DVBSCENE

DVB Digital Video Broadcasting

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The Technology Update from DVB

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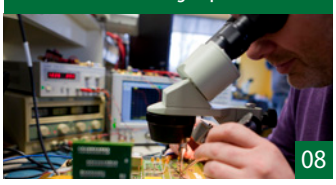
OPEN STANDARDS

Ken McCann Looks at the Progress of High Efficiency Video Coding

05

Time for an Enhanced Satellite Standard for Contribution & High Speed IP Links



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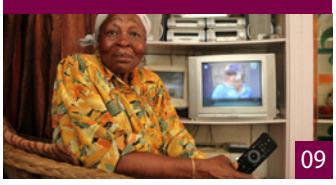
DVB-T2 in Africa



09

A SISVEL TECHNOLOGY CREATION:
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Award-Winning Partnerships

A Word From DVB

Peter Siebert
Executive Director

I am writing these lines just a few days after accepting, on behalf of DVB, a prestigious Emmy Award for DVB's contribution to the Active Format Description (AFD) specification. In addition to DVB, there were other Standards Development Organizations (SDO), manufacturers and broadcasters receiving an Emmy for this technology. The fact that several organizations received the Emmy for AFD clearly demonstrates that standardization and implementation of new technology works best when all stakeholders work together. For every organization involved, being a good partner is extremely relevant to further the development of digital TV.

This is our first Emmy and I hope it will not be our last. In the nearly 20 years of its existence DVB has contributed in many ways to the development of digital television. One example is the Common Interface (CI), the first version of which we developed in the nineties. Now, the technical group TM-CI Plus has begun working on new features such as dual tuner solutions and IP delivery of content. In parallel, as TVs become thinner, the Commercial Group for CI Plus has started to work on the Commercial Requirements for a new form factor for the interface to replace the PCMCIA slot. As every TV set in Europe is equipped with a Common Interface, the outcome of this activity will be relevant for the consumer industry.

Another of our activities, for which one day we may get an award, is the standardization of 3DTV. We have finished the Phase 1 specification in which we specified the Frame Compatible solution that can be supported by the existing transport infrastructure including current set-top boxes. Now we have started with Phase 2 where this is no longer a requirement. The technical group is now working on a solution where the left and right picture will be delivered in full HD resolution. Furthermore, non 3D receivers must still be able to present the 2D picture. The technical specification for this Service Compatible approach should be ready this summer.

These are just two of the ongoing activities of DVB in 2012, and you can expect much more to come.

New Standards

EN 302 583: Framing Structure, channel coding and modulation for Satellite Services to Handheld devices (SH) below 3 GHz - DVB-SH v1.2.1 (12/08/11)
TS 102 542-5: Frame Compatible Plano-stereoscopic 3DTV - IPTV Implementation Guidelines (01/09/11)
TS 102 728: Globally Executable MHP (GEM) Specification 1.3 (including OTT and hybrid broadcast/broadband) - DVB-GEM 1.3 (01/09/11)
TS 100 289 : Support for use of the DVB Scrambling Algorithm version 3 within digital broadcasting systems - DVB-CSA3 (06/09/11)
TS 102 585: System Specifications for Satellite services to Handheld devices (SH) below 3 GHz - DVB SH System v2 (06/09/11)
TS 102 470-2: IP Datacast: Program Specific Information (PSI)/Service Information (SI); Part 2 : IP Datacast over DVB-SH - DVB SH PSI/SI v2 (13/09/11)
EN 300 743: Subtitling systems - DVB-SUB v1.4.1 (04/10/11)
EN 300 468: Specification for Service Information (SI) in DVB systems - DVB-SI (20/10/11)
TS 102 584: DVB-SH Implementation Guidelines - DVB-SH IG v3 (17/11/11)
TS 101 162 : Allocation of identifiers and codes for Digital Video Broadcasting (DVB) systems - DVB-SI Allocation (05/01/12)
TS 102 323: Carriage and signalling of TV-Anytime information in DVB transport streams - DVB TV Anytime (05/01/12)
TS 102 773: Modulator Interface (T2-MI) for a second generation digital terrestrial television broadcasting system (DVB-T2) - DVB-T2 MI v1.3.1 (05/01/12)
TS 102 851: Uniform Resource Identifiers (URI) for DVB Systems - DVB-URI (05/01/12)
EN 301 545-2: Second Generation DVB Interactive Satellite System (DVB-RCS2); Part 2: Lower Layers for Satellite standard - DVB-ISS LLS (09/01/12)
TS 101 547 : Frame Compatible Plano-stereoscopic 3DTV (DVB 3D Phase 1) (31/01/12)

New Members

Ali Corporation a leading set-top box system-on-chip solution provider. **www.alitech.com**
AltoBeam is a fabless IC design company engaged in design of digital TV receiver chipsets. **www.altobeam.com**
Digital TV Labs is an independent international test conformance house. **www.digitaltv-labs.com**
Novelsat develops DVB-S/DSNG/DVB-S2 modulators and demodulators mainly for the distribution and contribution market. **www.novelsat.com**
Thomson Broadcast is a major equipment manufacturer dealing with radio and digital TV transmitters. **www.thomson-broadcast.com**

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On The Plus Side

Developing CI Plus Within DVB

Martin Gold, Chairman CM-CI-Plus

Martin Gold, NDS Limited

Until recently, the CI Plus specification was being developed by the CI Plus Limited Liability Partnership (LLP). CI Plus is built on the earlier DVB Common Interface specification, which was formally standardised as EN 50221 in 1997, and extended by ETSI TS 101 699 in 1999. In October 2010, CI Plus LLP invited DVB to take over further development of the CI Plus technical specification. In February 2011, the DVB Steering Board approved a proposal in which the DVB will develop the specifications beyond CI Plus Version 1.3, the latter continuing to be maintained by CI Plus LLP. CI Plus LLP will also continue to operate a Compliance and Robustness regime for implementations of the specification, although in principle other C&R regimes could be set up independent from CI Plus LLP.

The DVB work on CI Plus started in earnest in April 2011, initially to generate the Commercial Requirements for CI Plus version 1.4. These requirements build on version 1.3, thus it is expected that implementations of the V1.4 specification will continue to support the V1.3 functionality, extended by the new features of the V1.4 specification. Compatibility between V1.4 and earlier versions of CI Plus is considered essential, so it is intended that a combination of CI Plus Modules and CI Plus Hosts (integrated digital TVs or set-top boxes) with different versions should support the mutual capability of the combination.

A number of areas for additional functionality are specified in the requirements for V1.4. These are described below:

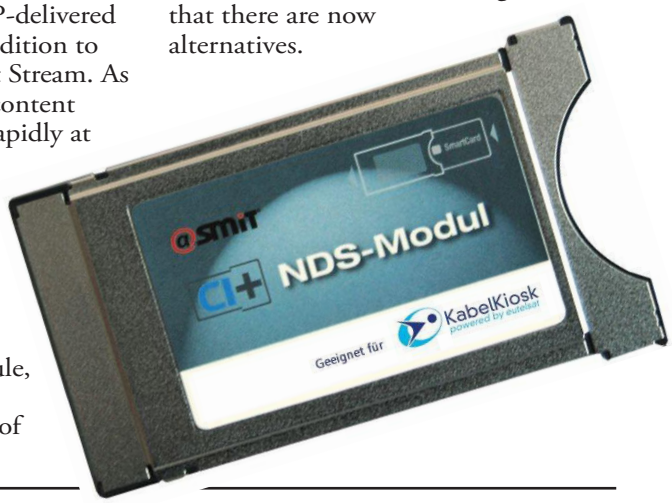
- **Dual-tuner support.** CI Plus versions up to V1.3 only enable a single Transport Stream in and out of the Module. A dual-tuner device, such as a digital video recorder could handle 2 encrypted services on different Transport Streams only by use of 2 Modules. V1.4 will enable this functionality to be achieved much more cost-effectively using a single Module and Host interface.
- **IP-delivered content.** Many pay TV broadcast and telco operators are interested in delivering TV content over IP, often as a supplement to broadcast services. Host devices are increasingly capable of being connected to broadband networks, and have some 'hybrid' broadcast-broadband capability. Beyond the budget and small screen devices, almost 100% of IDTVs on sale today have such capability. While some DRM systems are currently being embedded in such Hosts, the extension of CI Plus to enable the DRM function to be included within the Module (or use of the Module's CA System for IP content) will increase the flexibility for IP-delivered services.

For IP-delivered content, the file format known as ISOBMFF (ISO Base Media File Format) is expected to be prevalent, and therefore the V1.4 specification will support IP-delivered content as ISOBMFF in addition to the more familiar Transport Stream. As the delivery protocols and content formats are both evolving rapidly at the pace of internet development, to avoid the standard (and Hosts) becoming rapidly obsolete, there is a mode that will allow the delivery protocol and content format to be supported within the Module, which will then return the content to the Host in one of the two supported formats.

- **Extension of CI Plus Browser.** There are extensions for the Browser to make use of broadband connectivity, and to enable improvements to the user experience of operator applications using the Browser, such as for VOD and EPGs.
- **Module Application launching.** There is improved support for launching of applications supported by the Host middleware (e.g. MHP or HbbTV).
- **Usage Rules Information extension.** The URI will be extended to support trick-mode control and selectable output control. The appropriate specifications here are dependent on working with CI Plus LLP for consideration of Compliance and Robustness aspects.
- **Transcoding and Watermarking.** There is interest in being able to support these functions within the Module. While already possible technically, the current specification prohibits any manipulation of the content by the Module beyond decryption.

Technical work to develop the V1.4 specification to the Commercial Requirements got underway in December 2011, and it is hoped that the DVB work on the technical specification will be completed during 2012.

Beyond V1.4, there are currently discussions over consideration of a new form factor for CI Plus. The original PCMCIA format has now been dropped by the PC industry. This does not necessarily invalidate its continued use for CI Plus, but it is recognized that there are now alternatives.



Future Code

Progress Towards High Efficiency Video Coding

Ken McCann, Chairman TM-AVC

Ken McCann is a director and cofounder of ZetaCast, an independent technology consultancy company specialising in digital TV and related areas.

A new video compression standard, known as High Efficiency Video Coding (HEVC), is currently being jointly developed by ISO/IEC MPEG and ITU-T VCEG, the same two standardization bodies whose previous collaboration resulted in both MPEG-2 and H.264/AVC. The goal is to achieve a factor of two improvement in compression efficiency compared to the H.264/AVC, the best performing of the current generation of standards.

HEVC Call for Proposals

The first step towards creating HEVC was the launch of a Call for Proposals, which resulted in 27 responses. Both objective and subjective quality assessments of the proposals were performed, using a standard software implementation of H.264/AVC as the anchor. The objective measurements used the Peak Signal-to-Noise Ratio (PSNR), a convenient method of giving an approximate indication of the likely video quality. However, the only way to really determine video quality is the time-consuming and expensive process of running formal subjective tests.

The responses to the HEVC Call for Proposals were analyzed during the first meeting of the Joint Collaborative Team on Video Coding (JCT-VC) in April 2010. The test results were very encouraging, especially at 1080p resolution and above. A consistent trend was that the saving in bitrate relative to the anchors was greater when considering equal subjective quality than when considering equal PSNR.

HEVC Test Models

The first formal HEVC Test Model, 'HM1', was defined in October 2010. Further improvements of the Test Model in HM2, HM3, HM4 and HM5 were specified at subsequent meetings, with each successive version achieving better performance than the previous in terms of the trade-off between coding efficiency and complexity.

At the time of writing, no formal subjective tests have yet been published using the HEVC Test Models. However, test results based on PSNR have reported bitrate savings for equal PSNR of about 44% for the 1080p sequences in 'random access' configuration[1]. Assuming that the HM shows the same trend of greater bitrate saving for equal subjective quality than for equal PSNR that was observed in the Call for Proposals, the HEVC development appears to be on target to deliver a factor of two improvement in compression efficiency compared to H.264/AVC.

The HEVC standard is scheduled to reach Committee Draft stage in February 2012 and to be published from Final Draft International Standard in January 2013. A considerable momentum has built up around the development process, with a total of 284 participants at the seventh JCT-VC meeting, held in Geneva in November 2011.

Evolution & Revolution in Video Coding

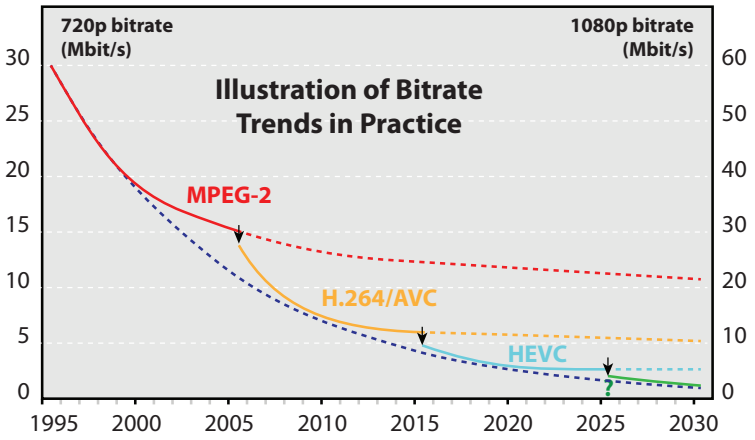
There is a general trend of improving video coding efficiency over time. Firstly, there is a gradual evolution of encoders giving greater efficiency within a specification. Secondly, there are occasional moments of revolution caused by a change of algorithm, requiring new decoders.

The primary driver for improvement is Moore's Law; more complex processing becomes practical over time. In an attempt to translate the effects of Moore's Law into bitrate, the author presented the modestly named McCann's Law at DVB World in 2003. This originally stated that the bitrate needed to achieve a given video quality halves every five years, assuming that both evolutionary and revolutionary improvements are implemented as early as possible. It was subsequently revised to predict that the bitrate required to achieve a given video quality halves every seven years.

In the real world, improvements do not follow a smooth curve, as legacy issues prevent overly frequent changes of algorithm. This is illustrated in the graph, which shows MPEG-2, H.264/AVC, HEVC and the possibility of a future standard around 2025.

When will HEVC-based Services be Launched?

The experience of MPEG-2 and H.264/AVC implies that consumers and the industry are prepared to consider a revolutionary change of algorithm roughly once a decade, provided that it can be justified by about a factor of two improvement in coding efficiency. If this experience is extrapolated to HEVC, then the timetable shown can be expected. HEVC could be the basis of a new generation of digital TV services using 1080p from about 2015. The increasingly prevalent 1080p displays would finally have a broadcast signal to do them justice!



Timescales for Video Coding Standards

	Standard Published	Added to DVB	First Broadcast Services Launched
MPEG-2	1995	1996	1997
H.264/AVC	2003	2004	2005
HEVC	2013	2014	2015

[1] "Compression Performance of High Efficiency Video Coding (HEVC) Working Draft 4", Bin Li, Gary J. Sullivan and Jizheng Xu, submitted to IEEE International Symposium on Circuits and Systems (ISCAS) 2012

On A Mission

Accelerating the adoption of 3D

Heidi M. Hoffman, Managing Director 3D@Home Consortium

Heidi M. Hoffman

The 3D industry is part of a long term transition in the television market space. Just like the introduction of color and high definition, the adoption of 3D by consumers is greatly influenced by what the broadcasters, creators and hardware manufacturers are providing to them.

In these early stages of the transition, companies are working together in many forums to ensure the 3D product for the consumer is as seamless and satisfying as the experience they receive in the movie theatre. In the case of 3D, this entails an entire ecosystem of new and established companies making technology and market decisions.

Collecting the intelligence and making the connections to make wise and strategic business decisions can be complicated and expensive for companies with great ideas for products. The 3D@Home Consortium provides the market intelligence and networking opportunities to allow its members to be more successful in their strategies.

The Consortium's mission is to accelerate the adoption of 3D into homes worldwide. Its 50 companies represent all parts of the television ecosystem: content creation, distribution, transmission, consumer products and their components and accessories, software, testing, research. Membership includes companies from all over the world and of all sizes.

3D@Home works with standards development organizations (SDO's) and other special interest groups (SIGs) to ensure the work going on in these groups is disseminated as widely as possible – especially to those who have a peripheral interest in the outcome. The Consortium maintains these open communication channels with organizations including: DVB, CEA, ISO, IEC, VQEG, SMPTE, ATSC, SCTE, MPEG, to name just a few.

From 3D@Home, members get a broad view of the 3D world and how the technology is being adopted within the various industries.

The Consortium is led by a Governing Board which has authorized six 'Steering Teams' or 'STs' to accomplish these activities as shown in the structure diagram below.

Every member company is encouraged to participate in one or all STs, usually via bi-weekly teleconferences and quarterly face-to-face meetings. ST's are led by a representative of Board or Leadership level companies and give regular updates to the whole membership.

Steering Team 2: Distribution, Transmission & Storage has taken on several projects to assist that community in understanding the most successful methods of encoding, compressing and transmitting high quality 3D. Initially, the team participated in defining requirements for digital interfaces and distribution. Digital interface requirements documents were sent to the Consumer Electronics Association (CEA) for standardization.

Most recently, the group is working on a multi-phase project to easily convey the many variables involved in sending 3D signals across the ecosystem. Phase 2 incorporates the metadata being designed for these signal paths. Portions of the metadata stream have been (or are in the process of being) standardized by internationally recognized bodies, such as DVB.

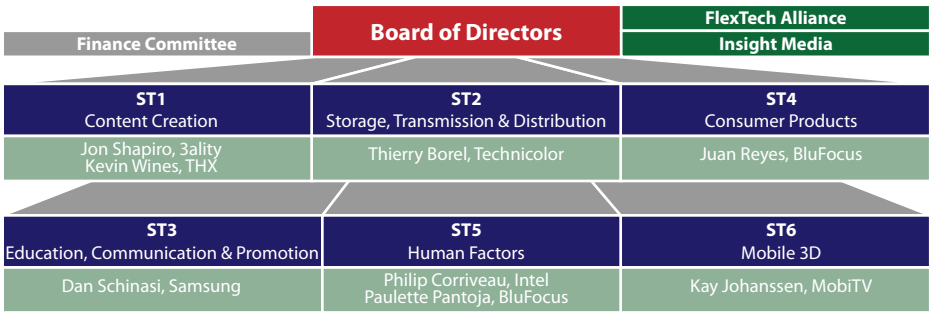
Understanding what makes high-quality 3D is the work of ST6: Human Factors Steering Team. The team is working to get a better understanding of the human response to watching 3D – particularly upon the vision system. Working with experts in the field of vision science, testing methods have been devised and content is being identified to begin a set of tests. The Consortium will share the results within the membership and publically, as appropriate.

One of the most intriguing outcomes from this team has been the excitement on the part of the optometric community for the introduction of 3D displays. It turns out that stereo acuity is an often overlooked ability that is effectively tested when viewing 3D. When a child experiences an inability to see stereo 3D, their parents are able to realize the issue and most effectively treat with therapy, more easily at a younger age when the vision system is most elastic. Their quality of life is sure to increase with better hand and eye coordination for many of life's large- and small-motor activities and general learning.

The eventual adoption of 3D into many facets of life is inevitable – from entertainment to communications to professional settings. For many in the 3D ecosystem there remain outstanding questions of exactly how that adoption will occur. 3D@Home exists to remove some of the uncertainty and lower the hurdles to full consumer and professional adoption.

For more information, visit www.3DatHome.org or the consumer-oriented site at www.3DUniversity.net. Links to these websites are welcome and encouraged.

3D@Home Consortium Structure



3D Rollercoaster

New Phases for 3D

David Wood, Chairman CM-3DTV

One day a new 3DTV channel opens in China. Another day, a 3DTV channel closes in France. There are demands from Hollywood movie makers for 'higher standards' of 3D movie production. But 3D movies are still good 'box office'. There are 3DTV channels on air today and the prospect of major sports event coverage (the Olympic Games) as a further spur this summer. The DVB Project is there to make possible the commercial plans of DVB Members - to sail the boat through the water, even when it's stormy.

The 3DTV Phase 1 specification was published in 2011 for 'frame compatible 'delivery, where the essential requirement was that existing HDTV set-top boxes would allow viewers to watch 3D (if they had a 3D display). This is the most used 3DTV broadcast format today.

In 2011, with Phase 1 rolling, we moved on to Phase 2. This is the environment where a new set-top box is possible. The main prize for doing so would be advantages in 3D picture quality.

3D-Fernsehen ohne Kopfschmerzen: Tipps und Tricks gegen Kopfschmerz durch 3D-Fernsehen by Dr Peter Höh

Phase 2 was split into a number of parts for manageability. The first part is Phase 2a, which is also called (in ITU-speak Level 2) a 'Service Compatible mode. The 'service' with which it should be compatible is a 1080i/720p HDTV service, so here the HDTV 2D viewer will just see a normal 2D picture at normal HDTV quality, and the viewer with a new 3DTV set-top box will see a full bandwidth 3D HDTV picture. This approach of '2D plus something' is also the one adopted in 3D Blu-ray, and the domestic 3D camcorders that provide full bandwidth HDTV 3D images. In both cases they use an MPEG system called 'MVC', and this system may be used for Phase 2a. Though there will be some differences to the way it's used in 3D Blu-ray, which is a 'non real-time' system with 24 pictures/second. DVB's Technical Module has been asked to prepare the Phase 2a specification by summer 2012.

Another option for compatibility could be for a 1080p/50, 60 compatible system, if a given market used such a system, and an approach to doing so, is termed 'Tile Framing'. DVB's Commercial Module is currently considering whether there could be a commercial requirement for such a system.

In autumn 2011, discussion included also a Phase 2b (in ITU-speak Level 3), which would be a system built on the original Frame Compatible Phase 1 system. In other words, rather than being an HDTV Service Compatible system, it would be a Phase 1 3DTV Service Compatible system. Commercial requirements for 2b are in the process of passing through the DVB process at the moment.

One of the issues that DVB Members are considering is what difference to the 3DTV picture quality having the full bandwidth, rather than the Frame Compatible's half bandwidth, will make. How much will it matter? How much will it be worth?

Finally, when could 3DTV be like learning to ride a bicycle? It takes a little explaining.

David Wood, EBU

DVB is developing a relationship with the '3D@Home' consortium. Part of the benefit of doing so is to glean the wisdom within 3D@Home about how taxing 3DTV may be to view. One of the principle reasons why 'eye-fatigue' can occur (and if it does, take off the glasses of course!) is because a 3DTV is asking the viewer to separate two processes (focussing and pointing) that are normally done automatically together. Some find this happens automatically when they look at a 3DTV picture with the right glasses. Others can find a degree of discomfort.

The work that 3D@Home has done suggests that showing young people 3DTV can be a way of bringing to light shortcomings of their eyesight, and which can often be corrected. And the earlier they are corrected in life, the easier it is to do so. In short, just like learning to ride a bicycle, the earlier you view 3DTV the better.

If you would like to know more about young people and potential 3DTV eye fatigue you don't need to go only to 3D@Home – you can contact the European expert, Dr. Peter Höh who is head of the Eye Clinic in Karlsruhe, Germany. He also has a useful book available on Amazon.de for German speakers.

Optimum Efficiency

Time for an Enhanced Satellite Standard for Contribution & High Speed IP Links

Dirk Breynaert, CTO and cofounder of Newtec

Dirk Breynaert cofounded Newtec 26 years ago, and is an expert in the field of modulation and RF. He has contributed to DVB and the creation of numerous satellite industry standards (DVB-S, DVB-S2, DVB-RCS).

Various players in the satellite industry are calling for a satellite transmission standard specifically for professional satellite contribution links which would be an update to the existing DVB-S2 standard. They are suggesting now is the best time to make the improvements and bring it in line with technological advancements. The expectations are that such a standard would lead to significantly more efficient solutions. This step forward is critical to ensuring the continuation of a vibrant and profitable satellite industry.

Considering the worldwide success of DVB specifications in the area of satellite, several DVB Members came together to start the new work item on a DVB satellite contribution standard. As in the past, DVB will bring together satellite communications experts from all around the world. These experts will analyze the latest advances made in technology to provide a solution for backbone and trunking applications.

Without a doubt, the new solution will be based on the well-established DVB-S2 specification. Up to now this standard has been the solution for Direct to Home (DTH) as well as for professionally used satellite links. DVB-S2 will continue to be the standard for DTH, however for contribution links, the cost of a transponder demands more efficient and more flexible solutions that are not compatible with the classical DTH scenario.

DVB has a rich history of involvement in developing standards for the satellite world. It started with DVB-S, the first solution for digital TV via satellite. Subsequently, return channel capabilities were added in the DVB-RCS solution. DVB also provided the necessary specification for satellite news gathering (DVB-DSNG). Ten years after the first specification was introduced, DVB-S2 saw its market introduction and now the experts are working on a second generation satellite return channel standard. In addition, DVB has begun work on the topics of Carrier ID and wideband transponders.

The proponents of the new specification are considering a number of critical items:

- The new specification will move towards an extension of the DVB-S2 standard that guarantees interoperability and better satellite efficiency for professional satcom applications including high speed IP links. For DTH applications however, DVB-S2 and its ongoing wideband update will continue serving the DTH market very well.
- The industry can benefit from optimization of both contribution and distribution. In the current standard these two very different applications utilize the same modulations, filters and error corrections. An improved standard can account for differentiation to make the greatest efficiency gains by making the standard aware of the application in which it is being used.
- The new solution could also be optimized for ranges of typical and realistic receive conditions per application.
- It should be possible to increase the number of modulation and coding schemes and FEC (Forward Error Correction) choices which then can provide the highest resolution for optimal modulation in all circumstances; bringing us as close to the maximum theoretical Shannon limit as possible.

New solutions are available now to implement lower roll-off factors with suppression of adjacent satellite carrier interference. There are also other methodologies for differentiated filter optimization for linear and nonlinear channels. All these improvements together highly increase spectral efficiency.

Adding higher modulation schemes, such as 64APSK, could be useful considering the professional applications that could work with improved link budgets provided by, for example, bigger antennas. Newtec sees the 32APSK boundary being reached frequently with FlexACM during clear weather situations. In these situations 64APSK could prove to be beneficial.

Newtec has already developed a new technology platform capable of supporting all these new functionalities, including wideband. However, we do feel that our satellite industry will benefit even more by having DVB and its Members support the idea of developing an extended standard in line with today's technological advances.

DVB has indicated that all of these improvements, including wideband and Carrier ID, will be made available by DVB in 2012, which will give the industry significant efficiency gains.

Peter Lambrechts, engineer at Newtec, testing the new technology platform that will support the new functionalities. (Photo: Jesse Willems)

Challenge Africa

Building the world's largest DVB-T2 Network

Ian Barnard, Project Manager, GOtv

One of Soweto's many DVB-T2 trial participants

As technology continues to speed up the pace of global change, Africa is challenging its image as a technological latecomer by pioneering the construction of the world's largest and most innovative DVB-T2 network.

Many European and Asian countries are well on their way or even done with their transition to first generation digital terrestrial broadcasting, or DVB-T. Africa, on the other hand, finds itself in the enviable position of being able to leapfrog straight to the latest second generation technology, DVB-T2.

In 2011 four African countries – Zambia, Uganda, Kenya and Nigeria – became some of the first in the world to embrace the technology when they launched MultiChoice's GOtv using DVB-T2. There is a planned rollout of a full pan-African DVB-T2 network, offering a multichannel bouquet.

The advantages of this second generation technology, such as many more channels and improved picture and sound quality, are wide ranging and well known to this audience. But some advantages are of particular relevance to Africa, including:

- Improved opportunities to offer local content: programs made in Africa for Africa. The better viewing experience is also likely to increase demand for local productions, helping to boost local production industries.
- Improved access to information for citizens, helping to close the digital divide.

With the International Telecommunication Union's (ITU) deadline for the global conversion from analog to digital looming ever closer, the unique private-public partnerships created between governments (via their national broadcasting corporations) and companies such as MultiChoice will help African countries meet the 2015 ASO.

Digital broadcasting will free up much needed spectrum, which then can be re-used for other purposes, such as the delivery of e-government programs including education, health and other public services.

The first country to launch GOtv was Zambia, last July. With an initial offering of 20 channels for ZMK 35,000 (around US$7), programming includes news, children's shows, documentaries, series and movies. Uganda was next in August followed by Kenya in September and then Nigeria in October. Tanzania, Rwanda and Burundi, the remaining East African Community partner states, met at the end of last year to call for the creation of policies that will enable a smooth transition, such as the scrapping of import duty on set-top boxes and limiting the number of signal distributors.

Another benefit Africa will reap from the widely adopted family of DVB standards is competitive pricing for set-top box manufacture and provision. GOtv launched with DVB-T2 set-top boxes developed and supplied by UK based technology company Pace.

Africa's GOtv DVB-T2 network will not only be the largest of its kind, but also be one of the most innovative. With technology provided by French equipment partner ENENSYS, MultiChoice will be able to take full advantage of all DVB-T2 features, including Multiple Physical Layer Pipes (M-PLP) and, single frequency network (SFN) operation. The terrestrial broadcast transmitters were sourced from Rohde & Schwarz.

These GOtv networks are based on a three PLP transmission that is uniquely assembled from a common satellite stream received at each site in a SFN. This unique world-first M-PLP DVB-T2 network solution allows innovative insertion of local and regional services.

Curbing costs is particularly important in Africa. The DVB-T2 standard and the unique M-PLP implementation not only uses the latest technology, but also ensures satellite bandwidth is used as efficiently as possible to deliver good quality content.

The multi-region headend and T2 Gateway solutions were installed by African Union Communication, the South African agent for Harmonic and ENENSYS. The new distribution system allows the transmission of HD/SD MPEG-4 content over satellite to the DVB-T2 network, providing improved regional programming while maintaining excellent video quality.

While GOtv is successfully helping to lay the technological groundwork and create audiences, there are still major political and policy decisions to be made, such as the discussions in various African countries over the creation of more than one signal distribution company and the right to self-provide signal distribution services.

Nonetheless, there is no doubt that 2012 is going to be a big year: all eyes will be on Africa as it matures towards its migration deadline, leading the continent towards successful digital terrestrial transmission.

DVB-T2 transmitter site – Lukasa, Zambia
(Photo: Steven Vorster)

DVB-T2 transmitter installation
(Photo: Steven Vorster)

Digital Know-How

Acquiring skill-sets through training

Ho Siew Mun, DigiWorkz

Indonesia has announced that it will consider DVB-T2 as its digital TV standard. For me, this latest development is much welcome as it is another sign that the Asia-Pacific region is committed to going digital. Over the past few years, the region, particularly the countries in Southeast Asia, has initiated digital TV trials that would bring them closer to their digital objectives.

The decision to go digital also means that broadcasters are looking into which standards to adopt. Will it be DVB-T, DVB-T2, ATSC, ISDB-T, T-DMB or DTMB-T? Granted that each digital TV standard has its own merits, the general indication is that countries in the region seem to be favouring the DVB-T standards.

Of course, Singapore is one of the early adopters of digital TV. In 2001, DVB-T was chosen when the republic started its digital broadcasts. Five years later, HDTV was deployed on Singapore's digital terrestrial TV (DTT) platform, and in 2008, there was a DVB-H trial to assess the feasibility of a mobile TV platform.

Currently, national broadcaster MediaCorp is in the midst of a DVB-T2 trial, signalling the country's next generation digital TV plans.

Neighboring Malaysia is also conducting a DVB-T2 trial. Last year, at the Asia-Pacific Broadcasting Union's (ABU) Digital Broadcasting Symposium in Kuala Lumpur, industry experts examined the role that DVB-T2 would play in the global broadcast landscape.

Prior to the symposium, two days were spent taking field measurements of the DVB-T2 signals strength and signal quality in and around the Malaysian capital. The positive results of the trial and a workshop on DVB-T2 generated much interest among the broadcasters that gathered in the Malaysian capital; more than 120 broadcasters from 16 countries participated in the discussion.

What is so great about DVB-T2 is that it provides 50% more usable bitrate than any other DTT standard including DVB-T; it can be used in existing DVB-T networks, allows transmitters to be farther apart in a single frequency network and has an improved carrier-to-noise performance.

The economic viability of the DVB-T standards has been one of the main reasons why DigiWorkz Asia-Pac Broadcast Training Centre has decided to offer courses related to this standard. From our online 'learn at your pace and in your own place' DVB Fundamentals course to customized courses for broadcast staff working on digital migration within their networks, the need to have a proper and thorough understanding of DVB standards is of utmost importance.

For broadcasters contemplating going to DVB-T or to DVB-T2, they need to understand fully the benefits and how to maximise usage of this standard for their own broadcast infrastructures.

DigiWorkz has been offering a number of practical two- to five-day workshops at its training facility located at Ngee Ann Polytechnic in Singapore as well as customized in-house training programs for broadcasters such as Astro in Malaysia and ABS-CBN and GMA Network in the Philippines. It also organizes seminars and forums in Singapore.

Recently, DigiWorkz successfully conducted the Digital Broadcasting Workshop — held in conjunction with Broadcast & Media Tech Vietnam 2011. Focusing on Vietnam's fledgling digital TV industry, DigiWorkz provided an impetus for the Vietnamese broadcast fraternity to further bolster and elevate the digitization of TV infrastructure in the country.

The workshop offered participants an overview of legacy and current broadcast technologies, before going on to discuss various pertinent aspects associated with digital broadcasting, including digital TV video system processing and distribution; the choices to be made in the selection of HDTV production equipment; HDTV multichannel audio design and distribution; and methods used in the compression and transmission of audio/video in digital broadcasting.

> ...industry experts examine the roll that DVB-T2 would play in the global broadcast landscape.

Ho Siew Mun, is the business development manager of DigiWorkz Asia-Pac Broadcast Training Centre in Singapore. Established in 2002 DigiWorkz has been serving the training needs of broadcasters in the Asia-Pacific region.

The workshop was targeted at traditional analog broadcasters — and we were pleasantly surprised by the high quality of the audience. The participants included representatives from satellite broadcaster Vietnam Satellite Digital Television (VSTV), the Vietnam Multimedia Corporation (VTC), one of Vietnam's largest multimedia corporations, as well as cable operator Vietnam Cable Television.

Paraphrasing the feedback received, participants found the workshop 'interesting and informative' while providing a 'good opportunity to learn more about digital broadcasting'. They were all hungry and passionate for practical knowledge — and short courses to supplement their digital know-how.

In addition, participants requested for more details on 3DTV broadcasting and 3D post-production to be included in future workshops to be held by DigiWorkz in Vietnam — a reiteration of the relevance of the courses offered by DigiWorkz to the broadcast industry.

All courses provided by DigiWorkz aim to increase and strengthen participants' knowledge of the skill-sets that are required in the migration from analog to digital broadcasting.

For further information on DigiWorkz visit: www.digiworkz.org

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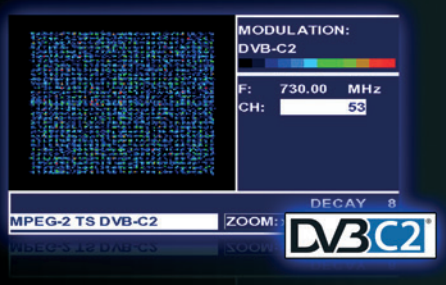

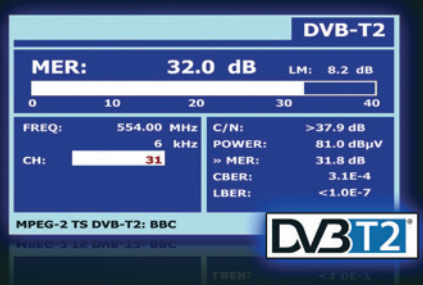

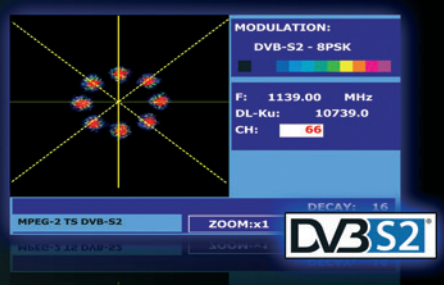

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www.promaxelectronics.com

Triple Play

Mongolia to introduce all three second generation DVB standards

Helmut Stein,
Chairman, Promotion & Communications Module (PCM)

On November 22 and 23, 2011, the Communications Regulatory Commission of Mongolia (CRC) invited international experts to the 'National Digital Broadcasting Forum' in Ulaanbaatar. Here, the path to analog switch-off for radio and television was discussed and experiences of managing this transition in Japan, Korea and Taiwan were presented. DVB was invited to present its second generation standards, as a decision on these had already been discussed internally.

But, firstly, what do we know about television and radio in Mongolia? Mongolia is situated in East and Central Asia, bordering with Russia in the north and with the People's Republic of China in the south. Mongolia's population is 2.76 million people who live a predominately nomadic lifestyle. The nation is divided into 20 regions with the capital Ulaanbaatar housing 45% of the country's population.

Mongolia is now a parliamentary republic and under the country's constitution citizens have the right to freedom of speech and to seek and receive all kinds of information. However, the various languages and dialects spoken across the country pose big hurdles to transparent communication to all of its citizens.

In the communist era, three state run newspapers were the central news source and independent media did not exist. The end of this period saw the creation of a number of private, independent media outlets. By 2005 there were already 250 media sources. The government financially supports small media enterprises and broadcasted content has not been restricted since 1998.

September 27, 1967 marked the birth of broadcasting in Mongolia with the Mongolian National Television and state owned Mongolian TV Broadcasting. The 1980s marked the beginning of the Mongolian National Broadcaster's use of new and improved international broadcasting equipment and color transmission technology.

Until reforms in the 1990s, the government had almost authoritarian control of the Mongolian media. For 70 years the state run Mongolian National Broadcaster was the single source of mass media. It was not until 1994 that Eagle TV, TV25 and UBSTV broke the monopoly of government owned stations and started commercial television broadcasting.

In 1991, the national broadcaster began transmitting via the AsiaSat satellite in order to reach the remotest areas. Currently, 18 local TV broadcasting channels are on air in Ulaanbaatar and 37 international TV channels are distributed and retransmitted throughout the country via the Apstar 5 satellite.

Currently, there are a total of 381 rural towns with 200 – 10,000 households that are served by 381 terrestrial transmitters. Each transmitter is retransmitting 18 channels from Ulaanbaatar at 50-200W. Households outside these towns can receive a total of 55 free-to-air channels via Apstar 5.

Today, television is more diversified and is considered the most important media in Ulaanbaatar. It also remains in a state of constant transformation, both nationally and locally. There are more privately owned stations and there is a significant presence of pirated television from foreign countries within the CATV, satellite TV, IPTV and MMDS networks that reach a large proportion of the population (see table).

The central antenna tower of Ulaanbaatar, the city's most important,

Type of Service	Ulaanbaatar	Countryside	Total
Terrestrial TV	18	79	97
CATV	13	22	35
MMDS	10	26	36
IPTV	2	0	2
Mobile TV	2	0	2

Central antenna tower of Ulaanbaatar

was built in 1967 and delivers the capital's TV and radio services. The antenna height is 190 meters tall and 1352 meters above sea level. Today, seven TV and eight FM stations are located at the tower. Each TV transmitter has 5kW and the FM transmitters have 1kW.

As per the ITU GE06 Agreement, concerning the migration to broadcasting digital technology by 2015, the national program of Mongolia was drafted to include system recommendations covering broadcasting services and new approaches to studio and network technology using experience gained from other countries. The transition to digital radio and television is being implemented through to 2015. ASO is scheduled for 12 a.m. on June 31, 2014.

Regarding the decision on transmission standards, the CRC used a clever approach. Instead of organizing wide and time consuming field tests, they asked local universities to give a recommendation based on the comparison of the data sheets. In addition, the CRC asked for reports on comparative field tests of the different standards made in many countries around the world. In conclusion, a clear recommendation to use DVB-T2 for terrestrial transmission and DVB-C2 for cable networks was made. DVB-S2 is already in use for the DTH services.

By making that decision Mongolia is set to be the first to use all three second generation DVB standards. Decisions for digital radio services are still under discussion.

Keeping sales afloat

Myra Moore is chief analyst of DTC, a market research firm that analyzes the digital TV market. DTC recently formed the Digital TV Transition Group which provides planning, consumer education, research and technical design for countries making the analog to digital TV transition.

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

Most North American, Western European and Japanese consumers already have TVs with digital receivers (IDTVs). And if the TV industry were dependent on these regions for growth, it would face some lean years ahead.

The continuing analog to digital terrestrial TV transition may be the only thing keeping worldwide IDTV sales afloat (an estimated 147.3 million due to ship in 2012) as the latest high-end features probably won't reverse a flattening sales trend in digitally mature markets – at least not as long as these regions continue to endure economic malaise.

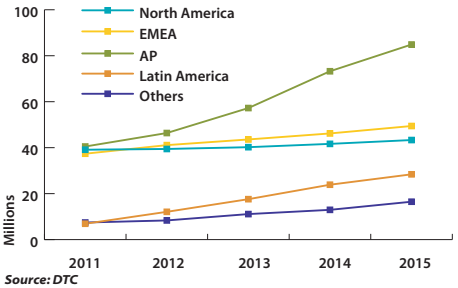
But tuner mandates that accompany pending analog TV shut-offs in major markets are providing a big boost in Latin America, Asia Pacific, and to a lesser extent, Europe. Growth in Europe largely stems from Eastern Europe and Russia switchovers, with Russia providing the most growth in the latter years of DTC's forecast. Although 2015 is the targeted analog shut-off date in Russia, the vast amount of infrastructure to be installed and the recent decision to rollout DVB-T2 will likely push the ultimate shut off date beyond 2015.

Although Japan and South Korea have a sizeable number of IDTV households (with the exception of earthquake-ravaged northern prefectures, Japan completed its analog shut-off in July 2011), China continues to lag behind other Asian nations in building a digital terrestrial TV market. DTC anticipates that will change shortly as the government is now showing signs of enforcing a here-to-fore non-enforced DTT tuner mandate.

Latin America is driving impressive growth now (DTC estimates there was 63% growth in 2011 forecasted to rise to 75% in 2012). The major population centers of Brazil and Argentina are not only preparing for the transition but are now increasing manufacturing of TVs in one of the few world regions riding a wave of economic growth.

North American TV sales are forecasted to remain flat (CAGR of about 2.3%) throughout DTC's forecast period. A combination of a completed analog TV shut- off, high HDTV household penetration, a tapped-out supplier price war, and a soft economy will keep North American TV sales mostly static for the foreseeable future.

Estimated IDTV Shipments by Region



Source: DTC

Myanmar News

John Bigeni, DVB

The ABU conducted a two-day workshop on Broadcasting Technologies for the ASEAN Region in Yangon on December 12-13, 2011. The workshop was located at the Info Tech centre on the University Hlaing Campus. The local host for the event was The Forever Group which is the National Broadcaster for Myanmar. I found this to be an extremely well organized event, which drew more than 100 participants, many from neighbouring countries such as Laos and Cambodia.

Presentations on standards and developments were given by DVB, NHK (Japan) TiMi Technology (China) as well as a number of prominent equipment manufacturers such as Harris. Also, a complete session was devoted to planning and implementation issues which included detailed coverage of the ITU guidelines for transition from analog to digital broadcasting together with an example for MTV Myanmar.

DVB provided an overview of the technologies underlying the DVB-T2 standard that also contained information on DVB-T2-Lite, as well as receivers and an update on worldwide adoption so far. The main presentation focussed on the relative technical performance compared to first generation standards which included DVB-T and ISDB-T.

The presentation was supported by demonstrations of DVB-T2 with the transmission of multiple HDTV services and multiple SD services. The enquiries and questions from the participants indicated great interest in the DVB-T2 standard and in particular its improved relative transmission efficiency.

As background, Myanmar was one of the first countries in the ASEAN region to decide on the DVB-T standard and commenced the rollout of DVB-T services as early as 2005. The transmissions have been progressively extended in both service diversity as well as population coverage. Digital terrestrial transmissions now cover more than 60% of the population. It is planned that ASO should take place when approximately 90% coverage is achieved. Analog coverage is currently around 92%.

Myanmar is now introducing DVB-T2, overlaying their existing extensive DVB-T network. The Forever Group has ordered three DVB-T2 transmitters that will be on trial in Yangon early this year.

Winn Maw, CEO of The Forever Group with DVB's John Bigeni

MARKET WATCH

www.work-microwave.de

WORK Microwave has developed a combined data and video modem, using DaVid technology. The DVB-S2 Modem SK-DV offers simultaneous transportation of live broadcasting (video content) and data (network connection) in a single carrier over a satellite link. Using DaVid technology the system aggregates multiple data streams and IP data into a single baseband stream. Teleport operators and broadcasters can now optimize bandwidth, boost data transport efficiency, and significantly reduce operating expenses by using the all-in-one solution.

www.rohde-schwarz.com

R&S BCDRIVE from Rohde & Schwarz is a drive test software for the R&S ETL TV analyzer. In enables broadcast transmitter operators to measure network coverage. It can determine network coverage in parallel for multiple broadcasting channels, which reduces measurement times. The software supports all of today's common digital broadcast standards, including DVB-T. A function for exporting results to mapping software provides a straightforward display of measured values on maps.

www.enensys.com

The ENENSYS IPGuard is a 1+1 automatic redundancy IP product that provides safe delivery of any IP stream. It is designed to provide automatic 1+1 redundancy of equipment outputting IP streams such as multiplexers, DVB-T2 gateways or IP gateways. It also realigns the same T2-MI stream or the same MPEG-2 TS carried over redundant IP-based networks (fibre, micro links, etc.) to enable a seamless switchover operation. It comes with bypass mechanism to avoid a single point of failure.

www.advantechwireless.com

Advantech Wireless recently launched a fully functional two-way broadband IP over satellite hub for under US$50,000. The Discovery hub uses the DVB-RCS standard (with DVB-S2 forward link) and the base model supports 500 remote users. It is fully upgradeable to higher capacities and capabilities, in many cases instantly via software key. Multiple return carriers (even in the base model) enable a broad mix of remote terminal profiles and applications on the same network.

www.verimatrix.com

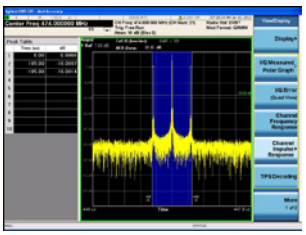
The next generation Verimatrix ViewRight DVB cardless client, part of the VCAS 3 multi-network platform, fully exploits the security technology of modern STB microcontrollers. Beyond its tight client code integration, it features a highly secure bootstrap, self-integrity checking and a multi-stage key ladder, securing the Control Word and other key material without external hardware. Microcontroller integrity and security is guaranteed through a robust manufacturing and programming workflow, ensuring secret information protection through preparation and deployment.

www.technisat.fr

The TechniSat TechniBox HD VA is a TNTSAT receiver for the reception of unencrypted and encrypted channels in SD and HD quality. It includes a Viaccess CA system with smartcard reader (TNTSAT smartcard is included). The flexible set-top box has the capability of recording digital programs on an external storage medium (via USB) and has a timeshift function. This digital satellite receiver offers an extensive range of functions and user convenience.

www.agilent.com

SFN is widely implemented for DVB-T/T2 systems. The channel impulse response measurement is important for operators to know the network characteristics at different places to guarantee good reception, like echo signal power ratio, delay spread. Agilent enhances its N6153A DVB-T with T2 measurement application to support the SFN measurement with Pre-echo, Post-echo, 0 dB echo or out of Guard Interval cases. This



benefits either field tests to diagnose coverage problems or optimize the network planning.

www.roverinstruments.com

ROVER Instruments' HD Touch is a complete, professional, 7" touchscreen analyzer that can support all SAT, TV, CATV and fibre optic standards, including DVB-T2, S2 (C2 optional) with real-time spectrum and echo measurements. It can show MPEG-2/4, SD/HD pictures and has a CI slot as well as an optional ASI IN/OUT. The meter is compact, light (2.5 Kg) and easy-to-use, with intuitive and fast navigation icons and has an 8-hour LI-ION/Pol battery autonomy.

www.blankom-digital.de

Blankom Digital's Edge-PAL family EPM 300 can transcode DVB MPEG-2 transport streams encapsulated in IP packets digitally, direct to analog TV channels. Up to 16 services are decoded, modulated and up-converted simultaneously. For redundancy reasons there are two IP GbE-SFP inputs to receive up to 4 transport streams. Additional DVB ASI inputs make the EPM suitable for the conversion of ASI sources. These features make the unit an interesting solution for analog cableTV applications.

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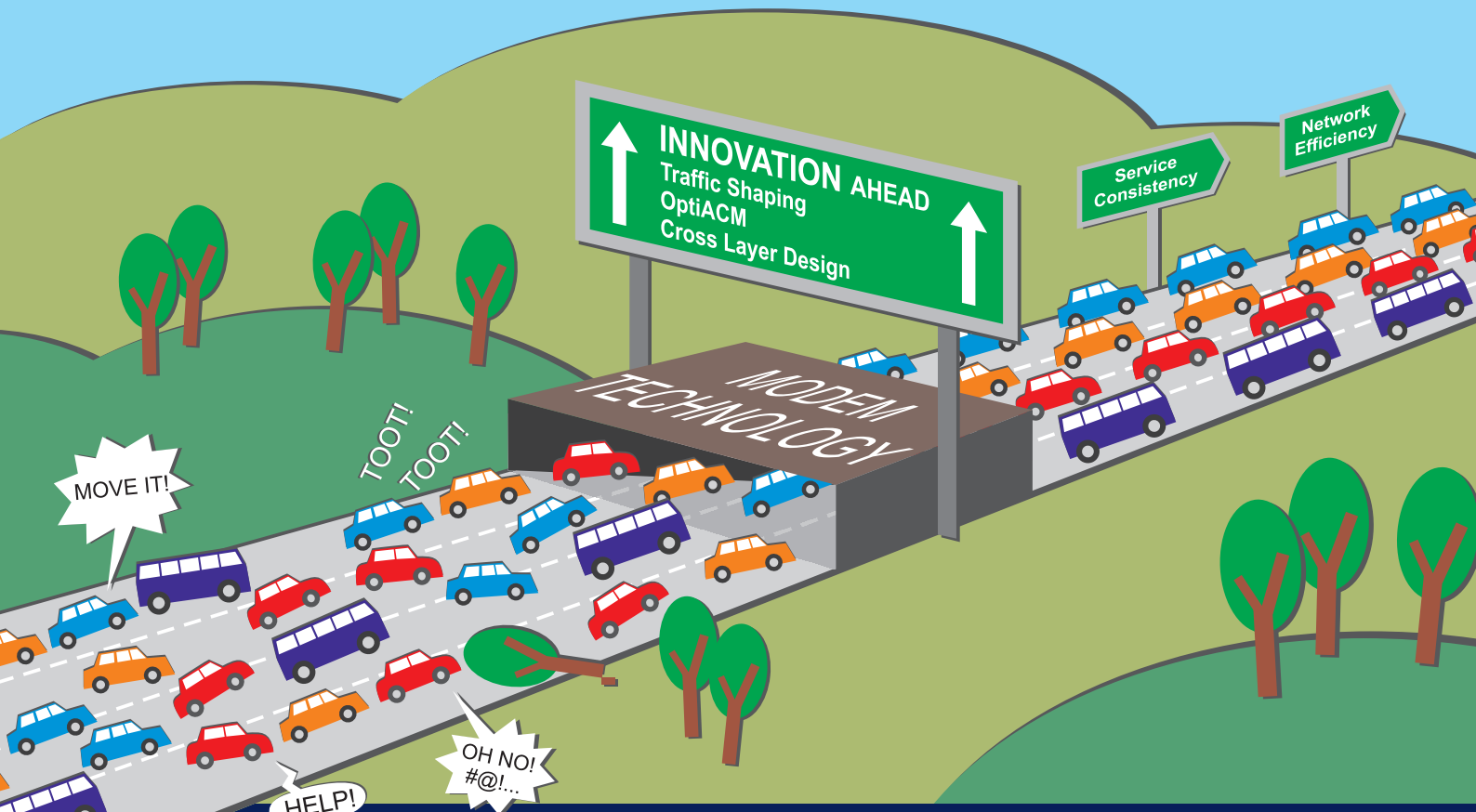

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