AUTOMETA Newsletter

Connected AUTOnomous Driving and Perception using Reconfigurable Intelligent METAsurfaces



Issue 1 - Year 1

22 Feb 2024 - 21 Jan 2025

AUTOMETA (BRIDGE2HORIZON/0823A/0004) is a research project led by the Frederick Research Center (FRC) that investigates how reconfigurable intelligent metasurfaces (RIS/RIM) can strengthen connected and cooperative automated mobility and collective perception - especially in challenging non-line-of-sight (NLOS) urban scenarios.

Project at a glance

Coordinator	Frederick Research Center (FRC), Cyprus
Scientific advisors (FROs)	FORTH (Greece) and University of Trento (Italy)
Duration covered	Year 1 (22 Feb 2024 - 21 Jan 2025)
Core focus	RIS-assisted V2X communications, cooperative driving, and collective perception
Project website	https://autometa.frederick.ac.cy/
Funding 	Cyprus Research and Innovation Foundation (RIF) - BRIDGE2HORIZON/0823A/0004; implemented under THALIA 2021-2027 with co-funding by the EU

Year 1 highlights

- Project launched with governance structures (Management Board & Advisory Board) and a quality assurance plan.
- Branding and communication channels established: project website and social media accounts activated and regularly updated.
- Horizon Europe proposal AI4TrustDrive coordinated and submitted in September 2024 (13 partners from 8 countries), receiving a score of 12.5/15.
- Major outputs: first public release of CoopeRIS (RIS-assisted cooperative driving simulation) and multiple peer-reviewed scientific contributions in 2024.

Progress snapshot by work package

WP1 - Project management

- Kick-off meeting held with the project's management and advisory board members.
- Regular coordination meetings established to monitor technical progress, deliverables, and financial/administrative activities.

WP2 - Dissemination and outreach

- Project identity and online presence strengthened through the project website and dedicated social media channels.
- Dissemination plan executed through scientific publications and participation in targeted venues.

Online channels

Website: https://autometa.frederick.ac.cy/

X (Twitter): https://x.com/AUTOMETA_RIF

LinkedIn: https://www.linkedin.com/company/autometa-research-project/

Facebook: https://www.facebook.com/61579961137965/

WP3 - Coordination of a Horizon Europe proposal (AI4TrustDrive)

- A multidisciplinary consortium of 13 partners from 8 countries was formed.
- AI4TrustDrive targets trust-calibrated, human-centered AI for CCAM, enhanced by collective perception and context-aware explainable AI (XAI).
- The proposal was submitted to call HORIZON-CL5-2024-D6-01-04 in September 2024 and received positive reviewer feedback (score: 12.5/15).

WP4 - Cooperative driving simulator incorporating RIS/RIMs

- High-fidelity RIS modeling integrated into the Veins/PLEXE simulation toolchain (including beam steering capabilities).
- Simulation scenarios and evaluation metrics prepared to study NLOS connectivity and RIS-assisted link performance.
- CoopeRIS made publicly available through the PLEXE ecosystem to support broader research uptake.

Research outputs (Feb 2024 - Jan 2025)

Selected publications and presentations from the first project year:

- M. Segata et al., "CoopeRIS: A Framework for the Simulation of Reconfigurable Intelligent Surfaces in Cooperative Driving Environments", Computer Networks, June 2024. doi: 10.1016/j.comnet.2024.110443.
- R. Saeed et al., "A Proactive Model for Intrusion Detection Using Image Representation of Network Flows", IEEE Access, 01 Nov 2024. doi: 10.1109/ACCESS.2024.3489772.
- A. Akbarpour Kasgari and C. Chrysostomou, "Optimizing Power Allocation and Beamforming in mmWave-NOMA Downlink with Deep Reinforcement Learning", IEEE MECOM, 17-20 Nov 2024. doi: 10.1109/MECOM61498.2024.10881629.
- E. Emoyon-Iredia et al., "Connected Autonomous Driving using Reconfigurable Intelligent Metasurfaces", Book chapter in Springer Tracts on Transportation and Traffic, 22 Dec 2024. doi: 10.1007/978-3-031-64769-7_10.

Looking ahead to Year 2

- Expand and validate end-to-end simulation workflows for RIS-assisted cooperative perception.
- Quantify communication timeliness (Age of Information) and its impact on cooperative maneuvers and control.
- Strengthen dissemination through additional peer-reviewed publications and stakeholder engagement activities.