

# THEIA<sup>XR</sup> NEWSLETTER

ISSUE No. 6



## UPDATE ON THEIA<sup>XR</sup>

December 2025 is here and we are just a few moments away from successfully concluding our Horizon Europe journey, delivering impactful technologies and ethical frameworks for the future of XR in industrial machinery.

In this very last issue of our series of project newsletters, we let you in on all the last steps, actions and events that took place and also to recap what happened over the last three very eventful years in the THEIA<sup>XR</sup> research. We thank you for your interest in our research and hope you have a good start into 2026.



**Martijn Rooker, THEIA<sup>XR</sup> project coordinator states:**

*“Like all good things, THEIA<sup>XR</sup> is also coming to an end. We are now in the final weeks of the project, finalizing the last deliverables and preparing for the final review meeting, which will take place in February 2026. Fortunately, we have the opportunity to have the technical experts on site and give them the possibility to experience the developed solutions first hand!*

*The last months of the project have been very intense, where we still have performed a lot of activities. Final integration, user tests and evaluations have taken place, bringing our solutions to the end users and really testing them in real-life situations. It was great to see it all coming together after three years of hard work and receiving feedback from these people, giving us the feeling that we really worked on something that can make an impact on future operation of off-highway machines! As a major highlight of closing the project, we attended the UnitedXR in Brussels, Belgium, with the whole consortium, showcasing the results to an international audience. Furthermore, we held a final webinar targeting the topics of Ethics and Privacy on XR and AI, showcasing that XR is not only about technical development, but that the human factor is still a vital aspect of bringing XR to the market.*

*As we are now almost at the end of the project, I want to extend a huge thanks to the whole consortium for working three years extensively on this project and giving their best effort in bringing XR to this fascinating domain. Without all of them, nothing of this would have been possible!”*

## THEIA<sup>XR</sup> @ CONFERENCES AND TRADE FAIRS

### EuroXR

During the [EuroXR](#) 2025, which was held from September 3<sup>rd</sup> until 5<sup>th</sup> in Winterthur, Switzerland, THEIA<sup>XR</sup> organized a workshop on the topic of “Preserving Ethics and Privacy in the Dawn of Industrial Extended Reality”. [Anastasia Sergeeva](#) from the [University of Luxembourg](#) hosted this workshop. Additionally, she participated in the European Project Panel Session on the “Future of XR”. It was once again a great possibility to interact with other researchers and see where the future of XR is taking us.



Figure 1: Panel talk at the EuroXR

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## FINAL EVENT @ UNITED XR

At the last meeting in Graz, Austria, back in June of this year, the partners decided to hold the final consortium meeting at the [United XR Europe](#). During this event, which was from December 8<sup>th</sup> to 10<sup>th</sup> in Brussels, Belgium, the project presented the three use cases with their respective demonstrators. THEIA<sup>XR</sup> was able to present its results to a wide audience of industry professionals, researchers, and policymakers. The event featured at our project booth live demonstrations of the excavator, reach stacker, and snow groomer, showcasing XR-based solutions in real-world scenarios. The event also included the final consortium meeting and panel discussions and presentations.



Figure 2: Group picture of the consortium at the THEIA<sup>XR</sup> booth



Figure 3: The media walkthrough at the THEIA<sup>XR</sup> booth



Figure 4: Martijn Rooker during his presentation

One was held by our coordinator [Martijn Rooker](#), who presented the project, and another one as part of the scientific track on “Co-Designing XR features with off-highway vehicle operators” by [Sarah Bacher](#), [Tanja Brodbeck](#), [Manuel Kulzer](#), Sophie Doublet and [Anastasia Sergeeva](#).



Figure 5: Presentation by Sarah Bacher (left) and Anastasia Sergeeva at the panel discussion (right)

A great exchange happened also on the panel “Choose your own reality: Ethics, Identity and XRAI”. “We all know that one of the challenges of augmenting reality is really a challenge of creating new, competing meanings, and I’m glad this conversation has begun early before we have XR-of-everything.”, [Anastasia Sergeeva](#) states.

### WEBINAR RECAP

#### "Privacy & Ethics in XR and AI"

On December 12, 2025, THEIA<sup>XR</sup> hosted a webinar titled "Privacy & Ethics in XR and AI". Experts from across Europe discussed critical topics such as trustworthy AI, ethical digital twins, and human oversight in the age of super-human AI. The session emphasized the importance of embedding ethics and privacy into XR development.



Figure 6: Insights from the webinar

Moderated by [Gerald Fritz-Mayer](#), the dissemination lead of the THEIA<sup>XR</sup> project, interesting key speeches were held:

For the THEIA<sup>XR</sup> project [Anastasia Sergeeva](#), [University of Luxembourg](#) on "Preserving Ethics and Privacy in the Dawn of Industrial XR".

An expert about "Trustworthy AI": [Dr. Peter Biegelbauer](#) from the [AIT Austrian Institute of Technology \(AI Factory Austria\)](#). We heard about "The Role of Standards Today and Tomorrow" from [Ilija Ilic](#) from [Austrian Standards](#) for the [CODE4EV](#) project. We further got into the topic of "Ethical Issues in XR application based digital twins" from [Irma Poder](#), who works at [Trilateral](#)

[Research](#) for the [DIDYMOS-XR](#) project. And, last but not least, [Bernhard Nessler](#) from the [SCCH Software Competence Center Hagenberg \(AI5Innovation\)](#) we learned about "Human Oversight in view of super-human AI".



Figure 7: Anastasia Sergeeva's presentation for THEIA<sup>XR</sup>

The webinar was a great success. Not only did we have a large audience, we also could not keep up with the ongoing discussions in the chatroom and beyond.

Key takeaways we gathered from the event:

- Ethics and privacy must be embedded in XR development.
- Standards play a crucial role in ensuring trustworthy innovation.
- Human-centric oversight remains essential in industrial applications.

**Be sure to check out the [whole recording of the webinar here!](#)**



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## PROJECT OUTCOME DESCRIPTIONS AVAILABLE

Be sure you click on all the individual pictures to read the full one-pager and find out more about the results of our THEIA<sup>XR</sup> research!

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## HAPTION

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TU Graz

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## GUIDELINES AVAILABLE

Within the project, guidelines for privacy and ethics in XR implementation for off-highway machinery context has been developed by the [University of Luxembourg](#). To bring this information in an easy way to a large audience, a visual document has been

designed that highlights the most important information regarding the guidelines, including a description and a place where these guidelines can be downloaded.

### Guidelines


Privacy & Ethics  
in XR Implementation  
for Off-highway Machinery Context

Guideline 1 <b>Transparency and Control</b>	Guideline 2 <b>Data Lifecycle Anticipation</b>
Guideline 3 <b>Accountable Audit Processes</b>	Guideline 4 <b>Awareness of Technology Limitations</b>
Guideline 5 <b>Bystanders Data Collection</b>	Guideline 6 <b>AI Meets XR</b>
Guideline 7 <b>Human Always First</b>	

THEIA-XR's design guidelines for ethics and privacy in the Off-Highway machinery domain aim to provide guidelines for developing human-centered and privacy- and ethics-preserving interaction design for industrial vehicle XR solutions.


We apply the higher-level concepts of user-centeredness, accountability, and privacy-preserving efforts to practical considerations within the domain.

The guidelines are compatible with higher-level regulations of Privacy and ethics in XR.



Online version of the Guidelines and a full list of referenced literature.

<https://www.theia-xr.eu/guidelines>



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Figure 8: Privacy Guidelines Flyer

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## OEM VOICES ABOUT THEIA<sup>XR</sup>

As part of a questionnaire, we approached an OEM in the forestry machine sector to introduce our project and the results we achieved. The interviewed design expert is specializing in forestry machines. He and his company are currently working on XR interaction technologies and is interested in the technological capabilities. Here is the feedback we got:

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*From his perspective, the results of the THEIA<sup>XR</sup> project have clearly made XR solutions more interesting and practically applicable in this domain. They have also positively influenced his view on the usefulness and feasibility of XR technologies. In particular, the project helped to clarify the foundational requirements needed to implement XR solutions.*

*However, he also points out several challenges. One key issue is achieving long-term cost-effectiveness, especially given the rapid pace of hardware and software development in the XR field. In addition, sufficient customer demand or a regulatory push is needed to justify adoption. Finally, further studies are required to make XR applications more appealing and even more user-friendly, ensuring that machine operators are willing and able to use them effectively in their daily work.*

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We would like to thank the expert for his time and feedback on our research and are looking forward to future projects on XR technologies.



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