CONNECT

CCAM TRUST & RESILIENCE

Never trust, always verify

CONTINUOUS AND EFFICIENT COOPERATIVE TRUST MANAGEMENT FOR RESILIENT CCAM

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Budget

€ 5.7 Million
100% EU-funded

Consortium

16 Partners
8 countries

Duration

36 Months
09/2022 - 08/2025

Message from the Coordinator

As the CONNECT project officially came to a close this August, I would like to take this opportunity to thank our entire consortium for their dedication and hard work on such an engaging and forward-looking topic: building trust in Cooperative, Connected, and Automated Mobility (CCAM) sytems. It is with some sadness that this joint endeavour has already come to an end. At the same time, looking back at what we have achieved together fills me with pride and optimism. With the openly released Trust Assessment Framework (TAF), the advancements in dynamic attestation, and many more technical results, CONNECT has provided a strong foundation for the future of trustworthy mobility. Equally important are the thought-provoking white papers we have recently published, which offer insights that will continue to guide both industry and research in the years ahead. While the project itself may have concluded, I am convinced that this journey will continue. The outcomes of CONNECT will leave a lasting impact, foster further innovation and shape the way trust and trustworthiness are understood in the CCAM ecosystem. I am also delighted to invite you to CONNECT Day on 22 September, a public online event where we will present the major results of the project to the wider community.

Content

01 CONNECT Project Wrap-Up

The CONNECT project has successfully delivered on its mission: building a secure and trustworthy foundation for next-generation Cooperative, Connected, and Automated Mobility (CCAM) systems. By pioneering dynamic trust assessment and reasoning mechanisms for safety-critical functions, CONNECT has set a new benchmark for embedding trust into automated decision-making—fully aligned with the EU CCAM Partnership's agenda.

Over the course of the project, CONNECT brought together global automotive experts, research institutes, and SMEs to merge zero-trust security principles with strong verifiability. This effort enabled secure, collaborative use of in-vehicle data, breaking down silos and unlocking new opportunities for cognitive computing across the CCAM ecosystem.

A central achievement was the release of the Trust Assessment Framework (TAF), an open-source solution designed to continuously evaluate system trustworthiness levels. By monitoring evidence gathered from custom trust sources within a Trusted Computing Base, the TAF empowers both researchers and industry to advance secure, transparent, and verifiable CCAM deployments. Its open availability is already fostering collaboration across Europe's research community, industry adopters, and standardization groups.

CONNECT's innovations were validated in three living labs:

- Intersection Movement Assistance (IMA): Demonstrated resilience against perception-based attacks by filtering out untrustworthy data.
- Cooperative Adaptive Cruise Control (C-ACC): Showcased high-speed, flexible trust evaluations with minimal performance trade-offs.
- Slow Moving Traffic Detection (SMTD): Highlighted the importance of reliable evidence sources and careful system design to avoid issues like double counting in distributed architectures.

Through rigorous testing, CONNECT proved its impact on enhancing the resilience, robustness, and trustworthiness of CCAM systems. Importantly, the project went beyond technical performance, exploring the ethical and societal dimensions of trust. Stakeholder feedback confirmed that future CCAM systems must address transparency, accountability, and fairness alongside safety and security.

In conclusion, CONNECT has delivered a comprehensive, multi-layered trust and security framework that not only strengthens CCAM systems today but also sets the course for future innovation.

02 Open-Source Contributions

A cornerstone of CONNECT's impact is its commitment to open-source development, ensuring that the project's technical achievements can be widely adopted, extended, and sustained by industry, research, and standardization bodies.

The core of CONNECT's trust architecture, the TAF continuously evaluates system trustworthiness levels using evidence from trust sources. It provides a flexible foundation for secure decision-making in CCAM and beyond. CONNECT's open-source releases are made available under the Apache 2.0 license, ensuring accessibility, flexibility, and long-term sustainability.

Key Open-Source Releases

- **Trust Assessment Framework (TAF)**
  horizon-connect-eu/go-taf

  The core of CONNECT's trust architecture, the TAF continuously evaluates system trustworthiness levels using evidence from trust sources. It provides a flexible foundation for secure decision-making in CCAM and beyond.
- **Direct Anonymous Attestation (DAA)**
  https://github.com/ubitech/daa

  Implements privacy-preserving attestation mechanisms leveraging hardware-enabled Roots of Trust (RoTs). This ensures that CCAM components can prove their integrity without disclosing unnecessary information.
- **UbiTrust Library (Configuration Integrity Verification – CIV)**
  https://github.com/ubitech/ubitrust

  Provides attestation, credential key management and several cryptographic functionalities such as hashing algorithms, HMACs, KDFs, RNGs, etc. that are agnostic to the underlying secure element. Our attestation mechanisms enhance resilience against tampering and misbehavior while maintaining interoperability across diverse CCAM deployments.

Sustainability and Collaboration

The repositories are maintained by Ulm University and Ubitech, with a long-term commitment to ensuring code quality, accessibility, and further development. CONNECT is also exploring the positioning of TAF as an Eclipse-endorsed framework, aiming for integration within the Eclipse Software Defined Vehicle (SDV) Working Group. This step would further strengthen sustainability while aligning CONNECT's innovations with Europe's open-source ecosystem.

03 CONNECT in Villach – Shaping the Final Chapter

In mid-June, the CONNECT team gathered in the beautiful city of Villach, Austria, for a two-day consortium meeting that set the stage for the project's grand finale.

On the first day, partners exchanged updates on the Trust Assessment Framework (TAF) — our central engine for making CCAM systems secure and trustworthy - and on other key components such as the Trust Level Evaluation Engine (TLEE), Adaptive Behavior and Safety Control (ABSC), blockchain-based trust logging, and MEC-powered task offloading.

The afternoon brought the project's three real-world use cases into focus:

- Intersection Movement Assist (IMA)
- Cooperative Adaptive Cruise Control (C-ACC)
- Slow-Moving Traffic Detection (SMTD)

Each team shared how their scenarios are now fully integrating with the TAF, bringing CONNECT's vision of trustworthy, cooperative mobility to life.

Day two opened with a General Assembly, where partners aligned on reporting, final review and a public event hosted online on 22nd September.

Following this, preparations for a joint scientific publication that will consolidate CONNECT's major research results into one comprehensive piece, started.

04 CONNECT Research Spotlight at IEEE VNC

This year's IEEE Vehicular Networking Conference (IEEE VNC) — the premier international event for vehicular networking research — provided the perfect stage for CONNECT to showcase its latest breakthroughs.

Representing the project, Prof. Frank Kargl and Artur Hermann from the Institute of Distributed Systems at Ulm University presented CONNECT's cutting-edge work on trust assessment in connected, cooperative, and automated mobility (CCAM).

A key highlight was their full research paper:

"Quantification Methods for Trust in Cooperative Driving" **[Link]**

The paper introduces innovative approaches to measuring and reasoning about trust in cooperative driving scenarios, addressing one of the most critical challenges for the future of CCAM: how vehicles can reliably decide which data and actors to trust in real time.

Alongside the paper, CONNECT also delivered a live demo of the Trust Assessment Framework (TAF), showing how dynamic trust evaluation can be applied to living labs.

Being featured at IEEE VNC — the most important annual gathering for this field — underscores CONNECT's role as a leader in bringing trustworthy, secure, and cooperative driving closer to reality.

05 Key Publications Shaping the Future of Trust in CCAM

CONNECT's impact extends beyond technical innovations — we are also shaping the broader conversation on trust, AI, and cooperative mobility. Two major publications, co-created by CONNECT partners, have recently been released:

Roadmap on Trustworthy AI [Link]

Emerging from our March workshop, the Roadmap on Trustworthy AI captures the insights and contributions of participants and provides a foundation for future research, policy, and standardization efforts. This roadmap outlines the critical steps needed to ensure AI systems are designed and deployed in ways that uphold trust, transparency, and accountability. It serves as both a reference point and a call to action for researchers, policymakers, and industry stakeholders working on the next generation of trustworthy AI.

5GAA White Paper: ATL and RTL Methodology [Link]

The 5G Automotive Association (5GAA) has officially published a White Paper featuring CONNECT's methodology on Actual Trustworthiness Level (ATL) and Required Trustworthiness Level (RTL). This contribution directly addresses one of the most pressing challenges in cooperative and automated driving: determining how much the data that vehicles rely on can truly be trusted.

The methodology introduces a dynamic framework for quantifying trustworthiness based on evidence, operational needs, and safety requirements. It is generic enough to be adapted across different systems and contexts, making it a versatile tool for industry adoption. A detailed case study on Automated Emergency Braking illustrates its practical application.

The White Paper also identifies open standardization gaps and proposes directions for harmonizing trust assessment approaches across the mobility ecosystem, helping pave the way toward safer and more resilient connected vehicles.

06 Save the Date – CONNECT Day!

We're excited to invite you to CONNECT Day, the final public event of the CONNECT project, taking place online on 22 September 2025, from 9:00 to 13:00 CEST.

This half-day event will be the perfect opportunity to look back at everything CONNECT has achieved and to explore what lies ahead for trustworthy, secure, and cooperative mobility.

What to Expect

- Project Overview – a comprehensive recap of CONNECT's journey and results
- Deep Dive into the Trust Assessment Framework (TAF) – the core of our approach to trust in CCAM
- Demonstrations – see our three use cases and technical components in action
- Future Outlook – insights into upcoming research directions beyond CONNECT

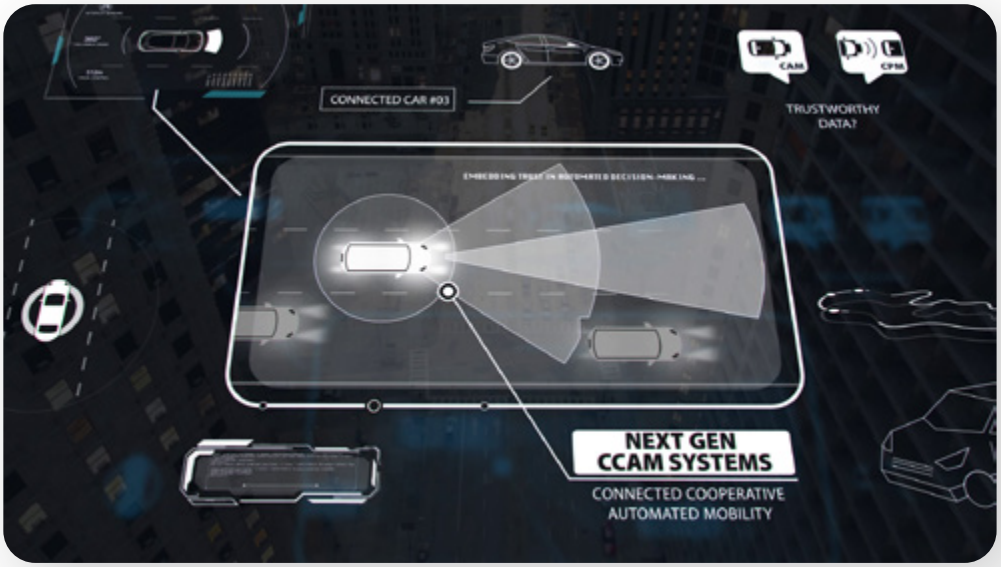
Each session will feature interactive Q&A, giving you the chance to engage directly with our experts and project partners.

Registration is now open! **[Link]**

Media & Papers

CONNECT Impact Video:

A brand-new impact video is now available in our video showcase on Vimeo [**link**]:



CONNECT scientific publications

All project-related scientific publications are available on the project website: [**link**]

Project Facts

Consortium: 16 partners (8 countries)
Project Coordinator: Lisa Burgstaller-Hochenwarter (Technikon)
Technical Leader: Thanassis Giannetsos (Ubitech)
Scientific Leader: Frank Kargl (University of Ulm)
Project number: 101069688
Project website: [**link**]
Project start: 2022-01-09
Project end: 2025-31-08
Duration: 36 Months
Total cost: EUR € 5 656 643.75
EC contribution: EUR € 5 656 643.75
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Upcoming Events

CONNECT Final Event
22nd September 2025
@Online (Stay tuned for more information!)

All past and upcoming events can be found on the CONNECT website:

horizon-connect.eu/events