6.   Publishable Summary

SafeCOP—Safe Cooperating Cyber-Physical Systems using Wireless Communication

SafeCOP targets safety-related Cooperating Cyber-Physical Systems (CO-CPS) characterised by use of wireless communication, multiple stakeholders, dynamic system definitions (openness), 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 is an important concern. Although such CO-CPS can successfully address several societal challenges, and can lead to new applications and new markets, their certification and development is not adequately addressed by existing practices.

SafeCOP will provide an approach to the safety assurance of CO-CPS, enabling thus their certification and development. The project will define a runtime manager architecture for runtime detection of abnormal behaviour, triggering if needed a safe degraded mode. SafeCOP will also 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: healthcare, maritime, vehicle-to-vehicle and vehicle-to-infrastructure (V2I). 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. The results are demonstrated in five demonstrators: cooperative moving of empty hospital beds, cooperative bathymetry with boat platoons, vehicle control loss warning, vehicle and roadside units interaction and V2I cooperation for traffic management.

The consortium is industry-led, consisting of 7 Large Enterprises, 11 Small and Medium Enterprises (SMEs), working with 6 universities and 5 Research Transfer Organisations. The partners are positioned across the full value chain, from technology provides, to system integrators, OEMs and end-users. The presence of 3 safety assessors and 6 members of standardization bodies facilitates the exploitation of safety assurance results.

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