

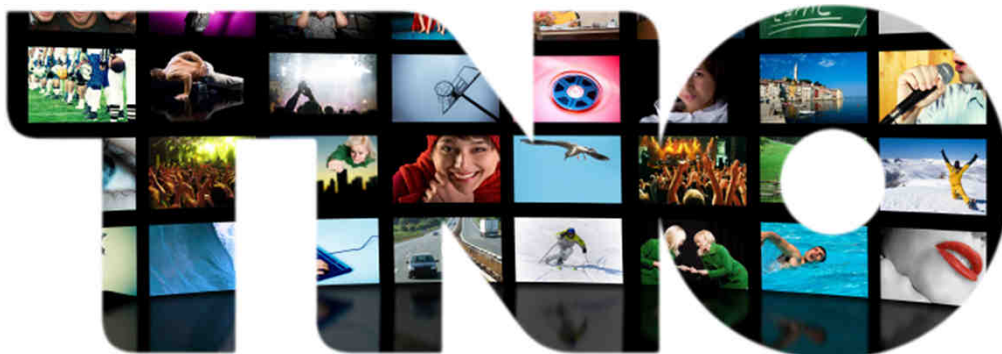


Enabling Ultra-HbbTV

A vision on future converged media

Dr. M. Oskar van Deventer

With Dr. Omar Niamut, Hans Stokking, Rob Koenen, Ray van Brandenburg, Arjen Veenhuizen

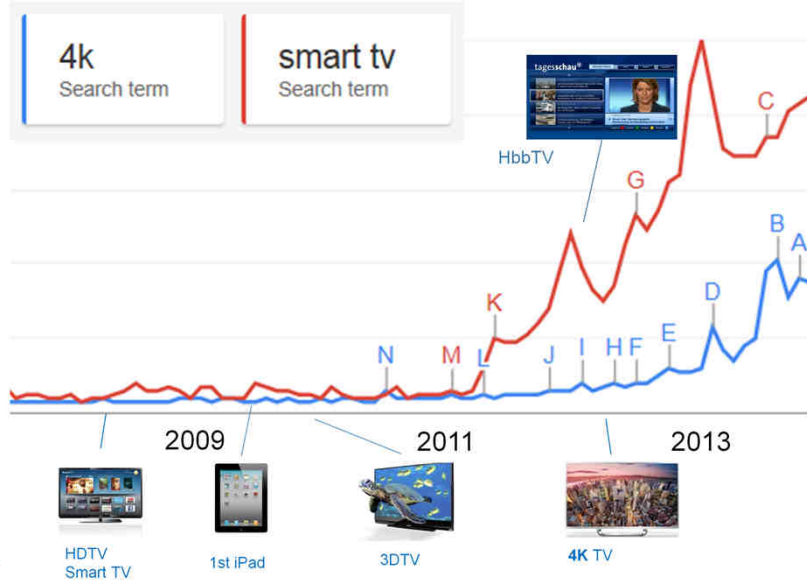


Keynote at NEM Summit 2013 by Dr. Oskar van Deventer

- Senior scientist media networking at TNO, The Netherlands Organisation for Applied Research
- Together with Dr. Omar Niamut and TNO colleagues
- Presenting a vision of Ultra Hybrid Broadcast Broadband Television, or Ultra HbbTV in short
- It is a vision that has many components and that offers an opportunity to Europe, both for R&D and standardisation, and what needs to be changed in European R&D and standards to make this vision come true



Trend: TVs are getting bigger and smarter





Ultra HbbTV: More pixels!

Cisco 'Fresco' future-of-video at IBC 2013



4K / 8K screens



UHDTV - More pixels:

UHDTV is first of all about more pixels. The Cisco Fresco demo at IBC showed that the trend for more pixels does not need to stop at 8k. They showed wall-sized displays, in which the user can place multiple widgets, and where the user can decide the size of the TV that he wants to watch.



Ultra HbbTV : More frames-per-second! Better colours! Better audio!

BBC high-frame-rate demo at IBC 2013



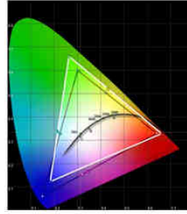
Conventional TV - 1/50 s shutter



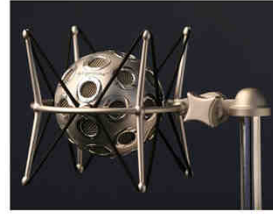
High Frame Rate TV - 1/500 s shutter

Images courtesy BBC R&D

Wider colour gamut



3D audio



UHDTV - Higher Framerate:

UHDTV is more than just more pixels.

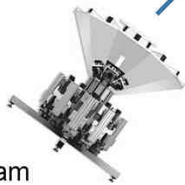
- It is also about more frames per second, see BBC demo at IBC
- It is also about better colour, and a wider colour gamut
- It is also about better audio, for example 3D audio



Ultra HbbTV: also more sources!



Format-agnostic production by FascinatE



Ultra HbbTV - more media sources:

More sources means more difficult production, which means the need for a virtual direction framework and format-agnostic media productions.

This is exactly what TNO built in FP7 FascinatE, together with a.o. BBC, Alcatel Lucent, HHI, Technicolor, and other partners. The FascinatE solution allows for “late binding”, which allows the director to produce multiple scripted productions and the possibility of automatically-generated scripts, which enables the director to manage the plethora of media sources. Also users could generate scripts for their friends.

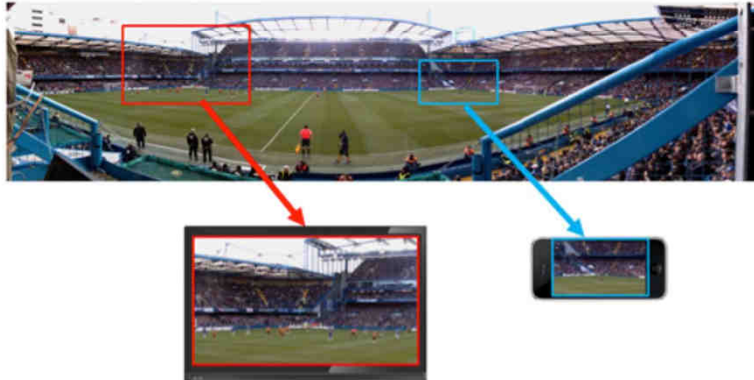
See <http://www.fascinate-project.eu/> and <http://195.188.87.10/rd/projects/fascinate>



Ultra HbbTV: also more interactivity!



Tiled video by FascinatE



Ultra HbbTV - more interactivity:

Users can select their own camera's and views on their televisions and companion screens. In FascinatE, we build a solution with tiled streaming, where a user can pan, tilt and zoom his personal camera view and personal Region of Interest (RoI). As the video is offered in tiles of multiple resolution, the companion screen selects only those tiles that it need and only in the resolution that it can display.

This approach makes UHDTV usable for multiscreen, offering maximal with minimal waste of bandwidth and resources. This offers further opportunities for gaming and social TV, where users can share specific camera views with each other to highlight events that they spotted.



Ultra HbbTV: also more synchronisation!



Companion stream & stream sync framework by HBB-Next



Ultra HbbTV – synchronisation:

All those camera views and audio tracks need to be synchronised over the different user devices.

- A user may select companion streams, like an alternative audio stream, subtitle track or sign language interpreter, to be presented on his HbbTV screen
- Some of the companion streams could be presented on separate companion screens, like smartphones and tablets
- Also social TV, “watching apart together”, requires synchronisation in order to enjoy a shared experience

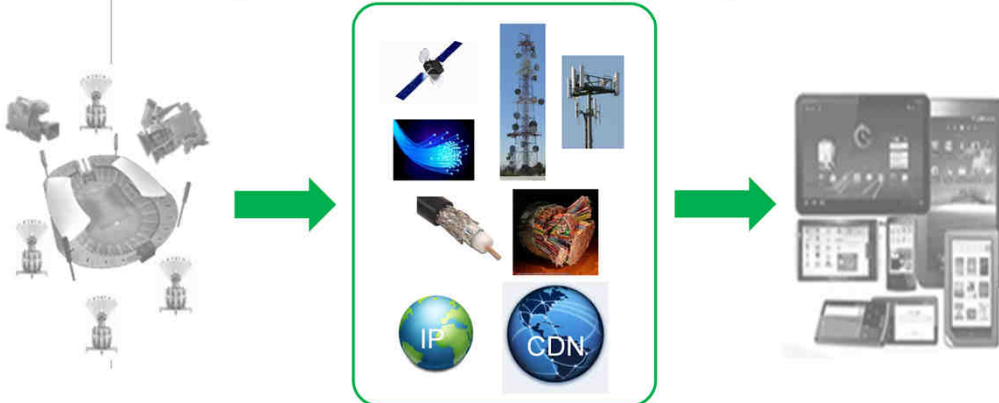
Measurements by TNO and others show that there can be delay difference of 6-10 seconds for the delivery of regular broadcasts. BBC reports delays of 30-60 seconds for HTTP adaptive streaming. Our user tests, together with KU Leuven, show that 1 second accuracy is required for social TV, whereas 40 ms or less is needed for frame-accuracy and lip-sync.

TNO has developed a framework for media synchronisation in a series of projects over the last seven years. Within FP7 HBB-Next, together with partners like RBB and IRT, we have built technology implementations and demonstrations of the different types of synchronisation.



Ultra HbbTV: also more diversity!

- › Need for more flexibility in combining delivery modes
- › E.g. possibility to switch to broadcast mode depending to popularity
- › Blurring between “live”, “synchronised”, “catch-up” and “on-demand”



Ultra HbbTV - more diversity:

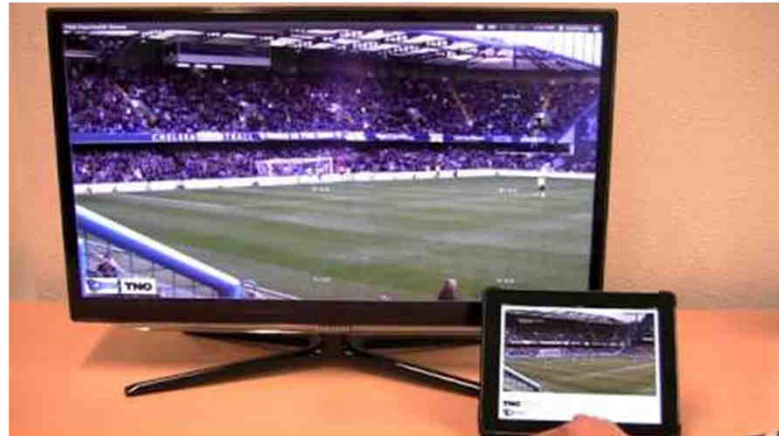
Media streams are transported over many different transports and modes. Depending on the scale of distribution, there is a choice between broadcast, multicast and unicast. CDNs deliver stored content by efficient caching, but increasingly they are also used for the delivery of live streams.

There are voices that all should converge to a single IP transport network that supports all services. However, each technology has its own merits. Broadcast is good for life delivery to many viewers. IP and broadband are good for interactivity. CDN is good for scalable delivery.



Video demo!


Synchronised hybrid HD interactive tiled streaming
-See NEM Summit, Booth 15 – MediaSync 2013
-See also <http://www.youtube.com/user/hbbnext>




Ultra HbbTV – proof of concept:


This integrated FascinateE + HBB-Next video shows many of the components of Ultra HbbTV in a single setup, as an example of how the vision might be realized:

- More pixels: 6k panoramic UHDTV video
- More sources: broadcast cam and Omnicam
- More interactivity: interacting with tiled streams
- More synchronisation: sync between stream and devices
- More diversity: combined broadcast + broadband network, television + companion screen









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Ultra HbbTV: more standards!

- › Need for over-arching frameworks, e.g. synchronisation, hybrid CDN
- › Need for “running code”, proving the standards
- › **There is no “they” in Standardisation**

CDN ←		mpeg-DASH →	Adaptive streaming Tiled video
Social TV sync ←		MPEG →	HEVC 3D Audio
Multi-stream sync ←		ITU →	UHDTV
Companion screen sync ←		ETSI →	???

Ultra HbbTV - standardization:

Standards are essential to the Ultra HbbTV vision. The vision contains many components, which are provided by many companies. And which need to work together. We want to achieve a consistent non-fragmented European ecosystem for Ultra HbbTV. Standards are the way to glue the ecosystems together. We are not going to achieve this with monolithic American market-driven standards. Fragmentation is the status quo. Many bodies work on synchronisation and content delivery technologies, but each addresses its own limited part of the market, and solutions don't work together.

The link between European R&D and standards is weak. At one ETSI workshop, I witnessed an excellent presentation from a European R&D project about Content Centric Networks to ETSI workshop. However, there was not any follow up, as the project was finished. European R&D should not approach standardisation as “yet another dissemination platform”. This is where ICT industry adopts technology and where business ecosystems are constructed.

I see an important role of RTO' like TNO, Fraunhofer and Joanneum here, namely to coordinate activities in various and **between** standards bodies. For example, TNO is coordinating media synchronisation between OIPF, DVB and HbbTV, where we are trying to get the same synchronisation framework adopted by all, and having standards that are applicable beyond some simple use case.



Ultra HbbTV: more research?

- › Europe underestimates importance of “innovation in ICT and Media”
- › ICT is framed as “just an enabler” for energy, mobility, health, ...
- › Media is dismissed as “entertainment”
- › Horizon 2020 offers limited opportunities for Media R&D
- › EIT ICT Labs 2014 does not provide for Media valorisation
- › Neelie Kroes Digital Agenda: worry about ICT research in Europe



Europe underestimates the importance of “innovation in ICT and Media”. Similarly in NL, we have so called “Top Sectors”, that do not consider ICT and Media as central elements. There is no Topsector ICT.



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TNO innovation
for life



Ultra HbbTV: more research!

- › Strong European players (technology, service, R&D, SME)
- › Strong European interests in Media
 - › Media is binding the European society, what people spend time on
 - › 138x10⁹ \$ broadcasting market EU 2016 (Research and Markets)
 - › 75x10⁹ connected devices in 2020 (Morgan Stanley)
 - › 400% growth of internet traffic for video next two years (Cisco)
 - › Competition/dependence from US and Asian technologies
- › Convergence is finally happening in ICT and Media
 - › Fixed, mobile, internet, broadcast → Ultra HbbTV

Europe has a strong media ecosystem and strong interests. Convergence is finally happening. Let Europe take this opportunity.



Conclusions

- › Opportunities for Europe
 - › Ultra-HbbTV offers an opportunity for Europe
 - › One non-fragmented European ICT & Media industry
 - › “Hybrid Europe” versus “Software US”, “Hardware China”
- › Challenges for European R&D
 - › Get Media (back) on the European Research Agenda
 - › Enable standardisation in European R&D

THANK YOU

Contact: oskar.vandeventer@tno.nl / omar.niamut@tno.nl



TNO: Innovation with ICT



- › TNO: 3900-employee not-for-profit Dutch research institute.
- › Mission: bring innovation to small and large businesses.
- › Information society expertise: telecommunication and content delivery networks, network planning and performance analysis, application development, security, business modelling, usability, predicting the success of innovations.
- › Media networking group
 - › Activities: TV, CDN, interactivity, social TV, beyond HD, immersive, companion screen
 - › Standardization: DVB, OIPF, IETF, HbbTV, ETSI, 3GPP, OMA, ...
 - › European research projects: HBB-Next, FascinatE, STEER, Figaro, iCORE, ...



www.tno.nl





Dr. M. Oskar van Deventer

- › European – and customer projects
 - › IMS-based IPTV, CDN-I, Rubens, HBB-Next
 - › Combining content with communication, social TV, media sync, companion screen, multi-user services
- › Standards contributor and rapporteur
 - › HbbTV, DVB, OIPF, ETSI, IETF, ITU
- › Author & co-author
 - › Over 100 international publications
 - › Over 500 standardization contributions
 - › IPTV, CDN-I, HbbTV 2.0, media sync
- › Creativity
 - › Over 50 patent applications
- › Award-winning game “Triangler”
 - › Guinness: largest order Rubik’s Cube

- › Contact: oskar.vandeventer@tno.nl

