



ASSURE

ASSURED PROJECT FUTURE-PROOFS CRITICAL IT SYSTEMS AGAINST CYBERATTACKS THROUGH AN INTELLIGENT MULTI-LAYER FRAMEWORK FOR SECURITY, PRIVACY, AND DATA PROTECTION

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Today's critical IT systems, from email and banking to manufacturing and smart cities, have become more and more complex and challenging to design due to increasingly sophisticated cyberattacks. As these systems grow more and more complex - what is known as Systems of Systems (SoS) -, similarly does the need for mechanisms to ensure their safety. **ASSURED**, an EU-funded Research and Innovation project, aims at designing an intelligent multi-layered framework easily tunable to diverse vertical industries that will enable new security features, system verification and risk management.

Most of today's trusted systems use highly centralised approaches to security. Such trusted systems rely on trusted third parties that help process transactions and keep our data secure. However, centralised systems are vulnerable to many types of attacks. This leads to a need for new technologies that can guarantee trust, security to its users and carry out complex operations.

ASSURED has a clear strategy to build on and advance technologies such as Blockchain, Distributed Ledger Technique (DLT) to develop this an intelligent multi-layered framework to ensure cybersecurity solutions.

“The vision of ASSURED is to design and implement a novel framework in the complex domain of Cyber-Physical Systems (CPS). As the demand for increasingly complex and autonomous CPSs grows, similarly does the need for certification mechanisms to ensure their safety. ASSURED will design and develop of a novel, highly-usable, and resilient cybersecurity, privacy and data protection management framework, targeted at Systems-of-Systems enabled ecosystems”, said Thanassis Giannetsos, project coordinator of ASSURED.

ASSURED relies on three core pillars, **remote attestation of properties, dynamic real-time risk assessment, and enforcement of self-learning adaptable policies**, that will:

- provide strong **system integrity and operational assurance** of safety-critical components;
- provide a set of **continuous risk-assessment and management mechanisms** able to evaluate in real-time the existing risks of the entire SoS ecosystem against an enhanced threat model including network operation and availability attacks, low-level system attacks and data privacy risks and propose the appropriate mitigation actions;
- provide a **Blockchain decentralized market** that enables **enhanced knowledge sharing of increased operational threat intelligence**, among the various stakeholders, by supporting them towards the continuous monitoring of the health state of safety-critical components and the accountable reporting of newly discovered Advanced Persistent Threats (APT);
- share the **operational threat intelligence data flows**, through the provision of advanced Blockchain-control services based on privacy-preserving protocols, encountered in today's hyper-connected digital supply networks.

ASSURED cybersecurity framework will be demonstrated in four different real-life critical scenarios:

- **Smart manufacturing:** ASSURED framework will be deployed and will orchestrate the safe human-robot collaboration in automated assembly lines;
- **Smart cities:** ASSURED framework will be used to automate the interactions between various technologies and systems secure for enhanced public safety;



- **Smart aerospace:** ASSURED framework will be used towards achieving the secure (over-the-air) software update of various safety-critical controls, comprising a cockpit, and the safe & secure component upgradability while proving its normal operation with the rest of the aircraft system;
- **Smart satellite communications:** ASSURED framework will be used towards achieving strong access control to the deployed satellites and control systems, as well as their protection and functional safety against a wide range of attack vectors trying to remotely compromise such safety-critical components.

PROJECT STATUS UPDATE

More than 15 months of the ASSURED project have passed and we are almost at the middle of the project. Therefore, we are able to report to you the project's progress.

During this period, we have successfully completed the first work package, which defines the security, privacy and trustworthiness requirements of the ASSURED framework and the envisioned use cases. All the technical tasks have been completed and the deliverables of this work package have been submitted to the EU and have been published on the project website

The first 5 milestones have been successfully achieved, namely:

- Availability of the ASSURED Reference Architecture;
- Availability of the technical, security, privacy and trustworthiness requirements, to be met by the ASSURED framework and the use cases;
- Availability of the ASSURED conceptual models designing the integral security, privacy, operational assurance and data sharing services in a conceptual model of trustworthiness for next-generation complex "Systems-of-Systems";
- Design of a new breed of efficient attestation enablers leveraging a purely software-based Tracer capable of providing high-level of details and high accuracy when tracing and monitoring all the required system traces;
- Development of the first release of all ASSURED core components; from the attestation enablers and novel secure on-chain data management schemes (Attribute-based Encryption, Searchable Encryption, Attribute-based Access Control) to the overall set of the ASSURED Blockchain infrastructure leveraging new technologies including gRPC.

The project has been working in parallel on all the three core technical work packages: risk assessment for complex "Systems-of-Systems" (WP2); security modelling design of remote attestation schemes (WP3); and design and implementation of policy-compliant Blockchain infrastructure for secure data sharing (WP4). Work on the implementation and demonstration work packages has already started and the first complete version of the ASSURED integrated framework is expected by end of May 2022.



ABOUT ASSURED

ASSURED is a three-year Research & Innovation project funded by the European Union's Horizon 2020 programme under Grant agreement number 952697. ASSURED project is powered by a strong consortium with partners who were carefully selected to provide complementary skills and competencies, which cover all project objectives and activities, starting from the generation of ideas to analysis of requirements, to specification and design, low-cost implementation, system integration, up to demonstration, validation and beyond.

The partners of ASSURED consortium are [Technical University of Denmark](#), [Martel Innovate](#), [Eindhoven University of Technology](#), [Technical University of Darmstadt](#), [University of Surrey](#), [MellanoX Technologies](#), [Intrasoft International](#), [Unisystems Luxembourg](#), [UBITECH](#), [Data Intelligence Solutions](#), [United Technologies Research Center](#), [Space Hellas](#), [Bremer Institut für Produktion und Logistik](#), [Dimos Athinaion Epicheirisi Michanografisis](#).

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