

4k REPROSYS

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Project Website

www.celticplus.eu/project-4kreprosys

4K ultraHD TV wireless REmote PROduction SYStems

4KREPROSYS aims at investigating and developing a new integrated cost-effective approach for the production of 4K TV content covering the needs from indoor studio production up to difficult outdoor large and mobile events and the needs for a low bandwidth remote production where the principle is based on "all -IP".

Main focus

The evolution of multimedia content and associated services towards improved user experience must rely on higher resolutions and more immersive and interactive formats, but this will be possible only if the production of such contents will be economically viable and fully compatible and scalable with the production of traditional content formats. Unfortunately, current production technology and systems are the results of an "ad-hoc patchwork" of different components based on often non-compatible or non appropriate legacy technologies that need to be deployed in the field with very heavy and extremely costly logistic means. new emerging powerful technologies such as HEVC and Internet/IP based wired and wireless communications capable of supporting large bandwidth transmission such as the one

needed for TV content production up to resolutions of 4K and beyond, for 3D or multi-view settings are the motivations to rethink and re-design the essential components of the production infrastructure providing higher resolution rates and advanced formats as well as new functionality.

The project will focus the investigations and developments on the integration of HEVC and IP based communications carrying both content and service signal for both wireless and wired production components. The goal is to study, develop and experiment in the field, production systems that will support ultra-high definition and advanced multi-view formats for indoor and outdoor mobile settings where thanks to the new approach the location of the TV studio infrastructure traditionally deployed in the field becomes a "virtual" component that can be locally or remotely deployed according to the best logistic solution of the specific production.

Approach

Technologies that are used to develop the new 4K production system are:

Ultra-low latency MPEG HEVC encod-



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ing and decoding (the only compression standard that provides the necessary performance to compress 4K TV signals to reasonable bitrates with studio quality)

Low latency IP based wired and wireless communication links for local and remote production for both TV and service signals (DASH and other streaming protocols will be investigated for the different use cases and possibility to implement ultra low delay performance)

Low latency switching and synchronization of compressed streams without packet loss for the mixing and multiplexing of wired and wireless content and service streams

Low latency content protection for on-line encryption of compressed streams.

Challenges that the project will face will be:

Low power implementation and compact integration of 4K HEVC studio quality compression and IP wireless modulation for battery operated mobile portable systems.

Seamless switching of high bandwidth video streams.

Use of high dynamic range or high frame rate contents at ultra-high definition currently studied as extensions of HEVC version 1.

Virtualization of studio production operations for remote TV production by integration of service signals and usage of "low bandwidth" communication infrastructure.

Robustness and reliability of large bandwidth wireless mobile TV streaming on static and highly mobile scenarios.

Low delay and embedded implementation of content protection systems able to handle very large streams.

Main results

The expected results will give the ability to master from start to finish a RF recording & transmission in a 4K configuration with their own solutions. Compliance and ascending compatibility with existing systems will be required and maintained.

Another innovation at production side is the approach based on integration and transmission of IP signals for both content and services. Multiplexing of audio, video and data will be managed at the very beginning of the chain leading to reduce the number of frequency needed between two emission & reception points.

The project will investigate a robust and reliable bi-directional IP technology allowing the deployment of remote control production configuration.

On final distribution chain, the technologies developed in the 4KReProSys can be used for increasing QoE in IPTV and OTT services and support the ongoing efforts of Finnish Communications Regulatory Authority (FICORA) on defining acceptable quality limits for services delivered over communication networks.

At the end, the major visible and concrete result of the project will be a full integrated system (equipment and integration with a remote studio via a "low bandwidth" communication infrastructure) for the production of 4K TV resolution capable of covering mobile sport events (cycling, marathon, triathlon,) such as the next Olympic events.

Impact

The most visible European business perspective will be the possibility of all television companies partners of Eurovision to profit from the new 4K production capabilities associated to the new "low bandwidth remote production" possibilities promoted and made available by Eurovision on its worldwide network infrastructure.

The consequence of this will be that 4K resolution content will be available for the distribution chain and for the creation of new added value TV services.

At the worldwide level, the results and deliverables of the 4KREPROSYS project will give the ability to become a strong player in the delivery of RF transmission solutions able to compete with Asian or US contenders.

The 4KREPROSYS project is in-sync with the European Digital agenda and its target to build a connected continent. Connectivity underpins competitiveness and the project is one of the steps mandatory to establish the Digital European Leadership in the TV sector.

The future RF services and Ultra High definition TV filming to broadcast services will be powered with European technology and solutions and will limit the entry of external competitors on our market.

On the other hand, the 4KREPROSYS project will strengthen the European know-how and current expertise and will facilitate the international deployment of our solutions on overseas markets.

About Celtic-Plus

Celtic-Plus is an industry-driven European research initiative to define, perform and finance through public and private funding common research projects in the area of telecommunications, new media, future Internet, and applications & services focusing on a new „Smart Connected World“ paradigm. Celtic-Plus is a EUREKA ICT cluster and belongs to the inter-governmental EUREKA network. Celtic-Plus is open to any type of company covering the Celtic-Plus research areas, large industry as well as small companies

or universities and research organizations. Even companies outside the EUREKA countries may get some possibilities to join a Celtic-Plus project under certain conditions.

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