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SERMAS partners





DISCLAIMER

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Executive Summary

This deliverable provides a general overview of the Project 101070351, SERMAS-HORIZON-CL4-2021-HUMAN-01.

The deliverable is structured as follows:

- scope;
- objectives;
- methodology;
- objectives

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1. Introduction

This deliverable provides a general overview of the Project 101070351, SERMAS-HORIZON-CL4-2021-HUMAN-01.

Acronym	SERMAS
Full title	Socially-acceptable Extended Reality Models and Systems
Programme	HORIZON-CL4-2021-HUMAN-01-13 HORIZON Research and Innovation Actions
Project number	101070351
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Table 1. Project general data

2. Context

The revolutionary opportunities opened by eXtended Reality (XR) technologies will only materialize if concepts, techniques, and tools are provisioned to ensure the social acceptance of XR systems. We need innovative, functionally complex, transparent, safe, secure, XR systems. However, current generations of XR systems fail to provide the XR experience they were envisioned for since state-of-the-art models and technologies of XR systems fail to ensure full-fledged social acceptance. In this context, SERMAS will develop innovative, formal and systematic methodologies and technologies to model, develop, analyse, test and user-study socially-acceptable XR systems.

This will be achieved by pursuing the four main objectives:

1. implement the SERMAS Toolkit: a set of methods and tools to simplify the design, development, deployment, and management of socially-acceptable XR systems.
2. Apply the Toolkit to industrial case studies drawn from real-world application scenarios.
3. Enable innovators to leverage the Toolkit to improve social acceptance and cut down the time-to-market of their XR systems, thereby enhancing the competitiveness of the vendors.
4. Produce the wider SERMAS Methodology to position the use of the Toolkit and enlarge its outreach.

2.1. Methodology

SERMAS will develop a Methodology and a Toolkit that will greatly simplify the design, development, deployment, and management of XR systems. The Methodology and the Toolkit will be applied to case studies drawn from industrial application scenarios. The work will start by employing the case studies and their scenarios to elicit the guiding requirements for project activities. These requirements form the basis of the design of the SERMAS XR Agent, an innovative modular hardware and software architecture to ensure general applicability and openness for integration of external input. Novel formal and automated methods

and tools will be devised to carry out a security assessment to check that the designed modules and their composition into the architecture satisfy the security (and privacy and trustworthiness) requirements on human-agent communication and data protection.

The SERMAS Toolkit will be developed using agile software development principles and continuous integration and testing services. The Toolkit will be an extension of the implemented SERMAS XR Agent modular architecture with cloud infrastructure resources supported with edge computing frameworks.

An iterative in-lab validation of both the SERMAS XR Agent and the Toolkit is foreseen before the real-world validation.

3. Overall Objectives

SERMAS will improve human-machine interaction by providing new models and systems of eXtended Reality with higher level of interaction and greater awareness of the context

OBJ 1: Define the SERMAS Methodology oriented at XR engineers who, assisted by security analysts and social scientists, intend to develop next-generation XR systems that can be accepted by their human users.

OBJ 2: Define the SERMAS XR Agent as a prototypical, general purpose system realising an XR model through a combination of hardware, software and algorithmic modules, allowing frictionless interaction with non-specialised users, adapting to the context.

OBJ 3: Improve open natural language generation to enable the XR Agent to access visual and language information, and communicate with users using both verbal and non-verbal signals requiring flexible language generation for fluent & natural machine interaction in diverse contexts.

OBJ 4: Context awareness and integration of structured knowledge allowing the SERMAS XR Agent to use its sensing suite to be constantly aware of its physical and social context, i.e. the geometry of the environment and the location and interaction intentions of nearby users.

OBJ 5: Frictionless interaction supporting the SERMAS XR Agent to interact with users in a similar fashion to human-human communication. Specifically, it will understand the environment where interaction takes place and its interlocutor. Mental and emotional states will be estimated to provide personalised interaction.

OBJ 6: Augmented gesture-based communication skills enabling the SERMAS XR Agent to recognise and generate pointing gestures to refer to spatially-located entities (e.g. a counter at a post office).

OBJ 7: Security assessment including formal and automated methods and tools for analysing socio-technical security.

OBJ 8: Release the SERMAS Toolkit that will integrate the SERMAS XR Agent and will leverage the methods and tools developed in the previous objectives.

OBJ 9: Demonstrate the SERMAS Proof-of-Concept and establish social acceptance of the case studies. The three case studies are:

Remote XR-based journalism training with advanced virtual avatar, Virtual Receptionist, and Virtual Assistant.