DVBSCENE

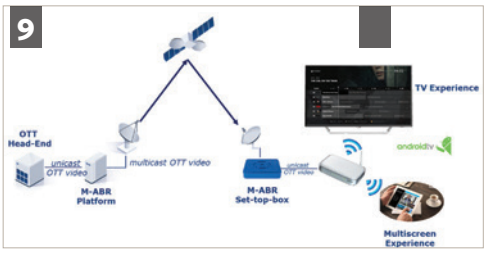
DVB

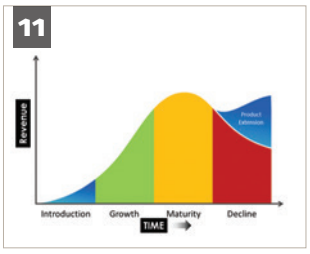
MARCH 2020

ISSUE 55

BRINGING THE FUTURE INTO FOCUS

What do our Members see on the horizon?





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The right place at the right time

It is with great joy and pride that I start this new decade by joining the DVB family and the great team in the Project Office. While I've been on the fringes of DVB throughout my career, having an opportunity to be at the heart of such a renowned and significant organization makes me feel very fortunate.

I have been involved in this industry for more than 20 years, taking in a broad range of topics and technologies through various stories. For instance, in my "young" years at Thomson, I saw the advent of HEVC encoders as well as taking part in the DVB-H adventure. Then, this time on the transmission side with my colleagues at TeamCast, I was engaged in the hugely successful roll-out of DVB-T2 (and the less successful T2-Lite add-on, another effort to reach mobile devices). At that time, I also witnessed the infancy of ATSC 3.0.

More recently, I actively contributed to the promising area of OTT delivery over broadcast, which is, again, somehow addressing the ever-increasing appetite for television on mobiles devices and, this time, bridging two worlds. Some would say they are two conflicting worlds, but their convergence is now unavoidable and promises so much, as you can read elsewhere in these pages.

Having lived through these varied stories, I feel like I'm in exactly the right place to bring all of these experiences together to really make a difference. Having previously worked with products and services *based on DVB standards*, my role now is to help guide the *creation of the standards themselves*.

Just as in my past customer-focused roles, the goal for DVB must be to answer the real needs of the industry as a whole. The convergence of the broadband and broadcast worlds is opening new opportunities. Now is the right time for DVB's Members, working together, to deliver the much-needed open specifications that will enable a new wave of innovation and growth.

Emily Dubs
Head of Technology, DVB Project

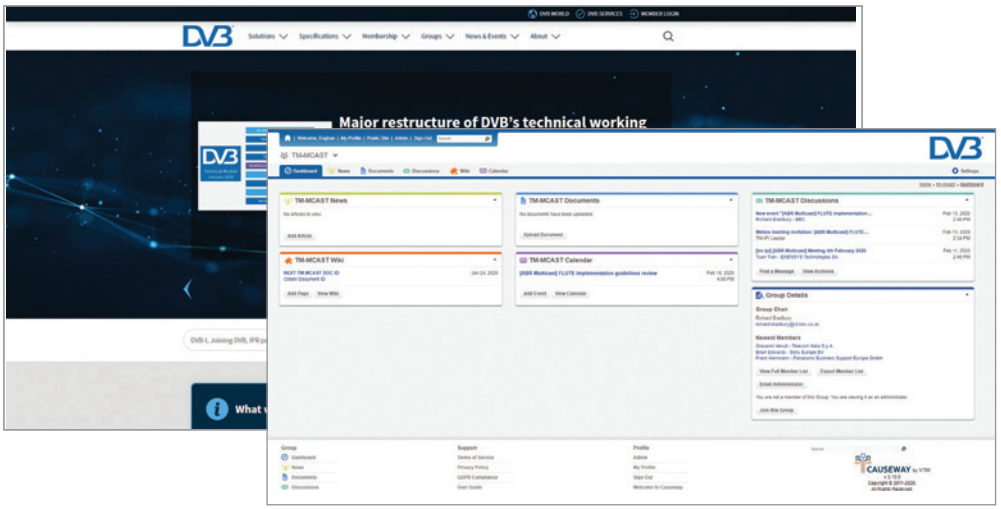
HAVING LIVED THROUGH THESE VARIED STORIES, I FEEL LIKE I'M IN EXACTLY THE RIGHT PLACE TO BRING ALL OF THESE EXPERIENCES TOGETHER TO REALLY MAKE A DIFFERENCE.

NEW DVB WEBSITE AND MEMBERS' PORTAL

dvb.org
Information about DVB solutions, a comprehensive specification library, news, events, webinars and more.

member.dvb.org
Workspaces for our groups including document repositories, email lists and meeting calendars. Any employee of a DVB Member organization can create a user account and follow our work.

bugzilla.dvb.org
Now integrated with the single sign-on for member.dvb.org.



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DVB News

MAJOR RESTRUCTURE FOR DVB'S TECHNICAL GROUPS

January's meeting of the DVB Technical Module approved a significant reorganization of its sub-groups, responsible for the development and maintenance of DVB's specifications. Five new groups were created and another was renamed to reflect a change of scope.

While the TM-IPI group had originally been created to develop DVB's IPTV specifications, in recent years it took on most of the work items related to the use of IP in DVB specifications. The result was a proliferation of task forces, which have now been elevated to be working groups in their own right. The TM-IPI group is now in sleep mode – it will be reactivated if any maintenance of the DVB-IPTV specifications is needed.

The new Technical Module sub-groups are as follows:

- **TM-HB (Home Broadcast)** – developing a specification to enable consumption of broadcast content that has been retransmitted, through IP means, by a server located in the same home network as client devices.
- **TM-I (Internet)** – maintenance of the DVB-I service discovery and programme metadata specification, along with any other technical work related to this and future DVB-I specifications, including provision of technical oversight for the DVB-I reference application activity. The group is also responsible for maintenance of the TV Anytime specifications.
- **TM-MCAST (Multicast)** – developing and maintaining DVB's multicast ABR specification.
- **TM-STREAM** – technical activities related to DVB-DASH, including collaboration on Verification & Validation activities with the DASH Industry Forum and the HbbTV Association.
- **TM-TA (Targeted Advertising)** – completion and maintenance of DVB's Targeted Advertising specifications, including verification and validation of the two recently completed specifications.

In addition to the creation of the new groups, the long-standing TM-GBS (Generic Broadcast Services) group has been renamed as TM-MPEG2TS (MPEG-2 Transport Stream). It will focus on maintenance of the DVB-SI specification and other DVB system specifications relating to MPEG-2 transport streams.

NEW & UPDATED SPECIFICATIONS

ETSI TS 101 154 V2.6.1: Specification for the use of video and audio coding in broadcast and broadband applications (September 2019)

ETSI TS 103 285 V1.3.1: DVB MPEG-DASH profile for transport of ISO BMFF based DVB services over IP based networks (February 2020)

DVB BlueBook A083-2 (Draft EN 302 307-2 V1.2.1): Second generation framing structure, channel coding and modulation systems for broadcasting, interactive services, news gathering and other broadband satellite applications; Part 2: S2-Extensions (DVB-S2X) (October 2019)

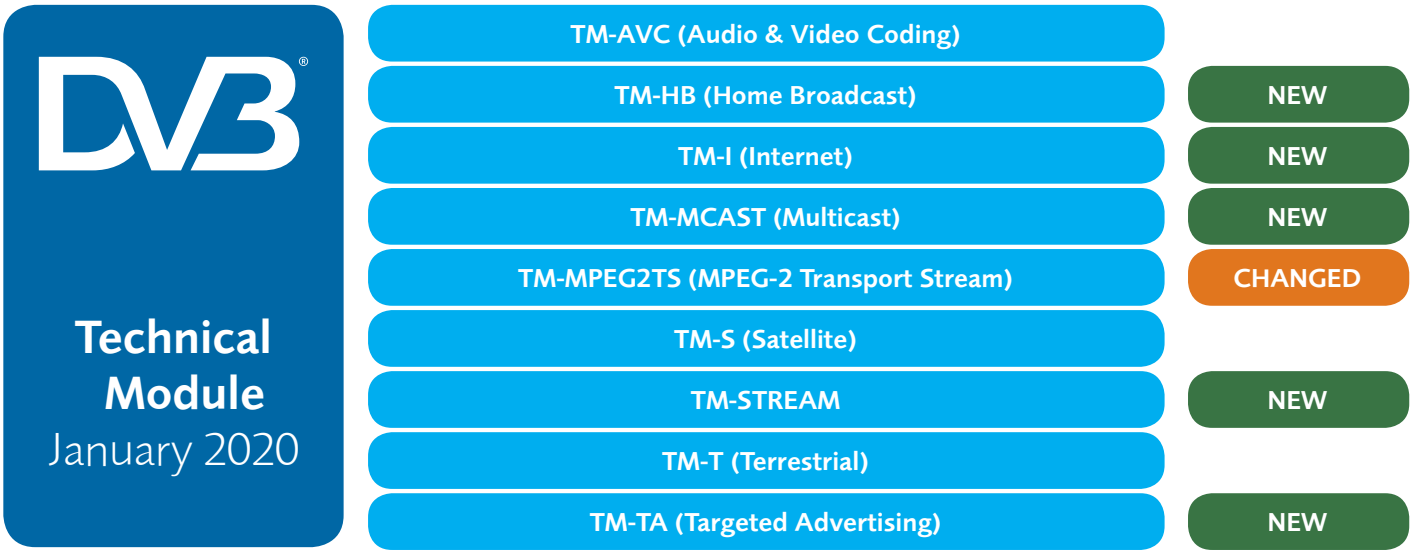
DVB BlueBook A177: Service discovery and programme metadata for DVB-I services (November 2019)

DVB BlueBook A178-1: Dynamic substitution of content in linear broadcast: interfacing an advert decisioning service and optimal preparation (November 2019)

DVB BlueBook A178-2 : Dynamic substitution of content in linear broadcast: carriage and signalling of placement opportunity information in DVB Transport Streams (February 2020)

DVB BlueBook A176: Adaptive Media Streaming over IP Multicast (February 2020)

DVB BlueBook A171-2 (Draft TS 102 376-2 V1.2.1) Implementation guidelines for the second generation system for Broadcasting, Interactive Services, News Gathering and other broadband satellite applications; Part 2: S2 Extensions (DVB-S2X) (February 2020)



DVB News

HELLO GOODBYE

DVB welcomed its new Head of Technology in January 2020. Emily Dubs, a native of France, comes to the role with 20 years' experience in the digital television industry. She has worked with several DVB Members, including Thomson Video Networks (now Harmonic), TeamCast (now ENENSYS Technologies) and SmarDTV/Neotion. Her career to date has taken her from end to end in distribution technologies, covering headend equipment, modulators and set-top boxes. She has strong expertise in the traditional broadcast world along with a solid grounding in emerging technologies from the broadband world.

Emily's predecessor as Head of Technology, Peter Siebert, retired from DVB in November 2019. He had joined the Project Office in 2009 and spent ten happy years overseeing the development and roll-out of several key specifications. He remains active in the industry, including as an Adcom member of the IEEE Broadcast Technology Society.

The DVB community also bade a fond farewell to another notable contributor at the end of 2019. Alberto Morello, as chair of the TM-S working group, led the development of DVB-S2 (and later DVB-S2X). He was also a valuable contributor to the work on DVB-T2. Having retired from leading Rai's research centre in Turin, his time as an active member of the DVB community also comes to an end.

We wish both Peter and Alberto all the best for the future.


Emily Dubs


Peter Siebert


Alberto Morello

NEW MEMBERS

Hisense, founded in China in 1969, is a manufacturer of flat panel TVs, household appliances and mobile communications devices. The company has a global R&D network of over 3,000 engineers and a state-of-the-art multimedia technology laboratory. Website: hisense.com

Vecima Networks Inc. is a global leader focused on developing integrated hardware and scalable software solutions for broadband access, content delivery and telematics. Based in Victoria, Canada, the company builds technologies to transform content delivery and storage, enable high-capacity broadband network access and streamline data analytics. Website: vecima.com

Zhuhai DingZhi Electronic Technology Co., Ltd was established in Zhuhai, China in 2019 and specializes in the design, development and sale of Wi-Fi modules and set-top box products. With strong design, R&D and production capacity, the company offers professional set-top box product design, development and delivery for pay-TV customers worldwide.

MEET US AT NAB SHOW

We will once again be present at the NAB Show in Las Vegas, with a booth in the Connected Media IP zone (SU11224). Please drop by the booth to say hello or contact us in advance (dvb@dvb.org) to set up a meeting with Emily Dubs (DVB Head of Technology) or Peter MacAvock (Chair of DVB).

NABSHOW Where Content Comes to Life

Profiling the future

PETER MACAVOCK

When it comes to media delivery, the broadband world is a hard nut to crack. A modern content provider must support a myriad of streaming technologies, formats, digital rights management systems and access control systems to reach an audience constantly on the move and using many different devices. How do you approach this problem? And what should we, as DVB, be doing?

DVB's reputation is built on state-of-the-art systems and standardized interfacing. One could argue that streaming technologies abound, but the interfaces are all proprietary. So perhaps DVB should focus on appropriate interfacing and architectures and profile the core building blocks?

DVB-I AND BEYOND

Enter DVB-I, a suite of technologies designed initially to replicate the user experience of broadcast on a broadband-connected device. First targeting TV sets and live, linear streaming, DVB-I will help a consumer to seamlessly build an EPG filled with broadcast and broadband content, discovered easily. But this is only a start: DVB-I must now deliver user authentication, to facilitate experiences across devices and networks, standardize the concepts of quality of service, and potentially engage in on-demand profiling too.

With these open interfaces and appropriately profiled delivery technologies, DVB has a valuable proposition for the media industry grappling with economically viable delivery via streaming.

But developing the proposition is one thing; making sure it's adopted by the market is far from obvious. DVB has changed the way it works to focus more on what it calls V&V – verification and validation – aids to interoperability, if you will. For DVB-I, this is initially taking the form of an open source stack for Android and HbbTV Operator Applications. This adds to the validation already available for DVB's profile of MPEG-DASH.

WHAT ABOUT BROADCAST?

With DVB-I, DVB-DASH and – read about it elsewhere in this issue of DVB Scene – DVB-mABR providing ample evidence that we're facing up to the *broadband* challenge, how do we, in parallel, make sure that DVB's *broadcast* technologies keep pace?

As THE innovator in broadcast distribution, DVB's S2 and its sister S2X remain the state-of-the-art satellite broadcast technologies. DVB-T2 has been around a while now, but never bettered. ATSC 3.0 and new systems doubtless to emerge in China and Japan will claim better performance, but they build on DVB-T2. The decisions taken in its design hold true today: there are options that have been specified, but their implementation depends on tangible performance uplift at reasonable cost.

DVB must continue to constructively evaluate any new technology that comes along, even if it is one that may disrupt the current markets. The 2018 study of WiB (Wideband Re-use 1) as a potential radical upgrade to DVB-T2 was a case in point. The conclusion of the work was that the technology was powerful and potentially relevant to green-field terrestrial sites, but the potential advantages weren't significant enough to warrant a complete revamp of the DVB-T2 networks already deployed.

Peter MacAvock
Chair, DVB Project

DVB commissioned long-term vision papers from its terrestrial and satellite communities, with a view to sparking new work. Contributions to this magazine provide insights into where some see the technology – and the business – heading.

For 2020, there will be further changes to DVB's processes to adapt them to the challenges of developing and validating technology higher in the stack. There will be further emphasis on timely and parallel working to deliver solutions and also trials with new XML-based deliverables, moving away from traditional paper-based specification work.

As the new decade begins, and with its new website and Member portal in place, DVB continues to be at the forefront of technology development in its effort to provide market-led solutions for the content provider value chain.

WITH THESE OPEN INTERFACES AND APPROPRIATELY PROFILED DELIVERY TECHNOLOGIES, DVB HAS A VALUABLE PROPOSITION FOR THE MEDIA INDUSTRY GRAPPLING WITH ECONOMICALLY VIABLE DELIVERY VIA STREAMING.

Peter MacAvock is the Chair of the DVB Project. He has been Head of Delivery Platforms and Services in the EBU Technology & Innovation Department since 2008. He was Executive Director of DVB from 1994 to 2008.

Figure 1. Connected TVs in Europe

A broadcast approach to targeted advertising

YVAN BARBOTIN (ENENSYS TECHNOLOGIES) & FAYSSAL KARTOBI (TDF)

Investment in internet advertising has grown steadily, overtaking television advertising in 2017. How can this be explained?

Some argue that people, especially younger generations, are deserting the main TV set. This is true, however television consumption remains strong and stable in general. The explanation cannot, therefore, be limited to the phenomenon of millennial viewing habits and the impressive growth of non-linear distribution.

Another analysis highlights the "static" and "complex" aspects of television in comparison with the "dynamic" and "easy" nature of digital environments. These two qualities, dynamic and easy, have been fully explored through programmatic growth and with them the emergence of an ecosystem beneficial to advertising markets, as well as the creation of the adtech field.

CONNECTIVITY

Digital and programmatic, this new way of buying advertising space is made possible thanks to the connectivity (even ultra-connectivity!) of devices. Indeed, an advertising space is no longer an isolated, fleeting, inert object, but is something that creates an interaction between the publisher, the media agency who sold it, the agency who bought it and the advertiser. This interactivity has now become the norm, and static advertising space is considered, often in error, as obsolete or even ineffective. Multiple studies show that this is wrong, and that television advertising remains the most effective. Nevertheless, television advertising is losing ground.

So how can television counterattack and regain lost ground? Well, thanks to connectivity and technological innovation.

TV sets today are massively connected (Fig.1), and this connectivity opens up a wide range of possibilities to replicate the success of digital advertising. TV sets have the advantage of offering a large screen with sound (usually on by default), making it the best device for high-quality content and therefore the most engaging.

The question is: how can one combine the best of linear television with the best of digital? In the DVB universe, the HbbTV standard provides a working foundation, bringing the broadcast and adtech ecosystems together to enable innovative advertising services. The DVB-TA and HbbTV-TA working groups are concentrating on defining and standardizing the best way to manage targeted advertising.

NEW WAYS OF SELLING

This new playing field allows broadcasters to regain lost ground – and their advertising agencies must adapt in how they sell their inventory. Until now television was in a world of abundance, where the massive inventory was sold massively, with little regard or concern for "waste". Thanks to these new capabilities, control rooms can now create new inventory without lengthening advertising breaks; attract new advertisers for whom television was previously inaccessible; build a massive regional and local approach for better engagement; and improve knowledge of the audience.

The key factors for success are:

1. Efficient broadcast/broadband synchronization for frame-accurate ad insertion, requiring integration with the playout to define the right frame, using SCTE and Stream Event;
2. Data collected, in compliance with GDPR, then structured and segmented in order to offer targeting capabilities;
3. Adech connectivity with partnerships between broadcast and digital experts.

These collaborative partnerships take advantage of expertise in both fields. On one side, the masters of broadcast streams, signalling and TV sets, and on the other experts in ad-decisioning and inventory management, together optimizing the unification of television and digital.

Only a "broadcast" approach and a solid alliance between broadcast and digital experts will bring out the best of both worlds: maintaining the quality of television with the addition of digital capabilities.

Yvan Barbotin who specializes in managing and developing targeted content solutions at ENENSYS Technologies, has over 10 years' experience in the broadcast industry. .**Fayssal Kartobi**, an engineer by training, worked in digital marketing and business development with SFR Régie, before joining TDF to take charge of DTT platform modernization topics related to connected TV and advanced advertising.

DVB signalling for Targeted Advertising

MARTIN GOLD (YOUVIEW TV LTD)

DVB's ecosystem for Targeted Advertising (TA) is taking shape. The specification for interfacing and preparation of media, published as a DVB BlueBook in November 2019, has been complemented by a signalling specification, scheduled for Steering Board approval at the time of writing.

Broadcast signalling is needed for TA to indicate precisely the start and end boundaries of the broadcast service segment that can be replaced. This replaceable segment is referred to as a placement opportunity (PO). The content broadcast during a PO is typically one or more adverts that can be replaced by alternative adverts that are targeted to the end user, and are typically delivered by unicast broadband. The signalling is not specific to advertising, as the PO could be carrying any kind of programme or interstitial content, and the substituted content is similarly not restricted to being advertisements.

BASED ON SCTE 35

The DVB specification for TA signalling is based on the SCTE 35 standard, which has been widely adopted in cable systems for signalling the insertion of regional or local advertising by network equipment downstream of the original broadcast signal. Encoding and network equipment supporting SCTE 35 is readily available, with the generation and associated stream conditioning controlled by messages using the companion standard, SCTE 104.

The DVB-TA signalling specification profiles and extends SCTE 35 for the DVB ecosystem. Figure 1 provides a simplified view of the TA signalling as it passes through a broadcast network. SCTE 35 messages are usually generated from SCTE 104 control messages, which specify the timing and data content of the SCTE 35 message. The SCTE 35 messages in the contribution feed may have multiple purposes, not just PO signalling. The DVB specification makes recommendations on filtering methods to select messages required for particular downstream usage.

The figure illustrates that the signalling used in the contribution feed can go directly to some receiver devices. However, the horizontal market is a major application for DVB-TA, for which HbbTV is particularly relevant. HbbTV apps do not have access to SCTE 35 signalling, but DSM-CC stream events are supported. DVB has developed a solution for making the SCTE 35 data available via DSM-CC stream events. The DVB-TA specification defines a "do-it-now" DSM-CC stream event structure which encapsulates SCTE 35 data. The specification also describes the operation of a signalling converter function to generate these events from SCTE 35 messages. The positioning of a converter is shown in Figure 1. There could be additional re-multiplexing stages in the network before or after the converter.

TIMING INFORMATION

The DVB-TA signalling specification enables the PO data in DSM-CC stream events to reference two alternative timelines. The first is the MPEG System Time Clock (STC), which is referenced by presentation time stamps (PTS) in an MPEG-2 transport stream. SCTE 35 messages indicate the first video frame of a PO by its PTS value. The second type of timeline is known as TEMI (Timed External Media Information), as used in the DVB-CSS (Companion Screens and Streams) specification. Both types of timeline can be referenced by HbbTV applications. The preference for one or other timeline will depend on the capability of the distribution network to handle SCTE 35 messages and TEMI data as well as the support in the target receiver population.

Future DVB work on Targeted Advertising includes specification of signalling embedded in video and/or audio.

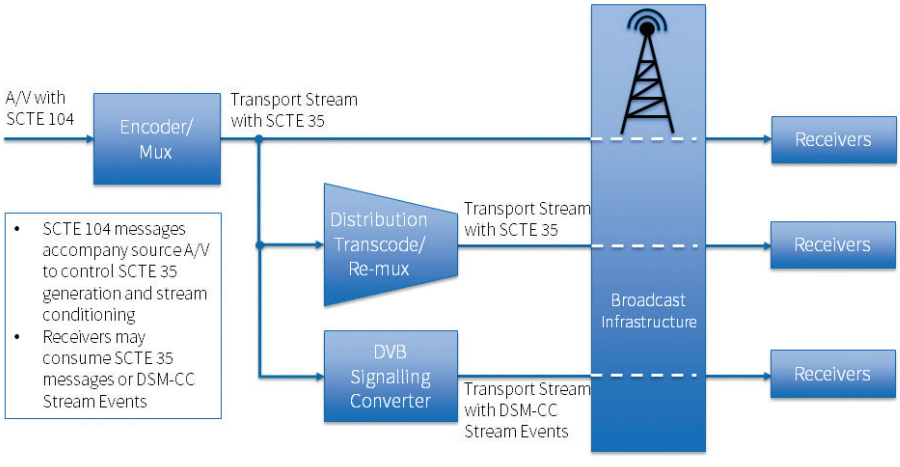


Figure 1. Simplified view of DVB-TA signalling

Martin Gold is a Consultant Architect at YouView TV Ltd. He has been an active contributor to DVB for more than 25 years. He was editor of the DVB-TA signalling specification and led the drafting group for its creation. He is also chair of the CM working group on CI Plus.

A vision for next generation versatile satellite delivery

JAN OUTTERS (SES VIDEO)

DTH (direct-to-home satellite broadcasting) is today in a strong position with a global population reach of 99%, several hundred million homes served, and 142 million free-to-air DTH households worldwide. For many viewers, it represents very simple access to a very rich offer of linear services in reliable quality. DTH has been the pioneer of digital television, HD and UHD. The DTH success story is also a DVB success story, as only a widely adopted standard could lead to cost-efficient equipment.

BROADBAND CHALLENGE

As is the case throughout the broadcast industry, the fast development of broadband may challenge DTH. The evolution of broadband promises ever increasing up- and download speeds in urban areas. Together with the evolution of mobile devices, it generates new consumer expectations: on one hand, the devices used for media consumption diversify beyond exclusively TV sets to include also tablets and smartphones. For the younger generation, these latter have already overtaken the TV set. On the other hand, nonlinear video is rapidly increasing its share of the viewing time. The challenge is avoiding disruption of the installed base while striving to complement DTH with a new system, facilitating new ways of delivery and "conventional" linear television at the same time.

DTH must continue to serve households reliably in high quality. Despite the rapid development of broadband, large parts of Europe remain underserved with high speed broadband. DTH arguably remains the only unconditional means for a premium media experience. It is hence necessary that the newly emerging codecs get profiled to support DTH.

When the DVB Project was launched, having common parts between satellite, terrestrial and cable was key to its success. The future of cable will be IP-based (DOCSIS) and terrestrial seems likely to migrate towards IP (with the impact of 5G). DTH should converge back with these other delivery paths by adopting IP mABR (Multicast Adaptive Bitrate). The expectation is that the same signal can be used with minimal adaptation on all end devices, including those for 5G, OTT, IPTV, and on cable networks, as they become increasingly IP-based.

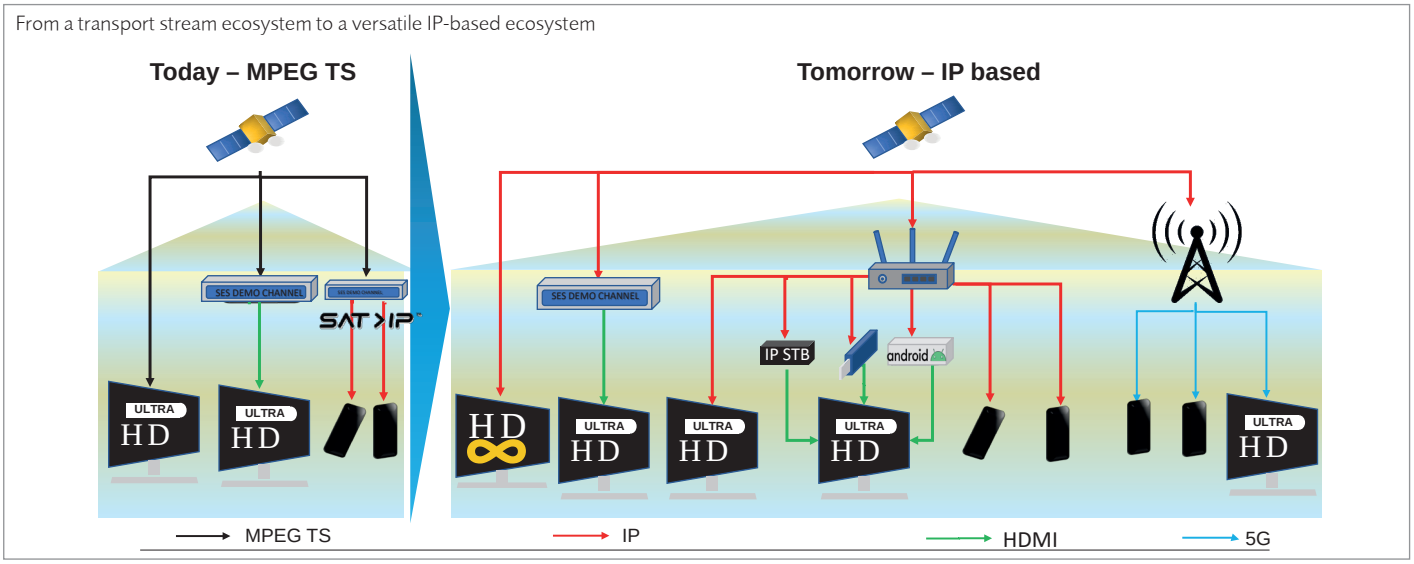
As on OTT, premium audiovisual experiences like UHD and 8K lend themselves to selected events rather than complete services. At the same time, new codec generations allow better adaptation to content and hence a higher variability in data rates. Opportunistic resource usage becomes possible with dynamic allocation. A new versatile delivery system shall support this, also facilitating non-linear delivery and better audience targeting.

WORK FOR DVB

Some work has already been accomplished by DVB. SAT>IP and its future evolution DVB-HB allow coexistence and a smooth transition by adapting existing legacy signals to IP delivery. Those specifications could be partly reused for a gateway device to adapt new satellite signals to legacy IP (DASH) compatible devices. DVB-I allows discovery for both legacy and new IP services and features tools perfectly suited to the DTH landscape. Furthermore, DVB-S2X allows increased efficiency, wideband carriers and transponder bonding.

A new optimized feature set for this new DVB satellite delivery system could facilitate its wide industry adoption. Finally, synchronizing all the above evolutions with the introduction of new codecs in DVB would benefit the consumer and ultimately the entire ecosystem.

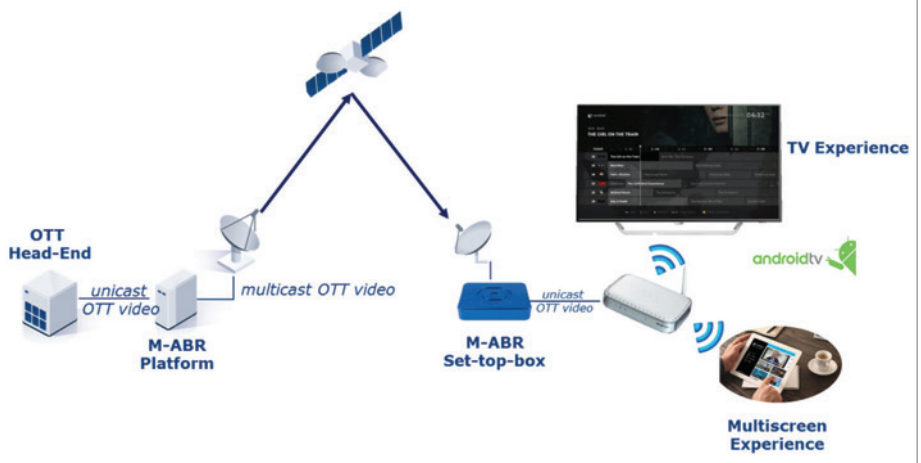
From a transport stream ecosystem to a versatile IP-based ecosystem



Jan Outters is Senior Engineer at SES Video in the New Technology & Standards department, which is enabling future business for satellite. Jan has a 20 years' experience in the television business including defining European Standards for UHD at Samsung Electronics and defining specifications at Philips (TP Vision).

Towards DTH 2.0

BRUNO CATTAN (EUTELSAT)



A simplified view of DTH 2.0

As of today, any DTH operator who goes for complementary OTT multiscreen services faces four major challenges. First, the need to build a second video headend for OTT, without the benefit of technical or cost synergies with the legacy DTH infrastructure. Second, most DTH set-top boxes seem old-fashioned in comparison to smartphones, tablets and other OTT devices. Only Tier 1 operators dare to perform massive and complex software upgrades that make their terminals OTT-ready. Third, broadband access is required to ensure that the end user can access these complementary services at home. And fourth, multiscreen delivery with poor or no internet connection can only become a reality with powerful DTH home gateways with transcoding, CA-to-DRM and streaming capabilities.

DREAM SCENARIO

So, let's dream for a moment. If one had to start a new television platform from scratch based on current technologies, how would one build it? Could the video headend be unified and directly compatible with all networks? Could aging DTH set-top boxes be replaced by future-proof Android TV devices? And could the satellite signal provide a direct-to-home multiscreen experience without the need for an expensive satellite home gateway? Surprise, surprise, the answer to all these questions is yes!

Indeed, technologies already exist that fulfil these requirements. The central one is multicast ABR (mABR). Eutelsat has been working in this direction since 2014 and launched a first solution in 2016. Based on a tailored version of an mABR solution from Broadpeak, it is a broadcasting pipe for linear television OTT streams. It enables television consumption at home and in public places on mobile devices, tablets and Android TV devices.

From a technical architecture standpoint, how does it work? The broadcaster interconnects its OTT headend with the mABR hub located on the satellite operator's premises. The output multicast IP stream is MPE-encapsulated and multiplexed into a standard DVB MPEG-2 Transport Stream, and finally uplinked to the targeted satellite. On the end user side, the signal is received by a dedicated set-top box. This embeds the mABR software agent and plays the role of a local origin server, enabling a multiscreen experience at home directly from the satellite signal.

NATIVE IP?

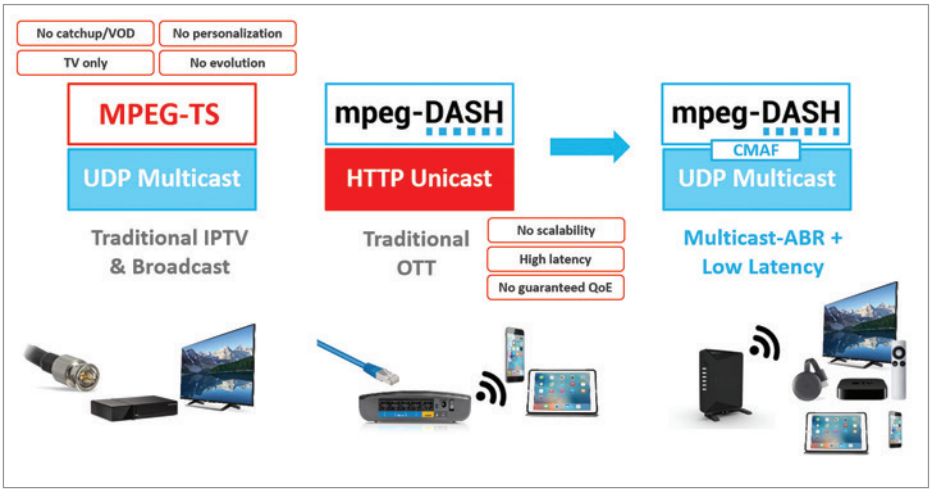
Is the circle complete? Not yet: this remains a proprietary solution. Key functions of satellite broadcasting are not fully specified. How should the channel list, the EPG, be transmitted? How should the signal be protected, beyond DRM?

Eventually, how can it be made a standard, providing a future path for DTH broadcasting? For sure, it reinforces the need to finalize DVB-mABR. Without a doubt, DVB-I will also find its place in this puzzle to carry signalling information. But once we know how to broadcast OTT streams (DVB-mABR) and to signal them (DVB-I), an unexpected additional question arises: should we still keep the legacy DVB MPEG-2 TS layer over the satellite link? Is it still useful or adding useless overhead?

This is where DVB, as an organization, can play a key and ambitious role: by tackling as soon as possible such new use cases; by performing a technical gap analysis against existing standards; by assessing the need for a "Native IP" transport layer for broadcast networks and the probability that it would be implemented by the industry; and eventually by setting up the appropriate promotional framework towards the broadcasters to ensure their awareness of these new capabilities.

Together, we can invent DTH 2.0!

Bruno Cattan is Director of New Applications at Eutelsat, where he has worked since 2016. Prior to that he worked for over a decade with Canal+ Group, in several technology-focused roles. He is a member of the DVB Steering Board.



The benefits of a shift to multicast ABR

Paving the way to adaptive bitrate for all video

DAMIEN STERKERS (BROADPEAK)

This is probably the biggest paradox of video distribution today: there is a general consensus that adaptive bitrate (ABR) is the future of video delivery, and this technology is already getting all the industry interest and investments. So why, then, is linear live television, which is still by far the most popular way of consuming pay-TV and the main revenue generator, mostly relying on the outdated MPEG-2 Transport Stream video format?

The challenge is that live content has its own technical constraints and very high quality standards, set by years of optimization in broadcasting, which cannot easily be matched. This is where DVB, as a player in both the broadcast and streaming worlds, has an important role to play in driving the transition towards an ABR future for live television.

SCALABILITY & LATENCY

The first objective, when migrating live video distribution to ABR, is to make sure that it doesn't introduce any obvious regression in quality of experience compared with broadcast. The two main concerns when distributing live video through ABR streaming are scalability and latency.

Default ABR streaming uses HTTP distribution, a one-to-one protocol, which actually makes it quite unfit to scale big live events, as the same content ends up being needlessly replicated individually for each user on the network. This generates largely unpredictable traffic peaks, which often slow down the network and even possibly saturate it. At the end-user level, this translates into more buffering on players to compensate for network variability, hence more latency, video resolution degradations, and even freezes or denial of service in the worst cases.

DVB is addressing these limitations with a specification that proposes multicast ABR (mABR) as an alternative to HTTP. The advantage of multicast is that it is one-to-many, the content is sent only once for all users, reducing the bandwidth required. It can consequently be prioritized, which guarantees both optimized video resolution and minimal latency. The principle is pretty much the same as traditional IPTV on the transport layer. The difference is that ABR simply replaces the MPEG-2 TS at the video layer.

A second focus for DVB is further reducing latency by adjusting the video format itself. Low latency in DVB-DASH is mainly based on the CMAF chunked format, which divides video segments into smaller entities, making streaming smoother and less dependent on the segments' download times at each stage of the delivery chain. DVB demonstrated the combination of DVB-mABR and DVB-DASH at IBC2019 with strong results, matching broadcast performance and showing virtually no extra latency induced by streaming.

ABR APPLICATIONS

Once all regression against broadcast has been discarded, it is then possible to take advantage of the benefits that ABR technology offers. Some examples of popular applications include:

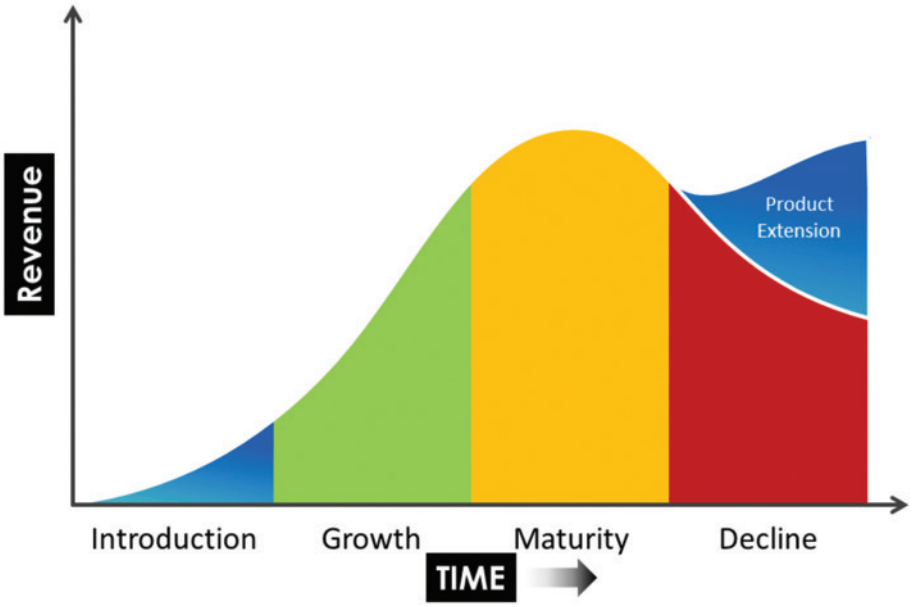
- Standard implementation of targeted ad insertion, on the same model as is currently available on the web;
- Support of standard streaming devices, such as Apple TV, Chromecast or Fire TV, as an alternative to traditional set-top boxes;
- Simple aggregation of other offers already available in ABR, such as SVOD portals.

Reinforcing this last point, as migration to ABR is to some extent an opening to the internet, aggregation and service discovery is becoming strategic. This is the third related topic that DVB is currently developing, via the DVB-I specifications, and it will likely become an important reference in order to maintain the openness of television distribution and to ensure we are not only relying on frameworks defined by dominant players, in particular web giants.

Damien Sterkers is Product Manager at Broadpeak, in charge of the nanoCDN multicast ABR solution. Prior to joining Broadpeak, he worked for Harmonic. He has 20 years of experience in designing, building and enhancing video distribution systems.

What future for broadcast in a broadband world?

PETER SIEBERT



Specifications developed by DVB and other SDOs (standards developing organizations) have enabled broadcast digital television (DTV) to become a great success over the past 25 years. DTV now brings more choice and better quality to billions of homes worldwide. However, with the rise of broadband over-the-top (OTT) content delivery, the dominant role of broadcast DTV is challenged. How will the story end?

The Industry Life Cycle Model (Figure 1) is a tool to analyse the growth, development and maturity of an industry or a technology. It assumes four different phases. When a technology is first introduced there are few market players willing to invest and prepared to accept losses. This phase is followed by the growth phase, with increasing revenues and profits, more market players, and a wide range of technical solutions. When an industry reaches maturity, revenues are at their peak with declining profit margins. Typically, technology is well standardized and only the most efficient market players will survive. Finally, the industry will go into decline, with reduced profits and companies leaving the market.

When analysing the DTV market within the context of the Industry Life Cycle model it is obvious that this technology falls into the maturity phase. The market is saturated and competition is fierce, with only the most efficient organizations surviving, at least for the private sector.

MILKING THE CASH COW

For the established players, broadcast DTV is the cash cow providing income in excess of the amount needed to maintain the business, which needs to be "milked" with as little investment as possible. Nevertheless, DTV operators have an interest in preventing their cash cow from moving into the decline phase. They are therefore willing to invest in new features that will extend the maturity phase. A good example was the introduction of HDTV, which provided the end user with improved resolution and gave the industry new momentum. The UHD features that DVB has specified in recent years – 4k resolution, high dynamic range (HDR), high frame rate (HFR), a wider colour space and next generation audio (NGA) – will give the end user further motivation to remain with broadcast technology.

OTT and video-on-demand are in the growth phase of the Industry Life Cycle Model. There is a wide range of operators in the market, from big players like Netflix to small organizations providing their own streaming services. For the time being only a minority can operate profitably. For many operators, the required subsidization of OTT services and delivery comes from the successful broadcast business.

Operators are willing to invest in this new business because OTT delivery offers high growth rates and is seen as the technology of the future. There is some interest in creating standards-based solutions, for which the DVB-I service discovery and programme information specification is one of the first examples.

COEXISTENCE

Technology standards are an important factor for the Industry Life Cycle Model as they are a necessary precondition for an industry to reach maturity. For OTT this process has begun with DVB-I. For broadcast DTV, SDOs must provide new technology to extend the maturity phase and prevent the slide into decline. In addition to the UHD features mentioned above, DVB and other SDOs provide the industry with specifications for interactivity, hybrid broadcast/broadband content delivery and targeted advertising.

As for the future, I'm convinced that OTT and broadcast DTV will coexist and complement each other. DVB and others must provide the technology to enable both approaches to coexist and to benefit from each other. Only thus will OTT reach maturity while broadcast DTV constantly renews itself with new features and functionalities.

Peter Siebert retired as DVB Head of Technology in November 2019. He remains active in the industry, notably as an Adcom member of the IEEE Broadcast Technology Society. Prior to joining the DVB Project Office in 2009, he worked for Philips, SES-ASTRA and Siemens.

DVB and the need for a security specification for compliant devices

PHILIPPE STRANSKY-HEILKRON (NAGRA)

DVB standards are a worldwide reference for defining and describing the technical characteristics of content transmission. DVB has contributed to the business of pay-TV by defining content scrambling standards and the system elements needed to allow content providers and transmission operators to monetize live and on-demand audiovisual content.

As the pay-TV landscape has evolved, DVB has had to evolve along with it, and within an increasingly connected world, which enables content streaming and new business models.This evolution has also brought on new challenges for service providers now faced with increasing illegal sharing of content and, more recently, new threats from pirates who see value in stealing consumers' personal data or using consumer devices to conduct cyberattacks.

Of course, service providers and consumer device vendors want to maintain the trust of their customers and put a lot of effort into delivering products and services that implement very high security measures for mutual benefit. These security measures are defined from past experience and recommendations from security experts, but there is no security specification that addresses the threats mentioned above and that can be used as a reference for DVB-compliant consumer devices.

Let's look specifically at some of these key challenges:

Content security and personal data

Consumers are overwhelmed with content offers, pay services and different purchasing methods such as subscriptions, on-demand, advertising-based, etc. Depending on the purchasing option, they must sometimes provide payment information, like credit card numbers, to an application running on the device. Their devices also collect data about consumption habits, preferences, location, and other personal information. Consumers usually trust their service provider and are willing to provide confidential and personal information.

Piracy, hackers and personal data

Unfortunately, pirates who profit from illegal redistribution of content are trying to increase their profit by stealing personal data as well, like login credentials, credit card and bank account numbers. For that purpose, they are developing malicious applications that run on consumer devices, allowing them to extract confidential and personal information from the memory of these devices.

Consumer devices and cyberattacks

Many are aware that viruses, worms and other malware can infect IT equipment like servers and personal computers. It is less known that pirates and hackers also try to use devices like set-top boxes and gateways to conduct cyberattacks. They attempt to install and run rogue software on these devices, helping them launch cyberattacks at large scale.

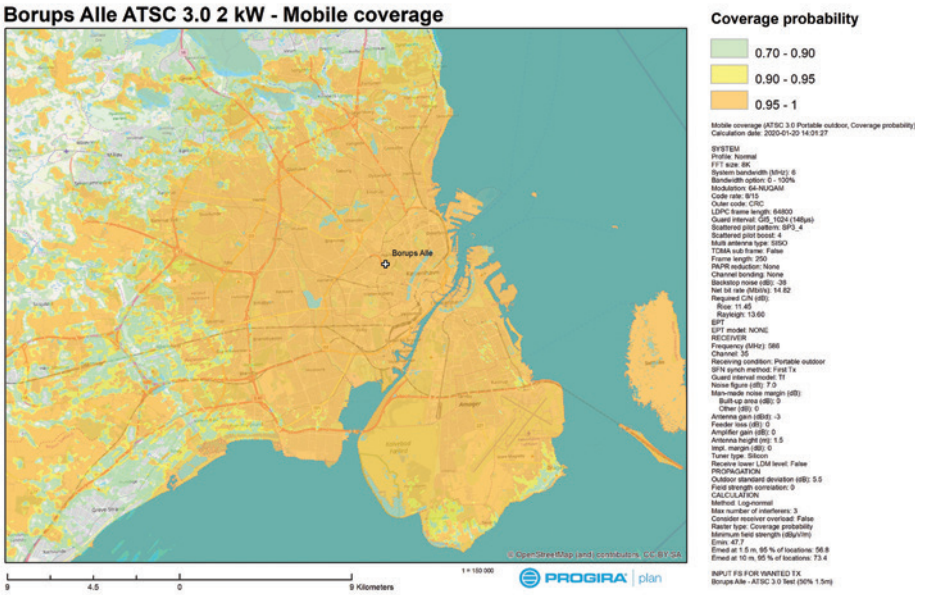
Service providers are fighting against content piracy via both technical and legal means, which are supported by various copyright laws and regulations. Until recently, there was little legal support for preventing the theft of personal data.

The European Union has paved the way for personal data protection, followed by other countries and states that are introducing similar directives and regulations.

DVB leadership is recognized worldwide. It has worked hard on defining the technical standards required to transmit content up to the consumer and on specifying some of the functional elements of the set-top box, for example DVB-MHP. DVB also defined the implementation guidelines of the scrambling and descrambling algorithms DVB CSA1/2 and CSA3.

DVB compliance is a reference for quality and trust. It is not desirable that end-user devices that are DVB compliant can be easily used for stealing personal data or conducting massive cyberattacks. DVB and its Members have an opportunity to use their security skills to define and support security robustness rules for end-user devices. With that, DVB can play in a key role in defining a security specification for DVB-compliant devices and help ensure a secure environment for pay-TV service providers, as well data privacy for the consumer.

Philippe Stransky-Heilkron is Chief Architect with NAGRA, the digital television division of the Kudelski Group. He has worked with the Swiss-based company since 1996.



What can we learn from trialling ATSC 3.0 in Copenhagen?

KENNETH WENZEL (OPEN CHANNEL)

The major advantage of broadcasting compared to OTT has, until recently, been a "managed network" coupled with dedicated spectrum to ensure reliable high quality, low latency reception and a uniform user experience for an evening of television entertainment. But recent developments in wired and wireless IP technologies, e.g. more reliable low latency protocols, have eroded some of these obvious broadcast advantages. Using IP in broadcast has some obvious advantages and it has begun to pick up technical and commercial momentum with ATSC 3.0, DVB-I and the use of various multicast adaptive bitrate (mABR) technologies.

In 2010, Open Channel was among the first movers to launch and operate a DVB-T2 platform. Now, partnering with another Danish company, mediathand, we are the first in Europe to go on air with ATSC 3.0, in a 6 MHz channel at 587 MHz in Copenhagen. Transmissions began in December 2019. ATSC 3.0 is already on air in the USA and South Korea and has joined DVB-T2 as an ITU-recommended international standard.

This trial is designed to explore the opportunities for service operators to define requirements for carrying OTT-type audiovisual services, using IP over broadcast bearer technologies, complementing existing delivery using the internet. Along with our partners, we will demonstrate how players from both the web and broadcast can realize some of the many technical and business opportunities emerging from the convergence happening in the global broadcast industry today.

TIME FOR OTT-B?

In April 2019, Open Channel received a three-year trial license from the Danish Radio and Television Board to do broadcast testing with vertical polarization, 2 kWatt ERP at a height of 100 metres, on top of the TDC radio tower at *Borups Allé* in Copenhagen, reaching more than 700,000 households.

The initial phase of the Copenhagen ATSC 3.0 trial will test the full-stack opportunities with ATSC 3.0 to leverage the new technical opportunities for crafting user-centric personalized and interactive experiences. The subsequent phase will include basic support for DVB-I and mABR delivery with ROUTE-DASH/HLS, using DVB-GSE (Generic Stream Encapsulation) over DVB-T2 at 618 MHz, as well as a 5G delivery platform for fixed wireless access (FWA) and mobile reception. In-home multi-screen reception will be enabled by a new generation gateway device. We propose that the bundling of these well-known technologies with open implementation recommendations and specific profiles should be named with the umbrella term: "OTT Broadcast" or in short OTT-B.

Too many technicians have for too long believed that the convergence of broadcast technologies would happen at the physical layer. However, this is not the case, as the convergence is happening at the IP layer instead. In summary, the idea with our ATSC 3.0 trial in Copenhagen is to create an all-IP broadcast platform based on OTT-B, specifying requirements for carrying OTT-type services over IP-enabled (existing) broadcast and broadband bearers. By doing so we can answer the question of whether IP is ready for broadcast and what it takes for broadcast to be ready for IP!

We are delighted to be supported for this trial with equipment, software and expertise from partners across Europe: ProTelevision Technologies and mediathand (both Denmark); Strategy & Technology (UK); Condition-ALPHA (Germany); BTESA and Gsertel (both Spain); Nevion and Appear (Norway); Progira (Sweden); and DekTec (Netherlands).

Kenneth Wenzel is the Director of the U-Media subsidiary Open Channel ApS, an independent Danish DTT network operator. He also undertakes DTT audit and project management contracts, training operators and regulators around the world in DVB-T2 system and network design, and moderates the DVB-T2 community group on LinkedIn.

Is "clustering" key to the success of Silicon Valley?

Can we define a recipe for success with media technology?

DAVID WOOD (EBU)

The media industry regularly needs new unique selling propositions in its services and products. How far does the environment in which new systems are devised and specified influence their success?

The DVB Project is an example of an alliance of companies coming together to prepare a common specification. This helps market success by ensuring a large market size, lower costs and increased public awareness of the system. But elsewhere we see individual companies competitively developing systems, with other advantages.

What does our experience of these differing approaches tell us about the potential success of future media systems? And to what extent is that due to the "invisible hand" of the environment in which they are created?

SUCCESSFUL COLLABORATION

DVB systems for broadcast delivery have been an astounding success throughout the world. The physical layer specifications (DVB-S2, DVB-T2, etc) are deployed in 1.5 billion user devices around the world. DVB must have been doing things right here. Yet other systems developed by the same kind of collaboration were not a success. What can this tell us?

Let's look elsewhere, to another way of developing technology. A decade ago, the European Union financed a series of collaborative projects to develop web search engines in Europe. The resulting tools did not come close to matching the success of the search engines developed in a different environment in the United States. This pattern has been repeated for other web and media technology systems. Why has the United States succeeded in these cases?

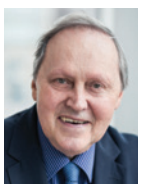
The success factor here is sometimes claimed to be "clustering". This is to say, if many independent companies doing similar things are grouped together in one geographical area, with a common language, the best ideas can emerge. The benefits include the value of informal cross-fertilization of ideas, and that staff can readily move from company to company. Clustering is claimed by some to have made the US West Coast the success it is. Other reasons proposed for US success are the larger home market and having an environment where it is easy for entrepreneurs to set themselves up and fail without stigma.

However valuable these may be, it is not true that whatever is developed in the US always succeeds. Clustering may be a factor in success – but it is not magic. Furthermore, clustering may be difficult outside the US anyway. For example, a European cluster in just one proudly protective country/geographical area, of companies developing media systems, may not be politically possible. After all, who would decide where it should be? Furthermore, clustering also does not account for DVB successes.

END-TO-END VALUE

Is there an overriding condition for market success that applies whatever the content-to-viewer chain, and whatever way the system is devised and developed? A former chair of DVB, Theo Peek, once told me that "new DVB systems will only succeed if all those in the end-to-end chain – from programme-maker to viewer – gain significantly by changing to the new system. If not, it will not succeed."

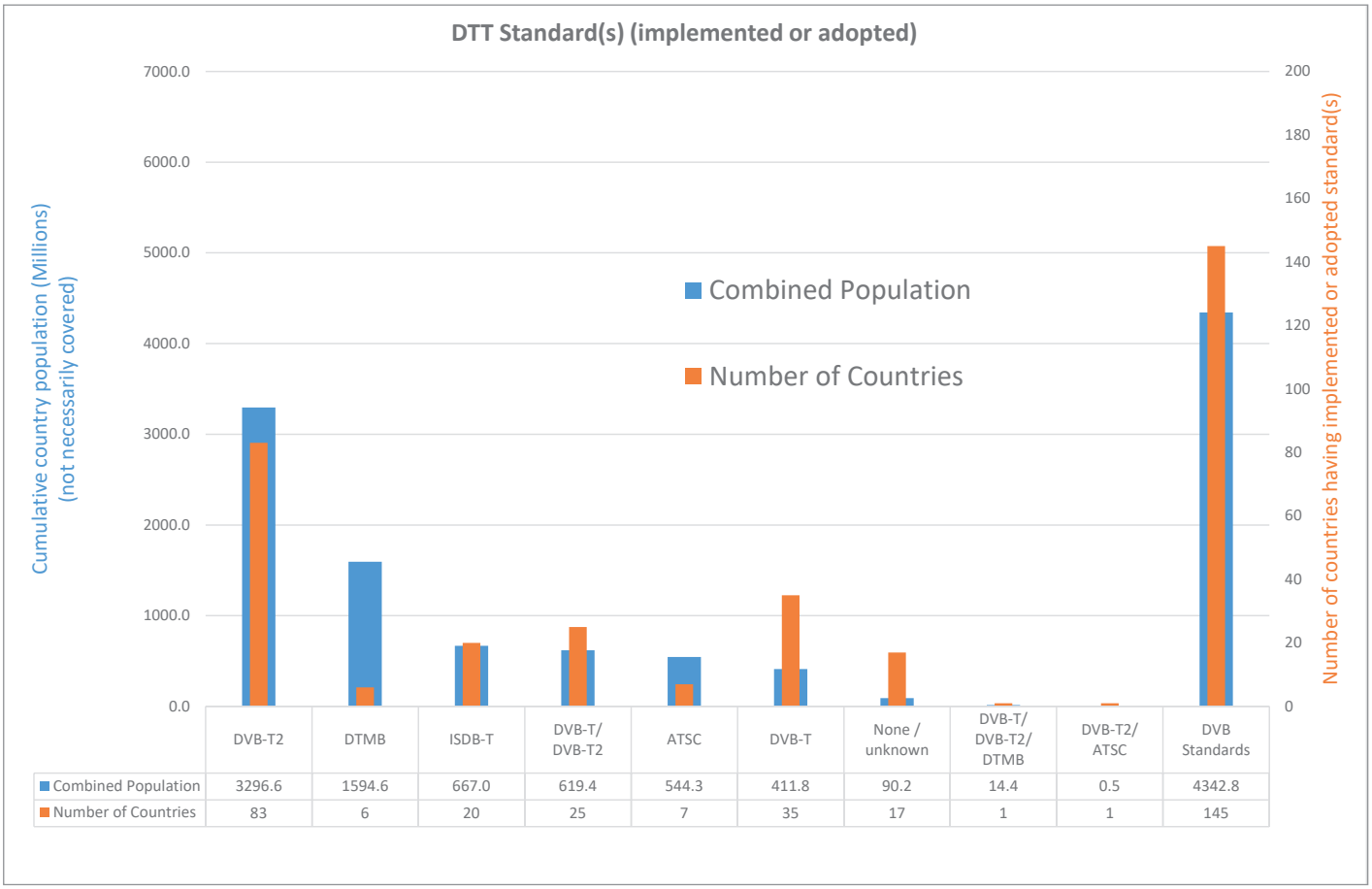
Though media chains from content creator to user can be, and will be, different, and they may be shorter or longer, with hindsight the quotation above may still state the most reliable way to judge potential success. The environment under which the system is developed can influence the creativity of its developers, and hence its success. The element of collaboration can also influence the speed and scale of success. But the most reliable way to predict its future may be whether a system has, end-to-end, significant gains for everyone.



David Wood is a consultant to the EBU Technology & Innovation Department. He has chaired several standardization groups in the ITU and the DVB Project over many years.

Digital Terrestrial Television around the world

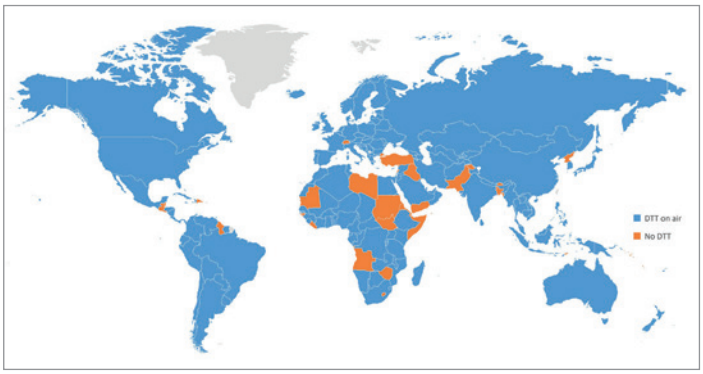
The charts on this page are drawn from a database maintained as part of a joint project involving DVB, the European Broadcasting Union and Broadcast Networks Europe. The aim of the project is to monitor the status of DTT deployment around the world and provide advice and support to those countries that have yet to launch services.
DVB Members can access the complete database by visiting: dvb.org/dtt-database



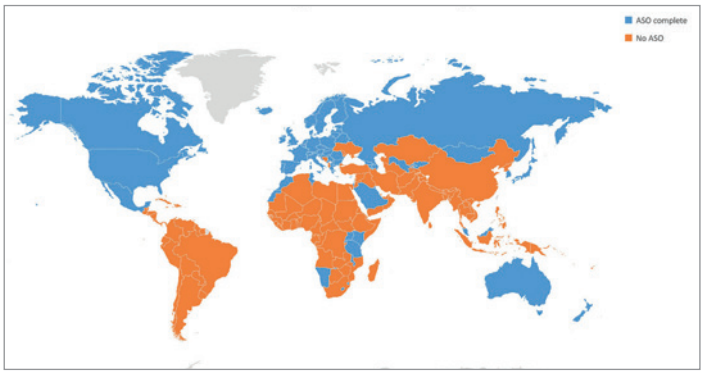
	DVB-T2	DTMB	ISDB-T	DVB-T/ DVB-T2	ATSC	DVB-T	None / unknown	DVB-T/ DVB-T2/ DTMB	DVB-T2/ ATSC	DVB Standards
Combined Population	3296.6	1594.6	667.0	619.4	544.3	411.8	90.2	14.4	0.5	4342.8
Number of Countries	83	6	20	25	7	35	17	1	1	145

Blue: cumulative population of the countries having implemented or adopted the given system(s)
Orange: number of countries having implemented or adopted the given system(s)

COUNTRIES WHERE DTT SERVICES ARE ON AIR



COUNTRIES WHERE ANALOGUE SWITCH-OFF IS COMPLETE



Includes some countries where only pay-TV services are available.

The data, updated as of the end of 2019, is drawn from a wide variety of sources and the information is provided "as is". Every reasonable effort has been made to verify the accuracy of the data.

Valencia, Spain • 9–11 March

DVB WORLD 2020


Programme & Registration: www.dvbworld.org

MONDAY 9 MARCH

- DVB-I masterclass
- Keynote presentation
- Focus on the Spanish media landscape
- Emerging trends in video distribution and consumption

TUESDAY 10 MARCH

- Evolution of broadcast technology
- IP- and internet-centric solutions from DVB
- DVB-I Service Lists
- Streaming standards for TV delivery

WEDNESDAY 11 MARCH

- UHD formats and video codec developments
- 5G for broadcast and OTT delivery
- Reviewing DVB World 2020

Programme Partners:

DASH Industry Forum

Ultra HD FORUM