MASTER

Annex 6

MASTER 1st Open Call

March 2024

Submission of applications starts on 18th of March 2024, at 09:00 (CET)

Submission deadline: 31st of May 2024, at 17:00 (CET)

Co-funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or European Commission. Neither the European Union nor the granting authority can be held responsible for them.

Disclaimer

Table of Contents

1 Annex 6: General Requirements

As mentioned in the Guide for Applicants the objective of the 1st Open Call is to **attract the best candidates able to provide innovative technologies to create rich XR experiences**. Thus, it is expected to contribute to the MASTER-XR platform with innovative technologies that would enable the teachers to create rich educational material based on XR technology. **These technologies should be related to industrial robotics and automations in XR environment,** similar to the ones developed by the MASTER consortium. Additionally, the applicants should have in mind that in the last months of each application, the provided technologies should be validated in educational scenarios with students (schools or professional training services).

1.1 Technical support provided from MASTER consortium

All beneficiaries of the first open call will receive technical support from the respective technical partner of the MASTER consortium, that leads the technical challenge addressed by the applicants. This contact will be the main communication channel between the MASTER consortium and the FSTP application, who will address any technical issues, who will track the technical activities of the applications and who will raise to the MASTER partners any potential issue that may occur.

Additionally, especially for the integration to the MASTER-XR platform, licenses will be provided by VIRTUALWARE to all beneficiaries for the VIROO platform tools, such as VIROO studio, single player etc. Alongside to the licenses, technical support and ticketing system will be provided to support the applicants to all the development stages for issues related to the MASTER-XR platform. Furthermore, a MASTER lab, similar to the VIROO lab developed by VIRTUALWARE, will be created for education purposes to help the developers use the VIROO technologies. The final outcome the applicants should provide will be a ".viroo" file that will be uploaded in the MASTER-XR platform and will contain their compiled libraries. This information will be later available, in the 2nd Open Call applicants, to be used and to create education material.

1.2 General support provided from MASTER consortium

The main contact for technical support that will be appointed to each application, will provide general support including administrative issues. This includes activities like tracking the progress of the applications, support on the creation of reports, support on the creation of the dissemination material, steer the execution of the activities and raise to the MASTER partners any potential issue that may occur long before the evaluation time.

1.3 MASTER XR Platform requirements

All the applicants should have in mind that the aim of the MASTER project is the development of a MASTER XR platform that would provide the necessary tools to create XR-based education material for robotics. Thus, the 1st Open Call applicants should elaborate on how their developments would be integrated under this platform and contribute to those requirements. In this section, the requirements for the individual modules as well as for the platform as a whole are described. **If any application is not able to fulfil those requirements, then it won't be eligible for the programme.**

1.3.1 Functional requirements

These requirements describe what the platform should do. Functional requirements specify the features, capabilities, and interactions to achieve its intended purpose. In the next table the platform

functional requirements (FR) are described and tagged with a unique identifier to follow it in the development and testing documentation.

Table 1 – Functional Requirements

Functional Requirement (FR)	Description
FR_01	The platform should have XR (Extended Reality) capacities.
FR_02	The platform should have tools to create XR robotics in manufacturing training content.
FR_03	The platform should have tools to execute XR robotic in manufacturing training content.
FR_04	The platform should have tools to manage XR robotic in manufacturing training content.
FR_05	The platform should have tools to program and interact with robots in safety configurations.
FR_06	The platform should have tools to facilitate the interaction with XR systems through multimodal interaction.
FR_07	The platform should have tools for programming robotic applications using PbD and visual support.
FR_08	The platform should have a training tool with comprehensive tutorials to teach how to use the FR_02, FR_03, FR_04, FR_05, FR_06, FR_07.
FR_09	The platform should have a managing tool to manage accounts, users, and the access to the developed tools (FR_02, FR_03, FR_04, FR_05, FR_06, FR_07, FR_08) and the didactic material.

1.3.2 Non-Functional requirements

A non-functional requirement (NRF) is a statement of what a product is or how it will be constructed, or a constraint on how the product will be designed or will behave.

Table 2 – Non-Functional Requirements

Non-Functional Requirement (NFR)	Description
NFR_01	The platform and its tools should be Open XR[1] compliant.

[1] https://www.khronos.org/OpenXR/

Non-Functional Requirement (NFR)	Description
NFR_02	The platform and its tools should follow ISO 27001[2] standard and XR Safety Initiative recommendations (XRSI)[3].
NFR_03	The platform and its tools ought to integrate with XR devices.
NFR_04	The platform and its tools ought to integrate with ROS (Robotic Operating System)[4].
NFR_05	The platform and its tools ought to integrate with gaze-based interaction systems.
NFR_06	The technologies of the Open Call 1 should be integrated to the platform.
NFR_07	To use the platforms a minimum HW requirements will be necessary (for example, VR Ready computers, VR or XR Headsets).
NFR_08	To use the platform internet connection is necessary.
NFR_09	The platform tools would be based on Unity[5].

1.3.3 User requirements

The end users are non-experts in XR content creation, but they are experts in robotic manufacturing as they know the elements involved in the process and the process itself. The MASTER XR platform will enable them to translate this knowledge into XR content, exercises, and learning sessions.

This led the platform to have different users' **roles,** shown in the figure below: **XR content creators, Trainers, and Trainees**. Furthermore, the platform should have administration tools to manage it, so there would also be system administrators.

[2] https://www.iso.org/obp/ui/#iso:std:iso-iec:27001:ed-3:v1:en

[3] https://xrsi.org/

[4] https://www.ros.org/

[5] https://unity.com/

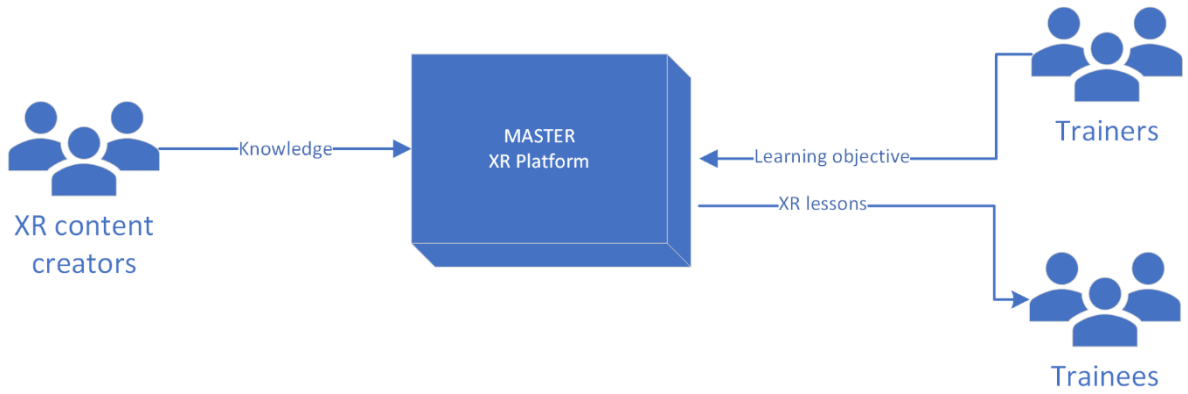

Figure 1 – MASTER XR Platform users' roles

The defined audiences of the platform are **students, workforce, teachers, and trainers**. Students and workforce will have the role of ***Trainees*** for the platform. **Teachers and trainers** will have the role of both, ***XR content creators*** and/or ***Trainers,*** depending on their knowledge of the platform tools and their role in the teaching/learning process. This users' requirements for the platform and its tools are in the table below.

Table 3 – User Requirements

User Requirement (UR)	Description
UR_01	The platform and its tools should be simple to access and follow accessibility standards[6].
UR_02	The platform and its tools should be simple to install.
UR_03	The platform and its tools user interface should be intuitive.
UR_04	The platform and its tools should be efficient and stable.
UR_05	The platform and its tools should have an efficient error handling and feedback.

1.3.4 System requirements

System-level requirements consider the environment in which the software will operate. This includes compatibility with hardware, operating systems, databases, and other software components.

Table 4 – System Requirements

Functional Requirement (FR)	Description

[6] https://www.w3.org/WAI/standards-guidelines/#guidelines

SR_01	The MASTER XR platform is based on VIROO® and it is a Virtual Reality platform. The first system requirement is to deal with technological aspects that led the platform suitable for **Mixed Reality hardware**, so will be an Extended Reality Platform.
SR_02	The platform should integrate technologies from all partners and its developments into it, together with the technological developments of the 1st open call participants.
SR_03	The platform should be compatible with VIROO®[7].
SR_04	The platform would be hosted and would work in Microsoft Systems.
SR_05	The platform Identity and Access Management would be with Keycloak[8].
SR_06	The platform Content Management would be with Nextcloud[9]
SR_07	The platform Training tools would be in Moodle[10].
SR_08	The platform would be compatible with the devices that follows OpenXR[11] abstract layer, and particularly through SteamVR[12] runtime.
SR_09	The platform content creation components would provide mechanisms to create users' own plugins based on specific .NET[13] code written in C# language.
SR_10	The platform would have integration capabilities to allow 3rd party SDKs using dynamic link libraries implementing APIs in C++ (DLL[14]).

1.4 Evaluation of technical requirements

All the applicants should have in mind when applying for the 1st Open Call, that the above requirements should be fulfilled to ensure the proper integration of the developed tools to the MASTER XR platform. Before the evaluation of each application by external evaluators, the consortium will perform an eligibility check which, apart from the administrative aspects, will check the capability of the developed tool to be integrated to the platform, rejecting the ones that cannot.

[7] https://www.virtualwareco.com/viroo/

[8] https://www.keycloak.org/

[9] https://nextcloud.com/

[10] https://moodle.org/

[11] https://www.khronos.org/openxr/

[12] https://www.steamvr.com/en/

[13] https://dotnet.microsoft.com/es-es/

[14] https://learn.microsoft.com/en-us/troubleshoot/windows-client/deployment/dynamic-link-library

2 Content creation requirements

All applicants are obliged to create visual material, which could be photos or videos or both, that will be available for use by the MASTER consortium to report project's activities to the EC. This material will be confidential and remain restricted within the project partners, project evaluators and EC officers. No publication or reproduction outside the strict boundaries of any entity, that is covered by the grant agreement or the sub-grant agreement, will take place without the explicit permission by the applicants.

In addition to this, the applicants should create a public video that will be publishable through the MASTER social media accounts and any other dissemination channel used in the project. This will be used to attract more people to engage in the XR world as well as explain to the potential 2nd Open Call beneficiaries on the tools that will be available in the MASTER-XR platform, inspiring them to create innovative education material.

Last but not least, all applicants will be obliged to refer the funding and technical support received by the MASTER project and the EC, using their logos in all their public material when they are publishing any information related to their application in any format.

3 General requirements

In order to ensure the post-project sustainability of the MASTER project, the applicants should ensure that the tools developed in the 1st Open Call, should be available in the MASTER XR platform for at least 1 year after the end of the project, while they will be unable to make them available in any other digital marketplaces during this period. VIRTUALWARE will be open to promote the developed technologies to their clients and would be willing to enter into a 1to1 commercialisation agreement with certain applicants beyond the MASTER project. This exclusive arrangement has been added as a result of additional close collaboration with the main project partners responsible for exploitation, sustainability and funding, even after the end of the project.