PrismArch

Deliverable No D7.4

Engagement strategies: plan and material

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Main Authors:	Ververidis Dimitrios (CERTH), Valia Margariti (CERTH)

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Abstract	This deliverable provides a plan for carrying out the ecosystem building activities, including promotional and communication material, awareness campaign, creation of educational material, webinars, themed events.
Keywords	Ecosystem building, promotional material, awareness campaign, engagement strategies, educational material, webinars, themed events.

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List of abbreviations and acronyms

Abbreviation	Meaning
AEC	Architecture Engineering Construction
BIM	building Information Modeling
CAE	Computer Aided Engineering
UG	User Group
VR	Virtual Reality
XR	Extended Reality

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Executive Summary

This deliverable presents the strategy and material developed by PrismArch partners towards the establishment of an ecosystem around the project, which will attract and involve third-party contributors, aiming to accelerate the adoption and broaden the scope of high-quality services in the PrismArch platform.

The report details the ecosystem development strategy, offers an overview of the communication material to be employed, and describes the activities that will be taken towards building the ecosystem. These activities include: a) online engaging, educational activities such as freely available online material and thematic webinars elaborating on the scientific background or the PrismArch modules, and b) physical events, such as networking and themed events.

The target audiences of these activities include AEC industry, key stakeholders, scientists, general public but also student groups and networks, freelancers, AEC communities and more.

Work during the second period of the project will focus on the implementation of the ecosystem-building strategy described in this deliverable.

1. Introduction

PrismArch's main objective is to "intersect the parallel words" of the AEC industry into a common platform that will promote decision making and ultimately reshape the design process in architectural projects. The principal objective of PrismArch is to achieve a "prismatic blend" between aesthetics, simulation models and meta-information that can be presented in a contextualized and comprehensive manner in VR in order to allow collaborative manipulation of the design and accurate assessment of new design decisions. This objective passes through intuitive interactions in a VR world with blended graphics across various types of simulation software that satisfies the needs of all types of designers in parallel.

In the direction of ensuring that the technologies developed in the context of PrismArch will be successfully adopted by AEC industry in Europe and beyond, Task 7.3 "Networking and engagement with relevant initiatives" hosts a set of ecosystem building activities, attracting and involving third-party contributors, aiming to accelerate the adoption and broaden the scope of high quality services in the PrismArch platform.

Deliverable D7.4 presents the ecosystem development strategy, offers an overview of the communication material to be employed, and describes the activities that will be taken towards building the ecosystem. These activities include: a) online engaging, educational activities such as freely available online material, thematic webinars elaborating on the scientific background or the PrismArch modules, and b) physical events, such as networking events, themed events at pilot sites.

The target audiences of these activities include AEC industry, key stakeholders, scientists, general public but also student groups and networks, freelancers and more. The Consortium members will act as educators, initiators or mentors, assisting the interested parties in exploring the challenges and opportunities of VR collaboration and parallel design on a project for effective decision-making and management of AEC projects, while encouraging them to implement their own ideas on how to facilitate workflow development in innovative ways.

The deliverable is organized as follows:

- In Section 3, we summarize the strategy for building the PrismArch ecosystem.

- In Section 4, we present the promotional and communication material that will be used to attract stakeholders and third-party contributors.

- In Section 5, we focus on the specific elements of the online awareness campaign that will be launched to facilitate the ecosystem building.

- In Section 6, we describe the thematic webinars that will be organized to educate attendees on the PrismArch scientific background and developed technologies, covering all aspects of the use of VR collaboration for AEC projects.

- In Section 7, we discuss the themed event that will be organized to demonstrate and promote pilot results on-site.

- In Section 8, we present already organized and planned networking events to disseminate the project and interest stakeholders in project outcomes.

- Section 9 draws the conclusions.

2. Ecosystem building strategy in PrismArch

In this section, we briefly present the PrismArch ecosystem building strategy and its different elements, which are then further explored and described in the following sections.

In order to ensure that the technologies developed in the context of the project will be successfully adopted by AEC key stakeholders in Europe and beyond but also to accelerate the adoption and broaden the scope of the PrismArch platform services, we propose a set of activities that will attract and involve stakeholders and third-party contributors, interested in AEC industry and the use of new technologies to support it. The **ecosystem building activities** have training processes in their core, aiming to simultaneously **disseminate, share knowledge, educate, and practically involve stakeholders** in the development of the PrismArch platform.

The starting point of our ecosystem building strategy is the development of appropriate **promotional and communication material** to attract stakeholders (see Section 4). This involves the design of an additional leaflet focusing on different aspects of PrismArch (design concepts, VR collaboration, visualization, etc.) and the creation of a video demonstrating the PrismArch concept and technologies.

This material will be utilized in the context of an **online awareness campaign** based on social media and online communication, which aims to attract relevant stakeholders and introduce them to the project goals and outcomes, but also interest them in joining our ecosystem and participate in ecosystem building events like networking events, thematic webinars etc. (see Section 5). The main tool to this end is the establishment of a **User Group** through the established collaboration networks of project partners, starting from the stakeholders that have already participated in the networking events organized during the first period of the project.

Aside from offering free informational/educational material, we also plan to organize a **series of webinars** to educate interested parties, mainly professionals from AEC industry but also scientists with an interest on new technologies on AEC, on the project's scientific background and the different PrismArch modules (see Section 6). These thematic webinars will elaborate on the issues mentioned before, covering theoretical and practical issues of effective overall decision-making process from major disciplines that are typically engaged in an architectural project, addressing issues such as collaborative design and visualization, interconnecting VR-aided design environment with BIM and CAE simulation environments etc.

Besides the aforementioned online engaging and educational activities, our ecosystem building strategy also includes physical events such as themed and networking events. More specifically, two **themed events** (one per usage scenarios for demonstration and evaluation) will be organized to demonstrate and promote project results to key stakeholders and AEC professionals on-site (see Section 7). These will be focused on the co-decision problems among the main contributors of an architectural project that we deal with in each pilot and will present how PrismArch has been used to assist architects, structural and MEP engineers in making decisions related to their project.

In addition to these events, a series of **networking events** aiming at major stakeholders, small and medium-sized enterprises (SMES), investors and the scientific community on an EU-level has already been launched (see Section 8). These focus on presenting the project

objectives and outcomes through short presentations by project partners, dealing with different aspects of an AEC project development and design, allowing a multi-designer presence and complex visualizations in VR.

Figure 3-1 presents an overview of the proposed ecosystem building strategy, illustrating its different components and their interconnection. In the following sections, we describe in more details the ecosystem building activities, including details on their content/focus, partners involved in their organization/implementation, target audiences, place and time, and tools employed for disseminating the events/material and attracting participants/interested parties.
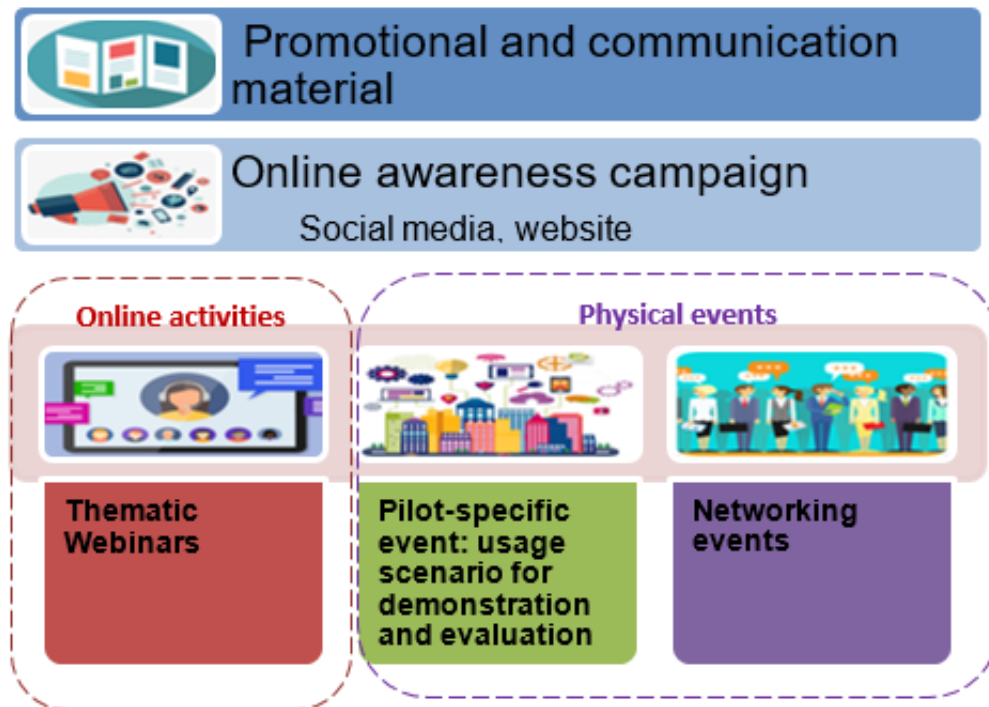

Figure 3-1: The PrismArch ecosystem building strategy and its main components

3. Promotional and communication material

To start building the project ecosystem, a crucial element is the development of **promotional and communication material** that will effectively communicate the project objectives and outcomes to different stakeholders and attract them to engage in online educational activities and also participate in physical events, seeking for more substantial information and knowledge.

Design of communication material includes the following:

- **Leaflets** providing information on different aspects of PrismArch (e.g. blending BIM notations within a VR-aided design environment, workflow analysis, visualization, pilots, etc.), based on a combination of short descriptions and smart visualizations.

- **Video,** efficiently demonstrating the PrismArch technologies as well as the use cases developed for different pilots. The aim of this video is to showcase the PrismArch concept and outcomes in a more straightforward and engaging way. The video will be uploaded to the project website and YouTube channel.

In the following subsections, we briefly present the designed dissemination material. More videos and leaflets will be added during the next period as project outcomes mature and demonstration use cases are implemented.

3.1 Brochures and Leaflets

One factsheet and one poster have been designed to promote different aspects of the project, aimed at AEC professionals and other interested stakeholders from the IT industry and the scientific community. A leaflet will also be created, briefly explaining PrismArch's core aspect functionalities, where the project's new updated logo will be included. The dissemination material will follow the same layout and include short informative descriptions and explanatory illustrations on selected topics, also providing useful links to relevant reports and other online project material (e.g. public deliverables). Below, we briefly summarize the content of each:

- **The PrismArch factsheet:** this brochure summarizes the fundamental core aspect of PrismArch, briefly explaining its main objectives and outcomes, listing the partners and providing the main contact details for the project (see Figure 4-1).

- **The PrismArch Poster:** A more analytical poster where the motivation, goals, scientific objectives and work package details of PrismArch are enlisted and briefly explained (see Figure 4-2).

- **Leaflet - The PrismArch platform**: this leaflet will be made upon the demonstration and evaluation of PrismArch in different architectural projects (M20). It will briefly explain the functionalities offered by the PrismArch platform and the main technologies employed. It will also provide diagrams of the project concept and briefly present the demonstration use cases that will be designed using the PrismArch platform; explaining the real design problems we are examining in each use case and how PrismArch is used to assist decision-making.

All dissemination material is available at the project website: https://prismarch-h2020.eu/dissemination/ (under "*Printed Material*").

PrismArch

Virtual reality aided design blending cross-disciplinary aspects of architecture in a multi-simulation environment

At a glance:

Employing virtual reality for the collaborative manipulation of architectural designs

Project Coordination:
Center for research and technology Hellas (CERTH), GR

Dr. Ioannis Kompatsiaris
(Project Coordinator)
Tel: +30-2311-257774
Email: ikom@iti.gr

Dr Dimitrios Ververidis
(Project Technical Manager)
Tel: +30-2311-257784
Email: ververid@iti.gr

Mrs Maria Papadopoulou
(Project assistant in administration and financial issues)
Tel: +30-2311-257726
Email: marpap@iti.gr

Project Website:
http://prismarch-h2020.eu
Start date: 01/11/2020
Duration: 24 Months
EC Contribution: € 1.928.062,50

The main objective of PrismArch is to achieve a "prismatic blend" between aesthetics, simulation models and meta-information that can be presented in a contextualized and comprehensive manner in Virtual Reality (VR) in order to allow collaborative manipulation of the design and accurate assessment of new design decisions.
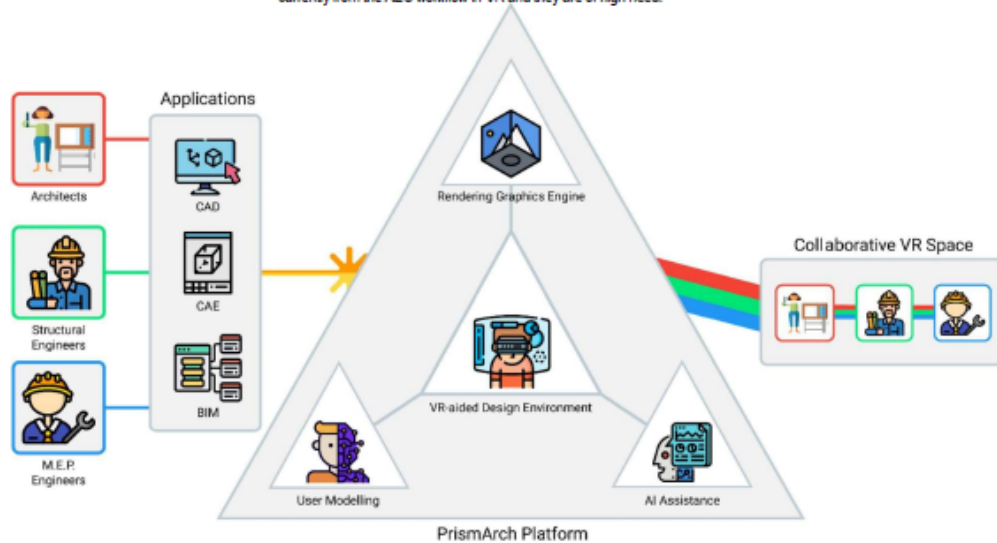
Objectives:

- Requirements of a cross-disciplinary, collaborative environment for VR-aided design in architecture
- Computational architecture design for automated content creation and design suggestions
- Cognition aspects of collaborative VR-aided design environments
- Blending multi-simulations and BIM notations within a VR-aided design environment
- System integration and development of the collaborative VR-aided design environment
- Demonstrate and evaluate PrismArch in different architectural projects

Use Cases:

The User oriented Objective (UO) targets for the definition of a) two architectural projects (demonstration use cases) that will be designed using the PrismArch platform; b) the usage scenario for the demonstration and evaluation of the PrismArch platform; and c) a methodology to evaluate the platform. Finally, this UO concerns the smooth execution of the evaluation process.

Outcome:

The main idea of PrismArch is to create a VR-aided design environment for the AEC industry that will enhance the collaborative capabilities across its main disciplines (architecture, structural engineering and MEP). It is the need for a "prismatic" decomposition of AEC projects that will allow each of AEC professionals to perceive and understand how their decisions affect the other AEC disciplines and consequently the project in total. In order to achieve this ultimate goal that aims to disrupt the AEC industry with VR, PrismArch will take advantage of well established technological advancements. By bridging the gap among a wide variety of domains such as computer graphics, machine learning, computational physics and cognitive science, and integrating them into a common workspace, PrismArch will develop a layered multi-simulation virtual environment, enhanced with AI-assistive capabilities, that meets the complex needs of each of the AEC professionals both independently and simultaneously, allowing a multi-designer presence and complex visualizations in VR that are missing currently from the AEC workflow in VR and they are of high need.

Partners

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L-Università ta' Malta   MINDESK®   ETHzürich   SWECO

Figure 4-1: The PrismArch factsheet

PrismArch
Virtual reality aided design blending cross-disciplinary aspects of architecture in a multi-simulation environment

Motivation:

The design process in architectural projects is characterized by high complexity which stems from the problem of "parallel worlds" (a term used to describe the fact that several disciplines -architects and a variety of engineers- coexist in an architectural project with distinct requirements and role). However, it is only the "intersection", by means of close collaboration, of these "parallel worlds" that can bring an architectural project to fruition. This "parallel world" aspect creates the necessity for an interdisciplinary tool capable to address the unique requirements of each discipline both individually and simultaneously, where all authors will be able to work on the same architectural project and perceive it in their own, different way that best suits their needs. This fact, dictates a necessity for "prismatic decomposition" of the architectural project into components that meet the needs of individual disciplines. Similarly, there is also a need for "prismatic composition", where individual designs, created separately, can be merged to form a unified architectural project.

Goal:

PrismArch aims to create a VR-aided design environment that will be able to host both architects and engineers towards a common goal, the effective realization of an architectural project. PrismArch will enhance the overall decision making process through an action and reaction paradigm. The dynamic collaboration that the PrismArch aims to offer, will allow designers to iteratively co-decide, preview and evaluate the result of their decisions towards a joint optimal solution. Through advanced VR-aided design environment, superimposed with physical and functional characteristics, the designers will be able to experience in-real time not only how their decisions affect their own discipline but also the other disciplines and consequently the overall architectural project.

Scientific Objectives:

- Requirements of a cross-disciplinary, collaborative environment for VR-aided design in architecture
- Computational architecture design for automated content creation and design suggestions
- Cognition aspects of collaborative VR-aided design environments
- Blending multi-simulations and BIM notations within a VR-aided design environment
- System integration and development of the collaborative VR-aided design environment
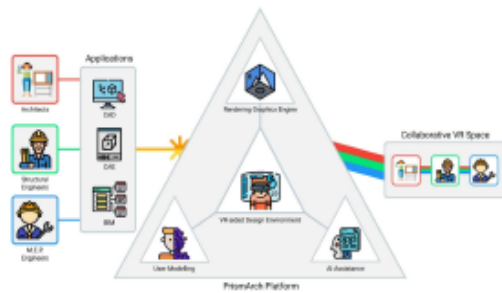- Demonstrate and evaluate PrismArch in different architectural projects

Contact

Dr. Ioannis Kompatsiaris Email: ikom@iti.gr

Dr Dimitrios Ververidis Email: ververid@iti.gr

Mrs Maria Papadopoulou Email: marpap@iti.gr

Project Website: http://prismarch-h2020.eu

WP1. Requirements of a cross-disciplinary, collaborative environment for VR-aided design in architecture
WP1 aims at eliciting the user and functional requirements of PrismArch by relying on experts' knowledge to, initially, identify the limitations of existing solutions and workflows in architecture; then move on with the main principles that govern the disciplines of architectural, structural and MEP design as well as their interconnections; and conclude with the conceptualization of a VR-aided design environment.

WP2. Computational architecture design for automated content creation and design suggestions
WP2 is focusing on AI assistance and content generation in VR-aided authoring tasks. In particular, AI will search across the parameters of the design space in real-time, presenting suggestions that satisfy functional constraints, and both improve efficiency and aesthetic diversity.

WP3. Cognition aspects of collaborative VR-aided design environments
The objective of this WP is to conduct behavioural experiments in VR on designers and engineers in order to measure the cognitive, spatial, and navigational stress induced, as well as the ability to author, take decisions, and being productive in the VR environment.

WP4. Blending multi-simulations and BIM notations within a VR-aided design environment
The objectives of this WP are to establish the seamless integration of BIM notations and CAE-Simulations within the VR-aided design environment. More specifically, WP4 will work out the details of establishing a high-speed two-way communication between the high-quality graphic engines (i.e. Unreal or Unity) and existing software packages handling BIM information and CAE-generated simulations.

WP5. System integration and development of the collaborative VR-aided design environment
The aim of WP5 is to integrate the PrismArch components into an overall platform, validate its proper functioning and fine-tune it for running the demonstrators.

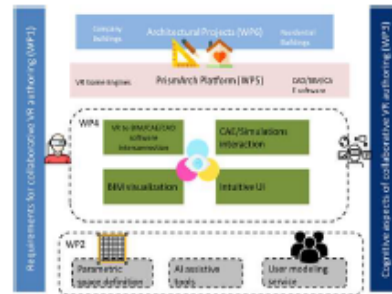**WP6. Demonstrate and evaluate PrismArch in different architectural projects**
WP6 aims to design and implement the demonstrations of the PrismArch platform in specified architectural projects. A methodology will be developed to design and execute two demonstrators concerning the design of company and residential buildings.

WP7. Dissemination, exploitation and innovation management
The objective of WP7 is to ensure that the technologies developed in the context of PrismArch enjoy the necessary level of dissemination, are exploited by the consortium partners and are sustainable beyond the end of the project.

WP8. Project Management and Coordination
The goal of WP8 is to plan and undertake all necessary activities for the project's effective coordination, to ensure the achievement of the project objectives on time, within budget and with a high degree of success.

Partners

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Figure 4-2: The PrismArch Poster

3.2 Video

One video will be created to communicate project objectives and outcomes:

- **PrismArch concept and technologies**: this short video uses smart graphs to present the main concept of the project and present the technologies employed to develop the PrismArch platform, presenting its functionalities and explaining how they help AEC professionals in making decisions and improving their overall workflow.

The video will be available on the project's website and YouTube channel:

- Website: https://prismarch-h2020.eu/dissemination/
- YouTube: https://www.youtube.com/channel/UC958Kydn3wTsv-DQkjkll5g

3.3 Open Software, Publications

In order to further promote PrismArch platform to software developers as well as AEC professionals with an interest on VR applications for improved decision-making in architecture and engineering design, a GitLab repository has been set up to depose the software developed within the project. The consortium partners who wish to open source their results can use the shared GitLab repository for the storage of their source code. As it was stated in GA, all software deliverables of PrismArch are Confidential. However, some modules such as the Voice Recognition interface and the Projects Browser using cartography maps can be published as open source given that all members of the consortium will agree to it.

In addition, all publications related to PrismArch will also be uploaded to open repositories. A Zenodo[1] community has already been made for PrismArch, where all public deliverables and scientific publications are free to access.

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[1] https://zenodo.org/communities/prismarch-h2020/

4   Online awareness campaign

Awareness campaigns are one of the most popular ways to raise public interest and educate people about a specific issue. These campaigns should:

- target people who share common interests;

- educate potential target groups about the use of PrismArch platform; and

- generate a new group of users interested in the specific issue and eager to participate in further activities.

The online awareness campaign undertaken in PrismArch is planned to also follow the above guidelines, by communicating to target audiences (forming our Interest Group) information about the benefits of using XR technologies to support AEC projects and workflow. Our campaign will use **social media and online communication** as a means to attract relevant stakeholders, introduce them to project goals and outcomes and invite them to participate in project events and educational activities focusing on collaborative VR-aided design environments analysis. The recruitment of people forming the Interest Group will take place via the communication channels and networks of project partners, which will be used as a starting point to reach a broader audience, in the context of this campaign.

More specifically, by effectively using the aforementioned tools, we aim to:

- **Raise awareness about the vision and goals of the project** by undertaking all actions necessary to establish and strengthen the PrismArch platform as an active player in the domain of AEC.

- **Foster technology uptake** by developing and maintaining a community of researchers and stakeholders that will use, develop and maintain PrismArch's outcomes towards the achievement of AEC project management and VR collaboration between architects, structural and MEP engineers.

- **Reach out to the end-users** by making sure to establish links of communication with key stakeholders from AEC industry, Software companies, 3D designers and simulation engineers and investors.

4.1 Target audiences

Five main groups will be targeted by the awareness campaign, aiming to formulate the PrismArch Interest Group.

- **The AEC Industry:** Architectural offices, architecture students, MEP and structural engineers and other creative industries that want to improve the effectiveness and quality of the design process.
- **Software companies:** Since PrismArch will interconnect with the software tools that are currently used in the AEC industry, it is important to link with the companies developing these software packages and leverage their existing network of clients.
- **3D designers and simulation engineers** will also be targeted, from various fields that may extend beyond the AEC domain to disseminate the project results.
- **Investors:** reaching to investors will be sought in order to create early exploitation opportunities through existing industrial partnerships or through connections with new entities willing to exploit the project results.

● **Research communities:** The project's academic partners have an extensive network of contacts across the research and development community in Europe. They will contribute in raising awareness of the new concepts and approaches taken within PrismArch to encourage future application in research and development activities

4.2 Messaging

The message that we want to get across to the target audience through the online awareness campaign is two-fold: a) XR technologies can be used to shift the existing paradigm of design and workflow in AEC industry towards a collaborative environment for VR-aided design; and b) provide theoretical basis for VR collaboration methodologies and the positive impact on AEC industry that they may have.

Shifting the existing paradigm of design and workflow in AEC industry towards a collaborative environment for VR-aided design in architecture

The PRISMARCH's main objective is to shift the existing paradigm of workflow and collaboration in AEC industry, which is largely based on one-way communication methods between major disciplines that are typically engaged in an architectural project - namely architects, structural and MEP engineers, towards a common platform that will promote collaborative decision making in real time through an immersive VR environment. More specifically, PrismArch will enhance the overall decision making process through an action and reaction paradigm; the dynamic collaboration that the PrismArch aims to offer, will allow the designers to gain insights and obtain a visceral feeling of their creation way long before their actual construction, through intuitive interfaces tailored to their individual needs and expertise.

VR-collaboration for effective solutions and growth in AEC industry

The main idea of PrismArch is to create a VR-aided design environment for the AEC industry that will enhance the collaborative capabilities across its main disciplines: architecture, structural engineering and MEP. By bridging the gap among a wide variety of domains such as computer graphics, machine learning, computational physics and cognitive science, and integrating them into a common workspace, PrismArch will develop a layered multi-simulation virtual environment, enhanced with AI-assistive capabilities, that meets the complex needs of each of the AEC professionals both independently and simultaneously, allowing a multi-designer presence and complex visualizations in VR that are missing currently from the AEC workflow in VR and they are of high need.

4.3 Tools

To implement the online awareness campaign, the following Internet-based communication tools will be used:

a) The **project website**[2], containing news & announcements, leaflets and factsheets, videos demonstrating the project's vision and outcomes, public deliverables, reports and whitepapers produced by project partners, etc.

b) Frequent updates of the project's **social media accounts**, including news, announcements, but also direct links to informative material, i.e.

   a. Twitter (https://twitter.com/prismarch_h2020),

   b. LinkedIn (https://www.linkedin.com/company/prismarch),

   c. Facebook (https://www.facebook.com/PrismarchH2020).

c) **Direct communication** with stakeholders, e.g., with e-mails. All PrismArch partners will approach their relevant stakeholder groups and organizations.

Overall, through our social media channels, we plan to diffuse our message and spread awareness about the benefits and relevance of the technologies of PrismArch for evidence-based decision-making related to urban development policies.

Moreover, an online form is already available on the project website[3] that can be used by interested stakeholders to register as members of our **User Group**. In order to register, the users must enter (apart from personal info, position in affiliate organization, etc.) the PrismArch-related topics that they are most interested in *(e.g. AI for automated content creation and design suggestions, aspects of collaborative VR-aided design environments, workflow analysis etc.)* as well as the type of discipline (i.e. architecture, structural or MEP engineering) that they are more focused on in their line of work. This information will allow us to group the members of the Interest Group in sub-groups, focusing on specific aspects of the project, thus allowing more targeted and thus effective communication.

4.4 Implementation plan

The following Table summarizes the different steps and components of our online awareness campaign and also provides an indicative implementation time plan.

Actions	Description	Tools	Period
Introducing PrismArch goals and concept	- Send e-mails with material (posters, leaflets, etc.) presenting PrismArch. - Invite specific people of the target audience to connect via our social media accounts. - Expand the social media network by asking connected accounts to promote	E-mail Project Website	November 2021 – October 2022

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[2] http://www.PrismArch-h2020.eu
[3] https://prismarch-h2020.eu/user-group/

	the project to their social media connections (e.g., retweet, share posts). - Share links to the project web-site and blog in the social media project description field. - Invite people to register as members of the Interest Group.	Interest Group online registration Social Media	
Publicize information about specific topics, including:	Requirements of a cross-disciplinary, collaborative environment for VR aided design in architecture	E-mail Project Website Social Media	November 2021 – October 2022
	Computational architecture design for automated content creation and design suggestions		
	Cognition aspects of collaborative VR-aided design environments		
	Blending multi-simulations and BIM notations within a VR-aided design environment		
	System integration and development of the collaborative VR-aided design environment		
	Demonstrate and evaluate PrismArch in different architectural projects		
Inform target audience about the project's educational activities (webinars)	- Send invitations for webinars including: a) their scope, b) scientific field covered in the classes, c) objectives, d) program. - Contact potential participants through the Interest Group and the existing networks of cooperation of project partners	E-mail Social Media	November 2021 – October 2022
Spread results from demonstration use cases	- Inform various key stakeholders and investors about the results of system testing and evaluation in the context of the two demonstration use cases - Send invitation for participation in the demonstration use cases events that will be organized to demonstrate the use of the platform and pilot outcomes	E-mail Project Website Social Media	November 2021 – October 2022

5   Thematic webinars

As part of our educational activities, we plan to organize a **series of webinars** to educate interested stakeholders (AEC professionals and companies but also researchers with an interest on XR technologies on AEC) on the project's scientific background and the different PrismArch modules.

Webinars are essentially seminars or workshops held over the Internet, and they can be a presentation, discussion, demonstration, or other instructional session. These online seminars turn a presentation into a real-time conversation from anywhere in the world. Webinars allow large groups of participants to engage in online discussions or training events and share audio or documents, even when they are not in the same place as the host or in the same room where the presentation is taking place.

Webinar participants can:

- Communicate using headsets, microphone and cameras;
- Virtually raise their hand to submit a question or answer a question posed by the presenter;
- Type questions to the presenters;
- Share their screen to show something;
- Answer questionnaires or polls during the presentation and overview the results.

Apart from the capability to attend the webinar in real-time, it is also important to be able to watch a video of the webinar at a later time. This allows more people to watch the lecture, while webinar participants can re-watch the lecture as many times as they want. To this end, we plan to record the webinars and then upload videos of these lectures at the project's website and YouTube channel.

The thematic webinars will cover theoretical and practical issues of virtual reality aided design in several AEC processes and stages, addressing issues related with collaboration in a VR environment. Different partners will be the presenters, depending on their expertise and role in the project.

Well-known webinar software tools like Webex, Zoom, YouTube Live and Skype Group Calls will be examined for implementing the webinars.

In the following subsections, we provide a short introduction of the webinars that we plan to organize, focusing on webinar content, presenters, target audiences, tools to attract participants, etc.

5.1 Defining requirements of a cross-disciplinary, collaborative environment for VR-aided design in architecture

Tentative title	*Defining requirements of a collaborative environment for VR-aided design in architecture*
Objective:	
The webinar aims to present the PrismArch platform and its functionalities to AEC professionals. Participants will learn how to use the platform, its semantics and standards which provide a solution approach to design and engineering problems, speeding up the whole authoring process. Architectural projects are never linear	

processes. They require iterative design and design evaluation to reach the final outcomes and build results – not just as an individual, but also as a collective level. A unified information space is essential for effective knowledge exchange, and for creating and hosting holistic, multi-author constructs. Examples of VR interaction paradigms created for the PrismArch pilots will be demonstrated and explained, with further details on authorship, IP and access privileges within the singular space each user will have.

Presenter:

The webinar will be prepared and presented by **ZHVR**, the partner responsible for the development of the platform's collaboration requirements. **AKT** will also contribute by sharing their expertise and insights on this section.

Target audience:

The webinar will be addressed to AEC industry, investors, companies and the community around solutions addressing the AEC industry and research communities in order to further raise awareness of the new concepts and approaches taken within PrismArch.

Tools to attract attendees:

Stakeholders to attend the webinar will be contacted using the existing networks of cooperation of Architectural design, structural engineering and MEP partners in the consortium that include various collaborations in AEC domain but also contacts established through European associations like the XR4ALL ecosystem. Social media and emails will be used to disseminate the webinar to potential participants.

Estimated number of attendees:

10-20 participants

Webinar duration:

1-2 hours

Educational material to be offered to attendees:

Leaflets, slides, videos demonstrating use of platform, public deliverables (D1.1, D1.2, D1.3).

Estimated date of webinar:

January-October 2022

5.2 Computational architecture design for automated content creation and design suggestions

Tentative title	*AI for content creation and design suggestions in AEC*

Objective:

This webinar presents the tools and methods employed in the PrismArch platform for the AI assistive tools and automatic content generators. The webinar will explain the methodology of the application of population-based evolutionary algorithms for

adapting the initial human design with changes and explorations of the parameter space, in order to improve functional or aesthetic qualities and satisfy IFC and BIM defined principles, rules and constraints.

Presenter:

The webinar will be prepared and presented by **UOM** who is the leader of WP2.

Target audience:

The webinar will be addressed to researchers, software developers that wish to acquire master level knowledge in AI methodology and solutions in AEC, software companies and the community around solutions addressing the AEC industry, investors and AEC professionals.

Tools to attract attendees:

The webinar will be advertised to numerous research and developer communities using the existing contacts of the technical and academic partners. In addition, social media and mailing lists will be used to outreach to online communities, contacts will be made with local communities and audiences such as the doctoral school of the AI4media project which UOM is a member of. These recruitment strategies will help us reach a large international pool of young talent, start-up entrepreneurs and business mentors.

Estimated number of attendees:

10-20 participants

Webinar duration:

2 hours

Educational material to be offered to attendees:

Leaflets, slides, videos demonstrating use of platform, public deliverables (D2.1, D2.2, D2.3).

Estimated date of webinar:

January-October 2022

5.3 Cognition aspects of collaborative VR-aided design environments

Tentative title	*Cognition aspects of collaborative VR-aided design environments*

Objective:

In this webinar, we plan to cover all issues related to the cognitive, spatial, and navigational performance of users in collaborative virtual design environments, as well as the ability to author, take decisions, and being productive in the VR environment.

When people interact with physical media (such as paper) and digital media (CAD software, interactive whiteboards etc.), we can say that they organize information flows in the team as a whole, to perform a task in a collaborative manner. Modelling team activity in an overarching, distributed cognition approach allows us to align task

requirements and the design environment can best support the team in doing design work together.

By the end of the webinar, attendees should be able to understand what is required for determining how much relevant vs. irrelevant information the designer needs to process during task performance.

Presenter:
The webinar will be prepared and presented by **ETH**.

Target audience:
The webinar will be addressed to software developers, IT personnel of AEC industry, researchers and students that wish to acquire master level knowledge in cognition aspects of collaborative VR-aided design environments.

Tools to attract attendees:
Social media and emails will be used to disseminate the webinar to potential participants. The project's website and ETH's mailing lists will also be used to promote participation.

Estimated number of attendees:
10-20 participants

Webinar duration:
1.5-2 hours

Educational material to be offered to attendees:
Leaflets, slides, videos demonstrating use of platform, public deliverables (D3.1, D3.2, D3.3).

Estimated date of webinar:
January-October 2022

5.4 Blending multi-simulations results and BIM notations within a VR-aided design environment: System Integration and development

Tentative title	*Blenting multi-simulations results and BIM notations within a VR-aided design environment*
Objective:	
The webinar aims to present the indicator-based methodology followed in PrismArch, in relation to interconnecting high-quality graphic engines such as Unreal with BIM-compliant software and CAE-Simulation software (Rhino, Revit, SAP2000). It will analyze the methods of developing the means to allow multiple inputs of different disciplines to co-exist within the VR environment.	

In terms of engaging with relevant initiatives, PrismArch will exploit the XR4ALL community ecosystem (e.g. Slack channel) to disseminate the methodology followed, and initiate interest of professional communities on how to solve the multivariate

problem of collaboration among the main three disciplines of AEC industry, i.e. architecture, electrical, and structural engineering. The interconnection technologies used through APIs, databases, formats, and plugins will be analyzed. Such software are Speckle API, Cesium maps, and Mozilla DeepSpeech voice recognition software. The webinar will provide a clear understanding of the tools created in PrismArch's integration and development of the collaborative VR-aided design environment. Prototypes of the VR-aided design platform will be demonstrated along with the overall architectural design and integration protocol.

Presenter:

The webinar will be prepared and presented collaboratively by the PrismArch consortium (https://prismarch-h2020.eu/partners/), with the coordination of **CERTH.**

Target audience:

The webinar will be addressed to software developers, IT personnel of AEC industry, researchers and students that wish to acquire master level knowledge in combining BIM and CAE software within a VR design environment. Stakeholders and investors will also be included.

Tools to attract attendees:

This workshop will attract audience from XR4ALL slack channel, partners collaborators in AEC industry, and external software companies such as Speckle, Cesium, Unreal, Mozilla DeepSpeech. Stakeholders to attend the webinar will be contacted using the existing networks of cooperation of the consortium partners. Social media, emails lists and the PrismArch website will be used to disseminate the webinar to potential participants.

Estimated number of attendees:

10-20 participants

Webinar duration:

1-2 hours

Educational material to be offered to attendees:

Slides, videos demonstrating use of platform, public deliverables (D5.1, D5.3)

Estimated date of webinar:

January – October 2022, Platform: Zoom

6   Pilot-specific event

One **themed event** will be organized to demonstrate and promote project results to major stakeholders and AEC experts. The event will be organized during the second phase of usage scenarios for demonstration (March - October 2022) as one-day or half-day workshops that will allow attendees to:

- be informed about the advantages of using the PrismArch platform to assist AEC projects;

- see how the platform has been used in a specific pilot to assist AEC professionals in making decisions related to specific architectural, structural and MEP engineering issues, enabling all relevant disciplines to interconnect and collaborate in PrismArch's VR-aided design environment;

- explore the PrismArch's interface and functions themselves guided by the AEC experts of the PrismArch consortium involved in the specific usage scenarios for demonstration (SWECO, ZHVR, Mindesk, ETH Zürich, AKT II Limited)

- discuss how they could use the platform in order to assist them in making decisions about their work and activities on AEC projects they are currently involved in;

- share experiences about the current workflow adopted by their organization, talk about the challenges they are usually facing, and discuss how the PrismArch platform could be integrated in their internal decision-making process and what benefits it could offer.

In the following subsections, we briefly present the event, focusing on their objectives and content, partners involved, target audiences, tools to attract participants, etc.

Organization of a Demonstration workshop

A demonstration workshop will be realized by ZHVR in London after the deployment of the first prototype (M14) and its results will be integrated into the next development cycles. The workshop will have the following objectives: (i) to present the lessons learned in PrismArch and illustrate its first results by demonstrations, (ii) to offer the interested parties the possibility to experiment with the PrismArch workbench in "hands-on" sessions, (iii) to provide a user forum for networking with professionals from related areas, (iv) to obtain feedback from the participants, and (v) to create a detailed document on lessons learned for the development of the future prototypes. The target group will be broader than the UG.

Tentative event title	*Initial launch of PrismArch platform: Usability and evaluation analysis*
Objective:	
This event aims to introduce AEC companies and experts, investors, software companies and the community around solutions addressing the AEC industry and research communities, focusing on how the PrismArch platform is used to assist AEC professionals in their workflow. The project partners will present PrismArch's functions and interface as developed for the first demonstrated version. The event will include all the necessary activities in order to conclude user training and usability study sessions with all types of designers-engineers. Testing and evaluation procedures will be made through various tools and instruments (questionnaires, interviews, online	

automatic collection mechanisms) for user feedback collection, and training material. A hands-on session will also be organized that will allow participants to interact with the dashboard themselves and explore the different facets and visualisations. The overall methodology and protocol will be reviewed based on participant's review. Participant's feedback will be collected, explaining the challenges and problems they have been dealing with and the ways in which PrismArch helped them in making more accurate and efficient decisions.

Tentative agenda:

- Welcome addresses by PrismArch representatives
- Introduction to the PrismArch project
- Presentation of the architectural project and usage scenarios for demonstration
- Demonstration of the collaborative VR-aided design environment
- Hands-on session (attendees exploring the dashboard)
- Short presentation of other related projects (H2020 or other)
- Discussion

Organizer:

The event will be organized by **ZHVR**. **AKT** will also contribute and co-present all relevant sections they expertise in, sharing their insights.

Target audience:

The workshop will be addressed to AEC industry, investors and key stakeholders, software companies and the community around solutions addressing the AEC industry and research communities in order to further raise awareness of the new concepts and approaches taken within PrismArch.

Tools to attract attendees:

Stakeholders will be contacted using the mailing list SWECO/ZHVR/MINDESK/AKT, their website and/or their social media channels, along with the ones from PrismArch. Press advertisements, official invitations and emails will also be sent. Industrial partners will also use their existing networks and established connections with business associations to promote the event to interested stakeholders. CERTH/UOM/ETH will use their network of academic and business partners to invite people from universities.

Estimated number of attendees:

30-40 participants

Duration:

Half-day event

Date:

March – August 2022

Suggested Venue: White Collar Factory, London (or any similar setting)

7   Networking activities and events

In addition to the pilot-specific events, a **series of networking events** aiming at AEC experts, industry and the scientific community on an EU-level will be organized. These focus on promoting and communicating project outcomes through short presentations dealing with different aspects of VR collaboration in AEC projects, also showcasing how these aspects have been dealt within PrismArch. We briefly present below all networking activities that have already been organized as well as our ideas and plans for future events.

Several networking activities have already been organized by project partners during the first half of the project, while more events are planned in the second half. More specifically, a series of networking initiatives took place that led to form PrismArch's advisory board, already including five members, as experts from AEC industry and research community:

● Assoc. Prof. Dr. Julian Togelius, Dept. Computer Science and Engineer at the New York University Tandon School of Engineering. He will provide PrismArch with his suggestions about the AI technologies that will assist Architects and Engineers to design buildings in VR.
● Adeline Stals, Ph.D. in Architecture and with postdoctoral research experience at the UC Berkeley College of Environmental Design, USA. Her research interests focus on the implementation of digital in small architectural offices and their adaptations on a cognitive and organizational levels.
● Prof. Michele Fiorentino from Polytechnic of Bari, expert in the field "Design and Methods of Industrial Engineering". He teaches "Virtual Design and Simulation" at the Faculty of Industrial Design and "Simulation and Virtual Prototyping" in the Master's Degree in Engineering at the Polytechnic of Bari.
● Dimitrie Stefanescu, founder of Speckle Systems where they are building an open-source digital infrastructure for the AEC industry and whose database solutions will be incorporated in PrismArch platform.
● David Craig Weir-McCall, an expert AEC Business Development Manager, currently working with the Epic Games Enterprise team in the AEC, spearheading the companies initiatives in technological innovation with the Unreal-Engine and our AEC partners.

UOM has participated in several networking events, presenting their research outcomes and contribution to PrismArch, further increasing awareness for PrismArch and its functionalities in research communities and AEC experts. More specifically, UOM has participated in the following events:

● 9th International Conference on Serious Games and Applications for Health, SeGAH 2021. Georgios N. Yannakakis delivered the keynote "AI and Games: Seriously Yours", diffusing the scientific and technological achievements regarding AI and its various applications.
● On 14 July 2021, Georgios N. Yannakakis delivered a presentation on Quality-Diversity as a tool for design exploration to approximately 20 engineers of the company AutoDesk. The dissemination event was well received and a discussion followed with participants from both AutoDesk and UoM. The discussions and bonds formed in this initial meeting will be enhanced in the coming months.

CERTH also contributes in XR4ALL[4] project, an EU Research and Innovation program aimed at providing breakthroughs, discoveries, and world-firsts regarding extended reality (XR) technologies. PrismArch provide useful insights regarding VR applications for collaboration in AEC industry.

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[4] https://xr4all.eu/

8   Conclusions

This deliverable presented a strategy for building an ecosystem around PrismArch using a variety of communication, promotion and demonstration tools ranging, including both online activities as well as physical events.

To this end, we have designed engaging promotional material in the form of short leaflets and video, presenting various aspects and technologies of the project. This material will be used as part of an online awareness campaign based mainly on social media and email communication, aiming to raise public interest on PrismArch-related issues and educate stakeholders on the opportunities offered by a collaborative VR-aided design environment with regard to AEC project management and design.

With training being at the core of our ecosystem building activities, we have presented a plan including both online activities and events with physical presence. Online activities include the organization of a series of thematic webinars to educate interested stakeholders (AEC experts but also researchers with an interest on VR-aided collaboration and design in AEC) on the project's scientific background and the different PrismArch modules.

Besides the aforementioned online engaging and educational activities, our ecosystem building strategy includes two types of physical events, i.e. pilot-specific events and networking events. More specifically, we presented detailed plans for the organization of usage scenarios for demonstration and evaluation-specific event to be organized during the second pilot phase, aiming to demonstrate and promote project results to AEC stakeholders and experts.

In addition, a series of networking events aiming at AEC industry and the scientific community on an EU-level have already been launched and will continue in the next period. They include a series of presentations in relevant conferences and events, bringing together an audience of academic, industry and expert representatives and aiming to demonstrate how the PrismArch platform helps AEC professionals to improve their decision and overall workflow and efficiency.

Activities during the second period of the project will focus on the implementation of the ecosystem-building strategy described in this deliverable.