



CA111 | Highly immersive Ultra HDTV on the way to becoming a reality

[UltraHD-4U]

PROJECT CONTRIBUTES TO

Communication	✓
Automotive and transport	
Health and aging society	
Safety and security	
Energy efficiency	
Digital lifestyle	✓
Design technology	✓
Sensors and actuators	
Process development	
Manufacturing science	
More than Moore	
More Moore	
Technology node	

Technology Platform for Process Options

Partners:

Pace France
 Alioscopy
 Arçelik
 ARTE
 Binocle
 Barco
 Hispasat
 mediAVentures
 Sapec
 STMicroelectronics
 Technicolor Connected Home Rennes (TCHR)
 Technicolor R&D France (TRDF)
 Thomson Video Networks
 University of Nantes/IRCCyN
 Vitec

Project leader:

Issa Rakhodai
 Pace France

Key project dates:

Start: April 2013
 End: March 2016

Countries involved:

Belgium
 France
 Spain
 Turkey

Website:

<http://www.ultrahd4u.eu>



Ultra HDTV, with its higher resolution, is the prime enabler of this impressive television experience, bringing the home a step closer to a full cinematic experience. Deploying a consortium of partners across the value chain – from content creation to display at home, including IC vendors and academics active in the standardisation bodies – the UltraHD-4U project focuses on studying and implementing the necessary components that will enable digital-cinema quality in the home.

Even as high-definition television continues to penetrate many countries, higher levels of ‘immersive-ness’ are already being sought after. But then the TV world has always been driven by technical breakthroughs. After full HDTV, a major innovation – Ultra HDTV (UHDTV) – is driving the next big thing in this important consumer market, which is only now starting to immerse in the consumer world with its huge potential for immersive and high quality user experience. In fact, UHDTV 4K is the future of television and manufacturers of everything from glass (camera) to glass (TV sets) want to show off support for the new standard, where displays and content offer horizontal resolution in the order of 4,000 pixels.

Digital cinema is the viewing norm

This project aims at studying and implementing an end-to-end UHDTV 4K chain (broadband and/or broadcast) for use in the home and/or at dedicated show-points.

Concretely, it will study and develop the necessary components enabling digital-cinema quality at home: 4K in 2D and better than 1080 pixels per eye in 3D. This is quite amazing, when you consider that this means receiving and consuming – in the comfort of the home – commercial quality audio-visual content normally found in a digital theatre equipped with the latest 4K-rendering and broadband-communication technologies for receiving and processing high-resolution, high-quality digital content.

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Interestingly, higher resolutions always increase qualitative expectations. The exceptional degree of reality perceived with UHDTV images will allow this project to enhance the value of the content generated in UHDTV because of the greater reality it captures, the impact of which will be part of a study conducted by this project. Regarding the issue of 3DTV, another technological hot item, it will only be addressed opportunistically by the project.

Main project activities include investigating, developing or implementing the following key components and features:

- High efficiency video coding codecs (a codec is hardware or computer code capable of encoding or decoding a digital data stream or signal)
- Advanced features such as deep colour, colour space and resolution, high dynamic range, higher frame rate and high-speed connectivity
- A new, high-bit-rate high-definition multimedia interface (or HDMI, an all-digital audio/video interface between a set-top box or DVD player, and a digital TV set, for example)
- Interoperability and backward compatibility with deployed HDTV infrastructure, required distribution bandwidth and audio
- UHDTV-frame-compatible 3DTV with a display technology that works with or without special glasses

Packing a collective punch

In creating the project consortium, organisers took into account digital TV's fast technological pace as well as their own keen desire to involve leading European field experts to participate and contribute to a common vision on UHDTV's evolution in the coming 5-10 years.

This calls for a considerable amount of commitment, organisation and expertise. For example, enabling digital-cinema quality calls for bandwidth and processing which is eight times more than for full HDTV. This means investigating and developing the necessary electronics and implementing new codecs, for example, more efficient in term of bandwidth and features. Appropriately, the project consortium comprises partners from across the value chain, providing the necessary innovation and leadership in their area of expertise. Partners range from creators of content for home consumption and academics active in the standardisation, to global leaders in the manufacturing and distribution of chips, encoding devices, set-top box and displays.

In short, UltraHD-4U's goals provide novel possibilities for industry, as well as, public and private research institutions, and collaboration between partners and specialists ensures a much deeper and comprehensive approach. Not surprisingly, all of this would be difficult for project participants to achieve individually when faced with technical challenges and the demand for a whole range of specialist skills.

Contributing to Europe's competitive edge

The development of new content formats, and capture, coding and rendering technologies, together with IC's used in consumer devices,

will be crucial to industry partners, content producers and distributors in maintaining Europe's position beyond the HDTV transition, and in preparing and expediting the European and worldwide deployment of UHDTV. And Europe needs tools to compete in this field. Producing, for example, a low-cost decoder (a project deliverable), or at least demonstrating the feasibility of producing one, will go a long way in equipping Europe to handle the competition effectively.

This project is expected to create focus and synergies between partners enabling European contributions to solutions (components, systems, but also user benefits and business models). It is also expected to promote active participation in standardisation and create visibility to a broader community. In addition, it will foster exchanges between organisations representing different elements in the intra-European chain, thus enabling a forum for alignment of objectives in features, but also in time.

This project will also help compress the implementation frame by ensuring that at least part of the chain is ready to be integrated, while providing European universities and other research institutions with opportunities to establish the level and quality of research in the field of networked media that will be really crucial to Europe in a global context.

The new infrastructure will help to further expand research and training at universities in the field of UHD media technologies. Moreover, this project will enable research institutions to valorise elements of their research both directly (via technology licensing) or indirectly (via spin-off ventures), thus accelerating the required technology transfer.

And what's more, the project's outlook looks bright. This is because UHDTV's future looks promising and the project timing is good (UltraHD-4U's deliverables will be ready by 2016). The first UHDTV 4K broadcasts should start around 2017, followed by the 8K variant in 2022. Furthermore, a recent study by In-Stat predicts that mass adoption of UHDTV sets will follow a similar process to the adoption of HD, stretching into the 2020s with about 40% of North American homes having a UHDTV set by 2025. By then, about 20m of these sets will be shipped in North America. The penetration in Europe will approach 5% by 2021 and increase to about 28.2% by 2025. And the Japanese market will be an early adopter of the technology in Asia.



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