2020 3D Media: New directions in Immersive Entertainment

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ABSTRACT This research project is conducted by a consortium of European industrial and academic partners that include companies like: Technicolor, Digital Projection, DTS Europe, Doremi, Mediapro, Creative Wokers (CREW) and Datasat, and research centers: Barcelona Media, Joaneum research, University of Hasselt, University of Reading and Fraunhoffer. It is aimed to research, develop and demonstrate novel forms of *compelling entertainment experiences* based on new technologies for the capture, production, networked distribution and display of *three-dimensional* sound and images.

2020 3D Media[1] research project is co-funded by the European Commission under the Seventh Framework Programme (FP7–ICT).

Introduction The media industry knows that astonishing the public is still a route to large audiences and financial success. It is believed that high quality presentation of stereoscopic or immersive images in the home and in the public entertainment spaces (such as cinemas) can offer previously unimagined levels of experience.

Objectives The users of the resulting technologies will be both media industry professionals across the current film, TV and "new media" sectors producing programme material as well as the general public. The 2020 3D Media has five Scientific and Technical Objectives:

1. To research and develop practical networked technologies for the capture, production, and display of sounds and images in three dimensions.
2. To create a heightened sense of presence, putting the spectator at the heart of the experience.
3. To develop means of navigating a virtualized world, based on captured data, that has a complete sense of reality.
4. To develop means of changing things in this world once it has been created.
5. To make it possible to repurpose and deploy multi-dimensional content in different contexts.

Development The overall project tasks are organized around four application areas:

- *Workflow and networked spatial media:* The research undertaken entailed a comprehensive study on the metadata set at different workflow stages as well as metadata acquisition and metadata conversion processes [Bailer and Höffernig 2009]. The metadata defined was based on standards adding extensions for identified needs or gaps. The resulting metadata ontology was subject to a proof of concept and several demonstrators have been implemented to test the adequacy of the defined metadata.

- *Capture & coding:* The project researches and develops a novel camera architecture, where one platform can be used to realize different applications like the generation of depth information for 3D Image Capture and enhanced resolutions above 2K for Digital Cinematography. Three different depth estimation approaches have been researched, namely the time of flight, the trifocal and the structure-light principles. In the trifocal approach, a camera rig to mount satellite cameras around a main camera was available early in the project. It was used for first test-shoots using the trifocal as well as the structured-light approach. Spatial audio capture solutions are also developed.

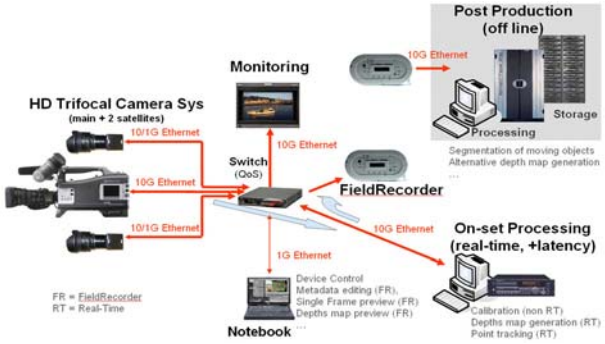

Figure1: 3D capture workflow for the trifocal approach

- *Post-production*: This area of work includes tools to manipulate stereoscopic and panoramic sequences, "dimensionalization" tools to help to give depth to standard 2D sequences and 3D audio tools. The project has developed a software framework for real-time depth enhanced image processing and CG rendering into various formats. In the meantime, improved methods for depth computation, 3D reconstruction and view-synthesis for 3D content post-production are being developed.

- *Distribution and exhibition*: A key part of this project is the development of a network-centric distribution system, capable of delivering 3D and immersive entertainment to cinemas, public spaces or homes [Wynants 2008]. One example of the work in this field could be the research on audio reproduction, were a proposal for a spatial audio methodology and format suitable for distribution, which is independent from the exhibition speakers setup, was produced.

Conclusion The market for stereoscopic 3D technologies is racing ahead, and this is leading to a growing awareness of the potential benefits of the more advanced technologies for depth cameras, omnidirectional video, and postproduction methods. 2020 3D Media works on an integrated plan of phased delivery of interim products, prototypes of medium-long term future technologies; and research results for future generations.

References

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[1] www.20203dmedia.eu

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