LOOKING AT THE BIGGER PICTURE

실험방송 4K

KBS UHD
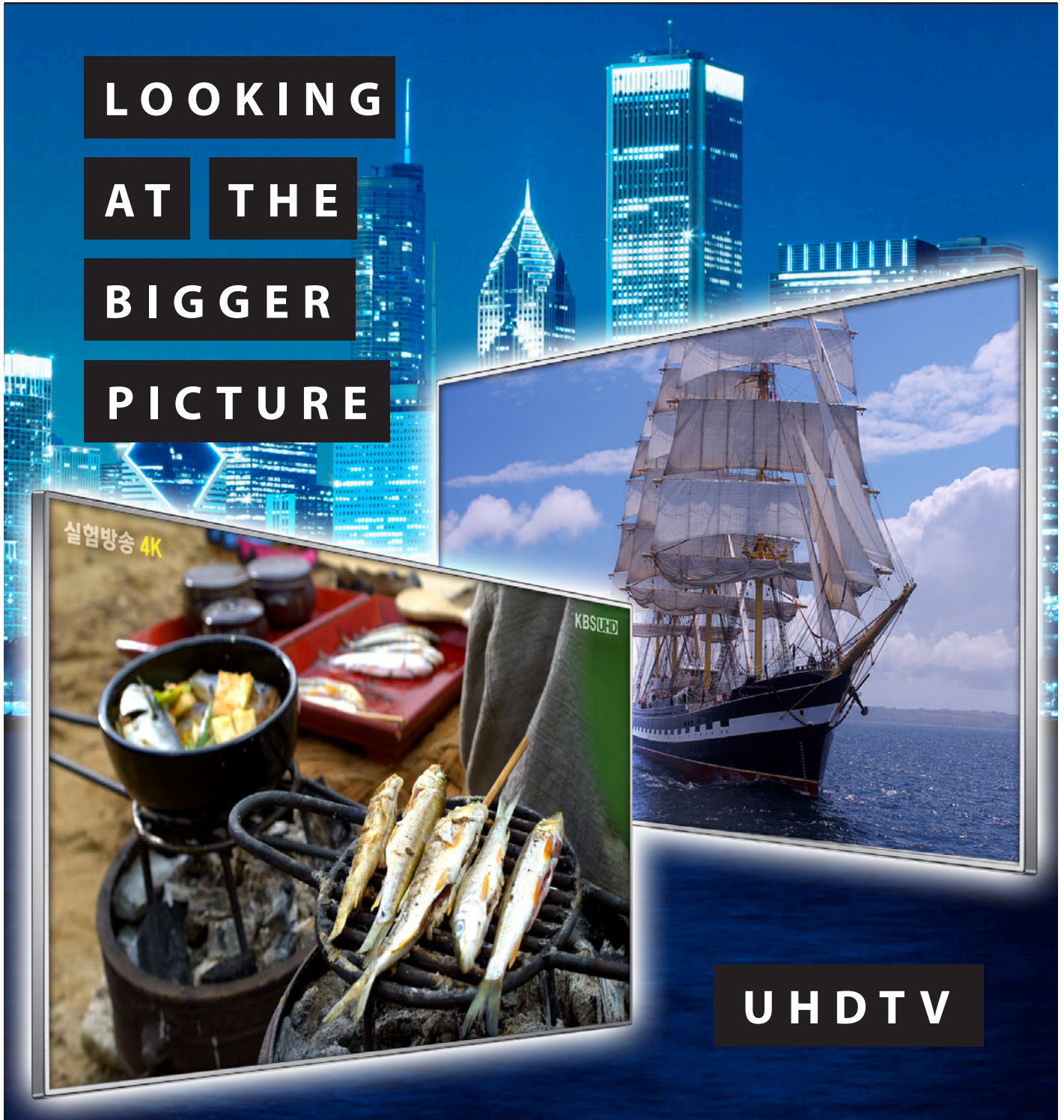
UHDTV

The Future of DigiTAG

DigiTAG

05

IHS Research Director, Guy Bisson gives his opinion on the true cost of OTT

06

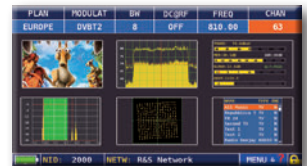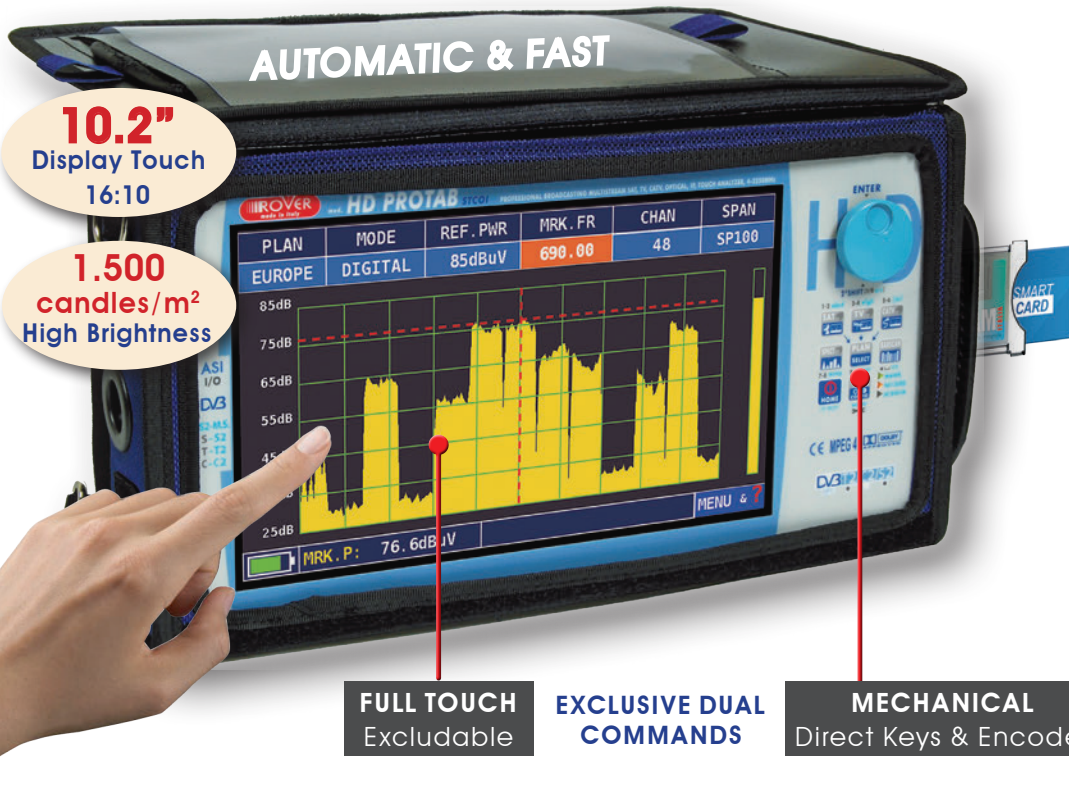David Wood takes a forward look with 'Where is the bigger picture for DVB?'

08
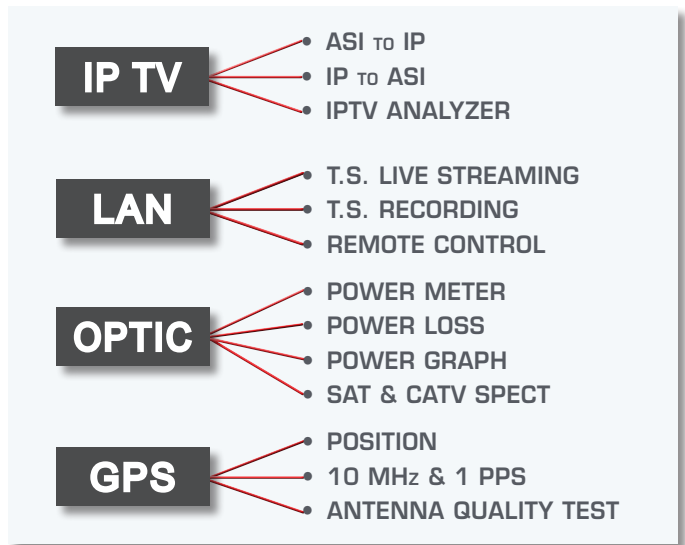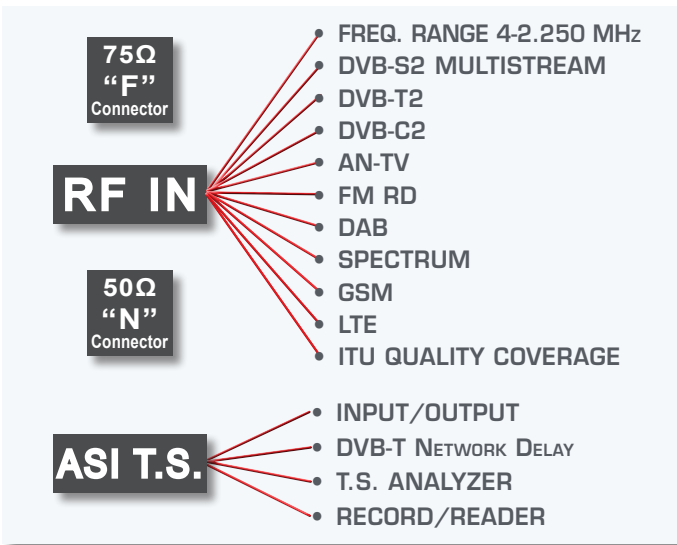
Members Benefit
A Word From DVB

Peter Siebert
Executive Director

An interesting aspect of my role as Executive Director of the DVB is to visit countries that are either in the process of selecting technology for digital broadcast or have already decided on DVB. In December 2012, I had the pleasure of visiting India and Vietnam. Both countries are relying heavily on DVB technology for their broadcast networks. Digital satellite and cable are very popular in both countries and terrestrial services, based on our latest technology, DVB-T2, are on air.

India and Vietnam are just two examples of the long list of countries that have adopted DVB specifications. This worldwide success demonstrates that our technology is flexible enough to cover a wide range of different requirements and use cases. Being successful worldwide also means that there are economies of scale for both professional and consumer equipment. Customers can choose from a variety of products from several suppliers and competition guarantees that the price is right. All of this has been achieved by a small, not-for profit, private organization. Many people are quite surprised to learn that all DVB activities are covered 100 percent by the membership fees! There is no subsidization by any government and there is also no financial benefit for DVB when our standards are deployed.

This clearly shows how relevant the members are for DVB. Not only do they finance our activities; they also contribute by sending experts to DVB meetings and supporting the DVB Project Office in marketing activities. Therefore, I would like to thank all members for their excellent support in 2012 and I am looking forward to an equally successful 2013. I would also like to encourage the not so active members to become involved in DVB activities. DVB is not only a standardization platform, it also brings together all the relevant players in the broadcast area. It is a good place to meet the industry and to discuss the future development of broadcast. By supporting the marketing activities of the Promotions and Communications Module (PCM), your organization will benefit from the extra visibility.

Being a DVB Member and participating in DVB activities is a win-win situation. The overall DVB organization becomes stronger through active members and these members benefit from their involvement with DVB standards and by being associated with the strong brand and established reputation of DVB.

New Standards

EN 300 468 : Specification for Service Information (SI) in DVB systems (08-16-12)
TS 102 831: Implementation guidelines for a second generation digital terrestrial television broadcasting system (DVB-T2)(29-08-12)
TS 101 547-1: Plano-stereoscopic 3DTV; Part 1: Overview of the multipart (11-22-12)
TS 101 547-2: Plano-stereoscopic 3DTV; Part 2: Frame Compatible Plano-stereoscopic 3DTV (11-22-12)
TS 101 547-3: Plano-stereoscopic 3DTV; Part 3: HDTV Service Compatible Plano-stereoscopic 3DTV (11-22-12)
TS 101 154 : Specification for the use of Video and Audio Coding in Broadcasting Applications based on the MPEG-2 Transport Stream (11-22-12)

New Members

MaxLinear Inc is a provider of highly integrated radio-frequency analog and mixed signal semiconductor SoC solutions for broadband communication applications offering high levels of performance, small silicon die-size, and low power consumption. **www.maxlinear.com**
Montage Technologie (Shanghai) Co. Ltd is a leading fabless semiconductor company which engages in IC design, application development and product marketing and sales in the areas of digital enterprise and the digital home. **www.montage-tech.com**
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Cover

The cover of this issue reflects the growing interest in Ultra High Defintion TV (UHDTV). In South Korea the four major terrestrial broadcasters, supported by the regulatory body of KCC (Korea Communications Commission) have been carrying out UHDTV tests using DVB-T2. While in France, Eutelsat is currently transmitting a UHD Channel using DVB-S2 in conjunction with the 4EVER Project whose partners include: Orange, ATEME, France Televisions, Technicolor, Globecast, Teamcast, Doremi, Insa/IETR Rennes, Telecom ParisTech. DVB SCENE would like to thank the respective parties for the use of the stills from these transmission and acknowledge their copyrights.

The still on the top right is from the Brest 2012 Maritime Festival transmitted on Eutelsat's UHD Channel and the bottom left is from a test transmission by the Korean consortium.

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Verify & Validate
ENGINES behind the scenes

Dr. Jani Väre, ENGINES, Project Coordinator

It is probably not common knowledge – perhaps until now – that a Celtic project has been behind the scenes in the evolution of DVB-T2 and the development of the DVB-NGH standard – and beyond. So, let me tell the story of the Celtic project, ENGINES.

The vision for the ENGINES project was clear from the start. The goal was ambitious, contribute to the DVB-NGH standardization and complement the verification work already done for DVB-T2. Little did we know what a roller coaster ride the project would be and how glorious the project ending would turn out.

The Celtic project, ENGINES, a consortium of 33 partners, started in January 2010, and in January 2013 the project had its final review which ended the three-year adventure. The project partners included many DVB Members, such as Teracom, Teamcast and the BBC, just to mention a few. In all, the consortium was a stellar combination of academia and industry, most of which were active contributors within the different DVB work items and especially in DVB-T2 and DVB-NGH. The scope of the ENGINES project was the development of DVB-NGH

technologies, the verification and validation of DVB-T2, the study of the Common Broadcasting Specification (CBS), cognitive radio and lastly DVB-T2 Lite. This last addition to the scope was obvious - even necessary.

The project started off slowly, mostly due to funding issues with the majority of the project partners. However, 'the show must go on', and so did the ENGINES project. Roughly a year after the start of the project the funding was resolved. There can be no doubt, the ENGINES project was determined to reach the goals that were set in the humble beginning.

As with many success stories there was also some luck involved with ENGINES too. We decided to extend the ENGINES project by another six months and replace one of the work items with the study for the CBS. Also, the work for the mobile extension of DVB-T2, DVB-T2 Lite, had commenced in DVB. That was a plug and play addition for our already ongoing DVB related work, and DVB-T2 Lite slipped right in between the verification and validation of DVB-T2 and the technical work of DVB-NGH. Towards the end, the extension of the project turned out to be crucial. We were able to carry out many extensive laboratory and field trials on DVB-T2, including DVB-T2 Lite, and other advanced features. Also the extension of the project enabled some testing of the physical layer of DVB-NGH, so-called 'pre-NGH'.

As we prepared for the final review and looked back over the project, we were surprised by how big an impact the project had on the individual partners and also on different activities in DVB. The total number of contributions enabled by the ENGINES project, and provided to the different standardization forums (mostly to DVB), was over 130. The number of academic publications, mostly related to DVB technologies and produced as a result of ENGINES, was more than 75.

Dr. Jani Väre received his M.Sc. degree in Information Technology with an emphasis on telecommunications at Tampere University of Technology, Finland, in 2002, followed by a Ph.D. degree in 2011. He holds over 60 patents. In June 2001 Dr. Jani Väre joined Nokia, where he started to work with DVB technologies and eventually DVB-H. He has been actively involved with DVB-TM Ad-Hoc working groups: TM-CMBS, TM-GBS, TM-T2 and TM-H. He was Task Force leader of Celtic B21C project and Project Coordinator of the Celtic ENGINES project.

A massive number of different DVB-T2 prototypes and commercial products were created during the ENGINES project. Last, but not least, the results of the MIMO campaigns done during the ENGINES project have been used as valuable input into some of the future DVB work that is already underway. And hey, if you need some 'light reading', why not grab the book "The Handbook of Next Generation Mobile Broadcasting" by CRC Press, another result of the ENGINES project. It's some 700 pages and surely an interesting read.

The afterlife of the ENGINES project continues at www.celtic-engines.org. We are proud to be part of the Celtic-SAGA started by WingTV, then continued by the B21C and now by ENGINES.
– What's next?

Main DVB related focus areas in the ENGINES project			
	DVB-T2	DVB-T2 Lite	DVB-NGH
System Architecture		✓	✓
Prototyping / Laboratory Validation	✓	✓	✓
Experimentation	✓	✓	

ENGINE Partners

The Future of DigiTAG

Renewing & broadening support for digital terrestrial TV challenges ahead

Ed Wilson, Executive Director, DigiTAG
Natalie Mouyal, Senior Communications Officer, DigiTAG

The beginning of 2013 was a special moment for DigiTAG. As a quick glance at the DTT map of Europe confirms, almost all countries had succeeded in meeting the European Union's deadline by completing their Analog Switch Off by the end of 2012. And the DTT platform has been a remarkable success. Today, over 50% of European households rely on the terrestrial platform for their primary television services, and many more households use the DTT platform for secondary television reception.

Countries which have traditionally had a high reliance on terrestrial television, such as France, Spain and Italy, have maintained a DTT penetration of over 75%. Furthermore, countries like Germany and even the United States have seen a measurable increase in the number of terrestrial TV households following the digital switchover.

The flexibility that digital terrestrial TV offers, such as the trade off between quantity of services and robustness, has been exploited well to suit the different markets. Content is varied with more than 750 television channels distributed on the DTT platform in Europe, including local and regional services.

Yet, despite or perhaps because of these successes, the DTT platform is increasingly under threat, with the risk that it may lose its ability to innovate and evolve. Arguments have been increasingly made that some of the gains in spectral efficiency provided by cutting edge digital TV technology should permit the release of spectrum for uses other than TV. While the terrestrial platform has traditionally used frequencies in the UHF band from 470 MHz to 862 MHz, these same frequencies, argued to be 'prime spectrum real estate', are increasingly in demand by other service providers, notably LTE mobile service operators. And, as these new service providers bid to be given access to the broadcast bands, the DTT platform risks a future suffering from increasing problems of interference, reductions in coverage, and constraints on future creative new services.
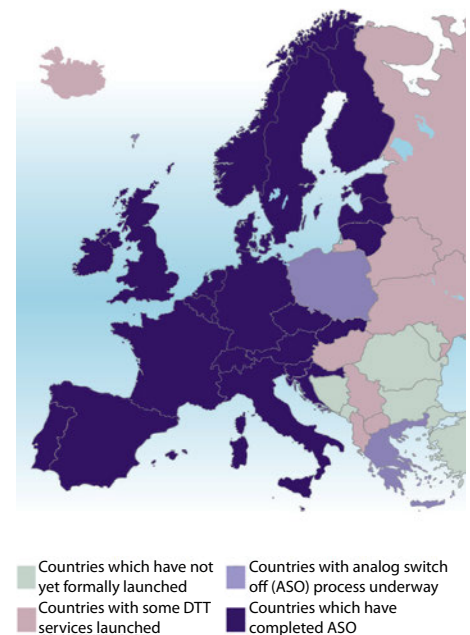
At the World Radiocommunications Conference (WRC-12) held a year ago, national administrations agreed to update the ITU Radio Regulations to allow the introduction of mobile services in the otherwise exclusive broadcasting band frequencies from 694-790 MHz as of 2015 in Europe, Africa, and parts of Asia. While the allocation of this '700 MHz band' will remain unchanged until 2015, the decision highlights the desire by some national administrations to allocate further frequencies below 1 GHz to mobile services which they see as a way of monetizing spectrum. Ultimately, national administrations will decide how much, if any, of these frequencies will be allocated to mobile broadband operators, however, the economic pressure for doing so remains. Already, the 800 MHz band has already been allocated to mobile telecom services in a harmonized way across Europe and most countries are in the process of auctioning these frequency licenses, if they have not yet done so. The real need for allocating further frequencies to mobile telecom operators in the present timescale has yet to be proven and should be put on hold until the full benefits of the 800 MHz band have been achieved and the impact on DTT networks fully understood.

Expanding and Refocusing the Role of DigiTAG

Given the current and new challenges facing the DTT platform, DigiTAG, at its General Assembly meeting at the end of 2012, was relaunched with renewed energy in its mission of defending and promoting terrestrial television, as the most efficient user of frequency spectrum, on a worldwide basis.

DigiTAG will continue to promote the DTT platform, and now especially in those countries beyond Europe which are as yet analog TV-based. It will continue to

European DTT Map

- Countries which have not yet formally launched
- Countries with some DTT services launched
- Countries with analog switch off (ASO) process underway
- Countries which have completed ASO

work towards the harmonization of DTT products and services. It will also continue to serve as the prime information source on DTT best practices and worldwide developments. DigiTAG is a well respected information provider, known for encouraging decision makers to understand fully the benefits of the DTT platform while also equipping them with the necessary facts and arguments to debunk certain exaggerated claims made by other industry groups.

DigiTAG will do its best to ensure cooperation between all stakeholders in the global terrestrial broadcast industry, bringing them together into a united front.

In My Opinion
The True Cost of OTT

Guy Bisson, Research Director, Television, IHS Electronics & Media

Guy Bisson is head of IHS Screen Digest's television department. Guy directs all TV-related research and statistical modelling activities. Guy was instrumental in building IHS Screen Digest's TV research department and the online statistical information services, Television Intelligence and TV Channel Intelligence. Guy has particular expertise in digital TV, cable and satellite television and pay and free multichannel TV, and comments regularly on the strategy and development of the international TV business.

Guy has acted as a consultant for numerous media groups, government organizations and investment banks. His experience spans due diligence, expert witness work and high-level strategic consulting. He frequently presents at international conferences and trade shows and has written numerous industry reports.

The IHS Electronics & Media market intelligence product portfolio is the unique combination of strong legacy brands and the world-renowned research prowess of iSuppli, Screen Digest, Displaybank, and IMS Research. Affording automotive, communications, consumer, industrial and medical electronics as well digital content market data and analysis – this business unit of IHS is powered by over 350 sector analysts and industry experts, and tens of millions of data points.

www.ihs.com

Inflection point: what a great phrase. Your dictionary will tell you that an inflection point is the moment of dramatic change in a market. It is the point at which all disruptive factors converge to cause a fundamental shift in market dynamics or behavior.

The future of OTT delivery of television content is all about inflection points. It's about when and if the point will be reached when consumer behavior, technological development and industry dynamics converge to make a shift away from broadcast technologies practical, attractive and cost effective.

There's a lot of opinion out there. Some argue that, today, we have already reached the inflection point that makes a shift to OTT the most sensible route for the industry to take. Others, citing the behavior of four year olds, suggest that the point will be reached as the next generation transitions to adulthood.

But these black and white views frequently fail to take account of the way in which the television value chain impacts the rate of change and the spread of cost within the TV industry.

Our analysis shows that at current cost base, scaling OTT to platform distribution levels is not cost effective, with widespread implications for single-player platform agnostic OTT providers like Netflix. The same scaling problems exist for large consumption channels with, in some cases, the Content Delivery Network (CDN) costs of fulfilling actual program consumption using OTT Unicast streaming being many hundreds of times the cost of broadcast delivery.

So should we write off OTT delivery altogether? Absolutely not. For a large number of small to medium scale channels, the cost of servicing their actual viewing demand using OTT Unicast (in standard definition at least) would already be cheaper than, satellite, the most cost effective broadcast technology. That's a pretty compelling statistic for change. But is it an inflection point?

...scaling OTT to platform distribution levels is not cost effective...

The reality of the business is that a switch to only OTT Unicast delivery would be commercial suicide for all but the most niche of channels. Success in the TV channel business still requires reach. And the other factors that go into the reach equation, notably consumer behavior and service availability, are still lacking.

Indeed, an interesting counterpoint is provided by analyzing the UK channels that also have a terrestrial feed. Despite terrestrial broadcast being considerably more expensive than satellite, the majority of UK channels paying for terrestrial transmission have actual content consumption demand that means, even with the combined broadcast costs of servicing satellite and terrestrial, the cost of fulfilling this demand by Unicast OTT delivery would be prohibitive.

HD presents further problems. With the additional bandwidth required, there are no BARB-rated channels that would find OTT Unicast more cost effective than broadcast, assuming an HD feed.

The reality remains that OTT costs today are not substitutive and will remain incremental on broadcast for the near to medium term. The burden placed by the need to meet increasing OTT demand on larger consumption channels, which must maintain fixed broadcast costs, is thus potentially onerous.

But the evolution of the industry, consumer demand, and developments in the platform market like YouView, BT Vision and Sky's Now TV mean that the drive towards OTT delivery is an increasingly important component of the TV business.

This presents business opportunities for existing and new players in the broadcast space. The longer term business model for infrastructure providers will bundle flat rate Unicast delivery with some form of 'broadcast' for linear channels. That should mean an increased role for owners of CDNs and last mile IP infrastructure. And while longer term this will most likely be fulfilled, at least in part, by IP Multicast, hybrid technologies that combine satellite or terrestrial with IP will most likely fulfill the near term need.

A Sharing Experience
Companion Screens & Supplementary Streams

Kevin Murray, Chair DVB-TM Ad-Hoc Group on File Formats

The growth in personal devices such as smartphones and tablets now includes their use as second screens guaranteeing their position as a key part of television. As a result we are seeing ever more extensive, engaging and complex use of these devices, and applications running on them, to enrich, extend and augment the television experience. Against this background, the DVB Technical Module recently launched a study mission to investigate the technical need and potential for standards in this area. The motivation behind this study is best summarized as a desire for an 'author once' environment – today content is potentially viewed many times, via many different delivery mechanisms on many different platforms and devices, both time-shifted and live. A consequence of this is the need to provide bespoke applications for each potential consumption pattern; this is not practical. The only alternative – providing support for a single platform, or a small set of platforms – will naturally alienate some viewers. Hence the goal of the study mission is to identify the work DVB can undertake to produce, or contribute to, a single system that can and will work across all platforms.

A Discussion Architecture

The first step the study mission is undertaking is to generate an architecture to frame the discussions covering the technologies and work required; the current version of this is shown in the diagram. This architecture identifies several key points:

- the presence of shared devices (such as a television) and potentially many personal devices (such as tablets or smartphones),
- the presence of multiple different delivery routes for content into the home, and that different homes may well have different sets of delivery routes available,
- the presence of both a home network (that may well be of a complicated structure) as well as that of mobile networks,
- the potential for either separate or combined providers of content and augmentation applications.

At this point, it is worth noting that the diagram does not show the streams that are flowing between the components above, or additional services that may be necessary to build the system we are describing.

Areas of Study

Through both an analysis of the experiences offered by some second screen offerings and the details identified in the discussion architecture, a provisional list of areas of study has been created that represents the first potential work areas for DVB. Work in these areas will seek to identify what technologies are available, what is required, and if there is a need for additional standards or clarifications.

Identification: For a personal device (or the application running on it) to be part of the television experience it needs to know what is the current content being consumed. This may be as simple as providing a means to query the shared device and receive an opaque data value, or as complex as only allowing an application to execute whilst the content with which it is associated is being viewed.

Synchronization: Once a companion experience is running, a degree of synchronization may be needed. This allows, for instance, the application to change the questions in a quiz program as the program progresses. Different applications (and, indeed, different architectures) will desire, and be able to support, different levels of synchronization from very tight sub-second accuracy (for instance to support synchronized videos on both shared and personal devices) through to a rough approximation of a few seconds, or even to a separate wall clock independent of the content.

*Protection:* The value of a brand could be compromised by unwanted applications

Kevin Murray is a System Architect in New Initiatives with Cisco. His work has included contributing to the development of HD, new coding techniques, home networking technologies, advanced DVRs, IP delivery of TV, 3DTV and file formats for content.

exploiting the content. Therefore there are models in which it is key to provide control to both the environment (such as synchronization and identification information) and content streams so that only approved applications are part of the television experience.

Closing Remarks

It is impossible to underestimate the potential of the second screen to change and enhance how we view television. However, without a suitable set of standards and architectures this potential will be both slow to be realized and only available to those with suitable devices. With the work proposed by DVB such as in those areas illustrated above we can widen, speed up and simplify turning the second screen into just as natural and powerful part of viewing television as the television itself.
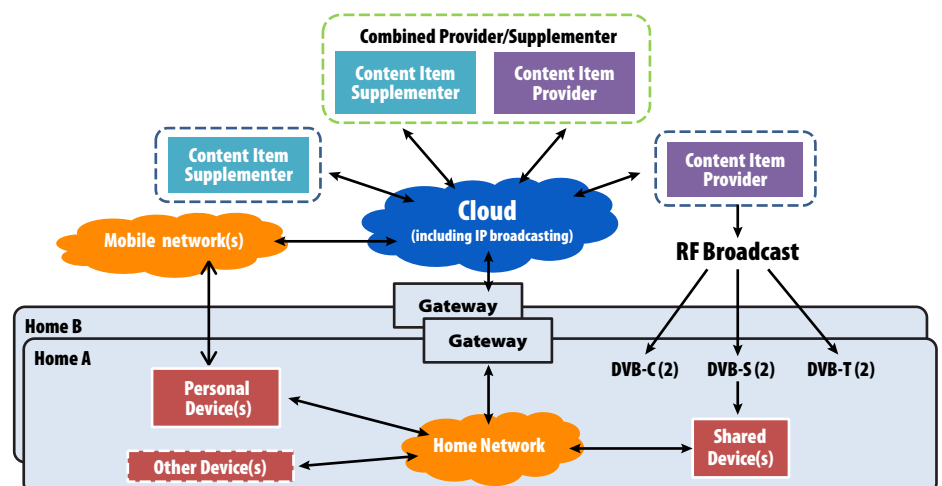
Forward Looking
Where is the big picture for DVB?

David Wood, Chair CM-3DTV & Chair CM-UHDTV

David Wood, EBU

As human beings, we can sometimes show stages of enthusiasm for new broadcasting systems. Stage 1 is: "this is ridiculous - it will never happen". Stage 2 is: "nice, but this is way off in the future". Stage 3 is: "I've been saying this is important for years, but no one listened!" With 3DTV and UHDTV, it's time to brush up on where you are.

We see things in different ways. Ask a television broadcaster what matters most, and he/she will say "audience time" – the product of the number of viewers and the length of time they watch. A consumer electronics manufacturer may look for reasons for purchasing a new TV set. For a technology provider, it may be generating technology licences. Through regulator's eyes, it may be spectrum efficiency.

To make UHDTV broadcasting a reality, we need a complete UHDTV 'ecosystem'...

The DVB has to bring together these perspectives when it considers 'commercial' requirements. Since 1993 it has been following the wise proposal of founder member Robin Crossley that the first stage of a specification should be to analyze what features the system would need to be 'successful' commercially.

The Emergence of HDTV

Though HDTV has been relatively successful, it is far from being omnipresent. More than 80% of the world's television channels in 2013 are 'still' in standard definition. The HDTV standard formats were agreed in the ITU in 1998, and their development began many years before. Technical evolution can involve degrees of infrastructure change. The greater the change, the greater is the infrastructure mountain that must be moved to introduce it, and the longer it can take.

Furthermore, each major step in technology follows three phases. The first phase is the 'ideas' phase - the case for a more advanced system becomes evident. The second is the development and standardization phase. The third is the implementation phase. Taken end to end, if the infrastructure change is large, the phases take many decades. Thinking ahead is a must.

Looking Beyond HDTV

The HDTV phases began thirty years ago, so it would be normal to be now in the midst of new phases of television system evolution. The search for television with a greater viewing experience has moved forward, beyond HDTV, into two 'new' directions: 3DTV and Ultra High Definition Television. The DVB has been among the worlds 'thought leaders' for television, and so these are now squarely on the DVB agenda.

3DTV

The story of 3DTV is now well known – at least the story so far. The DVB published the 'Frame Compatible' 3DTV broadcast specification in 2011, and this is now the world's most used system. A growing number of higher-end TV sets across the world are '3DTV capable'. Current 3DTV displays are good but have some limitations, and only modest amounts of 3D programs are available. Growth of 3DTV services has been finite but less than predicted.

In the 'Frame Compatible' 3DTV option, the left and right eye images have reduced resolution compared to 'normal' HDTV (or compared to Blu-ray 3DTV). Two further specifications are out, or due,

that allow full resolution left and right eye images.

The first is 'Service Compatible' 3DTV, for which a specification has been agreed, using a technical system with similarities to the 3D Blu-ray system. A Frame Compatible extension system is planned for preparation during 2013.

HEVC and 3DTV

In the midst of the evolution of 3DTV is the evolution of the digital compression technology. The MPEG specifications for the new generation of compression tools, HEVC, are close to availability. HEVC may offer up to 50% savings in bitrate compared to the current AVC system.

MPEG compression systems are 'tool kits' that allow a matrix of options termed 'profiles' and 'levels'. It's not enough just to decide to use HEVC – you also have to decide which level/profile combination to use. The DVB needs to consider whether there is a commercial case for new 3DTV systems using HEVC, and if so, with which profiles and levels.

AS-3DTV

We can add to the list of potential 3DTV systems, the emergence of 'auto-stereoscopic UHDTV displays'. A UHDTV display can be arranged to work as a dual-purpose device. It can continue to provide 2D UHDTV. It can also provide a 'multi-view' 3DTV picture by sharing the resolution between multiple stereo pairs. By using a special screen surface, different stereo pairs can be seen from different head positions. The result is a 3DTV picture seen without glasses with about (say) HDTV resolution.

There are multiple options ahead for 3DTV; and, because of this, the DVB Commercial Module is preparing a 'road map' for the DVB for 3DTV, to help focus on the options that have the highest likelihood of commercial success. Watch this space.

UHDTV

At the same time, DVB is also studying whether it should prepare commercial requirements, and subsequently specifications, for UHDTV (Ultra High Definition Television). Prompting for this came last summer when the ITU agreed

One of the first live satellite 4K transmissions from SES shown at IBC 2012 with content from Sony in 3840x2160 pixel resolution on a Sony Bravia 84" display. Photo courtesy of SES.

UHDTV transmitter installation and field test van in Korea.

baseband parameter options for UHDTV, and set makers announced plans to market '4K' displays.

Just as with HDTV, the ITU agreement is just the beginning of the story of UHDTV. To make UHDTV broadcasting a reality, we need a complete UHDTV 'ecosystem', with content being made that the public wants, and transmitters, receivers, and displays off the shelf.

The ITU UHDTV specification offers a range of options, and the issue now is whether one or more of the options could provide a commercially viable broadcast service. All options are progressively scanned and the use of HEVC compression is assumed.

The matrix shows two of the main options. There are two levels (rows) of 'resolution', called UHD-1 (or Ultra HD) and UHD-2 (or Super Hi-Vision). Factors that would influence choice include the availability and cost of consumer displays for each, and the size of the displays that the public will demand. Today's HDTV was designed with displays of about 42" diagonal in mind. If home sets rise to 70" maybe UHD-1 would be right. If they rise to 100" maybe UHD-2 will be right. Set makers say they will make UHD-1 displays available to the public in the next two years. Current thinking of most DVB Members is that displays for UHD-2 are too far away to consider now, but against that a few members argue that UHD-2 is inevitable, so

it could make more sense to wait for it.

There are three groups of frame rates. The first column is the group that could carry much of today's electronic movie content. Electronic movies today use a resolution similar to UHD-1, so there is readily available content to start broadcasting UHD-1 services right now, if the displays were in the public's hands.

The second is the group with 'conventional frame rates for television'. The movie rates would not be adequate for sports events. Events that involve a stadium could be a killer application for UHDTV. But today there is very little production infrastructure for UHDTV, so it certainly would not be possible to throw a switch and start a service with these frame rates.

The third is the group of higher frame rates – 120Hz or possibly 100Hz. Having such higher frame rates would make the image look even more 'real'. Some argue that, for example, UHD-1 shot at 120Hz would give the viewer an experience as involving as UHD-2 at conventional frame rates. The arguments about a lack of broadcast ecosystem however, would apply equally or even more so in this case.

The choice of options may be also linked

to the way the broadcast is to be delivered.

Apart from the 'thought process' about the most attractive combination of options, there are practical developments.

SES is already on air with test broadcasts of UHD-1 via satellite. In Korea, a consortium is already on air with test broadcasts of UHD-1 at 30Hz terrestrially (using the DVB-T2 system). In France, consideration is being given to including UHD-1 capability with their transition to DVB-T2. We await news of an enhanced DVB-S2 system that will have extended capacity, which may help with UHDTV satellite broadcasting. In January, Eutelsat launched a dedicated demonstration Ultra HD channel for Europe on the Eutelsat 10A satellite. The new channel operates with progressive scanning at 50 frames per second, encoded in MPEG-4 AVC and transmitted at 40 Mbit/s in four Quad HD streams.

Taken all in all, the coming years are going to be most exciting for the evolution of television. There is an old adage that 'any road is the right one if you don't know where you are going'. With your help and contributions we might have some DVB street lamps.

UHDTV Level	'Movie' frame rates – 24, 25, 30Hz	'TV' frame rates – 50, 60Hz	Higher frame rates – 120Hz
UHD-1 – 4xHDTV 8 megapixels	?	?	?
UHD-2 – 16xHDTV 32 megapixels	?	?	?

DVB-T2 sweeping through Asia

John Bigeni, DVB

John Bigeni

DVB-T2 is experiencing unprecedented success in Asia with most countries in the region adopting the standard, conducting trials or indeed proceeding with implementation of services. This includes countries as Singapore, Thailand, Indonesia, Malaysia, Mongolia to name a few.

The reason of course is because of the very significant benefits that can be realized by this standard's quantum leap in efficiencies relative to first generation standards like DVB-T and others. Such a change leads to better spectrum utilization, higher payloads and in some cases lower transmission power requirements.

Whilst a number of countries in the region had already adopted T2's predecessor DVB-T, some have still reconsidered and opted to change for T2 as the benefits were not to be ignored. Myanmar is a good example of a country that has already established an extensive DVB-T network but now sees great benefits in introducing DVB-T2. Myanmar is now introducing DVB-T2 overlaying their existing extensive DVB-T network. The Forever Group (National Broadcaster) has already commissioned three DVB-T2 transmitters and commenced test transmissions last year.

Mongolia also adopted the DVB-T standard for digital terrestrial broadcasting but has changed to DVB-T2 before the main transition to digital TV got underway. Efficiency of transmission is important to this country, it being very large and having a nomadic lifestyle and population diversity. It proposes to use large numbers of small power T2 transmitters in combination with DVB-S2 and DVB-C2 systems.

Indonesia, one of the most populous countries in the region, also preselected DVB-T but has now changed to T2. The benefits of T2 certainly played a significant part in this decision. Indonesia's concerns with respect to the consumer cost have now largely dissipated as T2 receiver prices are now very low and comparable with those applying to first generation standards. Indonesia has also now been joined in the region by Malaysia and Thailand to adopt and proceed with T2 services.

An interesting case is that of Singapore which was an early adopter of DVB-T. Singapore's objective in selecting T2 was to use the efficiency gain to minimize the use of external receiving aerials. The adoption of the DVB-T2 standard comes after a successful trial conducted last year with MediaCorp and pay TV operator StarHub. The Media Development Authority has announced that Singapore's seven free-to-air TV channels will operate fully digital by the end of 2013 using DVB-T2.

DVB-T2 is also to be found in some unexpected places in the region. Korea has recently utilized the DVB-T2 transmissions in Seoul to facilitate the testing of the transmission of UHDTV. The four major terrestrial broadcasters in South Korea participated in this project. The payload included 4K HEVC(H.265) Ultra HD service in a 6MHz channel. DVB-T2 had the best performance and indeed was the only practical terrestrial standard to deliver the necessary payload of 36.6 Mbit/s in a 6 Mhz channel. It is intended that the tests will be extended well into 2013 and beyond.

Digital switchover in Nigeria

Dr. Nick Wells, Chair DVB-TM

Dr. Nick Wells, BBC

Last December, I attended a conference in Nigeria entitled 'Digital Dialogue Nigeria'. The purpose of the conference was to assist in the planning of the Nigerian transition from analog to digital - so that this could be achieved by mid 2015 in accordance with the international agreements for digital switchover made at the Regional Radio Conference in 2006. The conference was sponsored by MultiChoice Africa, an innovative pay TV broadcaster operating within Africa. The attendees at the conference represented regulators, program makers, journalists, engineers and broadcasters.

Nigeria has already decided to opt straightaway for the use of DVB-T2 when they turn off analog (along with many other Southern African countries), thereby leapfrogging the use of DVB-T. I was invited to speak in support of this very sensible decision and to point to the ready availability of reasonably priced T2-enabled TVs and set-top boxes in countries that are already rolling out DVB-T2-based services. However, the process of detailed planning of the transition from analog to digital, and the process of preparing the public for switchover has not yet started in earnest.

The speakers at the conference represented the Nigerian National Broadcasting Commission, the ITU, the academic community, program makers, broadcasters and the legal profession. It was clear that there was a lot of local expertise and understanding of all that would be necessary in order to make digital switchover a success, including the need to increase the level of local program production to help fill the extra capacity enabled by digital. There was also the recognition that a cross-industry organization would be needed to coordinate all aspects of digital switchover. However, the whole process was being delayed by a lack of certainty in the relevant legislative framework and this uncertainty was making business investment decisions difficult.

Digital discussion in Nigeria

Overall, I had the impression of a hugely vibrant and growing economy giving lots of potential for innovation and development particularly in the broadcasting sector.

DVB-T2 Workshop in Delhi

Since 1959, India's public broadcaster, Doordarshan (DDI) has been providing terrestrial analog television services. In addition to the terrestrial free-to-air channels, cable and satellite networks providing pay TV services have become extremely popular. Starting about ten years ago, digital transmission technology based on DVB standards was introduced for cable and satellite. Around the same time DDI also started test transmissions for digital terrestrial television (DTT) in Delhi, Chennai, Kolkata and Mumbai. In 2007 DVB-H was included in these transmissions. Based on the experiences gained by these trials DDI decided in 2010 to adopt DVB-T2. Beginning with the greater urban areas, DDI plans to rollout the network in several phases. Altogether about 630 transmitters will be needed to provide sufficient coverage.

Such a challenging project requires good preparation, so a DVB-T2 implementation workshop was jointly organized by the ABU, DDI and DVB in Delhi in December 2012. The workshop included presentations and technical demonstrations from various DVB Member companies and experts.

The complete end-to-end aspects of implementing a DTT network, from encoding and multiplexing to the digital receiver were covered by the agenda. The presentations were enhanced by technical demonstrations highlighting the overall transmission chain, including local content insertion. These DVB-T2 features and the excellent support for Single Frequency Networks were the hottest topics.

The workshop ended with a panel discussion on the relevance of the terrestrial platform versus cable and satellite platforms. Chaired by Mr. Sharad Sadhu (ABU); Mr Tripurari Sharanthe, Director General of DDI together with the Chief Engineer, Mr Ravindra Kumar Sinha, exchanged ideas with DVB Member representatives regarding the possibility of supporting mobile services on a terrestrial platform, based on DVB-T2. The discussion confirmed that DVB-T2 is the most efficient solution for delivering mobile TV by a terrestrial broadcast network. Another relevant aspect for DDI is a flexible network architecture that allows the insertion of local content at the transmitter site. The audience discussed with the technical experts how this can be best achieved using the Physical Layer Pipes that are an inherent feature of T2.

All participants were highly satisfied with the workshop; those presenting acquired relevant information about Indian market requirements and their audience after the intensive discussions was further informed on DVB-T2 technology.

Festival of TV in Vietnam

"When will our people be able to watch television?" This question was raised by Ho Chi Minh, also known as "Uncle Ho", on May 1st 1968. More than two years later on September 7th, 1970, Vietnam TeleVision (VTV) started providing broadcast services from Hanoi. When the Vietnam War was over in 1975, VTV took over the US built TV stations in the south. This of course resulted in two television standards: the south used FCC for Black and White (B&W) and NTSC for color while the north used OIRT (International Radio and Television Organization) for B&W and SECAM for color. From 1978 onwards only SECAM and OIRT were used.

Since then many things have changed, while VTV is still the public broadcaster in Vietnam, PAL is used for analog transmissions and the country now uses DVB for digital broadcasting. Satellite services based on DVB-S and DVB-S2 are very popular and DVB-C is deployed for cable. Both DVB-T and T2 are used for terrestrial television.

In light of the importance of DVB technology for contribution and distribution of TV signals in Vietnam, Peter Siebert, DVB's Executive Director was invited to the annual VTV TV Festival. This year the festival took place in the city of Vinh, which is located about 200 km south of Hanoi on the coast. All of Vietnam's 63 regional broadcasters participate in this annual event. In addition, official delegations from Laos, Cambodia and China were invited. The event was a good opportunity to inform managers and technical experts about the current activities in DVB, such as the updates and the new form factor for the Common Interface (CI Plus), new satellite specifications, ongoing activity in 3D as well as the integration of HEVC (High Efficient Video Coding) into DVB's broadcasting standards. The audience was pleased to be informed about these latest developments and used the opportunity to discuss actual trends in broadcast technology. There was general agreement that DVB provides the right solution for the region.

DVB's Peter Siebert pictured with conference delegates

Global Ambition

Helmut Stein, Chair DVB-PCM

November 10, 2011 saw the birth of a global initiative around digital terrestrial broadcasting - named FoBTV (Future of Broadcast Television). DVB is an important and active member in this organization, which signed its MOU on April 25, 2012 in Las Vegas.

FoBTV is a voluntary, nonprofit association that is open to any organization that signs the MOU, which underscores the goals of the FoBTV initiative. The goals include coordinating the development of future ecosystem models for terrestrial broadcasting taking into account business, regulatory and technical environments; developing requirements for next-generation terrestrial broadcast systems; fostering collaboration of digital TV development laboratories; recommending major technologies to be used as the basis for new standards; and recommending standardization of selected technologies (layers) by appropriate standards development organizations such as DVB.

Broadcasting is at a crossroads, with internet convergence and new horizons of mobile communications dramatically affecting all sectors of this industry.

Broadcasters have a unique opportunity to position themselves as a key part of the next generation of the converged communications environment embracing IP and LTE.

There are many challenges in front us. To begin with there is the increase of spectrum efficiency and the reduction of power consumption. Another is the introduction of hybrid systems combining internet two-way systems with broadcasting. Also, the multiscreen challenges, as well as, the distortion free coexistence between broadcasting and mobile phone networks, and seamless access to all services available - independent from the networks used. In addition, we still have to overcome the hurdles of CA or DRM barriers plus many more.

In all these fields of research and standards development, DVB has already achieved tremendous success. In over 100 specifications and implementation guidelines, almost all of the challenges mentioned above have been addressed. Certainly, a lot is still needed and that will be important for designing a complete and global solution.

Helmut Stein, ISDM

The success of the internet and the mobile world is for sure based on the fact that these markets enjoy global standards. Even in modern digital broadcasting however, a variety of four different standards around the world is splitting these markets. FoBTV is an approach to overcome this situation. It will not be easy, but at least it is worth trying.

For DVB and all their member organizations, it is a unique opportunity to contribute to this initiative by using their achievements in a larger scale activity. DVB, with its market driven approach, will continue to develop the best technologies and play a role in its efforts.

Coming Soon to a Screen Near You

Feyo Kolff, DVB Marketing & Communications Manager

This year, DVB will celebrate its 20th Anniversary. Another reason for celebration is the upcoming upgrade of the DVB website, which had its last major update ten years ago. In the digital age, ten years is a very long time and in 2003 nobody had yet heard of YouTube, Facebook, Twitter and many other tools that we take for granted today.

Besides adding modern functionality for users and administrators, the project also aims to improve the usability, flexibility, connectivity and mobility of the website. After all, many DVB Members and users of the website will expect a fast and optimized user experience on their desktop and mobile devices, and perhaps someday even on their connected TV.

The second area of improvement is the presentation of news articles and country information. Next to the addition of RSS, rich media and social media tools, the new database will make it much easier for users to search and filter news articles on the basis of country, region, deployed DVB standards or key words. With an ever increasing number of active DVB countries, this will be a very useful deployment research tool.

Last, but definitely not least, the website will improve the visibility of the DVB Members. The homepage will show random DVB Member logos and the DVB Member section will include features to help promote our members. The DVB Member user tools for sharing documents and registering for meetings will have an improved usability, but the functionality will essentially remain the same. In a second phase of the project, we will also include the possibility to share personal profiles and areas of expertise between individual member users.

With a completely new website by Summer 2013, we will create a strong basis that can be continually updated and be ready for the next decade of DVB activity.

Next Generation of MPEG: Not just about broadcast anymore

Myra Moore is the chief analyst of DTC, a boutique market research firm that analyzes the worldwide consumer digital TV market and aids countries in transitions to DTT.

For more information, please see: **http://dtcreports.com/dtv.aspx**

MPEG-4 AVC Encoded VOD: The Internet Takes Over

Source: DTC

Broadcast video was the platform that powered the invention of digital video compression. Broadcasters got greater efficiency on their OTA, cable and satellite networks and they also gained very high-resolution pictures that are now the hallmark of big-screen in-home viewing.

Now that small-screen viewing delivered over IP and mobile networks is as critical a part of the video ecosystem as big-screen in-home viewing, how will its importance impact video-compression innovation? For starters, the greatest demand for the next generation of MPEG video compression, High Efficiency Video Coding (HEVC), will likely come from the internet and wireless parts of the video world – not the broadcast world.

Although HEVC is billed as the compression technology that will herald in the 4k and 8k (Ultra HDTV) era, its first big role will be to deliver a sizeable increase in compression efficiency for wireless carriers and internet video service providers. It has

been reported that the testing of a pre-finalized version of HEVC has resulted in 35%-49% bit rate reduction for HEVC Main Profile-encoded video compared to the bit rates for moving AVC/H.264 High Profile-encoded video. Any credible efficiency improvement in the capacity-challenged wireless and broadband networks is highly coveted by those managing them.

The first large order of silicon for decoding the HEVC standard, will likely be for smartphones and tablets and not for 4k or 8k televisions. This could result in, for the first time, ongoing improvements coming primarily from the mobile services and internet industries – not the broadcast industry.

The pivot toward IP has already begun as MPEG-4 AVC is now the ubiquitous IP video codec. MPEG's dominance online bodes well for the broadcast industry as new infrastructure and knowledge don't have to be acquired for broadcasters to have
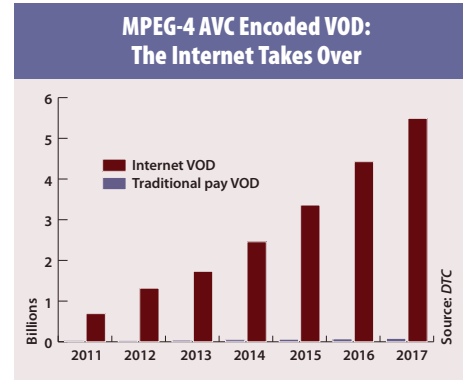
a significant internet presence. Even for pay internet-delivered video, the estimated number of VOD buys for content encoded in MPEG-4 AVC is far greater than that of VOD buys for traditional pay TV (DTH satellite, cable, IPTV), according to DTC's latest forecasts. (Note: Subscription VOD is not included in traditional pay TV data).

MPEG video standards have typically had a life of at least 10-15 years with standards-amending and improving process continuing throughout the standard's lifetime. If a greater number of MPEG implementers are more interested in bandwidth savings than with Ultra HD pictures, this generation of MPEG video may be the last one optimized for the traditional broadcast world.

MARKET WATCH

TechniSat's TechniStar K2 ISIO is a HD DVB-C STB upgrading any TV to a Smart-TV. With a variety of added values and the DVR ready function to record to an USB storage device. It also offers timeshift television. The ISIO functionality enables free browsing, VOD, media library and HbbTV. The STB is ready to be connected into any home network. Beside the CI Plus slot, it is equipped with embedded CONAX CAS additionally secured with chipset pairing.

HD COMPACT is ROVER-INSTRUMENT'S new advanced installation analyzer. It measures digital DVB-S&S2, DVB-T/H (T2 M-PLP opt.), DVB-C (C2 opt.) and analog signals and has an MPEG-2 and MPEG-4/H.264 decoder and a high resolution 4.3" TFT 16:10 display for SD/HD pictures. It can accurately measure MER, PER, LDPC, quality margins, constellation, echoes, MER versus carriers and many more. It also has bars-scan and real-time spectrum with max hold. Weighing only 1.6 Kg and including 6-hour Li-ion-polymer batteries, together with its memory and PC interfacing capabilities, make this device provides a solution for fast, efficient installations (versions available for other standards).

ENENSYS has unveiled EdgeProbe DTTV, a DVB-T2/T standalone monitoring probe. It provides monitoring of broadcasted RF signal and distribution streams over ASI or IP. The probe monitors in real-time key RF parameters (signal level, MER, Channel Impulse Response …), modulation parameters, ETR290, T2-MI and SFN synchronization. Features include SNMP interface for an easy integration in a network monitoring system, web based GUI for troubleshooting, statistical files management for SLA reporting, alarm templates and advanced scheduling of channel monitoring. This probe can monitor the quality of a DVB-T/T2 network at every point of the network: transmitter sites, off-air sites and distribution network.

StormTest from the S3 Group is used worldwide to automate the testing of a wide range of functional and non-functional requirements for service delivery to digital TV receiver devices such as STBs and tablets. S3 Group has just launched the HS64 StormTest hardware configuration, which has been developed to address the needs of customers that have a requirement to cost-effectively execute larger stress test use cases, and provides higher statistical confidence in the performance and reliability of the units under test. It enables the detection of stress test issues through the higher repetition of tests, while uncovering any issues related to long-term soak testing.
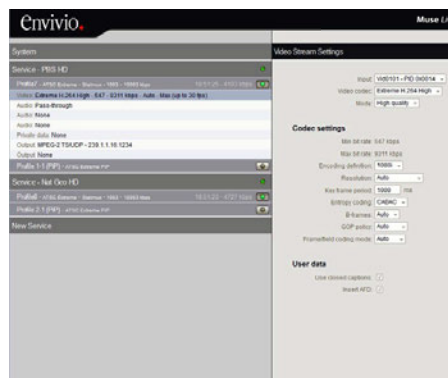
Envivio Muse software-based encoders are designed for live and on-demand encoding/transcoding and distribution to any device. The encoders offer an IP-centric and IT-oriented approach to video transcoding and support Apple iOS, Android and 3GPP smartphones, tablets, PCs with Flash or Silverlight, traditional MPEG-2/AVC set-top boxes, gaming systems and connected TVs. These encoders enable rich end-user experiences and provide the highest quality video, with support for picture-in-picture, alternative audio languages, closed captions, DVB Subtitles and DVB Teletext. These functionalities are available for not only broadcast TV services, but for any device (PC, tablet, smartphone) service supporting the related metadata.
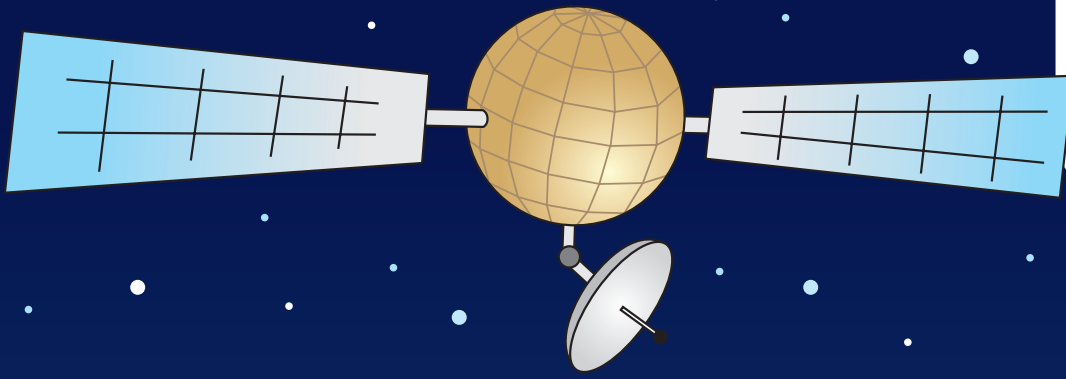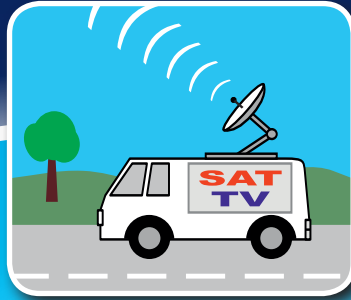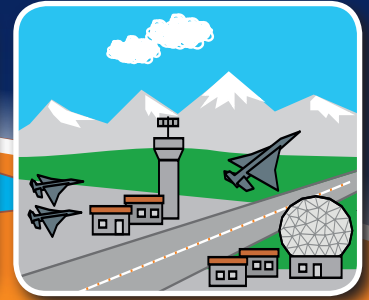
Sony has introduced to its Bravia range of television the X9000A series available in 65" and 55" screens featuring its best-ever picture quality and sound. The TV's boast 4K resolution (3840x2160), a backlight filter that increases the color gamut to enable faithfull reproductions of reds and greens, 800Hz refresh rate, built-in NFC (near-field communications), Passive 3D, Clear Phase processing and Magnetic Fluid Speakers provide S-FORCE Front Surround 3D, and SideView the intuitive new app for Android or iOS devices. It offers an integrated entertainment experience through its electronics, mobile, music, pictures, game and the Sony Entertainment Network.

The new Verimatrix ViewRight ONE set-top box client subsystem extends the multi-network Video Content Authority System (VCAS) platform to individual STBs. A single operational client subsystem provides benefits for both STB manufacturers and DVB operators by providing a unified STB security management framework for DVB Hybrid, IPTV, and DVB+OTT configurations. It offers multi-network embedded client device security via a single technical and commercial interface, including integration and certification. It also supports both cardless DVB client security as well as smart cards.