

APPROACHES, VERIFICATION, AND TRAINING FOR EDGE-AI BUILDING BLOCKS FOR CCAM SYSTEMS

CCAM WORK PROGRAMME 2025

CCAM Cluster	Topic title	Type of action	Budget (EUR million)	# of projects expected to be funded
Cross-cluster	Advancing remote operations to enable the sustainable and smart mobility of people and goods based on operational and societal needs – Societal Readiness Pilot	RIA	12	2
1	Preparing for large-scale CCAM demonstrations – <i>Societal Readiness Pilot</i>	CSA	4,5	1
2	Next-generation environment perception for real world CCAM operations: Error-free and secure technologies to improve energy-efficiency, cost-effectiveness, and circularity	RIA	8	2
3	Integration of human driving behaviour in the validation of CCAM systems	RIA	5	1
5	Approaches, verification and training for Edge-AI building blocks for CCAM Systems	RIA	4	1
7	Federated CCAM data exchange platform	IA	4	1

APPROACHES, VERIFICATION, AND TRAINING FOR EDGE-AI BUILDING BLOCKS FOR CCAM SYSTEMS



Lukasiewicz Research Network - Automotive Industry Institute

Interest in the call and / or expertise to be brought into a consortium

- **Optimization of AI models** for object detection and classification (e.g., vehicles, pedestrians, traffic signs) for deployment on edge-AI hardware.
- **Application of methods** for reducing model complexity to decrease energy consumption and improve the responsiveness of CCAM systems.
- **Integration of AI model optimization** with edge-AI hardware, ensuring computational efficiency while maintaining high prediction quality.
- **Development of anomaly detection** mechanisms in real-time data streams to identify potential threats and cyberattacks.
- **Development of methods for dynamic allocation of AI** workloads between edge and cloud based on road context and timing requirements.
- **Integration of self-supervised ML** in distributed systems, allowing for automatic tuning of models based on incoming data without the need for centralized processing.
- **Development of evaluation methods for edge-AI performance in real-world** conditions, ensuring model validation across various road scenarios to increase the AI decisions quality.
- **Application of self-supervised ML to create an encoder** with high generalization capability and an optimized structure compatible with various CCAM systems, which can be easily adapted to various tasks (allows to limit the needs for large labeled training sets for each task).

Contact details

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APPROACHES, VERIFICATION, AND TRAINING FOR EDGE-AI BUILDING BLOCKS FOR CCAM SYSTEMS



Organisation name	IDEMIA
Interest in the call and / or expertise to be brought into a consortium	<p>As an AI-based Road Safety Equipment provider, IDEMIA is used to developing real-time perception algorithms and deploying them on edge devices (Nvidia Jetson Xavier/Orin, or NPUs). Most of the recent advances in AI involve very large models. We want to explore ways to keep the accuracy of these models while making them light weight.</p> <p>Topics of interest:</p> <ul style="list-style-type: none">- Quantization aware training (computer vision algorithms);- Multi-Modal LLMs distillation for edge-devices applications;- Real-time 3D object detection/segmentation and tracking; <p>Expertise: Road & Public Safety, AI for Perception & Video Analytics, Edge AI, Secure Connectivity, Cryptography, Road Safety equipment, ...</p>
Contact details	<p>philippe.hercelin@idemia.com: Innovation Program Manager</p> <p>aiman.bensallam@idemia.com: AI/Computer Vision Research Engineer</p>

APPROACHES, VERIFICATION, AND TRAINING FOR EDGE-AI BUILDING BLOCKS FOR CCAM SYSTEMS



Organisation name	FZI Research Center for Information Technology
Interest in the call and / or expertise to be brought into a consortium	<p>Background and expertise</p> <ul style="list-style-type: none">• Flexible SoC design tooling for edge AI systems (target FPGA)<ul style="list-style-type: none">• RISC-V core with dedicated AI accelerators incl. embedded OS/VM• Running low-power prototypes of vision-based object detectors: YOLOv7-tiny @ 5W• Tooling for deploying ANNs (distributed deployment)• Tooling for hardware/software co-verification/validation: Static, simulation, emulation• Image Processing Pipeline for Smart and Connected Infrastructure• Extensive experience with Event Cameras and Spiking Neural Networks <p>Interests and ideas</p> <ul style="list-style-type: none">• Distributed inference; Self learning systems; Verification/validation of complex HW/SW(AI) systems both during design and runtime• Image Processing Pipeline, including Multi-Sensor-Fusion with LiDAR, Event Camera, Thermal Camera• Situation Classification Approaches (near-accidents, accidents, ...), misbehavior detection in Traffic
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APPROACHES, VERIFICATION, AND TRAINING FOR EDGE-AI BUILDING BLOCKS FOR CCAM SYSTEMS

Organisation name	
Interest in the call and / or expertise to be brought into a consortium	<p>ACTIA is a Tier 1 company of 580 M€ and 4.000 employees, specialized in on board smart electronic systems mainly for the Heavy Vehicles Market (Bus & Coach, Trucks).</p> <p>ACTIA is developing a new generation of ECU for Heavy Vehicles, dedicated to the on-board energy management of vehicules functions such as lighting, hydraulic actuators, HVAC, door and window management, wiper, ...</p> <p>State of the Art: at date, vehicules electronic failures dramatically impact the vehicle service rate, evenmore failure are coming from the devices listed before. The only maintenance & repair strategy for vehicle owner is to proceed to the vehicule inspection during a planned visit to the garage.</p> <p>Objective / Interest of ACTIA is to deploy an AI edge based app running on our ECUs to perform predictive maintenance strategies and reduce at maximum vehicles systems breakdowns.</p>
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APPROACHES, VERIFICATION, AND TRAINING FOR EDGE-AI BUILDING BLOCKS FOR CCAM SYSTEMS



Organisation name	ISTANBUL OKAN UNIVERSITY (OKAN)
Interest in the call and / or expertise to be brought into a consortium	<p>OKAN can develop OPINA database as a use case with the related interfaces and taxonomies and use this for automated development of digital twins and representation of scenarios. OKAN has the infrastructure and research team that could support a consortium on:</p> <ul style="list-style-type: none">• Using ASAM Open Data Services and collect data using two CCAM vehicles owned.• Generating automated scenarios using dSpace Data replay. Various AI and/or ML methods can also be used for generating scenarios.• OKAN has concluded optiTruck (H2020) Project and has various patents. Thus OKAN can take part in developing digital twins using the data collected.
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APPROACHES, VERIFICATION, AND TRAINING FOR EDGE-AI BUILDING BLOCKS FOR CCAM SYSTEMS

Organisation name	MOTOR TRANSPORT INSTITUTE (ITS, Poland)
<p>Interest in the call and / or expertise to be brought into a consortium</p> 	<ul style="list-style-type: none">• providing dataset for testing various AI-based perception systems and movement planning algorithms• fully-synchronised dataset recorded in 360°, using 19 sensors, including:<ul style="list-style-type: none">• 4 LiDARs (128 lines, 20 Hz),• 7 RGB cameras (2048x1536, 200 fps),• 6 RADARS,• IMU-GPS-RTK (1000 Hz IMU, 100 Hz GPS, accuracy 1 cm),• thermal imaging camera (125 fps, 640 x 480),• CAN data,• representation of East-European driving conditions (Poland),• safety-critical real road scenarios with various road conditions (different road type, weather conditions, VRUs, obstacles - animals, agricultural equipment),• scenarios chosen based on the Police accident database,• continuation of Polish strategic research project,• previous experience in HE and H2020 projects (IMPROVA and Trustonomy), including management of WPs and pilots.
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APPROACHES, VERIFICATION, AND TRAINING FOR EDGE-AI BUILDING BLOCKS FOR CCAM SYSTEMS

Organisation name	RISE
Interest in the call and / or expertise to be brought into a consortium	<p>Interested in the interaction of speed, latency, cost coupled with safety, security and privacy concerns for edge-AI.</p> <ul style="list-style-type: none">• Expertise in system safety, functional safety and security-informed safety.• Verification and Validation of ADSs' Safety and Security, including scenario-based testing.• Expertise in edge processing and distributed Machine Learning / Federated Learning in networks of connected vehicles
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APPROACHES, VERIFICATION, AND TRAINING FOR EDGE-AI BUILDING BLOCKS FOR CCAM SYSTEMS



Organisation name	TECNALIA
Interest in the call and / or expertise to be brought into a consortium	<ul style="list-style-type: none">• Code and algorithm optimization to increase perception efficiency and reduce energy consumption.• Development of systems that enable the distribution and balancing of computation from perception• Infrastructure perception, cooperative perception (fusion in the cloud), V2X communication, Cybersecurity• Cloud based decision making• Bringing the guidelines of ISO8800 to novel approaches of perception and decision making from the edge.• Development of AI-based tools for supporting remote driving from the edge.
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APPROACHES, VERIFICATION, AND TRAINING FOR EDGE-AI BUILDING BLOCKS FOR CCAM SYSTEMS



Organisation name	Fondazione LINKS
Interest in the call and / or expertise to be brought into a consortium	<ul style="list-style-type: none">• Possibility to involve the CCAM Turin ecosystem, leveraging the strong collaboration already established in previous CCAM demonstrations (e.g., SHOW, IN2CCAM and ToMove (national))• Long experience in the use of AI for sensing and cooperative perception on OBUs and RSUs• Set of AI-applications that can be orchestrated on OBU/RSU and edge/cloud depending on some condition (network, load, power consumption, etc...)• Experience in using cameras complying with GDPR constraints• RSU available for testing in real junctions in Turin• Possible contact with a USA company working on edge with the European branch based in Turin
Contact details	Daniele Brevi daniele.brevi@linksfoundation.com

APPROACHES, VERIFICATION, AND TRAINING FOR EDGE-AI BUILDING BLOCKS FOR CCAM SYSTEMS



Organisation name	Chalmers
Interest in the call and / or expertise to be brought into a consortium	We employ self-supervised and un-supervised methods with large amounts of unlabeled, raw data from different internal and external sources of information (camera, radar, traffic information, online maps) to give guaranteed and superior performance, at the same time.
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APPROACHES, VERIFICATION, AND TRAINING FOR EDGE-AI BUILDING BLOCKS FOR CCAM SYSTEMS

Organisation name	IKERLAN
Interest in the call and / or expertise to be brought into a consortium	<ul style="list-style-type: none">• Empathic AI Brain: Monitors and shares critical information with other vehicles, fostering a cooperative ecosystem that enhances situational awareness and decision-making capabilities.• Optimized scheduling and power management strategies at the firmware and OS level to balance AI execution with energy efficiency.• FOTA updates enhance adaptability, but they also introduce security risks. The system must ensure that updates are signed, verified, and come from trusted sources (Signed Contracts). Together with strong authentication mechanisms (e.g., digital certificates, tokens) will be made to verify the identity of communicating entities.• Controlled laboratory conditions for communication layers validation (from PHY to APP).• Neuromorphic sensing: Ultra-low power DVS processing algorithms for 3D perception to reduce the energy footprint while maintaining high-speed event processing.• Edge to Cloud continuum orchestrated applications, including in vehicle ones.
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APPROACHES, VERIFICATION, AND TRAINING FOR EDGE-AI BUILDING BLOCKS FOR CCAM SYSTEMS



Organisation name	APPR
Interest in the call and / or expertise to be brought into a consortium	<p>APRR has been involved in C-ITS projects since 2016 and has developed what is becoming a living Lab for C-ITS and CCAM.</p> <p>We have our own fiber optic network along our entire road network and we operate data centers close to it. This telecom infrastructure enable us to see opportunities to play a role in the field of edge computing technologies and CCAM.</p> <p>KEY FIGURES IP network:</p> <ul style="list-style-type: none">• backbone 10GB/s• local IP networks 1GB/s• latency < 10ms on every point of the network <p>Data Centers 2 TIER3 Data Centers dedicated to Eiffage motorway concessions IT systems</p>
Contact details	APRR - Benoît VUADELLE - CCAM and C-ITS programs manager - benoit.vuadelle@aprr.fr

APPROACHES, VERIFICATION, AND TRAINING FOR EDGE-AI BUILDING BLOCKS FOR CCAM SYSTEMS



Organisation name	TNO
Interest in the call and / or expertise to be brought into a consortium	<p>In this call, TNO is interested in investigating and providing a Proof-of-Concept for an edge/cloud flexible digital infrastructure with intelligent mechanisms to facilitate the training and inference of edge AI models. Specifically, we aim to enable the seamless movement of automotive functions between vehicle, edge, and cloud by considering both compute and network requirements. Links to SdV building blocks and monitoring are considered.</p> <p>TNO has proven expertise in both cloud and network (6G) domains. In the cloud domain, TNO is currently working on large Cloud Federation IPCEI-CIS projects. In the 6G domain, TNO is coordinating and playing a key role in the national Future Network Services (FNS) consortium. TNO is a partner in the Shift2SDV project.</p> <p>In terms of assets, TNO possesses both a research cloud infrastructure (OpenStack) and a 6G testbed, which includes base stations, end-user devices, and core functions.</p>
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APPROACHES, VERIFICATION, AND TRAINING FOR EDGE-AI BUILDING BLOCKS FOR CCAM SYSTEMS



Organisation name	LIST (Luxembourg Institute of Science and Technology)
Interest in the call and / or expertise to be brought into a consortium	<p>We can develop "CCAM solutions with reduced power consumption, latency, and improved speed and accuracy, as domain-specific adaptations of AI and cloud-edge-IoT technologies".</p> <p>Reduced power consumption: a reduced power consumption CCAM solutions can be obtained by low powered communications systems using RIS and other 6G enablers. Enhanced network planning can be adapted to provide coverage to CCAM solutions.</p>
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APPROACHES, VERIFICATION, AND TRAINING FOR EDGE-AI BUILDING BLOCKS FOR CCAM SYSTEMS



Organization	Polytechnic University of Bari, Italy - POLIBA
Interest in the call and / or expertise to be brought into a consortium	<p>POLIBA has a long experience in EU HORIZON projects on transport of people and goods (CO-GISTICS, AEOLIX, FENIX, optiTruck), CCAM (IN2CCAM, CHORUS), as well as on related fields, like Electric Mobility (NEMO, eCharge4Drivers) and communications (6G-TWIN). On these projects, POLIBA develops several activities, such as project, WPs and Tasks management, design and implementation of tools using modelling, simulation, AI, optimization, automation, Digital Twins, etc., management of Living Labs in Bari, involvement of different types of stakeholders, development of Use Cases and definition and use of evaluation methodologies and assessment of KPIs.</p> <p>For this call, POLIBA is interested in evolving to the Edge-AI settings its AI models developed for Autonomous Vehicles in IN2CCAM. In particular, ad hoc architectures will be developed, assuring reduced costs, latency and power requirements, as well as high speed and computing capacity. Simulation and optimization models, developed by POLIBA for the above-mentioned projects, will be specified to be applied and used in the Edge-AI approach. Like for all the research projects in which it has been involved, POLIBA will exploit its international academic network to foster collaboration with relevant stakeholders around the world, in particular Japan and United States. Also, extended dissemination at scientific and qualified technical levels will be pursued, through publication of papers in scientific journals, and presentations in reviewed international conferences.</p>
Contact details	<p>prof. Maria Pia Fanti – mariapia.fanti@poliba.it prof. Walter Ukovich – ukovich@gmail.com</p>


APPROACHES, VERIFICATION, AND TRAINING FOR EDGE-AI BUILDING BLOCKS FOR CCAM SYSTEMS



Organisation name	ETRA I+D
Interest in the call and / or expertise to be brought into a consortium	<p>ETRA's possible contributions to the project would be:</p> <ul style="list-style-type: none">• Advance in the development and validation of the current developed AI algorithms applied in other projects (AUGMENTED CCAM and PoDIUM) for traffic management and VRUs protection.• Optimisation of these Edge-AI algorithms to make them efficient in resource-constrained devices: minimising the energy use and latencies and improving the speed and accuracy.• Implementation and testing of Edge-AI models in CCAM real-world use cases applied in a Spanish urban pilot: collective perception of VRUs, urban traffic flow optimization, predictive traffic management and traffic recovery after disruptions.• Validation for collective perception, real-time decision-making and improvements in security and efficiency.
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APPROACHES, VERIFICATION, AND TRAINING FOR EDGE-AI BUILDING BLOCKS FOR CCAM SYSTEMS



Organisation name	VEDECOM
Interest in the call and / or expertise to be brought into a consortium 	Background and expertise <p>We have deployed advanced smart infrastructure systems on open-road test sites such as Saclay and Carquefou. These deployments serve as real-world validation platforms for our perception pipeline, which combines AI-based models with stochastic methods, all executed entirely at the edge for low-latency, energy-efficient processing. Information are shared between infrastructure and CCAMs thanks to V2X stack with several granularity depending on CCAMs capabilities. Our research is particularly focused on developing uncertainty-aware AI models and cooperative multi-agent fusion strategies to enhance robustness, reliability, and scalability in connected and automated mobility scenarios.</p> Interests and ideas <ul style="list-style-type: none">Uncertainty-aware and Lightweight AI modelsBandwidth efficient and real-time cooperative perceptionMulti-modal design for scene understandingKnowledge migration from high cost to low cost sensorsOnline KPI estimation for perception pipelines
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APPROACHES, VERIFICATION, AND TRAINING FOR EDGE-AI BUILDING BLOCKS FOR CCAM SYSTEMS




Organisation name	IMEC
Interest in the call and / or expertise to be brought into a consortium	<ul style="list-style-type: none">• Leveraging Edge AI testbed expertise, enabling relevant network information on human driving behaviour in real time (link AIA)• Expertise in AI workload distribution at the edge• Expertise in Privacy Enhancing techniques• Expertise in creation of perception models based on fused data sources <p>Assets to leverage: Edge AI testbed Privacy Enhancing building blocks, AI workload distribution, Edge AI testbed, Simulation environment (Sensai)</p>
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APPROACHES, VERIFICATION, AND TRAINING FOR EDGE-AI BUILDING BLOCKS FOR CCAM SYSTEMS



Organisation name	CEA
Interest in the call and / or expertise to be brought into a consortium	<ul style="list-style-type: none">- Optimization, quantization and porting of AI algorithms agnostic to HW platform and compliant to safety-critical requirements: Open source sovereign AIDGE platform developed by CEA and hosted by Eclipse foundation- Trustworthy and frugal embedded AI- Advanced tools for the verification, validation and safety assessment of AI- AI training approach- Runtime safety-critical embedded AI monitoring <p>Related projects: IN2CCAM, CPS4EU, CONFIANCE.AI, PRISSMA, TWINLOOP, SHIFT2SDV, HAL4SDV, SOPRANO</p>
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APPROACHES, VERIFICATION, AND TRAINING FOR EDGE-AI BUILDING BLOCKS FOR CCAM SYSTEMS

Organisation name	 - International Road Union
Interest in the call and / or expertise to be brought into a consortium	<p>AI-driven automation is transforming transport operations, and Edge-AI technologies are at the forefront of enabling real-time decision-making in CCAM systems. The ability to verify and train AI models for CCAM in real-world conditions is crucial for fostering trust and ensuring widespread adoption among fleet operators and mobility service providers.</p> <ul style="list-style-type: none">• Experience in HORIZON Europe – project Althena, ensuring the practical implementation and exploitation of AI-driven solutions for CCAM, assessing business models, regulatory frameworks and the added value of AI for trustworthy perception and situational awareness in automated transport.• Definition of AI performance metrics and developing best practices for AI training in logistics and mobility environments.• Conduct cost-benefit analysis to assess the financial viability and potential return on investment; develop exploitation plan; elaborate roadmaps for successful exploitation and commercialization.• Dissemination activities and stakeholders' engagement.
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APPROACHES, VERIFICATION, AND TRAINING FOR EDGE-AI BUILDING BLOCKS FOR CCAM SYSTEMS



Organisation name	Toulouse University, FR
Interest in the call and / or expertise to be brought into a consortium	<p>The autOCampus platform, deployed on the campus of the University of Toulouse, serves as a continuum of experimentation dedicated to autonomous and connected mobility. It combines onboard perception (vehicles equipped with advanced sensors) and remote perception (infrastructure featuring LiDARs, cameras, and computing units) to enhance environmental awareness. With an infrastructure integrating V2X communications, edge computing, and private 5G.</p> <p>For this call, we are interested in AI-based fusion of camera and LiDAR perception data for road safety applications, especially the protection of vulnerable road users,</p> <p>Another key focus is the deployment of AI techniques for the orchestration and management of computing and communication resources.</p>
Contact details	<p>Rahim.Kacimi@irit.fr Co-head of autOCampus platform , https://www.irit.fr/autocampus/</p>



APPROACHES, VERIFICATION, AND TRAINING FOR EDGE-AI BUILDING BLOCKS FOR CCAM SYSTEMS

Organisation name	F6S Network https://innovation.f6s.com/
Interest in the call and / or expertise to be brought into a consortium	<p>The F6S Network leverages the reach and assets of the F6S platform of +5.7 stakeholders via www.f6s.com</p> <p>Communication & Dissemination We go beyond traditional methods, integrating social media, project websites, webinars, podcasts, events and innovative outreach in high impactful promotion & dissemination strategies.</p> <p>Stakeholder Engagement F6S drives stakeholder engagement through high-impact campaigns, global community building, and interactive co-design workshops. We are experienced in implementing an efficient multi actor approach and building synergies/ clustering activities among projects and EU initiatives.</p> <p>Exploitation, Sustainability & Impact F6S accelerating projects teams and value proposition towards market We provide guidance in exploitation pathways for Key Exploitable Results</p>
Contact details	Robert Carroll: EU Projects Development Manager Email: robert@f6s.com