



## PROJECT PROFILE

# High Definition TV for Europe

### A coherent HDTV system



*While High Definition TV has been, or is being, rolled out in some other important markets, Europe has yet to prepare its industries and networks to support this exciting, but technologically challenging, entertainment media. Providing big improvements to the end-viewer experience, High Definition TV requires major changes in broadcasters' operations. Using established (digital TV) distribution networks, HDTV will be influenced by a HD picture 'profile', requiring operators to make difficult but crucial decisions about the ratio of quality to bandwidth. By addressing the developments in technology that will reduce the resources needed to broadcast High Definition content HD4U will help to make HDTV a success in Europe on all TV/broadcast networks (Satellite, Terrestrial, DSL). HD4U will also study the business scenarios and experimental results of those working on HD service adoption.*

#### The main challenges: technological innovation

This project is offering an innovative approach that will deliver an end-to-end generic solution for the HD market, based on the MPEG-4 AVC compression scheme and some other key enabling technologies relevant to HDTV broadcasting.

The two major technology areas of innovation are the MPEG4 AVC HD compression and the pre/post-processing of the signal.

#### Breakthrough in HD distribution bit rate

Studies show that MPEG-4 AVC HD compression scheme delivers a real advantage to HD deployment thanks to a two-fold efficiency increase over existing MPEG-2.

European encoding and set-top box industries will benefit from the competitive advantage given by using the "MPEG-4 AVC-able" component.

#### Optimisation of the HD networking & Broadcasting

DVB-S2 is a key technology that is driving HDTV through economy of scale. Enabling an additional 25 to 35 percent capacity gain compared to DVB-S, DVB-S2 enables six to eight HDTV channels compressed with MPEG-4 AVC to be broadcast on a single satellite transponder.

Internet Protocol (IP) is a key technology for HDTV, enabling the introduction of new services while lowering OPEX and CAPEX. By its nature IP provides future-proof transport networks with a cost-effective price per transferred bit.

#### AVC amendment1: Fidelity Range Extensions

In July 2004, the JVT has released a draft version of an extension of the MPEG-4 AVC standard. This extension called Fidelity Range Extension (FRX) includes four new profiles dedicated to HDTV. HD4U will work on the integration of this FRX extension for HDTV. These new tools will be integrated into the

## HD4U (ITEA 04027)

#### Partners

Euro 1080  
Newtec  
Philips Belgium  
Philips France  
Philips the Netherlands  
Telefonica I+D  
TF1  
Thomson Nextream  
Thomson R&D France  
University of Nantes

#### Countries involved

Belgium  
France  
The Netherlands  
Spain

#### Project start

January 2005

#### Project end

December 2006

#### Contact

*Project Leader:*  
Patrick Schwartz  
Nextream, France

#### Email:

patrick.schwartz@thomson.net



## PROJECT PROFILE

encoder/decoder side. Specifically, HD4U will see how FRX fits into the global HD picture improvement scheme and assess the reliability of such tools in the complete system.

### Pre/post Signal Processing

The effect of video compression on displays must be analysed in detail in order to investigate the right configuration of compression, including possibly adapted pre-processing.

In addition, post-processing after decoding will be studied in order to improve the subjective picture quality. Also needed are new signal processing algorithms based on motion compensation. These must be developed to give the display panel better rendering motion.

### End-to-End quality of experience for HDTV

The design and deployment of HDTV services, supported by displays based on new physical techniques, requires a controlled and optimised End-to-End visual quality. The objective is to

be in the development of a quality of experience (QoE), adapted to use in the optimisation of HDTV systems.

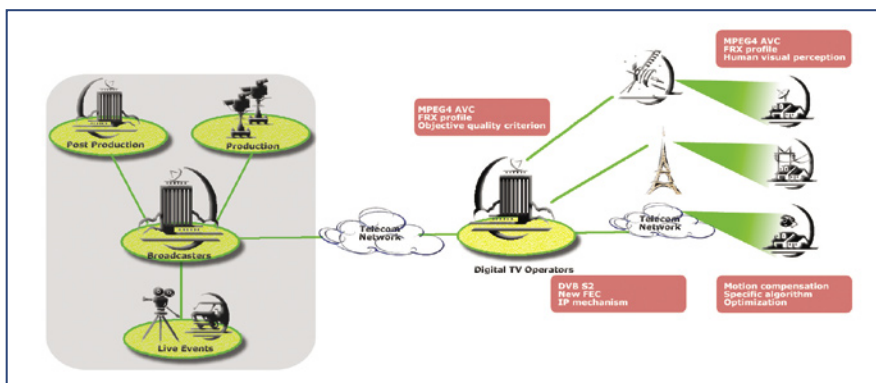
### Integration and Demonstration

The end-to-end solution will enable broadcasting of High Definition video in all market segments: telecoms, terrestrial and satellite across Europe.

The project will be involved in the very first trials of an interoperable MPEG4 AVC system for distribution of HD signals.

### Expected results

- Reports describing the state-of-the-art of HD formats, and standards
- Reports describing reference architectures, models and standards
- Reports describing QoE for HDTV services
- Prototype MPEG-4 equipment
- Validation by demonstrators of the new MPEG-4 architectures



optimise HDTV encoding-decoding efficiency by achieving a good balance between the maximum compressed-video visual quality for a given bit-rate and maximum data compression for a specified video visual quality.

Models of perception of visible impairments must also be taken into account within visual quality criteria. We have to redefine the main psycho-physical values for HDTV and adapt the models obtained for visibility functions and perception. A real innovative aspect of this project will

The project will look into existing and novel business models for the range of service scenarios. Use of real market scenarios will give a trusted assessment of the business. Its aim is to fulfil the increasing demand for HDTV by developing a generic system that will enable mass deployment of HD broadcasting around Europe.

HD4U will open new technological horizons and business opportunities, and provide a competitive edge by offering new products and services to keep pace with ever-changing markets.

### ITEA Office

Eindhoven University of Technology Campus  
Laplace Building 0.04  
PO box 513

5600 MB Eindhoven  
The Netherlands

Tel : +31 40 247 5590

Fax : +31 40 247 5595

Email : itea@itea-office.org

Web : www.itea-office.org

ITEA - Information Technology for European Advancement - is an eight-year strategic pan-European programme for pre-competitive research and development in embedded and distributed software. Our work has major impact on government, academia and business.

ITEA was established in 1999 as a EUREKA strategic cluster programme. We support coordinated national funding submissions, providing the link between those who provide finance, technology and software engineering. We issue annual Calls for Projects, evaluate projects, and help bring research partners together. We are a prominent player in European software development with some 9,000 person-years of R&D invested in the programme so far.

ITEA-labelled projects build crucial middleware and prepare standards, laying the foundations for the next generation of products, systems, appliances and services. Our projects are industry-driven initiatives, involving complementary R&D from at least two companies in two countries. Our programme is open to partners from large industrial companies, small and medium-sized enterprises (SMEs) as well as public research institutes and universities.



ΣI 2023