Technical Deliverable

CHARITY project has submitted one of the first technical project deliverables 'D1.2 - Reference scenarios, use cases and requirements' .

D1.2 deliverable presents the use cases (UCs), reference scenarios and their requirements for CHARITY. The UCs, seven in total, are subdivided into three main categories, namely a) Real-time Holographic Applications, b) Immersive Virtual Training and c) Mixed Reality Interactive Applications. The CHARITY project aims to impact these research areas by providing a platform tailored to accommodate relevant applications and suitable to support their innovative features.

To be able to efficiently design the CHARITY platform, a deep understanding of these UCs functionalities is required. To accomplish this, certain aspects of every UC were presented on a weekly basis for six months. In these meetings, UC owners provided details regarding the current as well as the envisioned UC workflows that support CHARITY. A refined summary of these presentations is described in the deliverable D1.2. There, for each UC, a list of potential reference scenarios is also provided along with sequence diagrams that help comprehend the interactions between the UC components and the CHARITY platform. Aspects regarding the privacy and security of data, transmitted through CHARITY platform, are addressed in a separate section per UC. Moreover, the impact of deploying these UC applications within CHARITY platform is highlighted as well as the challenges imposed by this project.

To better understand these challenges and successfully tackle them, a list of potential use case functional and non-functional requirements as well as a list of general-purpose requirements was assembled. These lists are indicative of the capabilities that the project should provide to accommodate the envisioned UCs and support similar ones. Therefore, these findings are guidelines that will help to effectively design and optimize the CHARITY architecture and components. This further highlights the importance of D1.2 deliverable that will be used as a reference point for the design and deployment tasks of other technical activities.

In this second newsletter, CHARITY consortium takes the opportunity to present two use cases: Holographic Concert and Collaborative Gaming.

Holographic Concert Scenario

(Use Case 1-1)

With over two decades of experience, Avcom Entertainment (HOLO3D) is a provider of unique 3D holographic display solutions for retail, expos and brand activations.
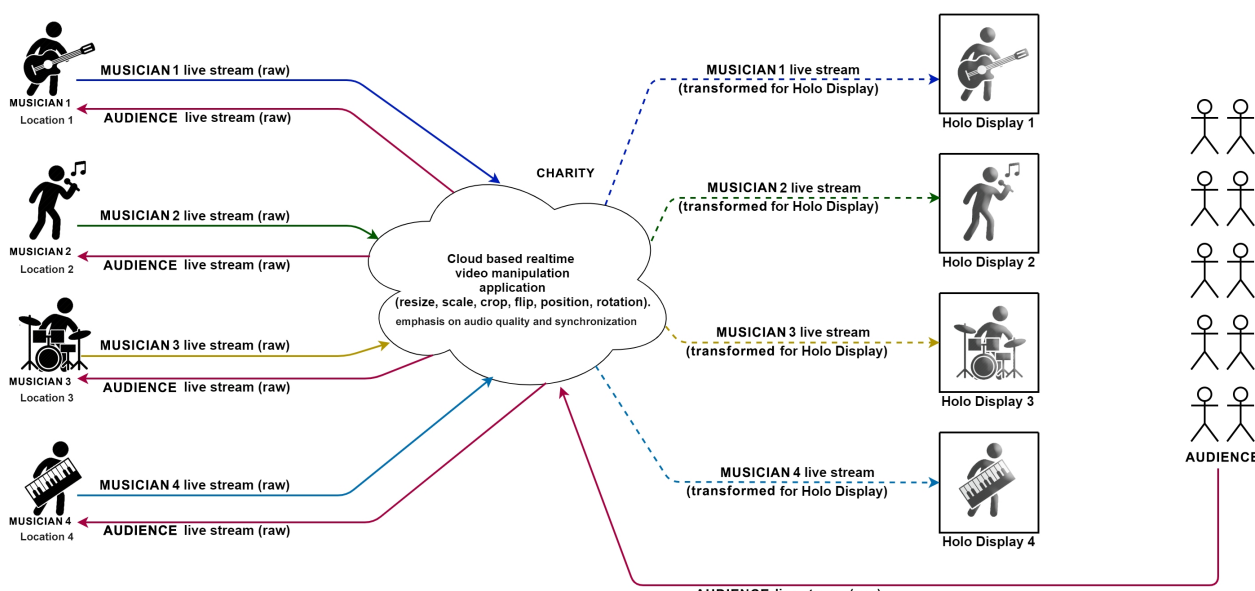
CHARITY targets a holographic live concert use case, framed within the Real-Time Holographic Application Use Case, adopting the basic optics principles of reflection and refraction of light along with streaming and synchronization services to project a real-size 3D hologram of a live artist or band on a stage in front of the audience.

Powered by CHARITY's platform capabilities, this technology will offer musicians a way to connect with their audience even if they are each in a different location. The performers will be able to see their audience on a screen and react in real time.

Alex Roibu, HOLO3D
Use Case Scenario Provider

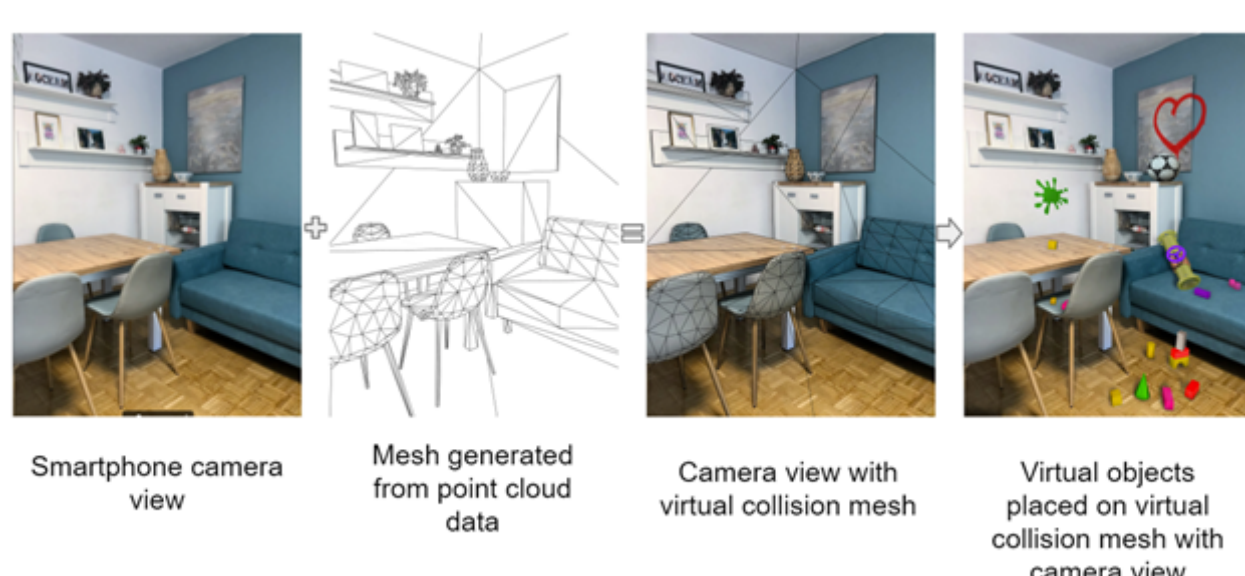# Collaborative Gaming

(Use Case 3-1)

Orbital Knight sp. z o.o. will provide one of the Use Cases for CHARITY project i.e. mobile multiplayer game utilising AR (Augmented Reality) technology.

This is one of the Use Cases envisioned within Mixed Reality Interactive Applications.

Our goal is to develop a highly immersive multiplayer AR game. In order to provide players with sufficient immersion, we will develop a dedicated multiplayer engine which will be able to synchronize all dynamic game objects along with user's states throughout end devices. The overall solution we propose is based on a client- server architecture. The solution requires the infrastructure to provide key features: very low network latency and efficient resource discovery service, a trusted infrastructure (cloud/edge) to support Game Server from dishonest player's breaches.

Orbital Knight's ambition is to explore the potential of AR multiplayer games in the worldwide mobile games market. Orbital Knight is willing to research and identify the type and features of AR multiplayer game that has the most market potential.

We are also planning to use 3D Point Cloud technology in order to enrich gameplay and strengthen player's immersion, exploring CHARITY 3D Point Cloud support. It will use built-in device cameras' capabilities to provide input and use the output data to mix the real and virtual environments.

| Smartphone camera view | Mesh generated from point cloud data | Camera view with virtual collision mesh | Virtual objects placed on virtual collision mesh with camera view |

AR game development technology that allows simulating physics based on the collision of virtual objects with the real environment using the 3D Point Cloud will allow us to create innovative games.

CHARITY project will help us improve our multiplayer engine and AR game development technology with physics based simulation in both virtual and real environment. Our goals for this project are to optimise and advance our multiplayer engine by minimizing the amount of data sent over the network and lowering RTT (Round-Trip Time). This will significantly improve user experience and allow Orbital Knight to develop interesting, immersive multiplayer games.

Zbyszek Ledwoń, Orbital Knight sp. z o.o.
Use Case Scenario Provider

CHARITY
Cloud for Holography and Augmented RealITY

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