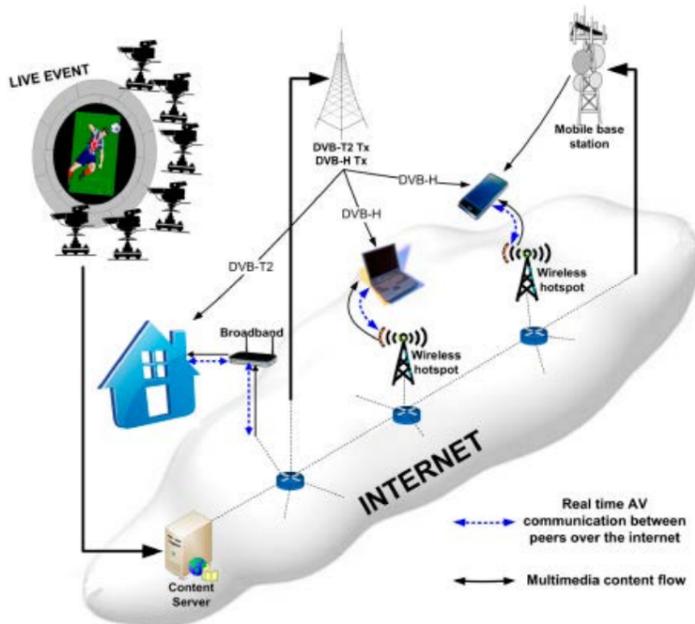


# Remote Collaborative Real-Time Multimedia Experience over the Future Internet

ROMEIO targets the design and development of new audio and video compression methods and the delivery of 3D multi-view video and spatial audio through a combination of the DVB-T2 broadcast access network technologies together with a Quality of Experience (QoE) aware Peer-to-Peer (P2P) distribution system. The concept also included collaboration between users through an audio-visual communication overlay.



PROJECT WEBPAGE URL  
<http://www.ict-romeio.eu/>

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Journal Papers	2
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Concluded PhD	1
Concluded MSc	1
Two Main Publications	
Silva, H. Marques, J. Rodriguez, <b>3D media distribution over the Internet with hybrid client-server and P2P approach</b> , chapter in Wireless Internet, Springer, November 2014	
E. Logota, H. Marques, J. Rodriguez, F. Pascual, M. Sanz, <b>Dynamic QoS Support for P2P Communications</b> , chapter in 3D Future Internet Media, edited by Tasos Dagiuklas and Ahmet Kondoz, Springer, April, 2013	

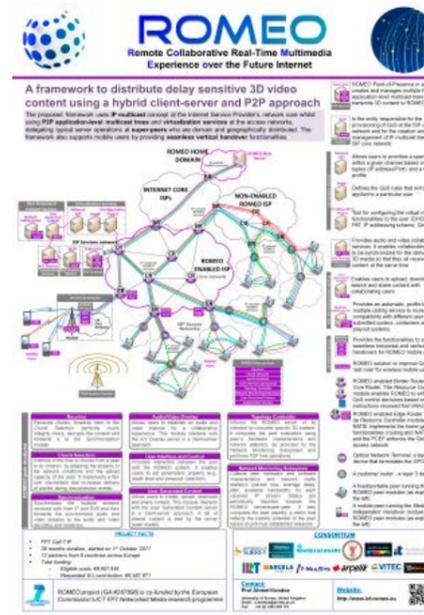


Fig. 1 A framework to distribute delay sensitive 3D video content using a hybrid client-server and P2P approach.

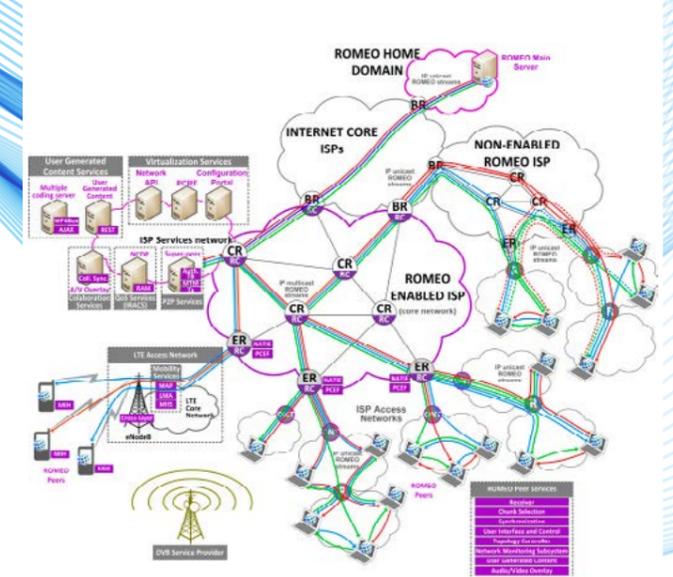


Fig. 2 The ROMEIO hybrid approach – Content distribution through DVB-T1, IP multicast and P2P approach.

## GENERAL MOTIVATION AND OBJECTIVES

ROMEIO brings new 3D media (3D multi-view video and spatial audio) to European citizens at home as well as on the move. In order to deliver the high bandwidth high quality 3D media to mobile and fixed users with guaranteed minimum Quality of Experience for all users, ROMEIO combines the DVB technology with the peer to peer (P2P) Internet technology. The broadcaster can deliver high quality stereoscopic 3D content to the users, and at the same time stream a set of supplementary 3D multi-view content (e.g. additional view-points with their respective spatial audio) through a Super-peer distribution tree. The peers can also acquire relevant information about the broadcast 3D media through other peers or other points on the Internet. In ROMEIO, the end-point peers also serve mobile devices with wireless access in a dedicated network, which can access the adapted and post-processed content. Peers located at the network edges also perform various adaptations, by deploying users' equipment virtualisation layer to eliminate the need for receiver set-top boxes and complicated equipment set-up, speeding up the user take up of cost effective high quality 3D media consumption.

The ROMEIO project therefore has three distinctive user types namely, users at fixed locations (home users) with high-end 3D media equipment, users with portable equipment such as laptops and finally mobile users with smart phones.

## CHALLENGE

The delivery of 3D media to individual users remains a highly challenging problem due to the large amount of data involved, diverse network characteristics and user terminal requirements, as well as user's context such as their preferences and location. As the number of visual views increases, current systems will struggle to meet the demanding requirements in terms of delivery of consistent video quality to fixed and mobile users.

Users will be provided with a real-time audio-visual communication channel so that they can share their experiences while watching the high quality 3D media. This will impose significant challenges to be developed within the ROMEIO project.

As the remote users (collaborators) are connected with a live audio-visual channel, the 3D media needs to be delivered to all collaborating users at the same time (or with only an unnoticeable delay jitter) if they are to jointly enjoy it. In addition both DVB and P2P networks will need to be synchronised at every user in the collaboration group. Finally both 3D multi-view video and spatial audio will have to be synchronised to enable live remote collaborative experience for all users in the collaborating group

## ACHIEVEMENTS

- Novel multi-view video and spatial audio capture methods
- Visual attention model development for QoE improvement
- Video and spatial audio codec development
- Object audio rendering framework development
- Real-time multi-view video renderer development
- P2P overlay network design for 3D media distribution
- 3D media consumption support for portable and mobile users
- Support for collaborating users, including media synchronisation
- Residential terminal virtualisation