwater and aerial vehicles, new services and applications for new markets in particular for automated guided vehicles at container terminals, control and communication networks on motorway networks; and • improved performance of distributed systems for control and communication on motorway networks, of complex machines, and of underwater and aerial vehicles. <p>The consortium consists of five user partners and eight academic partners which combined have a very wide and very deep expertise in the many topics required for the proposed project.</p>
MARINE - Maritime Incident Research and Innovation Network	SRA lines covered by the project:		Description and objectives:
Budget	1. Safety	✓	<p>The MARINE project aims at creating and fostering a Network of Excellence to promote the development and the transfer of knowledge and innovation in the field of maritime incidents within the context of maritime security and of protection of marine habitats.</p> <p>This involves the setting up of a network of expert bodies in research and development of innovative activities as well as the establishment of links with users and technology transfer organizations. Focus on systems based on:</p> <ul style="list-style-type: none"> • autonomous (air, surface, underwater) vehicles • networked devices • remote sensing • bioremediation
Duration: 01/2007 - 06/2008	2. Connected car	✓	
Programme: Interreg IIIB, Atlantic Area			Participants: Portugal, Spain, France, Ireland
www.project-marine.eu			Results: <p>The strategic objectives of the MARINE network are to:</p> <ol style="list-style-type: none"> 1. Develop a model of organization excellence based on a network structure. 2. Stimulate the development and the creation of competitive economic activities. 3. Lead the development of new technologies, techniques, high added-value products and services addressed to the identified application fields. 4. Identify regional and industry strengths and weaknesses and promote solutions for the relevant social, technological and commercial challenges in the field of maritime incidents.

			<p>5. Contribute to the internationalization of the network as well as of the involved entities, profiting from the high international demand concerning the application domain.</p> <p>6. Build a sustainable network for Research and Innovation in Maritime Incidents.</p>
▲			

LSTS – Laboratory for Underwater Systems and Technologies/ Faculdade de Engenharia da Universidade do Porto			
Rua Roberto Frias, s/n, i204 Tel: +351 22 041 3211 http://lsts.fe.up.pt	4200-465 Porto Fax: +351 22 508 1443	Contact: João Tasso Figueiredo Borges de Sousa Professor jtasso@fe.up.pt	
<p>▲ Description</p> <p>The Laboratório de Sistemas e Tecnologias Subaquáticas (LSTS) at the Faculty of Engineering from Porto University has been designing, building and operating unmanned underwater, surface and air vehicle systems for innovative applications with strong societal impact since it was established in 1997. Currently the LSTS team has over 30 researchers, including faculty and students, with Electrical and Computer Engineering, Mechanical Engineering and Computer Science backgrounds. In 2006 the LSTS received the national BES Innovation National Award for the design of the Light AUV.</p> <p>The LSTS fleet includes two remotely operated submarines (rated for 200m), two autonomous underwater vehicles (AUV) of the Isurus class, six AUVs of the Light Autonomous Underwater Vehicle (LAUV) class, one autonomous surface vehicle (Swordfish), and twelve autonomous air vehicles (wingspans ranging from 1.8m to 3.6m). LSTS has successfully fielded unmanned air, ground, surface and underwater vehicles in innovative operations in Europe and in the United States of America. These include some world firsts, such as the underwater rendezvous between the Aries and Isurus AUVs, respectively from the Naval Postgraduate School and Porto University, which took place in 2006 in Monterey, California, under a cooperation project between the two institutions.</p> <p>LSTS has been involved in fostering and growing a world-wide research network in the area of networked vehicle systems with yearly conferences and workshops, and, more recently, with large scale exercises at sea. LSTS researchers are well connected (with frequent visitors, seminar exchanges, and tools exchanges) to research efforts as collaborators (on other projects and developments) at MBARI (USA), Naval Postgraduate School (USA), Naval Undersea Warfare Center (USA), University of Michigan (USA), US Coast Guard (US), Naval Undersea Research Center (NATO), National Oceanography Center (UK), University of Limerick (IRL), Norwegian University of Science and Technology (NOR), Royal Institute of Technology (SWE), University of Delft (NL), and Swiss Federal Institute of Technology Zurich (CH). In Portugal the LSTS has a strategic cooperation with the Portuguese Navy (LSTS provided technical support to their unmanned underwater vehicles program, delivered three units of a mine warfare/REA version of the Light Autonomous Underwater Vehicle, and is evolving these vehicles for advanced operations with manned vessels under projects funded by the Portuguese Ministry of Defense) and Air Force (jointly developing the unmanned air vehicles program with funding provided by the Portuguese Ministry of Defense), with the Portuguese Task Group for the Extension of the Continental Shelf (systems and technologies for underwater exploration and mapping and in operation of the deep sea ROV Luso), and with the Porto Harbor (systems and technologies for harbor operations). The LSTS has been organizing, in cooperation with the Portuguese Navy, the Rapid Environmental Picture (REP) annual exercise since 2010. In addition, researchers from LSTS also participated in experiments, organized and hosted by collaborators, and taking place in the Pacific and Atlantic oceans, as well as in the Mediterranean and Adriatic seas.</p>			

▲ Main activities and products

The LSTS uses the IEEE P1220-standard for the systems engineering process in the design, development, and operation of several generations of unmanned air, surface, and air vehicles for defence and civil applications. In 2006, the LSTS received the national BES innovation award for the design of the Light Autonomous Underwater Vehicle (LAUV). This vehicle is now in its 5th generation. The LSTS delivered three LAUV units to the Portuguese Navy and has transitioned the technology to the spin-off company OceanScan Marine Systems and Technology. Vehicles in the LSTS fleet are engineered for networked operations and use modular hardware and software components to facilitate development, maintenance, and operations. The LSTS open source software tool chain for networked vehicle systems is now in use in the United States, Germany, Switzerland, Norway, France, England, Spain, and India. This tool chain allows the operators at the LSTS control stations to command and control all types of vehicles in a uniform manner, with special support for sense and avoid. The tool chain supports onboard autonomy through the integration of the deliberative on-board planning framework TREX (developed at the Monterey Bay Aquarium Research Institute).

▲ Related projects

SAFEPORT: Sistema de apoio a decisao para defesa portuária	SRA lines covered by the project:		Description and objectives:
Budget	1. Safety	✓	<p>SAFEPORT is a worldwide deployable Decision Support System (DSS) able to cope with the highly dynamic nature of NATO missions and assets, changes in coalition and/or availability of resources, changes in political scenarios and ability to evaluate alternative deployment sites. It targets harbor protection and can be easily extended and configured for other types of critical and strategic contexts.</p> <p>SAFEPORT is a multiple scenario system that addresses the critical problem of selecting the best sensor layout configuration for surveillance and protection of critical areas, within cost and logistical constraints, by ensuring optimized coverage and detection of threats reasonably from their targets, therefore enabling the launch of validation measures or even force deployment. SAFEPORT fulfils this task by generating risk maps for general or user defined scenarios (reflecting environmental conditions and mobile threats typology).</p> <p>SAFEPORT will determine, for any given scenario, an adequate set of solutions (selection of available assets, configuration and missions) that maximizes the number of threats detected (or minimizes certain risks or costs), considering available assets, user and environmental conditions, predictable threats and constraints. For this, a simulation tool is needed in order to play out the scenarios with the different configurations to be tested. These simulations will help to enhance the proposed solutions and, comparing them with more realistic metrics.</p> <p>Participants: MDNM, NATO, EDISOFT, FCUL, FEUP, UEVORA</p> <p>Results: SAFEPORT results improved know-how and skills of Security Officers by optimizing the use of resources to achieve better detection probabilities in adverse harbor environments.</p>
Duration: 04/2013 - 12/2015	2. Connected car	✓	
Programme: NATO			
http://safeport.edisoft.pt			
BLUEEYE - Sistema de Suporte as Operacoes Maritimas	SRA lines covered by the project:		Description and objectives:

Budget: 75,916.89 € of 1,732,929.32 €	1. Safety	✓	<p>The Blue Eye project arose from the need to overcome the challenges related to the efficiency and effectiveness of maritime missions related to Search and Rescue (SAR), maritime supervision and environment protection. In order to improve the anticipation capability and responsiveness when facing SAR incidents, illicit activities or environmental disasters, innovative technological solutions are needed.</p> <p>The Blue Eye project aims to investigate and develop technology that will increase efficiency and effectiveness in maritime safety, security and environmental protection operations.</p> <p>The Portuguese Navy operational context is characterized by the:</p> <ul style="list-style-type: none"> • existence of more and more stovepipe, independent systems; • growing need of sharing information between other entities with responsibilities on the Maritime domain; • increasing volume of information which needs to be processed faster. <p>These aspects cause difficulties in the decision process and decrease the speed of responsiveness, thus affecting the effectiveness of the operations.</p>
Duration: 04/2011 - 04/2013	2. Connected car	✓	
Programme: PO FC SI I&DT do QREN			
http://projectos.adi.pt/actions/project?id=C16/2011/21607&search=global&actionbean=actions/project			
			<p>Participants: Critical Software, FEUP, IH, MDNM</p> <p>Results:</p> <p>The project was able to i) Increase Operational Portuguese Navy CAPACITY, using a que A technological platform incorporé a Wide Operating Experience accumulated the Operations year long in the Maritime Domain; ii) promote the development of R & D to create the framework of a product que Allow to Critical Software (CSW) impose If the international market Exploring solutions no maritime segment and iii) investigate innovative solutions to the Portuguese Navy Explore New Operating Concepts.</p>
BRIDGES - Bringing together Research and Industry for the Development of Glider Environmental Services	SRA lines covered by the project:		Description and objectives:
Budget: 7,791,810€	1. Safety	✓	<p>BRIDGES will provide a necessary tool for further understanding, improved monitoring, and responsible exploitation of the marine environment while assuring its long-term preservation. This new tool, a robust, cost-effective, re-locatable, versatile and easily-deployed ocean glider, will support autonomous, long-term in-situ exploration of the deep ocean at large spatio-temporal scales. The sole European underwater glider: SeaExplorer will be modularized, new sensors will be developed, and the operational methodology will be modified, such that new horizons of service will be opened. It will be improved by: 1) adapting for deep basins (up to 5000 m), 2) implementing a novel payload architecture to increase autonomy and to accommodate the range of sensing capabilities needed, and 3) integrating the associated control support system for single and networked operations (mission behaviour, data management, planning, communications). The glider's sensing capabilities will be enhanced. The main modules are planned for: 1) environmental monitoring for facilitating the effective implementation of an ecosystem-based management under the</p>
Duration: 2015 - 2019	2. Connected car	✓	

			Marine Strategy Framework Directive, 2) the oil and gas industry, and 3) the deep sea mining industry. In order to achieve the technological objectives and meet service requirements, an open dialogue between stakeholders will be developed. The basic premises of the present call “Delivering sub-sea technologies for new services at sea-BG-06-2014,” are answered thoroughly: the ability to execute unmanned underwater operations, to operate in the deep ocean, and to assess the environmental impact of the maritime economy. In addition, this project will realize and promote the creation of collaborations among sensor and platform manufacturers, oil and gas and mining companies, public health and safety departments, and scientific and engineering experts.
Programme: European Commission, H2020 - BG - 2014 -2			Participants: OMST, BMT, FEUP, NERC, UCY, UoS, ARMINES, HUJI, ENITECH, SUT, ALBATROS MARINE, IRIS, ECORYS, HYDROPTIC, CMR, 52NORTH, UPMS, ALSEAMAR, CSCS
http://www.bridges-h2020.eu			Results: (project in progress)
BIOMETORE - BIODIVERSITY IN SEAMOUNTS: THE MADEIRA-TORE AND GREAT METEOR	SRA lines covered by the project:		Description and objectives:
Budget: 2,650,718 €	1. Safety	✓	The project aims at carrying out sampling surveys encompassing seamounts in the Madeira-Tore (Gorringe bank, Josephine and Seine) and Great Meteor geological complexes to acquire knowledge on biodiversity, from species to pelagic and benthic ecosystems and, human pressures. The data obtained will contribute to improve knowledge of relevant MSFD descriptors such as those related to biodiversity (D1, D3, D4 and D6) where the initial assessment identified insufficiency of data and information.
Duration: 10/2015 - 10/2017	2. Connected car	✓	
Programme: EEA Grants			
http://eeagrants.org/project-portal/project/PT02-0018			
			Participants: IPMA, ICG, ARDITI, CCMAR, CIIMAR, DGNRSMS, ESCS, FCUL, FEUP, IMAR, IPLEIRIA, EMEPC, RDMA, SOA, ULISBOA, UAZORES
			Results: (project in progress)
Networked Oceans - Networked ocean/air vehicles for communications and data collection in remote oceanic areas	SRA lines covered by the project:		Description and objectives:
Budget: 372,321.00€	1. Safety	✓	The project concerns the development and demonstration at sea of a networked vehicle system for persistent communications and data collection in remote oceanic areas. The system is composed of a long endurance autonomous surface vehicle (ASV), long endurance autonomous underwater vehicles (AUV), long range unmanned air vehicles (UAV), helikites, and control stations. The ASV is both a communications hotspot and a docking base (for
Duration: 09/2015 - 03/2017	2. Connected car		

			AUVs), operating 24/7 in remote ocean areas. The ASV supports smart routing protocols for direct communications, via persistent UAV relays, or delayed data transfer to control stations. The control stations provide advanced planning and execution control capabilities, as well as dissemination of data. The system supports inter-operability protocols to allow expansion to vehicles from third parties. The project is organized into 6 work-packages: 1: Project management and systems engineering; 2: Communications and inter-operability; 3: Unmanned vehicle systems; 4: Land/ship control stations; 5: System integration and testing; and, 6: Demonstration at sea. The project builds on technological, scientific and operational experience of a consortium of FEUP (leader), IPMA, and Portuguese Navy from Portugal, and AMOS from Norway.
Programme: EEA Grants			Participants: FEUP, IPMA, CINAV
http://networkedocean.lsts.pt/about			Results: (project in progress)
NECSAVE	SRA lines covered by the project:		Description and objectives:
Budget 1.443.904,00€	1. Safety	✓	This project aims to develop, test and evaluate tools and technologies to provide groups (swarms) of heterogeneous unmanned maritime vehicles of Network Enabled Capability (NEC). In this concept, vehicles and operators come and go and interact through inter-operated communication networks, and possibly intermittent, in scenarios where synergies are established that allow the group to do more than the sum of its parts. The project addresses these challenges through a multi-disciplinary approach that relies on advances in: <ul style="list-style-type: none"> - Dynamic networks of computer components; - Design of control architectures for distributed semi-autonomous agents teams; - Involvement of specialized human operators in the rings of planning and control; - Fault tolerance; - Communication networks tolerant connectivity interruptions.
Duration: 01/2013 - 01/2017	2. Connected car	✓	
Programme: Ministério da Defesa Nacional			Participants: FEUP, APDL, MP, Oceanscan, Calzoni, TNO, UCM
http://www.emfa.pt/www/po/unidades/subPagina-10D00-019.005.003.003-necsav			Results: (project in progress)

SUNRISE: Building the Internet of Underwater Things - Sensing, monitoring and actuating on the UNderwater world through a federated Research InfraStructure Extending the Future Internet	SRA lines covered by the project:		Description and objectives:
Budget: 4,036,000.00€	1. Safety	✓	<p>We must learn to both sustainably exploit and protect our vast oceans, provider of oxygen, food, hydrocarbons and other resources. A solution lies in sensing and interacting through an Internet of Things, with distributed networks of intelligent sensors and actuators. Unfortunately, we currently lack a marine Internet, crucial to achieve distributed, coordinated and adaptive control, due to the rapid absorption of light and radio waves in seawater.</p> <p>SUNRISE directly addresses FIRE objectives by combining technology with novel paradigms in new, open experimental facilities, integrating physical systems with software development into the Internet of Underwater Things. It is the first project that develops this concept, based on joint research performed in this directions by University of Rome La Sapienza, CMRE, and some of the other partners, in the last few years. SUNRISE will also provide a way to select Internet of Underwater Things standards based on objective measures of performance, strengthening in its facilities as more sites are added in the future as a result of the two envisioned open calls.</p> <p>Participants: SUALTI, HERIOT-WATT UNIVERSITY, NATO CMRE, U. FIRENZE, U. NEW YORK, U. GENOVA, U. PORTO, EVOLOGICS GMBH, U. ROMA - LA SAPIENZA, GRIDNET S.A., NORTHEASTERN UNIVERSITY, CAMPUS SRL, NEXSE SRL, U.GIRONA, U.SOUTHAMPTON, UNIVERSITEIT TWENTE</p> <p>Results: (project in progress)</p>
Duration: 09/2013 - 08/2016	2. Connected car	✓	
Programme: European Commission, FP7			
http://fp7-sunrise.eu/			
SEACON – Sistema de treino, demonstração e desenvolvimento de conceitos de operação com múltiplos veículos autónomos submarinos	SRA lines covered by the project:		Description and objectives:
Budget 311.644,00 €	1. Safety	✓	<p>The project aims to provide the Portuguese Navy with a system of training, demonstration and development of concepts of operation with multiple autonomous underwater vehicles, considering the requirements of military operation, based on SeaScout system. The system will be developed to ensure interoperability with other vehicles and systems.</p>
Duration: 12/2008 - 03/2011	2. Connected car	✓	

Programme: MDN - Ministério da Defesa, I&T - Investigação e Tecnologia			Participants: Marinha Portuguesa, FEUP
https://sigarra.up.pt/fcup/pt/projectos_geral.mostra_projecto?P_ID=63966			Results: System for training, demonstration and development of concepts of operations with small autonomous underwater vehicle.
URready4OS - Autonomous underwater vehicles ready for oil spill	SRA lines covered by the project:		Description and objectives:
Budget 579.569,00€	1. Safety	✓	<p>The general aim of this project, co-financed by Directorate-General Humanitarian Aid and Civil Protection of the European Commission, is to join forces to make available to European Civil Protection a fleet of autonomous underwater vehicles (AUVs), unmanned aerial vehicles (UAVs) and unmanned surface vehicles (USVs) with operational capability to intervene against oil spills in European Seas using new cooperative multivehicle robotic technologies.</p> <p>Surface oil is not the only effect of an oil spill. Underwater oil plumes can come from bottom leaks and from surface patches forming subsurface plumes as recently been brought into the public eye during the 2010 Deepwater Horizon incident. This approach will allow us to use relatively lowcost standard sonar and oil-in water sensors, with novel advanced algorithms to get the most out these devices. The distributed intelligence of these devices across the spill will then be able to build up a highly accurate and dynamic image of the spill. The robotic system will also be able to self-organise to improve the monitoring of the oil spill.</p>
Duration: 01/2014 - 12/2015	2. Connected car	✓	
Programme: European Commission			
http://www.upct.es/urready4os/?lang=en			<p>Participants: Universidad Politécnica de Cartagena , University of Zagreb , Oceanography Center – University of Cyprus, Spanish Maritime Safety Agency (SASEMAR)</p> <p>Results:</p> <p>Enabled a cheap, flexible, expandable, precise and rapid decision support system for Civil Protection decision makers, improving the capacity of responding to these events.</p>
PITVANT - Programa de investigação e tecnologia em veículos aéreos não tripulados	SRA lines covered by the project:		Description and objectives:
Budget: 2,000,000.00€	1. Safety	✓	<p>PITVANT is a joint project between the University of Porto (UP) and Portuguese Air Force Academy (AFA). This research and development effort is supported by the Portuguese Defense Ministry.</p> <p>The primary goals of this project are:</p> <p>Generation of operational know-how on UAS operations for the Portuguese military and security forces; Development of technological know-how on UASs, their subsystems, and UAS integration; Development of fully operational UASs; Definition, testing, and validation of UAS ConOps; Development of state-of-the-art UAV flight controllers for multiple and heterogeneous vehicles' operations;</p>
Duration: 09/2008 - 11/2015	2. Connected car	✓	

			Development of mixed initiative control of heterogeneous vehicles over inter-operated networks. The project began at the end of 2008 with a projected 8 year runtime. Currently the PITVANT project operation statistics count with a total of more than 700 flights and 320 hours of accumulated flight time.
Programme: MDN - Ministério da Defesa, I&T - Investigação e Tecnologia			Participants: FAP, FEUP, OAFUP, INEGI
http://www.academiafa.edu.pt/index.php?bd0b6f49=011.005.004&lang=PT http://lists.fe.up.pt/about/projects			Results: Development of new technologies and new concepts of operation for small unmanned aerial vehicle systems.
SEAGULL - Sistemas Inteligentes de Suporte ao Conhecimento Situacional Baseados em Veiculos Aereos Nao Tripulados	SRA lines covered by the project:		Description and objectives:
Budget: 1,041,208.20€	1. Safety	✓	<p>The project aims to (i) address the huge deficit respective to the capacity of observation and generation of maritime situational awareness, particularly in extensive maritime areas (the national area being an excellent case study), increasing coverage, temporal resolution and spatial resolution of the observation mechanisms, (ii) design and prototype a solution of substantially lower cost when compared to alternatives such as the use of manned aerial means.</p> <p>Thus, the Seagull project proposes to investigate and develop an intelligent system when linked with unmanned autonomous vehicles (UAVs) and existing optical sensors such as cameras, infrared, multi-and hyperspectral, can contribute significantly to the generation of situational awareness addressing maritime issues such as detection, classification, identification and tracking systems (eg vessels, spots of pollutants - hydrocarbons and chemicals, shipwrecked, lifeboat, debris, etc.), recognizing patterns of behavior (eg still boats in high sea side-by- side, high-speed vessels, atypical patterns of navigation, etc.) and monitoring parameters and indicators of good environmental status. The system should also be able to address issues related to collaborative missions of several autonomous vehicles, specifically by enabling detection and collision avoidance.</p>
Duration: 07/2013 - 07/2015	2. Connected car	✓	
Programme: QREN			
http://www.criticalsoftware.com/pt/seagull			Participants: Critical Software, AFA, CINAV, IST, U. Porto
			Results: The Seagull project investigated and developed effective solutions to address the challenges entailed in creating maritime situational knowledge, which is indispensable in maritime operations related to safety, security and environment, making use of existing technology of unmanned aerial vehicles.

NOPTILUS - autoNomous, self-Learning, OPTImal and complete Underwater Systems	SRA lines covered by the project:		Description and objectives:
Budget: 3,779,711.00€	1. Safety	✓	<p>NOPTILUS main objective is to determine – fully-autonomously & in real-time – the AUVs’ trajectories/behavior that maximizes the situation awareness under severe communication, sensing & environmental limitations. Crent multi-AUV systems are far from being capable of fully autonomously taking over real-life complex situation-awareness operations. As such operations require advanced reasoning and decision-making abilities the current designs have to heavily rely on human operators. The involvement of humans, however, is by no means a guarantee of performance; humans can easily be overwhelmed by the information overload, fatigue can act detrimentally to their performance, properly coordinating vehicles actions is hard, and continuous operation is all but impossible. Within NOPTILUS we take the view that an effective fully-autonomous multi-AUV concept/system, is capable of overcoming these shortcomings, by replacing human-operated operations by a fully autonomous one.</p> <p>Participants: ETH ZURICH, CNRS, CETH, OCEANSCAN, TSI, APDL, TU DELFT, UP, IMPERIAL COLLEGE OF SCIENCE TECHNOLOGY AND MEDICINE</p> <p>Results: Significant advances involving cooperative & cognitive-based communications and sonars (low level), Gaussian Process-based estimation as well as perceptual sensory-motor and learning motion control (medium level), and learning/cognitive-based situation understanding and motion strategies (high level). Integration of all these advances and the demonstration of the NOPTILUS system in a realistic environment at the Port of Leixões, utilizing a Team of 6 AUVs that will be operating continuously on a 24hours/7days-a-week basis. Evaluation of the performance of the overall NOPTILUS system were performed with emphasis on its robustness, dependability, adaptability and flexibility especially when dealing with completely unknown underwater environments and situations “never taught before” and its ability to provide arbitrarily-close-to-the-optimal performance.</p>
Duration: 04/2011 - 03/2015	2. Connected car	✓	
Programme: European Commission, FP7			
www.noptilus-fp7.eu			
NETMAR - Networked systems for situational awareness and intervention in maritime incidents	SRA lines covered by the project:		Description and objectives:
Budget: 1,826,309.52	1. Safety	✓	<p>The project concerns the demonstration, evaluation and dissemination of new robotic systems, sensors and networking technologies in maritime incidents endangering human life, the environment and economic activities. The project is organized around demonstrations led by the operational partners for 3 types of maritime incidents: harbor in the proximity of a metropolitan area, estuary and open sea. Universities and R&D institutions will demonstrate new tools and technologies and evaluation methodologies. Planning and return on experience workshops will contribute to transition tools and technologies to operational practice and to companies, local, regional, national and EU authorities; technological and business challenges will be</p>
Duration: 03/2011 - 03/2014	2. Connected car	✓	

			presented to EU networks of Excellence and funding agencies.
Programme: Atlantic Area			Participants: FEUP, FUAC, Portos de Galicia, ENSTA, Bretagne, UL – University of Limerick, NMCI, UKSpill, TECNALIA
www.project-netmar.eu			Results: Along the project, the partners have achieved the following results: <ul style="list-style-type: none"> - New concepts of operation for networked vehicle systems. - Transition of systems to operational practice. - New networked vehicle systems capabilities. - Recommendations for national and international legislation. - Dissemination in the EU and US.
DAEDALUS-Design, implementation and flight testing of advanced control and coordination techniques for unmanned aircraft	SRA lines covered by the project:		Description and objectives:
Budget: 98,112.00€	1. Safety	✓	The main objective of the Daedalus project is to design and flight test advanced control and coordination techniques for Unmanned Air Vehicle Systems (UAS) with applications in environmental and surveillance applications. The control and computation literature is rich in advanced control and coordination techniques for UAS. Few of these techniques are ever transitioned into UAS. Typically, computational simulations are the last development stage for majority of these techniques. Flight testing and evaluation is typically expensive and involves detailed knowledge of these techniques, as well as of flight operations, vehicles, sensors and on-board computational systems. The mapping of advanced coordination and control techniques into real a UAS creates intricate relations between hardware and software which generate rich behaviors that are difficult to model mathematically. However, predictable behavior and guaranteed performance are one of the main obstacles in the path to the certification of UAS for operation in non-segregated air space. This is especially important in trajectory optimization, obstacle avoidance and coordinated control, three of thrusts of the project.
Duration: 01/2012 - 12/2014	2. Connected car	✓	
Programme: FCT			Participants: FEUP, AFA
www.fe.up.pt/~plopes/daedalus			Results: Interdisciplinary approach built on experience in designing, developing and operating six different types of UAS


			(wingspans ranging from 1.2 to 6m) and on advances in (1) non-linear control; (2) platform-based design; (3) formal methods; (4) trajectory optimization; and (5) coordinated control.
RAIA_CO - Marine and coastal observatory of Iberian Margin	SRA lines covered by the project:		Description and objectives:
Budget 4,070,267.00€	1. Safety	✓	<p>Overall Objective: Establish services and products of operational oceanography, available to the coastal communities and economic agents of the region.</p> <p>Specific Objectives:</p> <ol style="list-style-type: none"> 1) Maintain and improve the network in the framework of the Ocean Observatory RAIA. 2) To strengthen the productivity and competitiveness of sustainable coastal activities, linked to strategic sectors, through product development and services in operational oceanography and meteorology. 3) Establishment and consolidation of a competitive business sector to develop marine technologies, in Galicia and N of Portugal. 4) Development a strategy of communication with end users, through a consultive and interactive process.
Duration: 01/2011 - 12/2013	2. Connected car	✓	
Programme: POCTEP			
www.observatorioraia.org			
			<p>Participants: MeteoGalicia, INTECMAR, INSTITUTO ESPAÑOL DE OCEANOGRAFIA (MCT), IIM-CCI, CETMAR, U. Porto (CIIMAR,FEUP; INESC; INEGI; FCUP), U. Aveiro, IH</p> <p>Results:</p> <p>Services and products of operational oceanography, available to the coastal communities and economic agents of the region.</p>
DIGITAL OCEAN - Integrated multimedia mixed reality system, of real time virtual diving, by web teleoperated underwater data collecting robots, diffused online and through a network of submersible simulation devices	SRA lines covered by the project:		Description and objectives:
Budget: 1,083,405.00€	1. Safety	✓	<p>The project general objective is to allow any internet user subscriber, anywhere even in a beach, through his computer, tablet, mobile or Dolphin, to "dive" virtually in selected diving sites around the world. There, dedicated underwater robots, teleoperated via the internet by this user, alone or in a Team, under the control of local diving instructor, will be able to explore the diving site. He will get - by the quality of images, by instant access to knowledge of scientists or to expertise of professional divers, by the opportunity to play games where fiction and reality get mixed, a feeling that his experience has a value at least comparable if not superior, to an actual dive in the real site, which costs are 20 or 30 times higher and which risks aren't negligible. If and when virtual diving offered by Digital Ocean, will become in the</p>
Duration: 01/2011 - 12/2012	2. Connected car	✓	

			international market, a serious alternative to real diving, the project would have reached its objective.
Programme: European Commission, FP7			Participants: EPITA, U. Yväsylä, ANTINEA FOUNDATION, VIRTUALDIVE, LUDOCRAFT OY, OCEANSCAN, U. Porto, MEDIATOUCH 2000, UNIVERSITE D'EVRY-VAL D'ESSONNE
www.digitalocean.eu			Results: Digital Ocean promoted the virtual diving as an alternative to real diving.
XTREME - LAUV Extreme Version	SRA lines covered by the project:		Description and objectives:
Budget: 265,184.00€	1. Safety	✓	<p>The OceanScan wants to diversify the supply of its catalogue of products, including the series of autonomous vehicles surface. Since some time that invests in a new range of vehicles, the Light - Autonomous Underwater Vehicle (LAUV), which are little more than platforms with capabilities of underwater navigation, with low costs of production and operation. Today provides a platform basis (winner of the prize Innovation BES), but customers demand new features and characteristics. Thus the work of OceanScan has been directed towards the development of this platform, which intends to present to customers in 4 different versions: OEM, INSTITUTIONAL, PROFESSIONAL and EXTREME. Since the version EXTREME (Xtreme) an evolution of other 3 earlier. Catalogue LAUV: http://www.oceanscan-mst.com/downloads/lauv-flyer.pdf Co-promotion, proposed in this application, with the entity FEUP, builds on previous projects where it has been demonstrated the ability of this entity in the area of the underwater system. This nomination, also wants to use the synergies with other entities (Portuguese Navy of War, and APDL, SA), which may well contribute to the success of this project, in an area of great development potential, as evidence the market studies carried out</p>
Duration: 02/2009 - 02/2012	2. Connected car	✓	
Programme: ADI – Agência de Inovação – QREN - SI I&DT - FEDER - Programa Operacional do Norte			
http://sigarra.up.pt/ant/feup/projetos_geral.mostra_projeto?p_id=1350			Participants: Oceanscan, FEUP
			Results: Design and development of an Autonomous Underwater Vehicle, version Xtreme
RAIA - Observatorio Oceanico del Margen Iberico	SRA lines covered by the project:		Description and objectives:
Budget: 3.563.193,00€	1. Safety	✓	<p>This project is the result of a common strategy developed by two regions with the ambition of reaching a deeper understanding of the ocean.</p> <p>Within the project, different partners with operational, technological and scientific background have come together. In all cases, existing projects in operational oceanography in which they are involved provide experience of the marine environment and a point of departure for this trans-frontier collaboration. The results of these projects for the region of the northwest Iberian Peninsula (some of which are detailed below) will be available for the developments outlined</p>
Duration: 03/2009 - 12/2011	2. Connected car	✓	

			here.
Programme: POCTEP			Participants: MeteoGalicia, INTECMAR, INSTITUTO ESPAÑOL DE OCEANOGRAFIA (MCT), IIM-CCI, CETMAR, U. VIGO, CIIMAR-UP, INESC Porto, INEGI, FEUP, IH, CESAM, FCUP
www.observatorioraia.org			Results: Built an extensive network of ocean-meteorological observation on the coastal shelf in the transboundary area of northern Portugal and Galicia.
NETVEHICLE - Framework for the systematic design and deployment of networked vehicle and sensor systems in novel applications with strong societal impact	SRA lines covered by the project:		Description and objectives:
Budget: 50,000.00€	1. Safety	✓	<p>The main objective of this project is to contribute to the development of a scientific framework for the systematic design and deployment of deploy networked vehicle and sensor systems (NVSS) in new applications with strong societal and scientific impact such as oceanographic or environmental surveys with high temporal and spatial resolution.</p> <p>To achieve this objective we propose an interdisciplinary approach with a technology push driven by researchers in control, computation, communications, sensing and vehicle design from the Universities of Porto and Minho in Portugal, from the Swiss Federal Institute of Technology in Switzerland, from the Royal Institute of Technology in Sweden, from the University of California at Berkeley in the USA and from the Porto Polytechnic Institute; and an application pull driven by earth and environmental scientists from CIIMAR (the largest Portuguese Institute devoted to marine and environmental research) and Porto University.</p> <p>The project will actively pursue cross-disciplinary interactions with European Networks of Excellence such as Euron (Robotics research), Artist (Embedded Systems Design), and Marbef (Marine Biodiversity and Ecosystem Functioning) and with the Control and Dynamic Systems Alliance (Caltech, Santa Barbara, Princeton, Porto, Campinas and Lund universities).</p>
Duration: 05/2008 - 04/2011	2. Connected car	✓	
Programme: FCT			Participants: FEUP, CIIMAR, ETHZ, FCUP, ISEP, LIACC, KTH, UCAL, UMINHO
https://sigarra.up.pt/feup/pt/PROJECT_OS_GERAL.MOSTRA_PROJECTO?P_ID=63624			Results: Design and deployment of deploy networked vehicle and sensor systems (NVSS).

CON4COORD (C4C) - Control for Coordination of Distributed Systems		SRA lines covered by the project:		Description and objectives:
Budget: 2,900,000.00€	1. Safety	✓	✓	<p>Abstract Control for coordination of distributed systems is motivated by the case studies of control for underwater vehicles, for aerial vehicles, for a road control and communication network, for automated guided vehicles, and for complex machines.</p> <p>The research thrust is in control design and control synthesis. In particular, control synthesis of a global coordinator of a distributed system, in communication for control, in informatics for control, and in tools for control design. Control ,design for the case studies based on the research thrust will form the main effort of the project and will be disseminated to the user partners.</p> <p>The contribution to the European Commission Work Program are in control of large-scale complex distributed systems (ICT-2007.3.7.(c)). The consortium consists of five user partners and eight academic partners which combined have a very wide and very deep expertise in the many topics required for the proposed project.</p>
Duration: 05/2008 - 04/2011	2. Connected car			
Programme: European Commission, FP7				
www.c4c-project.eu				
		<p>Participants: TUE, U. CYPRUS, Trinité Automation, Océ, U. Porto, TU DELFT, FEUP, CERETETH, U. VERONA, CWI, UNIVERSITEIT GENT, OCEANSCAN, PSA ANTWERP</p>		
		<p>Results:</p> <ul style="list-style-type: none">• enabled low cost monitoring for the environment and natural resources by underwater and aerial vehicles, new services and applications for new markets in particular for automated guided vehicles at container terminals, control and communication networks on motorway networks; and• improved performance of distributed systems for control and communication on motorway networks, of complex machines, and of underwater and aerial vehicles.		
Maritime Incident Research and Innovation Network		SRA lines covered by the project:		Description and objectives:
Budget 733 800,00€	1. Safety	✓	✓	<p>The MARINE project aims at creating and fostering a Network of Excellence to promote the development and the transfer of knowledge and innovation in the field of maritime incidents within the context of maritime security and of protection of marine habitats.</p> <p>This involves the setting up of a network of expert bodies in research and development of innovative activities as well as the establishment of links with users and technology transfer organizations. Focus on systems based on:</p> <ul style="list-style-type: none">• autonomous (air, surface, underwater) vehicles• networked devices• remote sensing• bioremediation <p>international demand concerning the application domain.</p> <p>6. Build a sustainable network for Research and Innovation in Maritime Incidents.</p>
Duration: 01/2007 - 06/2008	2. Connected car			

Programme: Interreg IIIB, Atlantic Area		Participants: FEUP, APDL, IUEM, FUAC, ENSIETA, BREST PILOTAGE, U LIMERICK.
www.project-marine.eu		Results: <ol style="list-style-type: none"> 1. Developed a model of organization excellence based on a network structure. 2. Stimulated the development and the creation of competitive economic activities. 3. Lead the development of new technologies, techniques, high added-value products and services addressed to the identified application fields. 4. Identified regional and industry strengths and weaknesses and promote solutions for the relevant social, technological and commercial challenges in the field of maritime incidents. 5. Contributed to the internationalization of the network as well as of the involved entities.

Instituto de Telecomunicações			
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<p>▲ Description</p> <p>Instituto de Telecomunicações is a private, not-for-profit, association of six Portuguese universities, one polytechnic, one public telecom operator and one telecom equipment manufacturer, established in 1992 with a mission to create and share scientific knowledge in telecommunications at world level and to host and tutor graduate and postgraduate students. IT earned the statute of Associated Laboratory in 2001.</p> <p>IT is organised around three main sites: Aveiro, Coimbra and Lisbon with delegations in Covilhã, Leiria, Lisbon and Porto. IT hosts more than 300 (PhD holding) researchers, 6 of which are Fellows of IEEE, 250 PhD Students and 200 MSc students.</p> <p>IT expertise spans all areas of telecommunications and supporting sciences including wireless and optical communications, networks and multimedia.</p> <p>IT yearly scientific output includes 15 books, 60 book chapters, 300 journal and 450 conference papers and 10 patents. IT has an accumulated total 2200+ journal papers gathering 22000+ ISI citations. IT is currently involved in 100 national and 30 international R&D projects. About 20% of IT patents are being exploited. IT developed technology has already been used to create 6 startups.</p> <p>By joining geographically scattered expertise and creating a common culture of excellence, IT managed to create a critical mass, enabling to level with the most influential players in telecommunications, to compete for external funding and get international visibility and recognition.</p>			
<p>▲ Main activities and products</p> <p>IT has deployed the largest smart city experimental infrastructure in the world, comprising a vehicular network of 404 buses and 20 municipal vehicles (BusNet), 23 static environmental and weather sensors plus 23 pedestrian counter sensors (UrbanSense), and the SenseMyCity crowdsensor (currently 185 users), including 30 smartphones and 25 on-board diagnostics OBD devices. Static sensors communicate with the backoffice (with 3 cloud servers, and an on-premise infrastructure) either via static WiFi hotspots or using the vehicular delay-tolerant network. SenseMyCity collects data opportunistically and non-intrusively while guaranteeing data security, privacy and ownership.</p>			

IT also holds several other technologies related to road transportation, such as IEEE 802.11p, WiFi, Cellular, LoRa and SDR radios, and several platforms with fast handovers between different technologies, multihoming with network coding, and prototypes with delay tolerant networks. IT also owns an emulator of delay tolerant network that is able to test the real mechanisms in a server emulating a large-scale network. It also holds demos on wireless power transmission and RFID based type reader system, National Instrument ETTUS SDR radios.

It has founded a Spinoff, Veniam (www.veniam.com), on vehicular networks, who will continue to cooperate with IT.


Main road transportation related areas in IT:

- Vehicular communications: vehicular radios, wireless power transmission, communication with radars (V2I and V2V);
- Vehicular networks: multi-hop routing (V2I and V2V), fast handovers (horizontal and vertical), multihoming, connection Management (IEEE 802.11n, DSRC/IEEE 802.11p, 4G), security, opportunistic data gathering (delay tolerant networks), content distribution through the vehicular network,
- Emergency networks and applications.
- Approaches for Edge-cloud integration.
- Network mechanisms and applications for Assisted Driving.
- Integration with aerial drones.
- Integration with sensors.
- Integration with mobile phones for Internet access.
- Dashboards and decision systems.
- Mobile applications for users and drivers.
- Vehicular networks as enablers for Smart Cities and IoT
- Software defined vehicular networks and virtualization.

▲ Related projects


FP7, Coordinated Support Action FP7-REGPOT-2012-2013-1, 316296 “FUTURE-CITIES Budget: 1.2M€ Duration: 3 years Programme: EU FP7		<p>Build a lab for urban sciences & technologies for smarter cities, by providing different testbeds with a wide range of sensors and communication infrastructures, thus creating the conditions for future research and development using advanced technologies for data collection through mobile platforms, wireless communication and large-scale information processing.</p> <p>This living lab enables the development of research in areas such as sustainability, mobility, urban planning and information and communication technology.</p> <p>The Vehicular Ad-hoc Networking testbed has been implemented in two ways.</p>

		On the one hand, the FP7 initial project has instrumented with 802.11p technology harbor trucks that move regularly among containers packed high as buildings, emulating a small-scale city. On the other hand, +600 buses in the City of Porto are currently operating an hybrid wireless ad-hoc network that seamlessly switch between 802.11p, Wi-Fi and 4G. Thus, this urban-scale testbed consists of hundreds of networked vehicles, which use 802.11p, WiFi or 4G to connect to each other and to the infrastructure. Furthermore, GPS, accelerometer and OBD2 data collection was added to the on-board system, making vehicles, city sensors.	
DRIVE-IN: Distributed Routing and Infotainment through VEHicular Inter-Networking Budget: 900.8K€ Duration: 3.5 years Programme: CMU-PT/NGN/0052/2008	SRA lines covered by the project:		Description and objectives: The goal of DRIVE-IN project is to investigate how vehicle-to-vehicle communication can improve the user experience and the overall efficiency of vehicle and road utilization. As positioning devices, sensing technologies and wireless interfaces become standard commodities, all sorts of vehicles such as cars, buses and trucks will soon be able to operate in a networked fashion, sharing vital information ranging from traffic congestion data to accident alarm signals and making navigation and safety decisions based on the messages they receive from neighboring nodes. In addition, vehicle-to-vehicle communications open a myriad of new applications, including location-based information dissemination, vehicle-based social networking and distributed interactive games. So far, in most applications navigation and communication are viewed as separate capabilities with little or no relationship to each other. Clearly, vehicle mobility and node density can vary dramatically depending on the road network and daily traffic patterns, and, consequently, wireless network connectivity between vehicles is extremely dynamic and highly correlated with the position of the vehicles and the physical characteristics of the road. It is thus important to explore how one can exploit the interplay between realtime navigation and wireless communication to achieve stable and efficient traffic and information flows. Participants: IT, CMU, N-DRIVE Results: A full network of vehicles with 100 vehicles communicating.
	13. Safety	Yes	
	14. Connected car 15. Infotainment		

Instituto Pedro Nunes			
Postal Address : Rua Pedro Nunes Tel.: (+351) 239 700 900 URL: www.ipn.pt	Post Code:3030-199 City: Coimbra Fax.: (+351) 239 700 912	Contact: Name: António Cunha Job description: Adjunct Director (LAS) Email: cunha@ipn.pt Tel.: (+351) 239 700 934 Mobile: (+351) 912 569 913	
▲ Description Founded in 1991 as an initiative by the University of Coimbra, Instituto Pedro Nunes (IPN) – Association for Innovation and Development in Science and Technology – is a non-profit private institution for public benefit. “It promotes innovation and the transfer of technology, establishing the interface between the scientific and technological system and the production sector.” Mission Statement Contribute to the transformation of the business environment and organizations in general, promoting a culture of innovation, quality, rigor and entrepreneurship, built on a solid university/enterprise relationship and operating in three fronts that reinforce and complement each other: - Research and technological development, consultancy and specialized services; - Business and idea incubation; - Highly specialized training and dissemination of science and technology. Laboratory for Automation and Systems (IPNlas) The Laboratory for Automation and Systems is one of the founding laboratories of Instituto Pedro Nunes. IPNlas develops projects in partnership with companies and entities of public domain through activities of technology transfer, consultancy and incentive for creation of spin-off companies. IPNlas activities result from collaboration between researchers from Department of Electrical and Computer Engineering (DEEC) of University of Coimbra, Institute of Systems and Robotics (ISR) and the University of Coimbra.			
▲ Main activities and products IPNlas have strong competences on Intelligent Transport Systems (ITS) namely in driverless vehicles for people transportation. Since EU FP5 by CyberMove projet, IPNlas have been involved in several promotions of driverless vehicles concept to several stakeholders, namely Airports, historic city centres, touristic resorts, university campuses, hospitals. Consequently, IPNlas developed and implemented an ITS at Rovisco Pais Hospital for patients with mobility limitations, allowing them to move between different buildings of this complex (2 Km long circuit), by using the non-pollutant, electric, autonomous vehicle - the MOVE, developed and constructed in Coimbra by IPNlas. This small mini-bus is equipped with ramps for wheelchair access and circulates in a predetermined circuit by means of electromagnetic path, having			

<p>the ability to avoid potential obstacles. The operation of MOVE is very simple and user-friendly for the passengers: patients, employees, visitors.</p> <p>MOVE became a fundamental horizontal transportation system at Rovisco Pais Hospital since mid 2010, where 80 people receive rehabilitation care every day. In fact each day, Move is used by 60 users covering a total of 6300 Km/year.</p> <p>(http://ipn.pt/laboratorio/LAS/prestacaoservicos?searchStr=Intelligent+Transportation+System&lab=LAS)</p> <p>In the beginning of 2016, IPNlas installed a new system in Deltapark, a Swiss resort, with the objective to transport their guests between the hotel and SPA buildings.</p>			
▲ Related projects			
Title: Move Budget: >400k€ Duration: 2008-2016 Programme: IPNlas and customers investment.	SRA lines covered by the project:		Description and objectives: MOVE is an electric driverless vehicle designed to be easily used for small trips at low speed in urban or private environments to complement regular public transport. This driverless solution is also silent and has zero emissions, therefore contributing to a healthier quality of life. It is also able to use solar energy. MOVE is only activated when it is called to service (demand response), avoiding unnecessary energy waste. Moreover, this small minibus is equipped with ramps for wheelchair access and circulates in a predetermined circuit with the ability to avoid potential obstacles. The operation of MOVE is very simple and user-friendly for its passengers: patients, employees and visitors. Participants: Instituto Pedro Nunes and TulaAuto. Results: Three vehicles fully working, 2 at Hospital Rovisco Pais in Portugal since 2010 and another at a Swiss resort since 2016.
	16. Safety	Yes	
	17. Connected car	Yes	
Title: AUTOCITS Budget: 2,5M€ Duration: 1/11/2016 - 31/12/2018 (selected for funding) Programme: CEF-Transport-2015-General	SRA lines covered by the project:		Description and objectives: The aim of this proposed Action (astudy with pilot activities) is to contribute to the deployment of Cooperative ITS (C-ITS) in Europe aligned with other current initiatives (C-ITS Platform, Amsterdam Group, etc.) on a large scale and thorough study of the current regulation for autonomous vehicles circulation in European urban nodes in terms of interoperability as well as the role of C-ITS as catalyst for the implementation of autonomous driving. In concrete, the project aims to conduct a study on the rules of autonomous vehicles in coexistence with conventional vehicles, aimed primarily at urban nodes connected to the main transport networks. The study has a pilot that includes autonomous driving capabilities and will be deployed in Spain / Portugal network as part of the Atlantic corridor. In this pilot, autonomous driving supported with C-ITS will be tested in open and closed traffic to check the
	1. Safety	Yes	
	2. Connected car	Yes	

			<p>applicable traffic rules, its extension to other European countries and contribute to European standards organizations. Aspects of real-time monitoring, communications with infrastructure, self-guidance control for complex maneuvers, safety and security, and high-level strategies for management of the autonomous vehicle from traffic control centers will be addressed in the project.</p> <p>Participants: Instituto Pedro Nunes, Indra Sistemas S.A, Universidad Politécnica De Madrid, Dirección General De Tráfico - Ministry Of Interior, Institut National De Recherche En Informatique Et En Automatique, Autoridade Nacional De Segurança Rodoviária - Ministério Da Administração Interna and Universidade de Coimbra</p> <p>Results: AUTOCITS contributes to TEN-T's priorities, and specifically to the implementation of studies with pilot activities for the deployment of C-ITS services.</p>
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<p>▲ Description</p> <p>The University aims at being a University Without Walls, completely turned towards the surrounding socioeconomic environment. The level of interaction with the external community, in all fields of knowledge and culture, is rather high. International activities are intense not only with the Portuguese-speaking countries but also with other countries from all continents. The European Universities Association considered the University a case study of good practices at the European level, as may be seen on the EUA report available at the WEB page of the University. The University considers itself to be a research university, engaged in the valorisation of the chain of knowledge - Research, Development and Innovation - as is evidenced by a series of indicators. The ratio between PhD students and PhD teaching staff is over 1; the fraction of postgraduate students in the total student population is over 20%; 80% of the teaching staff hold a PhD; the ratio between research projects and PhDs is over 0.5; around 150 PhD theses are awarded every year; the average yearly production of refereed papers published in international magazines is 2/full time equivalent/year; and 250 R&D contracts are signed every year with external companies. Amongst the 30 University Research Units reckoned by The Portuguese Science Foundation 21 were considered in 2009 to be Very Good or Excellent by International Evaluation Panels, placing the University on the top of the Portuguese Universities ranking. The School of engineering is truly committed to providing a superior quality higher education, aiming at training highly competent and socially relevant citizens and professionals. We are driven by education and lifelong learning, constantly seeking to provide the opportunity to renew competences and acquire new knowledge, fostering the continuous improvement of professional skills.</p> <p>The School of Engineering is a School devoted to cutting-edge research and capable of addressing real life problems in close cooperation with industry and society. R&D activities foster the creation of new knowledge, which is in turn applied and taught, constantly renewing the cycle of practice-based learning. As an R&D excellence institution, the School devotes its activities to strategic areas for its development, strengthening its position in the national and international research institutes' network. We intend to provide academic environments which encourage our students' entrepreneurial skills. Our research is not only market-driven but addresses also the benefits of long-term approaches to our key partners – Industry and Students.</p>			
<p>▲ Main activities and products</p> <p>The research carry out on the topic “Automated Road Transport” spans across a wide range of research Groups within the Algorimi Research Center (http://algoritmi.uminho.pt/), namely the Embedded Systems Research Group (ESRG), the Computer Communications and Networks Group (CCN) and the Industrial Engineering and Management (IEM) research line.</p> <p>Within the research line Industrial Engineering and Management (IEM), the Human Factors Engineering plays an important role in the context of smart, green and integrated transport. It also addresses several challenges related to new forms of human-vehicle interaction and new safety paradigms, which highlight the importance of</p>			

understanding the human role as the key-element in the interacting systems. These challenges are essentially centred on the improvement of human-centred design, not only by addressing new forms (technological) of interaction but also by anticipating the future challenges of the vehicle manufacturing plants and their supply chain. Previous work focused on the study of theoretical and practical issues regarding the improvement of human-vehicle interaction, with a particular emphasis on questions regarding the user experience, safety issues related to workload management in autonomous and semi-autonomous cars and driver monitoring. The research carried out also addressed user case scenarios, in particular in what regards to human comfort aspects, physical interfaces and biomechanics. For these user case scenarios, a Driver Simulator Mock-up was developed and implemented in order to ensure features like driver monitoring, car and environment synchronized variables log in order to provide functional validation methodologies and tools.


Within the Computer Communications and Networks Group (CCN) research has focused on Intelligent Transportation Systems, namely Car-2-x solutions based on wireless technologies where the communications can be performed from any location and in mobility situations, even when no network infrastructure is available. This technology can be used for communication systems of vehicles that have a high degree of mobility. Several wireless technologies have been already employed today, but they tend to use communications Direct Short Range Communications (DSRC) or infra-structured, based on cellular networks. The combination of new communication paradigms, the increase in the number and on the variety of information sources (sensors, other vehicles, other intelligent objects, and Internet sources infotainment) and the respective adaptation to different environments and different communication systems, also introduces new challenges in terms of differentiation of data types and differentiation of telecommunications mechanisms associated with the transmission of information in V2 * context.

Within the Embedded Systems Research Group (ESRG) research was also directed for the Intelligent Transportation System. Namely on the methodologies and tools to support the creation of automotive embedded systems, in particular real-time operating systems, hypervisors and support for fault-tolerances. Several prototypes for commercial and industrial applications have been deployed.

Expertise / Resources:


Connected Car (Car-2-x)
Collaborative/Platooning Driving(
DSM – Driving Simulator Mockup

▲ Related projects

Title SustIMS Budget: 1.026.316€ (363.000€) Duration: 2 years Programme: QREN I&DT Empresas/ Projectos Co- promoção nº23113	SRA lines covered by the project:		Description and objectives: Implement a Cyber Physical System capable of detect vehicle collisions and monitor the stability of motorway's walls & slopes. Participants: Ascendi - Portugal Results:
	18. Safety	Yes/No	
	19. Connected car 20.		

			In this project a sensory structure capable of detecting vehicle collisions with guardrails at critical points of road infrastructure and monitoring walls & slopes as well as environmental factors, based on a wireless sensor network of reduced power consumption and energy harvesting capabilities was developed, the developed system was integrated on an integrated management system to support motorway management.					
Title Road Condition Sensores Budget: Not Available Duration: 3 years Programme: QREN I&DT / Projectos Co-promoção	SRA lines covered by the project: <table><tr><td>1- Safety</td><td>✓</td></tr><tr><td>2- Connected car</td><td>✓</td></tr><tr><td>3- Autonomous driving</td><td>✓</td></tr></table>	1- Safety	✓	2- Connected car	✓	3- Autonomous driving	✓	Description and objectives: Develop a novel sensor capable of detecting road conditions, namely ice, snow, water and water thickness. Participants: Bosch Car Multimedia S.A. Results: Under development.
1- Safety	✓							
2- Connected car	✓							
3- Autonomous driving	✓							
Title CAR2X Communication Budget: Not Available Duration: 3 years Programme: QREN I&DT / Projectos Co-promoção	SRA lines covered by the project: <table><tr><td>1- Safety</td><td>✓</td></tr><tr><td>2- Connected car</td><td>✓</td></tr><tr><td>3-</td><td>✓</td></tr></table>	1- Safety	✓	2- Connected car	✓	3-	✓	Description and objectives: The CAR2X Communication project aims to develop a communications system vehicle-to-vehicle (V2V), vehicle-to-infrastructure (V2I) and vehicle-to-pedestrian (V2P), able to automatically identify dangerous situations or emergency, to fuse the warning mechanisms and protocols and select the appropriate telecommunications means to interact independently with other vehicles, pedestrians and smart objects and even independently control the behaviour of vehicles and some smart road infrastructure (eg.: traffic lights). Participants: Bosch Car Multimedia S.A. Results: Under development
1- Safety	✓							
2- Connected car	✓							
3-	✓							
Title Automotive Precision Positioning Budget: Not Available Duration: 3 years Programme: QREN I&DT / Projectos Co-promoção	SRA lines covered by the project: <table><tr><td>4- Safety</td><td>✓</td></tr><tr><td>5- Connected car</td><td>✓</td></tr><tr><td>6- Autonomous driving</td><td>✓</td></tr></table>	4- Safety	✓	5- Connected car	✓	6- Autonomous driving	✓	Description and objectives: Based on sensor fusion and new techniques for self-calibration of sensors, together with the current global positioning systems (GPS, GLONASS, Galileo, Beidou) the objective is to develop a unit capable of delivering car precision position in order to keep the car in lane; Participants: Bosch Car Multimedia S.A.
4- Safety	✓							
5- Connected car	✓							
6- Autonomous driving	✓							

		Results: Under development						
Title Cockpit of the Future: HMI Concepts and Functions Budget: Not Available Duration: 3 years Programme: QREN I&DT / Projectos Co-promoção	SRA lines covered by the project: <table><tr><td>7- Safety</td><td>✓</td></tr><tr><td>8- Connected car</td><td>✓</td></tr><tr><td>9- Autonomous driving</td><td>✓</td></tr></table>	7- Safety	✓	8- Connected car	✓	9- Autonomous driving	✓	Description and objectives: The project Cockpit of the Future: HMI Concepts and Functions aims to develop advanced HMI systems for the car of the future, prepared for assisted and autonomous driving, as well as all components and support systems for the development and test of advanced HMI systems. It also includes the development of an integrated process design, development and testing and validation systems (software and hardware) of HMI, which will provide critical information security and additional requirements as well as reducing new interfaces development times. Participants: Bosch Car Multimedia S.A. Results: Under development
7- Safety	✓							
8- Connected car	✓							
9- Autonomous driving	✓							
Title Cloud Applications for SMART Cars Budget: Not Available Duration: 3 years Programme: QREN I&DT / Projectos Co-promoção	SRA lines covered by the project: <table><tr><td>10- Safety</td><td>✓</td></tr><tr><td>11- Connected car</td><td>✓</td></tr><tr><td>12- Autonomous driving</td><td>✓</td></tr></table>	10- Safety	✓	11- Connected car	✓	12- Autonomous driving	✓	Description and objectives: Development of a new architecture of cloud applications for smart vehicles, as well as the development of three prototype cloud applications covering Advanced Driver Assisted Systems services: Road condition (pavement quality, traffic signs information layers and Driver ‘Style’ classification concept; Participants: ... Bosch Car Multimedia S.A. Results: Under development
10- Safety	✓							
11- Connected car	✓							
12- Autonomous driving	✓							
Title Driver Monitoring Budget: Not Available Duration: 3 years Programme: QREN I&DT / Projectos Co-promoção	SRA lines covered by the project: <table><tr><td>13- Safety</td><td>✓</td></tr><tr><td>14- Connected car</td><td>✓</td></tr><tr><td>15- Autonomous driving</td><td>✓</td></tr></table>	13- Safety	✓	14- Connected car	✓	15- Autonomous driving	✓	Description and objectives: Development of next generation Driver Monitoring by: Enhanced Presence Detection – “Driver opens glove compartment while PAD”; Co-Driver/Object Detection – “Detection of passengers/objects on front seats”; Body Posture/Gesture Control (beyond HMI) – “adjust seat and open sunroof!” Participants: ... Bosch Car Multimedia S.A. Results: Under development
13- Safety	✓							
14- Connected car	✓							
15- Autonomous driving	✓							

Institute of Systems and Robotics (ISR), University of Coimbra			
Postal Address : Department of Electrical and Computer Engineering University of Coimbra, Polo-II Tel.: +351 239 796 201 URL: www.isr.uc.pt	Post Code: 3030 City: Coimbra, Portugal Fax.: +351 239 406 672	Contact: Name: Urbano Nunes Job description: Full professor Email: urbano@isr.uc.pt Tel.: +351 239 406 570 Mobile: +351 910 423 744	
<p>▲ Description</p> <p>▲</p> <p>Institute of Systems and Robotics—University of Coimbra (ISR-UC) is a Portuguese private, non-profit research institution. ISR-UC promotes advanced multidisciplinary R&D in the areas Mobile Autonomous Robotics, Intelligent Transportation Systems, Search and Rescue Robotics, Robotic Manipulation, Computer Vision, Medical Robotics, Assistive Technologies, Biomedical Engineering, Advanced Industrial Automation Technologies and Intelligent Energy Systems. ISRUC gives special attention to international scientific research cooperation with centers of excellence, as well as to training and education Initiatives. ISR was founded in 1992 with the global purpose of setting up a first class multi-disciplinary research team, able to carry out leading edge research in several important areas of science and technology, with a special emphasis in systems and robotics. ISR has also developed strong links with industry, either existing national and international companies, or promoting the creation of spin-offs.</p> <p>ISR-UC is organized in two research groups:</p> <ul style="list-style-type: none">- Automation and Robotics for Human Life;- Computer Vision and Robot Perception.			
<p>▲ Main activities and products</p> <p>Automation and Robotics for Human Life Group</p> <p>The Automation and Robotics for Human Life (AR4LIFE) Group addresses fundamental and open issues located at the heart of human-centered robotics, in the strands of mobility systems, intelligent energy systems and computational intelligence , medical robotics, field robotics.</p> <p>Mobility systems: the AR4LIFE Group performs R&D aiming to improve mobility in human-made environments, including wheeled assistance mobile robots and automated vehicles, with focus on: methods and algorithms for new urban mobility/transportation systems; assistive mobile robots and human-robot interaction in human environments; human-robot collaborative navigation and perception systems; multimodal human-machine interfaces with high reliability and usability.</p> <p>Intelligent Energy Systems: research on advanced electrical technologies, as well as renewable energy and energy storage systems, in the scope of robotics, automation and electric vehicles, with the major topics: Development and assessment of energy efficient technologies (such as lighting systems or electric motors and drives); Impact assessment of energy-related products; Design of smart grid architectures and energy storage systems to the large scale integration of renewable generation.</p> <p>Computational Intelligence: computational learning methodologies, and intelligent control, with applications in robotics, intelligent vehicles, human-centered applications, soft sensors, and process control, giving special attention to industry applications and knowledge transfer.</p>			

Some achievements:

- Detection and Tracking of Moving Objects using 2.5D Motion Grids (<https://sites.google.com/site/amshmi12/10--experimental-tests>) , (<https://sites.google.com/site/amshmi12/publications>) , and (http://mobility4people.isr.uc.pt/?page_id=29)
- A fully functional real-time parallel 3D reconstruction pipeline (<https://sites.google.com/site/amshmi12/description/stereo>)
- ISRobotCar: Autonomous electric vehicle prototype (<https://www.youtube.com/watch?v=Lt5ZTwoTQE0>)
- ISR-TrafSim: ISR traffic Simulator (<http://www2.isr.uc.pt/~conde/isr-trafsim/>)

International Awards (U. Nunes):

- as co-author, awarded as a winner of NiSIS Competition 2007 "Problem Task: Analysis and Classification of the DaimlerChrysler Automotive Dataset Images"
- the IEEE ITS Society Outstanding Service Award in 2006;
- as Co-Chair of RAS TC on ITS, the IEEE RAS Society Most Active TC Award in 2006;

Computer Vision and Robot Perception

The Computer Vision and Robot Perception group deals with a subset of scientific problems that are usually classified as being part of computer vision (as a scientific discipline that deals with extracting information from images) as well as robot perception (which encompasses additional sensing modalities). This group has existed since the inception of ISR—University of Coimbra, and has gradually expanded the range of topics that has been studying.

From the scientific standpoint the main issues we are currently dealing with are: Geometric computer vision including camera calibration, pose estimation, 3D reconstruction, radial distortion modeling; Camera models; Application of differentiable manifolds to computer vision problems such as image segmentation, tracking, object recognition and learning; Segmentation and tracking; Classification and Clustering; Estimation and optimization applied to computer vision problems; Application of a Bayesian framework to multimodality sensing, adaptive decision, and action/actuation in robotic systems; 3D shape analysis under a Riemannian framework; Spatiotemporal analysis of human facial/bodily signals.

▲ Related projects

AUTOCITS (project recommended to be funded)	SRA lines covered by the project:		Description and objectives:
	21. Safety	Yes	
	22. Connected car	Yes	
Budget: 2.5M € Duration: 1/11/2016 - 31/12/2018 (selected for funding) Programme: CEF-Transport-			The aim of this proposed Action - a study with pilot activities - is to contribute to the deployment of Cooperative ITS (C-ITS) in Europe aligned with other current initiatives (C-ITS Platform, Amsterdam Group, etc.) on a large scale and thorough study of the current regulation for autonomous vehicles circulation in European urban nodes in terms of interoperability as well as the role of C-ITS as catalyst for the implementation of autonomous driving. In concrete, the project aims to conduct a study on the rules of

2015-General			<p>autonomous vehicles in coexistence with conventional vehicles, aimed primarily at urban nodes connected to the main transport networks. The study has a pilot that includes autonomous driving capabilities and will be deployed in Spain / Portugal network as part of the Atlantic corridor. In this pilot, autonomous driving supported with C-ITS will be tested in open and closed traffic to check the applicable traffic rules, its extension to other European countries and contribute to European standards organizations. Aspects of real-time monitoring, communications with infrastructure, self-guidance control for complex maneuvers, safety and security, and high-level strategies for management of the autonomous vehicle from traffic control centers will be addressed in the project.</p> <p>The proposal is aligned with TEN-T objective of optimising the integration and interconnection of transport modes and enhancing the interoperability of transport services, while ensuring the accessibility of transport infrastructures, and the priority of Intelligent Transport Services for Road (ITS).</p> <p>Participants: Spain: Indra Systems SA(leader), UPM, DGT Portugal: University of Coimbra (ISR-UC), IPN, ANSR France: INRIA</p> <p>Expected Results: AUTOCITS contributes to TEN-T's priorities, and specifically to the implementation of studies with pilot activities for the deployment of C-ITS services. The project is going to start on the last quarter of 2016.</p>
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CyberCars - Cybernetic Technologies for the Car in the City Budget: +1 M€ Duration: 36 months (2001-2004) Programme: EU-Funded Information Society Technologies Project	SRA lines covered by the project:		Description and objectives: The project CyberCar joint European actors of the field of automated urban transportation together in order to test and exchange best practices, share some of the development work and progress faster in the experiments. Several cities throughout Europe have participated in the project. A major part of the work carried during the project, was the development and test of several key technologies for the enhancement of the existing systems. These technologies concern better guidance, better collision avoidance, better energy management, better fleet management and the development of simple and standard user interfaces. Cooperative work is also needed at the European level in order to reach a consensus on the certification techniques of these systems which are now developed in a very imprecise regulatory framework.
	23. Safety	Yes	
	24. Connected car	Yes	


			<p>Participants:</p> <p>-Research Institutes: INRIA, TNO, Robotiker, CSIC, DLR, SINTEF.</p> <p>-Universities: DITS, ISR, Technion, Un. Stuttgart, TRG, Un. Bristol, Griffith Un., Shanghai Un. ITS, ika RWTH, T&M Leuven.</p> <p>-Manufacturers: SERPENTINE, FROG, Robosoft, YAMAHA, CRF, Autos & Energies, ULTra.</p>
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<p>CyberC3 - Cybernetic technologies for Cars in the Chinese Cities</p> <p>Budget: +500 K€ Duration: 36 months (2005-2006)</p> <p>Programme: EU-funded EESD EVK4-2001-00050</p>	SRA lines covered by the project:		<p>Description and objectives:</p> <p>This project will liaise with the existing IST European CyberCars Project and apply advanced IT&C technologies in cars and transport system, on one hand, aiming to propose an innovative transportation for the city of tomorrow based on fully automated vehicles (Cybercars), which has advantages of high flexibility, efficiency, safety; on the other hand, aiming to protect the environment and improve the quality of life for Asian sustainable development. The target groups are made up of five sub-groups: the IT&C researchers in automated vehicles; the decision-makers, such as governments, site managers, organizers of big activities; the end users; the system operators; the industries, such as car manufactories. The main activities of the action include a series of workshops, sites visits, establishment of task forces, the development of new Cybercars vehicles in China, the realisation of a pilot application in China, potential site studies, and dissemination of the results.</p> <p>PARTNERS RIR – Research Institute of Robotics, Shanghai Jiao Tong University, China; NRRIA - Institut National de Recherche en Informatique et en Automatique, France; ISR-UC - Institute of Systems and Robotics, Coimbra University, Portugal.</p>
	25. Safety	Yes	
	26. Connected car	Yes	

<p>EVSIM09 - Models for</p> <p>Traffic Simulation of Electric Vehicles with Communications and Dynamic Decision Capacity</p>	<p>Description and objectives:</p> <p>The project was organized in six tasks: T1- Scenarios Definitions; T2- Energy Models; T3- Extension of existing Traffic Simulator; T4- Information Management Models for Inter Vehicle Communication; T5- Novel Architecture Definition; T6- Field Tests of Energy Models.</p> <p>In T1 Scenarios of Interest for studies in a Traffic Simulation Environment were defined.</p>
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<p>Budget: 190 K€ Duration: 36 months (2010-2012)</p> <p>Programme: FCT</p> <p>SRA lines covered by the project:</p> <p>Safety: Yes</p> <p>Connected Cars: Yes</p>	<p>This task continuously contributed and received contributions from the other tasks. As the scenarios were defined, requirements for the energy models, for the communication models, for the extension of the existing simulator and for the novel architecture were identified and defined. On the other hand, as the models were being developed new case studies and the related scenarios were refined.</p> <p>In T2 energy models for EV were developed. These models were used in the extended traffic simulator in some studies related to mobility systems based on EVs.</p> <p>In T3 an existing traffic simulator (SUMO) was extended to allow 3D traffic simulations with energy consumption predictions.</p> <p>In T4 communication and information management models were developed. V2V and V2I communications and information management were considered in traffic management and mobility systems studies.</p> <p>In T5 a new traffic microsimulator, named ISRTraSim was developed (http://www2.isr.uc.pt/~conde/isr-trafsim/). The main goal was to develop a traffic simulator capable of testing Intelligent Traffic Management Systems (like intelligent intersection management) in urban environment with capacity to implement different urban scenarios, especially road intersections .</p> <p>In T6, field tests of the energy models and of the developed navigation algorithms/systems have been performed with a Nissan-Leaf and ISRobotCar (autonomous electric vehicle instrumented during the project).</p> <p>Project webpage: http://www.isr.uc.pt/~urbano/evsim</p> <p>With the support of the EVSIM09 project, the team organized the 13th International IEEE Conference on Intelligent Transportation Systems, Madeira Island, Portugal, 19-22 September 2010 (http://itsc2010.isr.uc.pt/site/).</p> <p>The project was also contributed to the visibility of team. The PI, in the period of the project was: Vice President for Technical Activities of the IEEE Intelligent Transportation Systems Society (2009-2011); Member of the Board of Governors (BOG) of IEEE Intelligent Transportation Systems Society (2009-2011);</p>
<p>PDCS10 - Pedestrian Detection in Urban Challenging Scenarios</p> <p>PTDC/EEA-AUT/113818/2009</p> <p>Budget: ~100 K€</p>	<p>Description and objectives:</p> <p>The research work has been done, with new achievements, in the following topics: TASK1: 1) SymSTEREO- Stereo Matching using Induced Symmetry: a new stereo was proposed ; 2) SymSTEREO-based new approaches were proposed such as on obtaining stereo vision working as a laser rangefinder and planar stereo reconstruction; 3) S3F-method: A new method for Simultaneous Segmentation and Superquadrics Fitting (S3F) of objects detected in range data was developed . S3F relies</p>

<p>Duration: 36 months (2011-2014)</p> <p>Programme: FCT</p> <p>SRA lines covered by the project:</p> <p>Safety: Yes</p> <p>Connected Cars: Yes</p>	<p>ona novel global objective function that accounts for the size of the object and the distance of range points, and for partial occlusions; 4) A road segmentation method has been developed that relies on a superpixel detection based on a novel edge density estimation method; 5) A road detection approach based solely on dense 3D-LIDAR data was proposed; 6) New vision/laser calibration methods: 6.1) A minimal solution for the extrinsic calibration of a camera and a laser-rangefinder ; 6.2) A fast and accurate new calibration method of the RGB-D Kinect sensor ; 6.3) A new geometric method to estimate not only the distortion parameters but the entire camera calibration (up to an “angular” scale factor), using a minimum of 3 lines, was developed ; 7) A new visual odometry approach: a novel approach for estimating the relative motion between successive RGB-D frames that uses plane-primitives instead of point features was developed ; TASK2: 1) A GA-based MM-training method able to jointly optimize the parameters of both HOG and SVM was formulated and the resulting model was so named MMHOG-SVM. The idea was to control the classifier complexity in Vapnik sense, that is, by automatically controlling the feature space dimension. 2) Rectangular-HOG descriptor: a new image descriptor called Rectangular-HOG was proposed . The Matlab source code of the proposed HOG descriptor (R-HOG) developed in this project was made available for download at: http://www.mathworks.com/matlabcentral/fileexchange/28689-hog-descriptor-for-matlab</p> <p>TASK3: 1) SVNN and TNN algorithms - new training methods for MLP neural networks named SVNN (Support Vector Neural Network) and TNN (Transductive Neural Networks): two new training algorithms were developed for multilayer perceptrons based on evolutionary computation, regularization, and transduction.</p> <p>2) DNMM-model : A Dynamic Bayesian Mixture Model (DBMM) is designed to combine multiple classifier likelihoods into a single form, assigning weights (by an uncertainty measure) to counterbalance the likelihoods as a posterior probability -] was finalist for Kazuo Tanie Best Paper Award at IEEE RO-MAN’14.</p> <p>TASK5: A new pedestrian detection method based on LIDAR-driven sliding window and relational parts-based detection was proposed . A context-aware multisensor system, applied for pedestrian detection in urban environment was proposed;</p> <p>TASK6: Field tests and real data collected from our ISRobotCar (Yamaha-based electric vehicle, fully instrumented in ISR) were performed.</p> <p>6.1)- LIPD dataset by ISR-UC: http://www2.isr.uc.pt/~cpremebida/dataset LIPD dataset: Laser and Image Pedestrian Detection Dataset in Urban Environment Contributor</p> <p>6.2) - LSI dataset by the University of Carlos III: http://orff.uc3m.es/handle/10016/17370 LSI Far Infrared Pedestrian Classification & Detection Dataset ; Contributors: Carlos III University of Madrid. Intelligent System Lab Collaboration: ISR-UC</p> <p>Webpage: http://home.isr.uc.pt/~urbano/pdcs2010/index.html</p>
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CEiiA – Centro de Engenharia e Desenvolvimento de Produto			
Postal Address : Av. D. Afonso Henriques, 1825 ... Tel.: (+351) 220 164 800 URL: www.ceiia.com	Post Code: 4450 - 017 City: Matosinhos Fax.: (+351) 220 164 802	Contact: Name: Bernardo Ribeiro Job description: R&D Manager Email: bernardo.ribeiro@ceiia.com Tel.: (+351) 220 164 800 Mobile:	
<p>▲ Description</p> <p>CEiiA is a Centre of Engineering and Product Development that designs, implements and operates innovative products and systems mobility industries. CEiiA offers complete solutions based in robust engineering skills and unique project methodologies, covering all product development phases from concept to the production of small series, and operates intelligent systems.</p> <p>The mission of CEiiA is to be a leverage for the development of mobility, from the generation of opportunities and skills to the development and integration of technologies in new products and systems, to their operation associated to new services.</p>			
<p>▲ Main activities and products</p> <p>CEiiA develops, implements and operates technological solutions alongside its partners to push innovation in the automotive, mobility, aeronautics, and naval/offshore industries.</p> <ul style="list-style-type: none">- The activity of the Automotive area is focused on product development, from concept and design to pre-series, namely in areas like vehicles exterior, body panel and closures, chassis, interior, and also the electrical part. The portfolio of projects includes collaborations with some major global OEMs and Tier 1 companies (e.g. Volkswagen, PSA Peugeot Citroen, Pininfarina, Elbil Norge, Siemens) but also with Portuguese-based automotive suppliers (e.g. Simoldes, TMG, Inapal Plásticos, Inapal Metal,) and universities (e.g. University of Porto, University of Lisbon, University of Minho).- CEiiA offers complete solutions for the deployment and management of Smart Mobility services. CEiiA has developed mobi.me to connect vehicles and infrastructures, to integrate different information systems and to promote sustainability, offering a comprehensive answer to the needs of users, operators and city authorities. In this area CEiiA works with local authorities (e.g. Lisbon, Milan, London, Porto, Curitiba, Brasília, ...) and companies in different countries (e.g. Alliance Renault-Nissan, Itaipu Binacional, EFACEC, Critical Software, Siemens, INTEL, CPFL, Cooltra ...). CEiiA is a member of eMI³, the eMobility ICT Interoperability Innovation Group, that brings together key players of the electric vehicles market in order to standardise the definitions, formats and interfaces of ICT data and share mechanisms to create a common language among all ICT platforms for electric vehicles.- The activity of CEiiA in Aeronautics is centred in product development and structural testing, and in unmanned aerial systems to monitor the territory. CEiiA provides solutions for both the civilian and the military markets and has a portfolio of projects that include long-term collaborations with Embraer, Leonardo Finmeccanica, Daher and Marengo, and also with the Portuguese Air Force and the European Defence Agency. CEiiA is also a member of EREA - Association of European Research Establishments in Aeronautics and IFAR - International Forum for Aviation Research.- In Naval / Offshore, CEiiA develops and tests structures and equipment for subsea environments. CEiiA has developed partnerships in this new area with the most			

relevant entities in Portugal, including the IPMA, the EMEPC, or the University of Lisbon.

▲ Related projects

Title: BE Budget: 22M€ Duration: 2016-2020 Programme:	<p>▲ SRA lines covered by the project:</p>	Yes/No	▲
	27. Safety	YES	Description and objectives: BE is a new concept of vehicle, which is a part of an integrated development programme. It goes from the R&D to the premarket and market phases, and it does also include the operation of shared mobility and on-demand mobility services. BE is an urban interactive vehicle designed as a platform to integrate technologies and services for shared mobility. BE is adapted to new usage models, with less environmental impact and reduced life cycle costs. The solution of BE combines base systems (interior, exterior body and body shell) with advanced functions (connectivity, autonomous vehicles, and smart energy management), which cope with the challenges of new shared and on demand mobility models such as smart commuting, smart local logistics and smart flexible mobility. - A connected and interactive vehicle - Real-time integration of users, vehicles, infrastructure through “social networks of mobility” in which the vehicle is simultaneously a hotspot and an explorer of information. - Sustainable, based on smart energy management – “Zero emissions” mobility based on the smart management of energy according to the optimisation of urban services, impacts measurement, life-cycle approach to industrialisation. - Ergonomics and Functionality – Interiors, ergonomics and materials designed for the user, adapted to urban shared mobility and logistics - Advanced design based in new materials - Usage of light materials and structures, based on technological hybridisation, privileging durability and safety. - A solution with autonomous functions – Usage of autonomous functions to optimise urban services, and the mobility efficiency and safety. - A platform to integrate technologies - The vehicle as a platform to integrate technologies to urban mobility services
	28. Connected car 29. Autonomous Car 30. Electrification 31. X-Sharing	YES YES YES YES	

			<p>Participants: TMG Automotive, CEiiA, UMinho, FEUP, Centi, Inapal Metal, Fibrauto, Exatronic, VENIAM, Imobilmagic, Follow Inspiration, GMV, EFACEC.</p> <p>Results: The results of this programme are as follows: - 2 functional prototypes for demonstration; - Demonstration in a real-usage urban environment of the 3 key applications (Smart and flexible mobility, Smart local logistics, Smart commuting); - Definition of an industrial model of new generation.</p>
<p>Title: Região MIND CEiiA / CTAG</p> <p>Budget: 7M€</p> <p>Duration: 2016-2018</p> <p>Programme: POCTEP</p>	<p>▲ SRA lines covered by the project:</p>	Yes/No	▲
	1. Safety	YES	<p>Description and objectives: The project “REGION MIND: smart specialization in mobility industries” is a crossborder partnership to develop an innovative concept for the development and promotion of mobility technologies in this Euro-region (Northern Portugal and Galicia) and their integration in new products and services for international markets. In order to do so, this partnership intends to reinforce skills of R&D+i, engineering and technology, to create the environment for the attraction of projects, to attract creative and entrepreneur scientific talents, to consolidate a crossborder value chain, and to reinforce the connection between the signatories of the MoU and the industry.</p> <p>Participants: CEiiA, University of Minho (Portugal), CTAG - Centro Tecnológico de Automoción de Galicia (Spain), University of Vigo (Spain)</p> <p>Results: The results of this project are as follows: - Creation of a crossborder living lab to demonstrate and test technologies of new generation - Creation of an observatory of regulation in the area of autonomous vehicles, drones and related technologies</p>
	2. Connected car 3. Autonomous Car 4. Electrification 5. X-Sharing	YES YES YES YES	