Edition No.27 **September 2008**

DVB-SCENE

Tune in to Digital Convergence

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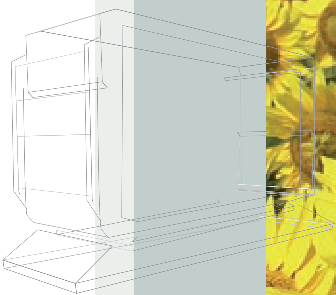

T2
extra terrestrial

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The Standard for the Digital World

This issue's highlights

SUMMER DAYS

A word from the DVB Project Office

Peter MacAvock, Executive Director

Summer months in Europe are often the main holiday period, with enterprises slowing down whilst staff are on holiday. Summer 2008 is one of much change and development in the DVB Project. Usually, it's a time when the Project Office undertakes tasks which get put aside at other times during the year, and when preparations for IBC fight with the summer holiday period. There's a lot more going on this year.

DVB's Steering Board meeting on 25th June was the last for Theo Peek in his role as Chairman of DVB. Theo has overseen many of the key developments in DVB – as it moved from broadcast into the world of interactive television and IPTV. From the outside, it might appear that DVB runs smoothly, but such a perception is a testimony to the excellent work done by Theo during his tenure as DVB chairman spanning some 12 years. Phil Laven (EBU) is the new DVB Chairman. Familiar to many in his previous role as the Technical Director of the EBU, Phil is a long-standing member of the DVB community and brings a wealth of experience to this important role.

Phil takes over the reins of DVB at a crucial time in the Project: IBC '08 will see the first demonstrations of the DVB-T2 specification, bringing some 30-50 percent performance benefits over DVB-T. As analogue switch-off (ASO) approaches in a number of countries, T2 will add an extra string to the bow of those claiming that broadcasting can exploit the digital dividend post ASO. Balancing the relationship between new DVB-T2 services and existing mainstream DVB-T is going to be interesting – whether you're in the DVB Project finalising all the elements of T2, or whether you're at the coalface of digital terrestrial television and trying to ensure that your viewers have a clear and consistent offering. DVB's message is clear: DVB-T is the bedrock of ASO and will continue to be despite the advent of DVB-T2. DVB-T2 allows broadcasters to exploit the unique opportunity afforded by the freeing up of large swathes of analogue spectrum for new and exciting services.

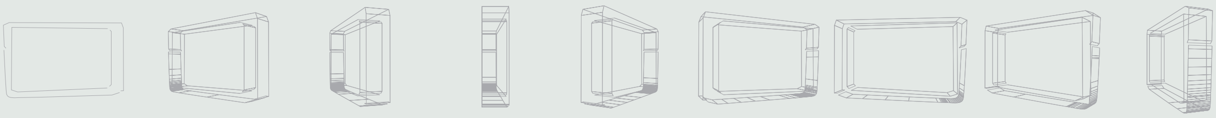
NEW STANDARDS

EN 300 468 V1.8.1 "Specification for Service Information (SI) in DVB systems" (Published on 25/07/08)
EN 301 192 V1.4.2 "Specification for data broadcasting"(Published on 20/04/08)
TS 102 006 V1.3.2 "Specification for System Software Update in DVB Systems" (Published on 21/07/08)
TS 102 323 V1.3.1 "Carriage and signalling of TV-Anytime information in DVB transport streams" (Published on 24/04/08)
TS 102 824 V1.1.1 "Remote Management and Firmware Update System for DVB IP Services" (Published on 21/07/08)
TS 102 826 V1.1.1 "DVB-IPTV Profiles for TS 102 034" (Published on 21/07/08)
TS 102 757 V1.1.1 "Content Purchasing API" (Published on 04/08/08)

NEW MEMBERS

Blankom Digital GmbH – Manufacturer of products for the processing and distribution of radio and TV signals that are used by cable TV operators and broadcasting corporations. www.blankom-digital.de
Fresco Microchip Inc. – Fabless semiconductor company focused on leading edge RF, mixed-signal, and digital signal processing architectures for consumer markets. www.frescomicrochip.com
NetUP Inc. – Provider of essentials for delivery of interactive TV services over IP networks. www.netup.tv
Mier Comunicaciones, S. A. – Designs, manufactures and integrates professional equipment for broadcast and space applications. www.mier.es
Ocean Blue Software – Specialist in digital TV software developement. www.oceanbluesoftware.co.uk
Sichuan Changhong Network Technologies Co., Ltd. – Engaged in developing and manufacturing digital television terminal set-top boxes. www. changhong.com

Cover picture courtesy of NHK



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SUPER FUTURE

DVB-S2 Enables 140 Mbps Super Hi-Vision By Satellite At IBC 2008

Dr Alberto Morello,
Director of RAI Research and Technology Innovation Centre, Turin, Italy & Chairman of DVB TM-S2 Group

One of the highlights of this year's IBC in Amsterdam is the first broadcast, live by satellite, of Super Hi-Vision (SHV) using DVB-S2, from the RAI Research up-link station in Turin.

SHV, the 4000 line x 8000 pixels/line television system under development by NHK, the Japanese public broadcaster, offers an astonishing user experience, thanks to a picture resolution sixteen times that of what we presently call 'High Definition'. There are 60 progressively scanned frames a second, and for audio, 22.2 three dimensional surround channels: nine channels at ceiling height, including one directly overhead; ten channels at the centre height of the screen; three front channels at floor level; and for the rolling thunder and other low frequency effects, two channels at the front.

Since the native SHV signal bit rate is a massive 24 Gbit/s, the major part of the challenge has been in developing technical ways of delivering the service to the final user. SHV is in our case compressed using MPEG-4 AVC at a final bit-rate of around 140 Mbit/s and delivered to IBC in Amsterdam from the up-link station of the research headquarters of Italian public broadcaster RAI in Turin, over Ku-band satellite capacity provided by Eutelsat.

For this first public demonstration of SHV by satellite, it will come as no surprise to discover that DVB-S2 technology has been selected by RAI, which led the development of this 'father' of second generation DVB systems in 2003. Thanks to this state-of-art system, recognised by the ITU as a worldwide standard for digital satellite broadcasting, the theoretical Shannon limit is approached, to within less than one decibel in a linear channel.

In the IBC demonstration, in order to accommodate the 140 Mbit/s SHV signal in a 72 MHz satellite bandwidth, a symbol rate of 60 Mbaud is adopted with 20 percent roll-off, combined with 8PSK modulation and rate 5/6 LDPC FEC coding, for a total required signal-to-noise power ratio of around 10 dB including satellite distortions. For practical reasons, such as the present lack of availability of 60 Mbaud DVB-S2 demodulators on the market, the SHV signal is split into two 70 Mbit/s MPEG Transport Streams, transmitted over two 36 MHz satellite transponders, and recombined at the receiver using the synchronisation and de-jittering features of DVB-S2 in the Adaptive Coding and Modulation (ACM) mode.

Eutelsat's Atlantic Bird 3 satellite at 5°W offers a high EIRP (53 dBW) Superbeam over central Europe, Italy and Spain, where SHV can be received with a consumer-type 80 cm antenna (leaving a 4 dB clear sky margin).

While SHV was developed initially by NHK, it has now been taken up by some research laboratories (BBC, NHK and RAI) of the Broadcast Technology Futures group. This is an alliance of leading broadcast research and development facilities including also IRT and bodies like the EBU, investigating higher quality television standards, such as higher resolution, better motion portrayal, better sound and, from a longer term perspective, full 3D TV.

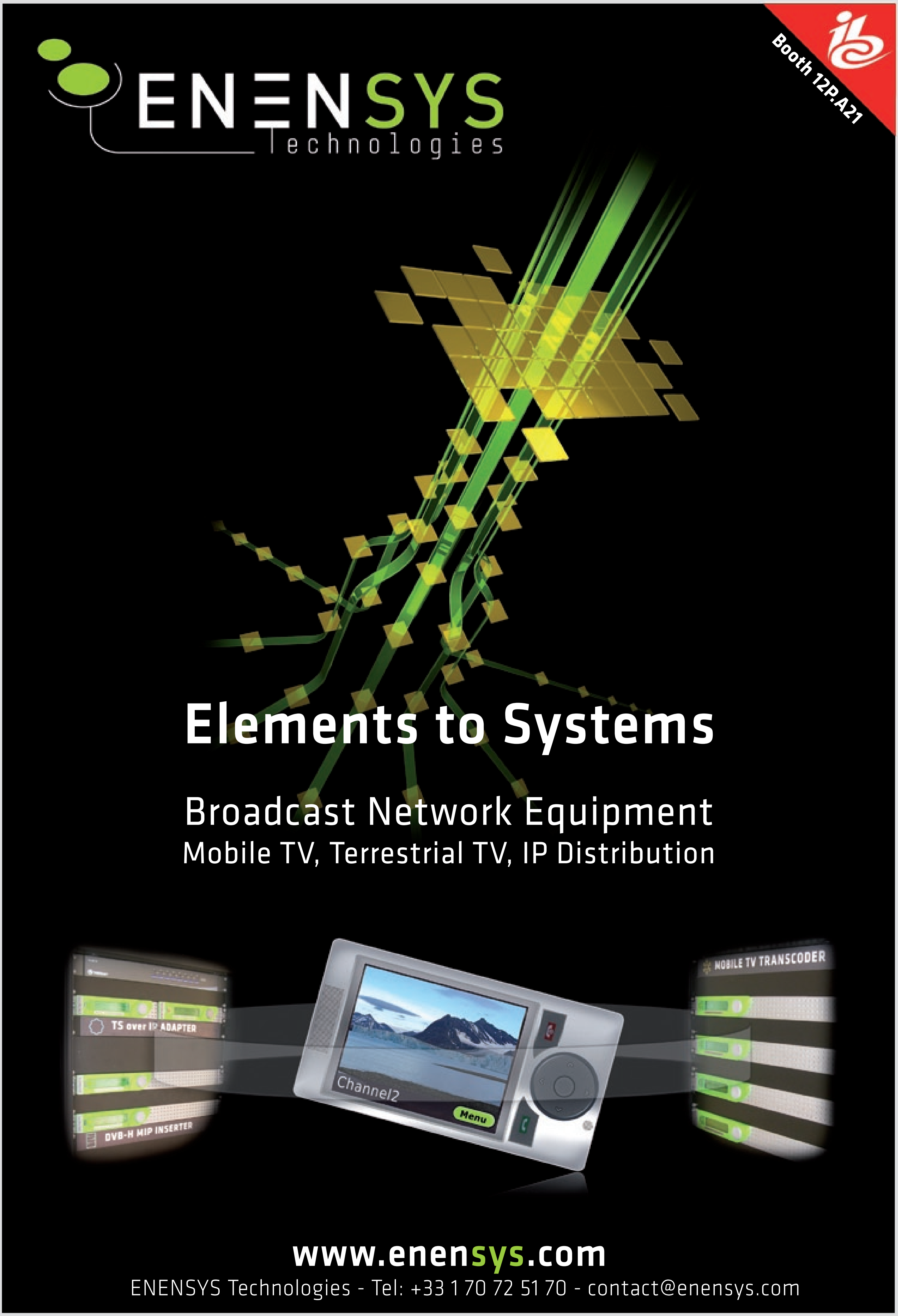
Is SHV a practical proposition for broadcast? According to Dr Keiichi Kubota, newly appointed Director-General of NHK Science & Technical Research Laboratories, "As a broadcaster, NHK's goal is to make it possible that Super Hi-Vision can be enjoyed in every home. We estimate that it will take around ten years to establish the technical foundations and a couple of years more for the standardisation. However, the applications of Super Hi-Vision other than broadcasting, such as public viewing or theatres, will be utilised much earlier".

A challenge for SHV is that it needs a large screen to benefit from its resolution. For example, you could appreciate SHV on a screen of about 1.5-3m diagonal from a viewing distance of about 1.5-3.0 m. It does have other applications, such as presentation of live events in theatres, or as a professional capturing method for high resolution images which are later processed into HD or digital cinema formats.

A second challenge for SHV is delivery to the final user: in this respect, the IBC demonstration shows that today 72 MHz Ku-band satellites and state-of-art transmission technologies such as DVB-S2 can deliver SHV to the home using reasonably sized receiving antennas. The Ku-band is already used widely today for many services, therefore other frequency resources may also be investigated for future comprehensive multi-programme SHV services. Analysis of the satellite Ka-band, allocated to broadcasting services in 1992, is in progress in the research labs, taking into consideration additional sophisticated technologies to overcome the high rain attenuation of this band: these are for example dynamic power control on board of the satellite (See Report ITU-R BO.2071, Annex 2) and multi-spot coverage combined with ACM, already included in DVB-S2 system.

At IBC 2008, SHV is in action on a 6 m projection screen in the NHK Theatre, with a full audio system, and at the EBU Village, down-converted on a 2000 line LCD display.

Picture courtesy of NHK.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DIGITAL TAKEOFF

DigiTAG's Natalie Mouyal Takes A Look At Analogue Switch-Off In Europe

Analogue switch-off is a looming deadline in many countries.
The European Commission's recommendation that Member States complete digital switchover by 2012 has compelled many countries to launch DTT services and begin switch-off planning. While not a mandatory deadline, 2012 has been set by almost all countries in Europe as the date when analogue switch-off will be completed.

Current status

Already, six countries have completed analogue switch-off while a further seven have begun the process (see map). These countries have made rapid progress either because few viewers rely on the terrestrial platform for the delivery of their primary television services or the government has mandated a tight switchover schedule.
Countries with a high dependency on cable networks have required a relatively short time between the launch of DTT services and the switch-off of analogue services, averaging a little over two years. In Luxembourg, perhaps an extreme example, DTT services were launched in June 2006 and analogue services switched off in August of the same year.
In the Nordic countries, governments have generally set binding switch-off dates prior to the launch of DTT services. Denmark and Norway, which have benefited from the experiences learned in neighboring countries, have both planned to complete analogue switch-off just three years after the launch of DTT services.
As can be expected, countries where over 50 percent of households rely on the terrestrial platform for their primary television reception require more time to complete digital switchover. This time is necessary to ensure viewers are ready for analogue switch-off and that DTT services are widely available. Based on the target switch-off dates set in the UK, France, Italy and Spain, it will take an average of 9.5 years from the time of the launch of DTT services to analogue switch-off.

Supporting switchover

Analogue switch-off requires the active participation of all stakeholders in the broadcast industry. Most countries have set up an organisation to steer the process with representatives from the government, broadcast industry and consumer groups. These organisations help ensure that viewers are informed when switchover will take place in their area and know how to prepare for it. Communication tools such as websites, call centres, advertisements, and direct mail have proven to be an essential means to reach out to viewers. But such activities have a cost. In the UK, Digital UK will spend an estimated £200 million on its communication effort.
In most countries, governments have directly or indirectly provided funding to support digital switchover. Funding for broadcasters and network operators has included loans, temporary suspension of license fee payments, and direct grants. Viewers have benefited from direct subsidies, in most cases targeting households with low incomes, special needs or located in border regions. Some governments have distributed subsidies to viewers in order to promote key features of digital television, such as interactivity, or to encourage the purchase of basic DTT converter boxes as has been the case in the US.
However, such subsidies in Europe must have the approbation of the European Commission which has been vigilant in ensuring that its rules governing competition and television platform neutrality are observed. Subsidies that can be used across all television platforms are generally permitted, but not those which are specific to terrestrial television.

Obstacles remain

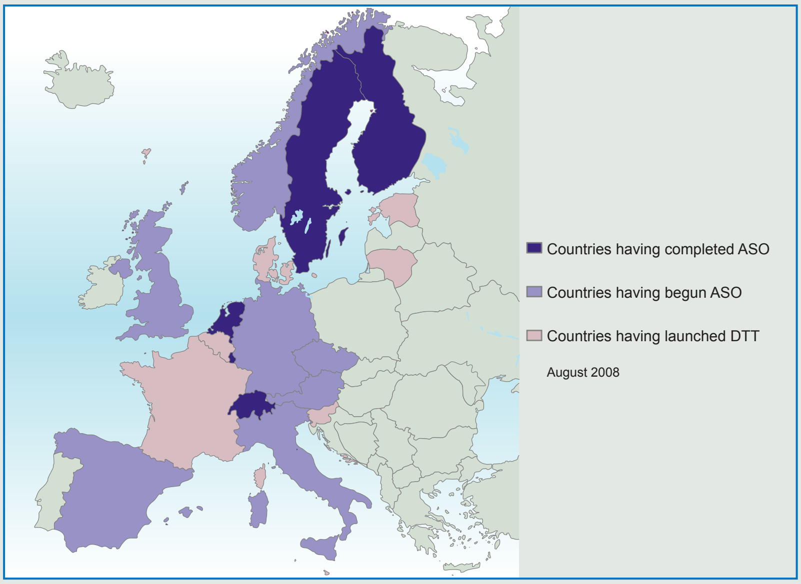
Switching off the analogue terrestrial platform is not so easy. Consideration must be given to the number of households affected, possible delays and costs.
When calculating digital penetration, the primary television set is the determinant. Yet it must be remembered that households own an average of 2.2 television sets and secondary sets usually rely on the terrestrial platform. This means that the digital conversion task may be greater than was initially estimated.
Interruptions to the switchover timetable are possible should network operators have problems installing antenna masts due to bad weather or when building permission is delayed. Long term planning allowing for some flexibility is necessary.
The cost of digital conversion is high, especially for viewers. In the UK, the government has estimated that the total conversion cost for viewers will be £3.8 billion, in addition to the cost to broadcasters and network operators. This may cause some households to resist switchover.

The real winners…

Digital switchover brings benefits to the whole broadcast industry as well as to viewers and government. The launch of DTT services has guaranteed the relevance of the terrestrial platform and ensured that viewers continue to have free access to mainstay television services.
But non-terrestrial television service providers may also benefit from digital switchover. In Sweden, it is estimated that 20 percent of analogue terrestrial television households chose a non-terrestrial television platform while in Whitehaven, the first area to complete digital switchover in the UK, 40 percent of analogue terrestrial television households chose to switch to satellite services.

> **"...launch of DTT services has guaranteed the relevance of the terrestrial platform and ensured that viewers continue to have free access..."**

DigTAG ASO Handbook available at www.digitag.org



A SPEC IS BORN

DVB-T2: A New Terrestrial Broadcasting Standard

Nick Wells, BBC Research and Chairman of DVB TM-T2 Group

INTRODUCTION

DVB-T2 is a new standard for terrestrial broadcasting. Following a technical study mission and the preparation of commercial requirements, the DVB Project concluded that a new standard should be able to provide increased capacity and ruggedness in the terrestrial transmission environment, primarily (but not exclusively) for HDTV broadcasting to fixed and portable receivers.

A technical study group of the DVB Project has prepared a specification for a new DVB-T2 system, and this has now been approved and published by DVB. This article gives a short overview of the new DVB-T2 system.

Several countries have shown an early interest in implementing T2 in their terrestrial networks, in particular the UK, which plans to launch HDTV terrestrial broadcasts using T2 in late 2009 or very early 2010.

BACKGROUND TO T2 DEVELOPMENT

The success of the DVB-S2 standard in providing additional satellite capacity was the inspiration for initiating the work on T2. DVB-S2 has been successful at providing an additional 30 percent capacity increase over the DVB-S standard for satellite transmission and consequently S2 is now being used for new HDTV services over satellite.

Given that HDTV reception will require a new receiver/set-top box, it was inevitable that the DVB organisation should consider defining a new generation of its terrestrial modulation scheme, DVB-T, in order to squeeze more capacity from a terrestrial channel. Consequently, DVB launched a Study Mission in February 2006. This Study Mission reported favourably and, in August 2006, technical work was formally started within DVB to define a next generation, 'DVB-T2' standard.

The DVB organisation also defined a set of commercial requirements which acted as a framework for the T2 developments. These commercial requirements included:

- T2 transmissions must be able to use existing domestic receive antenna installations and must be able to re-use existing transmitter infrastructures. (This requirement ruled out the consideration of MIMO techniques which would involve both new receive and transmit antennas.)
- T2 should primarily target services to fixed and portable receivers
- T2 should provide a minimum of 30 percent capacity increase over DVB-T working within the same planning constraints and conditions as DVB-T
- T2 should provide for improved single-frequency-network (SFN) performance compared with DVB-T
- T2 should have a mechanism for providing service-specific robustness; i.e. it should be possible to give different levels of robustness to some services compared to others. For example, within a single 8MHz channel, it should be possible to target some services for roof-top reception and target other services for reception on portables.
- T2 should provide for bandwidth and frequency flexibility
- There should be a mechanism defined, if possible, to reduce the peak-to-average-power ratio of the transmitted signal in order to reduce transmission costs.

In June 2007, DVB received formal responses to a 'Call for Technologies' and between June 2007 and March 2008, more than 40 organisations worked intensely to define the DVB-T2 standard through a series of physical meetings, a host of telephone conferences and thousands of email exchanges. The DVB Technical Module 'endorsed' the draft specification in March 2008 and, in June 2008, the DVB Steering Board finally approved the T2 specification for publication on the DVB website and for release to ETSI for formal standardisation.

BACKGROUND DESIGN PRINCIPLES

T2 adopted two key technologies from DVB-S2. These were:

1) The system-layer architecture of DVB-S2; in particular, the packaging of data into 'Baseband Frames'

2) The use of the same powerful Low Density Parity Check (LDPC) error-correcting codes as used in S2.

Most decisions in the design of T2 were directed by the requirement to maximise the data carrying capacity. Many options have been included in T2 in order that the overheads of the modulation scheme can be reduced to a minimum based on the requirements imposed by a particular transmission channel. For example, several options have been included for FFT sizes, guard-interval fractions, and pilot carrier modes as described below.

FEATURES OF THE T2 SPECIFICATION

Forward Error Correcting (FEC) Schemes and Baseband Frames

The data to be transmitted is packaged into Baseband Frames with an appropriate header for the frame that carries information about the data within the frame. The data is then protected by the DVB-S2 LDPC FEC by appending the LDPC check bits at the end. In order to mop up any residual errors after the LDPC decoding, the data is also protected by an additional short BCH error-correcting code as shown in Figure 1.

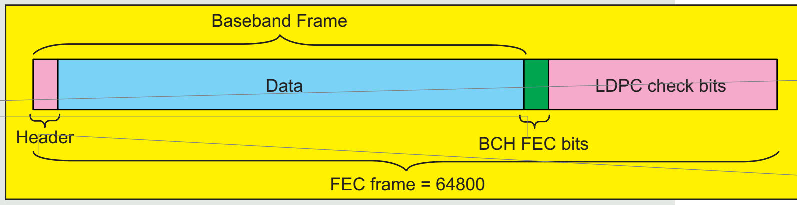


Figure 1 – Baseband Frame Structure

The total length of the FEC frame is typically 64,800 bits and this FEC frame is a fundamental unit within the T2 system. Within T2, the proportion of the frame that can be assigned to FEC parity bits ranges from around 15 percent to 50 percent.

Modulation

T2 uses conventional guard-interval OFDM as used in DVB-T.

Conventional DVB-T has '2K' and '8K' carrier modes. T2 has additional '16K' and '32K' carrier modes that enable larger single-frequency networks (SFN) without increasing the overhead expended on the guard-interval. The maximum guard-interval size in T2 is over 500μs which is sufficient to implement a large national SFN. T2 also offers a wide range of fractional guard-intervals so that the guard-interval overhead can be minimised according to the transmission network architecture.

T2 also has a '1K' carrier mode in order to provide extra frequency and bandwidth flexibility.

Scattered Pilot Patterns

In OFDM systems, scattered pilots are OFDM (data) cells of known amplitude and phase that are used by the receiver

Picture courtesy of BBC

to compensate/equalise for channel impairments as the channel changes in frequency and in time. In DVB-T, 1 in 12 OFDM cells are always scattered pilots - which is an 8 percent overhead, independent of the chosen guard-interval. In T2, there are 8 different scattered pilot pattern options that have been designed specifically to minimise the pilot overhead when using a particular guard interval fraction.

Service Specific Robustness and T2 Frame Structure

A commercial requirement for T2 is that it should be possible to apply different levels of robustness, in terms of modulation mode and FEC coding mode, to different services. This is achieved in T2 by grouping OFDM symbols together in frames and then assigning different services to different 'slices' within each frame as illustrated in Figure 2.

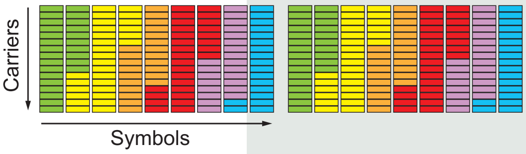


Figure 2 – Illustration of T2 Frame Structure: Different Colours Indicate Different Services

Each slice may also be split into sub-slices in order to give more time diversity. Time interleaving can also be used to spread the data for a given slice across sub-slices within a frame and even across T2 frames. This approach, where the FEC and time interleaving follows a service/slice rather than the multiplex as a whole, is a radical departure from a traditional DVB-T architecture. However, a traditional approach is still possible by arranging that each T2 frame carries only a single slice and this slice carries the complete, multiprogramme Transport Stream. In this case, service-specific robustness can not be applied.

The start of each T2 frame is signalled by a short, robust OFDM symbol. A typical T2 frame duration is around 200 ms and the overhead required to signal the structure of the frame is typically less than 1 percent. This frame structure information is sent in a robust mode at the beginning of each frame.

	DVB-T (Current UK mode)	DVB-T2
Modulation	64QAM	256QAM
FFT size	2K	32K
Guard-Interval	1/32	1/128
FEC	2/3 CC + RS (8%)	3/5LDPC + BCH (0.3%)
Scattered Pilots	8%	1%
Continual Pilots	2.6%	0.35%
Frame Structure Overhead	1%	0.7%
Bandwidth	Normal	Extended
Capacity	24.1 Mbit/s	35.9 Mbit/s

Table 1 – Comparison of DVB-T and DVB-T2 Transmission Capacity For Estimated Equivalent Gaussian Channel Performance

Rotated Constellations

T2 uses the novel technique of 'rotated constellations'. Rotated constellations offer the potential for a significant improvement in robustness, particularly in the case of challenging terrestrial channels. The values of u_2 and u_1 for a given constellation, for example as shown in Figure 3, are separated in the modulator and paired with values of u_1 or u_2 taken from different symbols and different OFDM carrier frequencies. At the receiver, the u_1 and u_2 values are recombined to give the original rotated constellation. In this way, if one carrier or symbol is lost due to interference, some information is still available from the remaining axis value and this can be used by the powerful error correcting code. Initial simulation results show a significant gain in performance (up to around 5dB) may be achieved in difficult channels through the use of this technique.

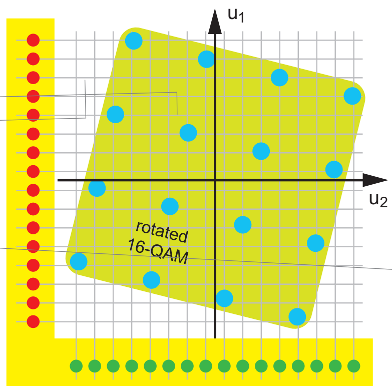


Figure 3 – A Rotated 16-QAM Constellation

Transmit Diversity

T2 includes the optional use of a form of Alamouti encoding, which provides transmitter diversity. This can significantly improve the performance of the system when a receiver can 'see' a signal from two transmitters at the same time, for example in relatively small local SFNs when using non-directional receiving antennas. Initial planning studies predict that a 30 percent increase in coverage may be obtained from some simple SFNs through the use of this technique.

Peak to Average Power Reduction

A significant cost in the transmission of broadcast signals comes from the cost of the electricity to power the transmitters. OFDM signals tend to have a relatively high peak to average power ratio, but T2 includes the use of two techniques which can reduce this, and allow a reduction in peak amplifier power rating of around 25 percent. This could result in a significant saving in electricity costs.

System Capacity

Table 1, above, compares the capacity expected for a DVB-T2 channel with the capacity achieved from a conventional DVB-T (UK mode) channel under the same reception conditions. The table shows the expected increase in capacity to be around 49 percent (not yet verified by laboratory trials or field trials).

CONCLUSIONS

The outline of DVB-T2, a new terrestrial broadcasting system, has been described. DVB-T2 builds not only on the DVB-T standard but also on the DVB-S2 system and also introduces several new features to meet the specified commercial requirements. T2 is expected to provide a very significant increase in capacity, whilst simultaneously improving the ruggedness of the transmission system. Both of these features make it an ideal system for the broadcasting of High Definition Television.

PLANNED USAGE/TAKE UP OF T2

In the years ahead, in countries where DVB-T services have become well-established, regulators will be keen to achieve full Digital Switch-off (ASO) and, in the process, release valuable UHF and VHF spectrum for other purposes. Some countries have already completed ASO. One option at ASO will be the introduction of new services using DVB-T2 technology. This could enable, for example, the roll out of new nationwide multiplexes offering multichannel HDTV services, or perhaps innovative new datacasting services. As with DVB-T, the new standard is certain to target not just roof-top and set-top antennas, but also PCs, laptops, in-car receivers, and a whole range of other innovative receiving devices.

The transition from DVB-T to DVB-T2 will need to be carefully managed in such countries, if such a transition happens. The DVB Project fully expects DVB-T and DVB-T2 services to co-exist side-by-side for some time to come.

The first country to deploy DVB-T2 is likely to be the UK, where ASO is already under way. The regulator there, Ofcom, has stated its intention to convert one nationwide multiplex to DVB-T2 with the first transmissions of multichannel HDTV set to begin at the end of 2009.

The BBC has begun DVB-T2 test transmissions, from the Guildford transmitter southwest of London, in preparation for terrestrial HD services. The transmission facilities are provided by National Grid Wireless and Arqiva as part of their support for the DVB standardisation process and the UK project for the launch of DVB-T2 services.

In My Opinion – Lieven Vermale

FROM DIGITAL DIVIDEND TO DIGITAL DEFICIT?

We all know what a ‘dividend’ is. It is the cash reward or bonus you hope for, and get sometimes, when you invest in a company. It is the payback for an investment. The Digital Dividend is something similar. It is the payback for the investment in the digitisation of broadcasting.

The investment in digital broadcasting will be made partly by the broadcaster, and partly (read: mostly) by the public who have to change their receivers. You can argue that both of these groups should have a share of the ‘payback’ for going digital.

“...the scarce resource of spectrum itself belongs to the people.”

We should also not forget that the scarce resource of spectrum itself belongs to the people. They own the spectrum, and what happens to it should be in their interests. Society should be the main beneficiary of the digital dividend payback. But how?

After the digitisation of the current services there will be some spectrum left over with which to do other things. This might be to provide other, and more, broadcasting services, or new innovative services from broadcasters and others. There is nothing wrong at all with using the spare spectrum either for more broadcast services, or for innovative new (pay) services. But whatever it is, the result must be in the public interest. In this football game, they own the pitch.

The public interest is to make the wireless environment better than it is today. This may mean higher quality, more choice, better experience, lower costs or valuable new services; or any combination of these. The digital dividend must be used for these things. There is a risk today that it will not be, at least for the world of services to ‘handhelds’ or mobiles. There is a risk that the digital dividend will become a digital deficit for the public - at least as far as these services are concerned.

What the broadcast bands are used for in the digital age is a national decision, but there are international rules about permitted levels of interference in the broadcast bands (RRC06), and there is international agreement that part of the bands can be shared between broadcasting and wireless broadband technologies like 3G, LTE, WiMAX, etc. In short, there is every likelihood that in one or other parts of the broadcast bands there will be services to handhelds or mobiles. So, how can the public interest be sustained in the emerging market for services to handhelds?

Today, digital mobile phones can receive calls from anywhere in the world. There is what we may term ‘caller neutrality’. The network operator can charge whatever rate he wishes, but he has to be non-discriminatory about who calls. The world of services to handhelds or mobiles is not always like that. Network operators like ‘closed gardens’.

In a ‘closed garden’ you are only allowed to access the services ordained by the network operator.

This situation is not fair to the public because the most is not being made of their spectrum - and indeed it is unlikely to be successful anyway.

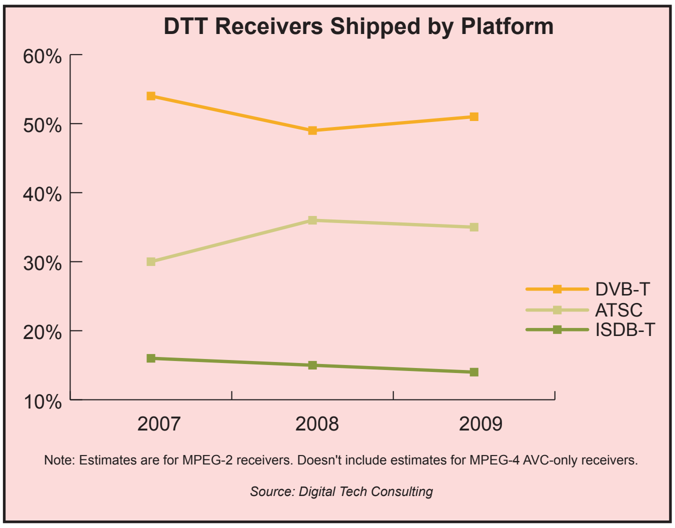
We know how successful the Internet,

in its open way, has been in 15 years of development. It is dynamic and responsive to public needs and tastes. There is huge choice and quality available. There is competition, which is always a driver for the public interest and new services. 'Open access' and 'Net neutrality' are crucial to sustain this success in the future.
The mobile media environment has to follow the same path to be successful. This is the formula that the public responds to. This is the formula that works.
Mobile media services (which are different to 'simple' mobile TV) to handhelds have to have an infrastructure that allows open access to all on reasonable and non-discriminatory terms. We must create an 'open and neutral' environment for mobile media services. We must create a framework that allows us to follow the same successful (economic) path in the mobile media world as we have had in the broadband Internet domain over the last 15 years. We must find creative ways that will make this possible. It is probably the only way that these mobile services will have more than niche audiences.
If we as a society create a digital dividend on the basis of public resources, they must be reused in the public interest. We talk about and understand 'Net neutrality' today, but we have to think about 'mobile neutrality' in the future.
Regulators must create a framework where this happens, today, when the dividend is created.
Let's make it a political, business and technical goal. It can be done. It must be done.
If not, the digital dividend will become a digital deficit.

Lieven Vermaele was appointed Technical Director of the European Broadcasting Union (EBU) by the Administrative Council of the EBU on 24 May 2007. He took up his position on 1 September 2007.
Lieven began his career at VRT, the Belgian, Flemish, broadcaster, where he worked on the broadcaster's digital roadmap with a focus on transmission, ICT, digital radio, television and new media projects. In particular, he played a key role in developing and planning the digital future of VRT.
After six years with VRT, he moved to Alcatel-Lucent where he was responsible for the strategy, marketing and portfolio management of the converged applications and business ventures of the group. He joined the EBU from this last position.
Born in Ghent (Belgium) in 1975, he holds a Master of Science in Engineering from the University of Ghent, and has pursued several post-graduate studies. Lieven is married and has one child.

Moore
Analysis

CONTINUED GROWTH



Note: Estimates are for MPEG-2 receivers. Doesn't include estimates for MPEG-4 AVC-only receivers.

Source: Digital Tech Consulting

Despite the sizeable gains pay TV platforms have made at the expense of terrestrial TV business, the digital version of plain old over-the-air broadcasts is creating plenty of opportunity in the TV marketplace.

The transition from analogue to digital terrestrial transmissions (DTT), which began about 10 years ago, still has plenty of life in it. In fact, Digital Tech Consulting (DTC) estimates that growth for DTT receiver sales will continue to log healthy numbers through 2013, the latest year for which DTC forecasts receiver shipments. In 2008, DTC estimates that more than 111 million DTT receivers will ship throughout the world.

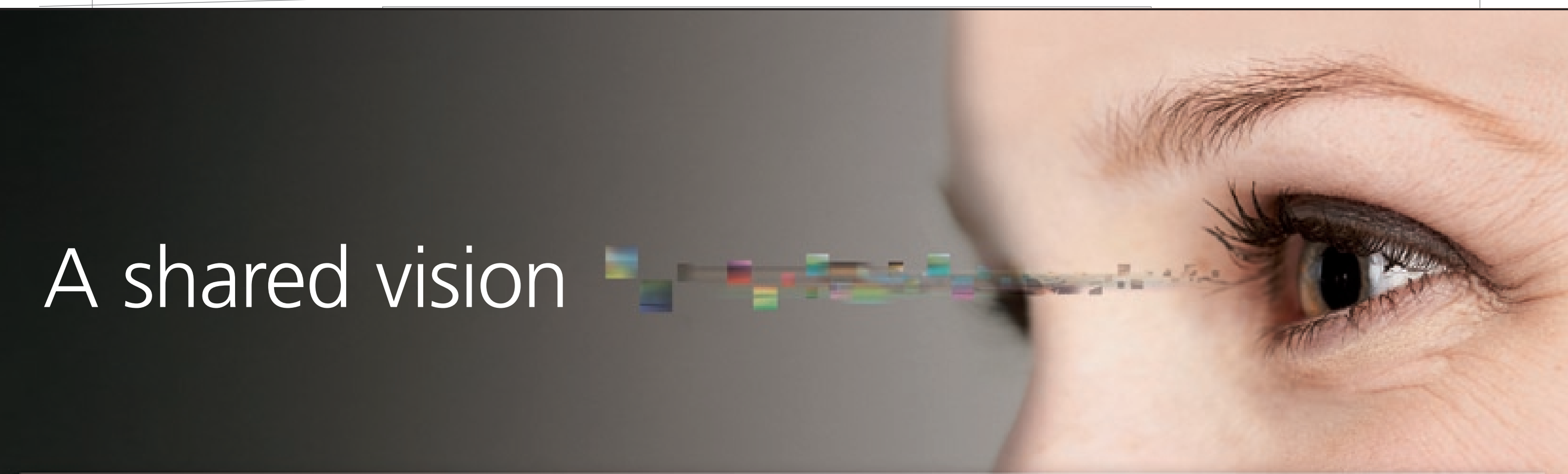
And as next-generation technology is emerging in countries where DTT transmissions began in the late 1990s, the DVB-T standard is in strong position to continue its standards dominance within the terrestrial technology community.

DTC estimates that in 2008, DVB-T receivers will represent 49 percent of all DTT receivers shipped throughout the world. This is despite the strong surge of ATSC receivers estimated to ship this year with the US analogue shut-off date looming in February, 2009. But by 2009, when the ATSC digital-to-analogue converter box sales will begin to slow, DVB-T is estimated to represent 51 percent of all DTT shipments.

DVB-T has always had its anchor firmly placed in European countries, but it has also made considerable gains in non-European countries – namely parts of Asia and Africa. In 2008, DTC estimates that about 16 percent of all DVB-T receivers that will ship will go into countries such as Australia, India, and South Africa. DTC estimates that most of the future growth will come from these regions, as well as Eastern Europe. By 2010, more than one-quarter of DVB-T receivers are forecasted to ship into non-European countries.

But with the solid base of DVB-T transmissions and receivers in already well established DTT countries such as the UK, Germany, France, Italy, and Spain, DVB-T is well positioned to continue its dominance for the foreseeable future.

Myra Moore is chief analyst for Digital Tech Consulting (DTC), a market research firm that tracks and analyses the consumer digital video marketplace. More information on the company and its latest research on the TV receivers, DVB-T devices, and other digital video activity is available at www.dtcreports.com.



MARKET WATCH

Fujitsu MB86H60 Multi-Standard Decoder

Fujitsu's latest DVB solution for digital TV, the MB86H60, is a highly integrated system-on-chip incorporating the necessary processing functions required by digital HDTV receivers, including those for digital video, audio and graphics. This cost effective, low power, HD media processor can decode both MPEG-2 and H.264 compressed video up to full HD resolution (1920x 1080i). In addition, the flexible audio processor can decode a wide variety of audio standards required by the broadcast market. www.fme-multimedia.com

Expway has developed an audience measurement and usage monitoring solution for DVB-H that goes toward securing the whole mobile TV business model. Mobile operators and audience measurement agencies looking for a reliable technical solution to collect usage figures can now turn to the company's FastCollection that is secured to monetise consumption of current and future mobile TV services. The tool guarantees total confidentiality of collected measurements, even if the user is in multi-campaign mode. www.expway.com

TeamCast is launching RPX-1000, an innovative solution for digital terrestrial and mobile TV signal performance monitoring and measurements. The unit exhibits an MER (Modulation Error Ratio) measurement range of more than 40dB, and also makes precise right and left spectrum shoulder evaluations for intermodulation product checks. Thanks to its sturdy and compact form factor, it can be easily integrated within DVB-T/H/SH transmitters or can form part of any stand alone or field measurement solution. www.teamcast.com

TeamCast RPX-1000

Nagravision's IPTV Solution, consisting of content management system, service platform and cardless security, allows an operator to manage and deliver innovative services to set-top boxes, PCs and mobile phones while maintaining consistency of user experience. In addition to accessing live and on-demand TV services on each device, the end-user can program his DVR from his mobile phone, pause a live event from his set-top box and resume viewing later on his mobile or PC. www.nagravision.com

IZT S2000 Signal Generator

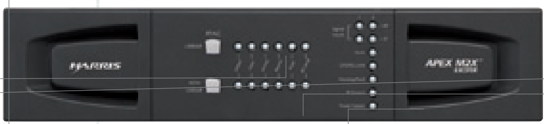
IZT GmbH has expanded the functionality of the IZT S2000 signal generator to simulate DVB-T and DVB-H signals. The system offers the complete signal processing chain in real-time, DVB-H compliant coding and transport stream multiplexing capabilities, channel coding and modulation. Real-time simulation of signal impairments and propagation effects between transmitter and receiver can be applied. The user can test devices via the intuitive graphical user interface, the remote interface or the built-in programmable test scenarios. www.izt-labs.de

MARKET WATCH

Infineon TUS 9090

The **Infineon** TUS 9090 DVB-H/T receiver integrates a tuner, demodulator and memory for multi-service usage into one monolithic chip. It has a high performance related to Doppler that is a 25 percent improvement from the MBRAI II specification. The device offers a 2dB better product than the market average with an extra GSM transmitter attenuation for wanted frequencies < 700MHz to avoid a serious block, and enables better sensitivity for supporting VHF, UHF and L-Bands. www.infineon.com

Harris Corporation's new transmitter is a liquid cooled UHF television transmitter platform designed for analogue and digital standards, including DVB-T/H. The transmitter features the company's PowerSmart technology and Apex M2X multimedia exciter, which allows for easy migration from analogue to digital or between different systems. It also features all digital linear and nonlinear precorrection and delivers digital power levels up to 18.9 kW COFDM, providing customers with maximum power density, efficiency and a small footprint. www.broadcast.harris.com



Harris UHF Transmitter

The new cost effective MobiEdge from **ENENSYS** is designed to build DVB-H streams at the transmission site. It enables the delivery of regional content, statistical multiplexing, and Multi-Mobile Network Operator management. Combined with the company's DVB-H IP encapsulator (MobiMUX) it provides a solution for optimising the distribution of DVB-H services.

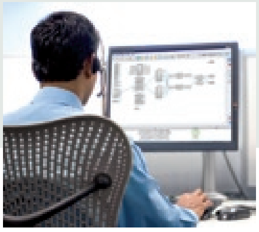
Also making its debut is the CastXplorer-T/H, a standalone network probe for monitoring the QoS of DVB-T/H broadcasts ensuring real-time and long term performance analysis. www.enensys.com

ENENSYS CastXplorer

NetUP's conditional access system (DVB CAID 0x4AEF), designed for IPTV services, encrypts multimedia streams for transmission over unprotected channels. The system consists of two parts: the real time encryption server and the client module that is loaded into IP set-top boxes for descrambling.

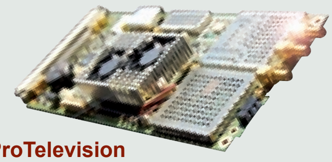
It was developed in C++ with the use of optimised algorithms. The system works on x86, PowerPC, Broadcom, STM, TI Davinci and other STB platforms. www.netup.ru

The new **Cisco** ROSA video service management solution offers service providers an intuitive, service oriented interface for easy setup and management and monitoring of video networks. The system builds upon ROSA's proven technology and is suitable for satellite, terrestrial, DSL, and cable broadcast networks. It offers off-line service configuration and single-click service activation; built-in scheduling for seamless switching between national and regional; service availability monitoring and automatic recovery; and PSI/SI and EPG generation. www.cisco.com



Cisco ROSA Video Service Management

The Terrestrial Gateway is a state-of-the-art HW platform on which all of the standard products supplied by **ProTelevision Technologies** can be uploaded in original or customised format. The platform is capable of hosting other transmission formats by mounting firmware that implements the required format. It offers full field upgradeability which enables the OEM customer to stock units for any application and thereby shortening delivery time/cost of ownership. www.protelevision.com



ProTelevision Terrestrial Gateway HW platform

Verimatrix is extending its software based content security solution VCAS (Video Content Authority System) to DVB for one way networks (i.e. without a return channel) with support for DVB-S, DVB-T and DVB-C broadcasting. VCAS provides unified content protection for 3-screen pay TV services including seamless support for DVB-IP hybrid networks and mobile devices. A key benefit for pay TV operators is the ability to manage content security without the need for smart cards. VCAS is DVB Simulcrypt compliant. www.verimatrix.com

Neotion and **Fastcom** have developed a product for implementing CPCM in an Advanced CI Module that brings secured silicon based conditional access, IP home network capabilities, and MPEG-4 transcoding when needed to legacy hosts. In doing so, broadcast content can be exported in CPCM, and vice versa. CPCM content is accessible on a flat panel, with no need for extra remote control or an extra box. www.neotion.com, www.fastcom-technology.com

Neotion & Fastcom Pocket CPCM

Advantech AMT's new AMT75e, SBM75e and SBD75e products help content distributors deliver DVB multiplexes to terrestrial transmission sites by encrypting and further multiplexing several Transport Streams over a single DVB-S2 carrier. Multiple carriers are also supported, useful for where distribution requirement exceeds transponder capacity. The slim line, single box solutions maintain original stream timing, enabling them to deliver content to single frequency networks. The products are now entering service following successful trials with distribution network operators. www.advantechamt.com

ATEME releases the KTF 7100, a new Kyrion tape to file MPEG-4 AVC encoding solution. Designed for post production and VOD applications, the it provides rapid ingestion of video tapes into a file based workflow. The KTF 7100 works with all professional decks and includes embedded storage (160 GB), configuration software, 2 Ethernet ports, 1 USB port and an SDI connection all within a single 1u 19" rack module. www.ateme.com

ATEME KTF 7100

Imagination Technologies has added NorDig-Unified 1.0.3.compliant DVB-T to its licensable receiver IP platform family. With the addition of support for NorDig, the stringent digital television platform test specification, Ensigma UCCP230 supports the widest range of standards available on a single receiver platform and offers the best balance of functionality, performance and size. With support for NorDig, the company can deliver a DVB-T solution capable of passing the most rigorous use-case tests, alongside high Doppler DVB-H. www.imgtec.com

The **UDcast** TSprocessor is a universal mobile TV MPEG-2 Transport Stream processing tool. It can transform itself into a multiplexer, channel simulator, content recorder, IP network adaptor or other digital television appliances. Its 17 unique software modules are fully programmable and can interconnect between themselves. The latest DVB-SH decapsulation module makes it particularly suitable for mobile TV broadcasters and labs that need to prototype, test and deploy networks without engaging any R&D efforts. www.udcast.com

UDcast TSprocessor

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DVB-SH

PRODUCT LINEUP

Success with UBS

DVB-SH IP Encapsulator

The DVB-SH model adds the additional SHIP synchronization packets for DVB-SH compliance.

The UBS DVB-SH IP Encapsulator incorporates the same class leading architecture of the UBportIPE DVB-H model with features such as:

- *Dynamic Time Slicing for highly efficient bandwidth utilization*
- *Internal SI/PSI table editor, parser, compiler and generator (UBS SI/PSI TDL)*
- *Internal SFN adapter*
- *Internal stream recorder and player*
- *Remote setup and monitoring through WEB GUI or SNMP*
- *Compact, reliable, solid state design. No moving parts.*

DVB-SH Modulator

Fully DVB-SH compliant modulator with all of the required timing and modulation modes for DVB-SH head end and repeater sites.

- *OFDM and TMD modulation modes available*
- *Up to 3GHz output selectable in 1Hz increments*
- *High performance MER (>43dB)*
- *Built in test signal generator*
- *Remote setup and monitoring through WEB GUI or SNMP*

DVB-SH Terrestrial Repeater

Fully self contained compact outdoor terrestrial repeater for DVB-SH. The entire system is designed to be easy to deploy in space constrained sites such as tight urban areas and cellular co-locations.

- *DVB-SH network receiver*
- *GPS synchronization*
- *DVB-SH modulator*
- *High performance LDMOS S-band amplifier*
- *Remote setup and monitoring through WEB GUI or SNMP*
- *High performance forced air cooling system*

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