

Deliverable

Project Acronym:	VRTogether
Grant Agreement number:	688619
Project Title:	<i>Immersive Experiences around TV, an integrated toolset for the production and distribution of immersive and interactive content across devices.</i>

D5.7 - Documentation and technical fact sheets

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Dissemination Level		
P	Public	x
C	Confidential, only for members of the consortium and the Commission Services	

Abstract: This deliverable is a compilation of all printable documentation, mostly used for dissemination and communication purposes. There is all content created during the last ten thirteen: one posters, two triptychs, one technical factsheet. These materials were used in the different commercial and scientific events as VRDays 2017, IBC 2018, VRDays 2018, Joint 3GPPP Sa4 & Vr Industry Forum Workshop, NEM Summit, MMSYS2018 and TVX 2018.

REVISION HISTORY

Revision	Date	Author	Organisation	Description
0.1	14/11/2017	Susana Otero	i2CAT	First release

Disclaimer

The information, documentation and figures available in this deliverable, is written by the **ImmersiaTV** (*Immersive Experiences around TV, an integrated toolset for the production and distribution of immersive and interactive content across devices*) – project consortium under EC grant agreement H2020 - ICT15 688619 and does not necessarily reflect the views of the European Commission. The European Commission is not liable for any use that may be made of the information contained herein.

Statement of originality:

This document contains original unpublished work except where clearly indicated otherwise. Acknowledgement of previously published material and of the work of others has been made through appropriate citation, quotation or both.

EXECUTIVE SUMMARY

This document is the first release of D5.7, a compilation of printed dissemination material.

This documentation has been used in the global events VRDays 2017, IBC 2018, VRDays 2018, Joint 3GPPP Sa4 & Vr Industry Forum Workshop, NEM Summit, MMSYS2018 and TVX 2018 where the VRTogether project has been showcased.

One poster has been created targeting general approach to transmit the nature and objectives of the project. It gives an overview of the project: objectives, goals and added-value of VrTogether concept and has served as support document in order to present the project in the cluster session organized by the NECT I4 RESEARCH. The workshop "Collaboration Towards the Future of Media" was a multi-project showroom with posters and quick presentations.

Additionally, and during the initial months of the project was created a triptych in order to grasp visitors' attention to have then the possibility to give them a more comprehensive explanation of the project. This showed an overview of the project and has been used mainly in the events that took place from November 2017 to September 2018: IBC 2017, NEM Summit 2017, MMSYS2018 and TVX 2018.

A triptych more oriented to commercial stakeholders was prepared after some months of the project life. This has been shown in the latest events as IBC2018, VRDays 2018.

A technical leaflet has been prepared to use it as dissemination support during the scientific events and disseminate the technical features.

The material is accessible and downloadable through the project website: <http://vrtogether.eu/project-outcomes/dissemination-materials/>

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1. INTRODUCTION

This document is a compilation of dissemination material (including technical information). The document is mainly structured in two parts. A first part lists all the documents produced during the second year of project. The list provides also a brief description of the document.

The second part of the document provides the documents.

This is the first release of the document.

2. PROJECT DOCUMENTATION

2.1. List of material

Name	Description	Release date	Author
Initial Logo	A logo that was initially used in internal documents and later would be improved	10/17/2017	Entropy
Project image	An image to have a recurrent resource to be used in the several dissemination materials that transmits the project concept	11/29/2017	i2CAT
Poster VRTogether	<p>A poster that introduces the project and its objectives.</p> <p>This poster was used in order to present the project ImmersiaTV during the workshop "Collaboration Towards the Future of Media" (organised by the EU) in Brussels on October 10th, 2017. It shows the project objectives and milestones</p>	10/10/2017	i2CAT
General triptych	An item that introduces the project and has been frequently used in the more initial phase of period 1: IBC 2017, NEM Summit 2017,	11/29/2017	i2CAT

	MMSYS2018 and TVX 2018		
New logo	Different formats of multi colored and dynamic logo	12/11/2017	Entropy
Triptych more market-oriented	A flyer with a more commercial byas that can be used in order to reach and engage the industrial stakeholders	09/13/2018	Entropy, i2CAT
Technical factsheet	Design of a general document that explains the main technical aspects of the first Pilot and the demo shown. It has been used during IBC2018.	09/13/2018	Entropy
A Roll up	One roll up and designed only to grasp visitors' attention during the IBC2018 and making them test the demo. It contains a market-oriented claim, the members of the consortium and the EU flag.	10/29/2018	i2CAT

3. INITIAL LOGO



4. PROJECT IMAGE



5. POSTER



6. GENERAL TRIPTYCH

GENERAL TRIPTYCH

In this project, our aim is to radically improve the experience by innovating in how media formats are used (i.e., how audio, video and graphics are captured, delivered and rendered at users' homes) demonstrating a significant improvement of the feeling of being there together and the photorealistic quality of the content.

VRTogether's consortium has been strategically set up to consist of partners that cover all stages of the production chain in a well-balanced way. A combination of leading academic institutions (ICAT, TNO, CWI, GRIITH, Artanim) together with industry actors (Future Lighthouse, 8minopy, Motion Sixel, Viscoron) once spread over 8 European countries.

MAIN OBJECTIVES

1. Develop a well-tailored user need to formulate clear deliverables, high quality content, realistic content and create a strong feeling of being present in a completely integrated experience.
2. Use design thinking to define what is each innovative content format, how they are created and delivered in a suitable manner.
3. Establish the impact of VRTogether on how content is created, produced, distributed, tested, evaluated, and how providers and the general audience.
4. Adapt the existing production pipeline to improve and create multiple use cases for mobile and desktop based on the state-of-the-art production tools.
5. Develop appropriate quality of experience (QoE) metrics and evaluation methods to quantify the quality of these use cases of VR experience.

MILESTONES

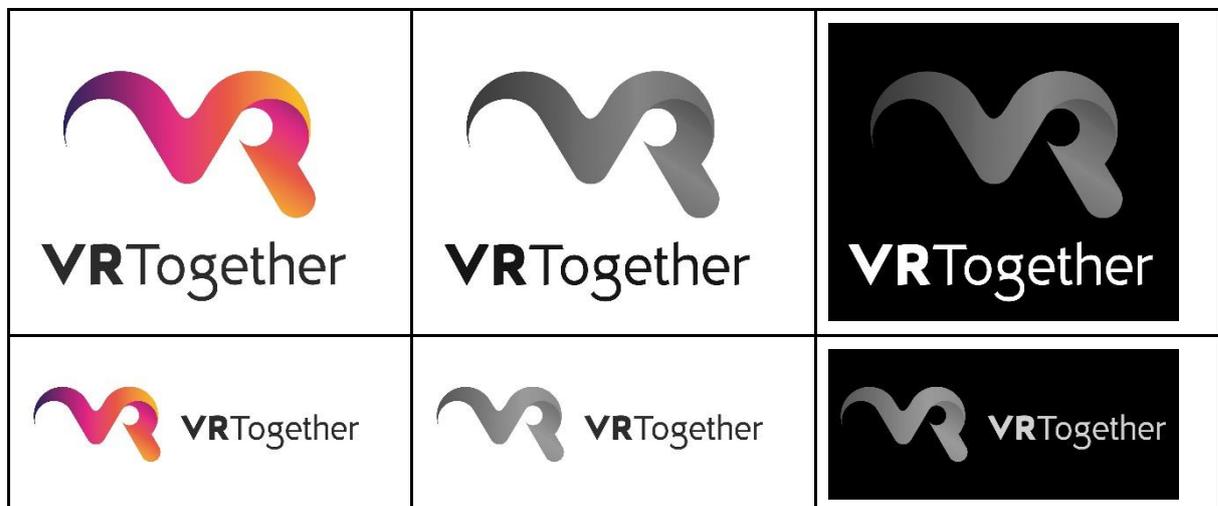
Deliverable 1: Consortium
Q1/18 to define the high-level innovative use cases for VRTogether including technical, QoE, user-based metrics and multiple video-spread scenarios in a state-of-the-art and leading activity.

Deliverable 2: User needs
Q2/18 to define the user needs and scenarios which align with the user needs, feedback, which scenarios which align with other people.

Deliverable 3: User needs
Q3/18 to define the user needs and scenarios which align with the user needs, feedback, which scenarios which align with other people.

Deliverable 4: User needs
Q4/18 to define the user needs and scenarios which align with the user needs, feedback, which scenarios which align with other people.

7. NEW LOGO



8. MARKET-ORIENTED TRIPTYCH

MARKET-ORIENTED TRIPTYCH

<p>OBJECTIVES</p> <ol style="list-style-type: none"> Develop and integrate new media formats that deliver high quality photo-realistic content and foster a strong feeling of co-presence & coherently integrated experience. Adapt the existing production pipeline to capture and encode multiple media formats and integrate them with state-of-the-art post-production tools. Re-Design the distribution chain so such an audio content format can be orchestrated and delivered in a scalable manner. Develop appropriate Quality of Experience (QoE) metrics and evaluation methods to quantify the quality of these new social VR experiences. Maximize the impact of VR-Together on content creators, producers, distributors, tooling companies, service providers and the general audience. <p>FOLLOW US</p> <p>@VRtogether_EU www.vrtogether.eu</p> <p>PARTNERS</p> <p>This project has been funded by the European Commission as part of the Horizon 2020 program, under the grant agreement 101017111</p>	<p>PHOTOREALISTIC IMMERSIVE CONTENT</p> <p>VR-Together project aims to offer ground-breaking social Virtual Reality (VR) experiences between users located in remote domestic locations. Based on photorealistic immersive content, it is a cost-effective means.</p> <p>VR-Together's ecosystem has been strategically set up to consist of partners that cover all stages of the production chain in a well-balanced way.</p> <p>A consortium of leading research institutions (ICAT, TNO, CWI, CERTH), Amazon together with industry actors (Entropic, Motion Spell, Viconna) have signed over 4 European countries.</p>
<p>PILOTS</p> <p>Three pilots, three different episodes of a great story about a murder's investigation.</p> <p>Pilot 1: Police interrogation</p> <p>Two users watch a police interrogation from the dark side of the room. During the experience, the users can interact and talk about the scene while seeing each other in a photo-realistic quality 3D representation.</p> <p>Watch the promotional video!</p> <p>Pilot 2: Live scenario</p> <p>Several users experience a live scenario: they are taken to a news broadcast set where, following the story, the background changes and they can view and examine the crime scene.</p> <p>Pilot 3: Interactivity</p> <p>Enhancing the experience of the other pilots, users interact with the virtual environment with cause-effect actions.</p>	<p>APPLICATIONS & USE CASES</p> <p>In current Social Virtual Reality applications, users are always represented as avatars, since recreating it's difficult to offer high-quality representation in a cost-efficient way, usable in a consumer environment.</p> <p>VR-Together now offers the possibility of meeting, friends, family and colleagues in photo-realistic quality, which shows advantages in several use cases:</p> <p>GOOD FOR</p> <ul style="list-style-type: none"> Business meetings Family experiences Educational purposes Social networks Entertainment Games <p>MAIN FEATURES</p> <p>The main characteristics of the VR-Together platform are:</p> <ul style="list-style-type: none"> Multi-elastic delivery chain workflow development 3D rendering engines 3D character full-body reconstruction with Data Mining Machine Learning/Cloud Live motion capture of content creator Encoding and re-configuration of content stream Data orchestration with the Information Flow <p>EXPECTED IMPACT</p> <p>To set a new standard in social VR using off-the-shelf products</p>

9. TECHNICAL FACTSHEET

TECHNICAL FACTSHEET

WEB BASED CONFIGURATION

Capture and delivery

TNO innovation for life

This is a basic web-based configuration employed in VR-Together. For the capturing process, the Kinect V2 or the RealSense D415 camera is used. For the streaming process, the WebRTC framework is used.

The foreground/background segmentation is based on the depth image. A reference image (RGB + depth) is captured before a user is present in the scene. Next, each frame of the captured video is processed. The depth image of each frame is compared to the reference frame to determine the foreground, i.e. the image of the user. This depth map is cleaned up, and applied to the RGB image to retrieve the users RGB foreground image. The sequence of images, retrieved in this way, is offered as a virtual webcam to the WebRTC framework.

The delivery is currently based on the SimpleWebRTC framework. The Media Capture API is used to retrieve both the virtual webcam and the HMDs microphone. Sessions are set up between the various users under supervision of the Orchestration component. The media is exchanged in a peer-to-peer fashion between the clients involved in the session.

Additional developments in this configuration involve:

- Applying the captured RGB+D into a Point Cloud that is overlaid on the captured users position, to show a self view;
- Streaming the captured depth images to other clients to allow a 3D image reconstruction at the receiving side;

Play-out

TNO innovation for life

For rendering, the A-Frame framework is used, which is based on WebVR. In this framework, various objects can be combined into a single VR experience. In the basic scenario, a 360 degree photo is used as a virtual environment. In this environment, 2D planes are placed at the other users' positions, and their video (containing only their foreground) is displayed on these 2D planes. The accompanying audio, which is synchronized with the video by using the WebRTC framework, is also placed at the users' positions.

Object-based audio is supported through the integration of the Google Resonance framework. For display of 3D objects, i.e. self-representation of a user or representation of other users, custom shaders that support the employed RGB + depth format for display in a 3D fashion have been developed while the 3D room model object is supported by A-Frame by default.

This project has been funded by the European Commission as part of the Horizon 2020 program, under the grant agreement 792111

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[*https://www.simplewebrtc.com/](https://www.simplewebrtc.com/)
[*https://aframe.io/](https://aframe.io/)
[*https://developers.google.com/resonance-audio/](https://developers.google.com/resonance-audio/)

PLATFORM ARCHITECTURE

COMPONENTS DESCRIPTION

The software architecture of the end-to-end VR-Together, i.e. from capture to consumption chain is comprised of 5 main components. These components serve as a basis of the integrated platform structure, and each one of them is a conceptual entity related to a general task within the end-to-end communication system.

The Capturing component captures / produces the visual and audio data, performs content reconstruction tasks and synchronizes the captures audio and video signals.

The Encoding & Encapsulation component encodes, encapsulates and packages the audio and video signals received from the previous component into one single stream.

The Delivery component makes this content available for consumption on the network.

The Orchestration component provides end-users with the information necessary to initiate a communication session over the VR-Together platform.

The Play-Out component is responsible for rendering and presentation of the immersive contents. It includes the contents for the shared virtual scenario and end-users' representation. It includes modules for up packaging, demuxing and decoding and synchronizing the audio-visual content.

10. ROLL UP

