Edition No.33 **March 2010**

DVB-SCENE

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4K Vision

33

The Standard for the Digital World

This issue's highlights

- NGH Commercial Requirements
- Italy's GEM
- DVB Indentifiers in Terrestrial Networks
- Transmitter Signature Signalling
- DVB-T in Russia
- DVB-T in Panama
- Market Watch

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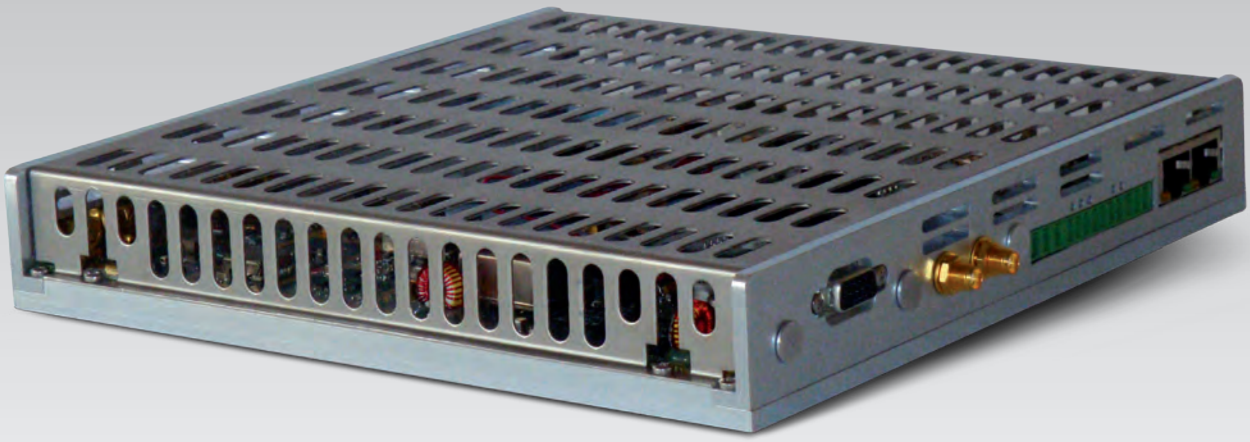

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2010 BEGINS

A Word From The DVB Project Office


Peter Siebert, Executive Director

The new year was off to a flying start and at the beginning of February I had the opportunity to participate in the conference at CSTB 2010 in Moscow. There is much activity in the Russian Federation as they prepare to switch to digital TV using DVB-T. This is a major step for Russia, and as the Director of the DVB Project Office I am of course satisfied to know that 142 million Russians will benefit from DVB technology. In addition, I am equally pleased to see the ongoing activities around DVB-T2 in the UK. Rollout of the DVB-T2 network is progressing well and a significant percentage of the UK population will be able to watch this year's World Cup hosted by South Africa in HD over DVB-T2.
In this issue of DVB-SCENE our cover story looks at the work RAI Research Centre is carrying out with digital cinema quality transmissions on terrestrial TV with DVB-T2, as well as Russia and Panama's move to digital. In addition, you will also find articles about the standardisation activities on DVB's Next Generation Handheld (NGH) specification, Transmitter Signature Signalling, Managing DVB Identifiers in Terrestrial Networks and GEM in Italy.

I would also like to welcome a new contributor, Ben Keen, Chief Analyst of Screen Digest, who looks at how internet connectivity comes to the fore as HD displays overtake SD TVs for the first time.

NEW STANDARDS

TS 102 474 Ver. 1.2.1: IP Datacast over DVB-H: Service Purchase and Protection (10/11/2009)
TS 102 826 Ver. 1.2.1: DVB-IPTV Profiles for TS 102 034 (20/11/2009)
EN 301 192 Ver. 1.5.1: DVB specification for data broadcasting (26/11/2009)
EN 300 468 Ver. 1.10.1: Specification for Service Information (SI) in DVB systems (26/11/2009)
TS 102 470-2 Ver. 1.1.1: IP Datacast: Program Specific Information (PSI)/Service Information (SI); Part 2 : IP Datacast over DVB-SH (17/12/2009)
TS 102 685 Ver. 1.1.1: High-level Technical Requirements for QoS for DVB Services in the Home Network (05/01/2010)
TS 102 542-1 Ver. 1.3.1: Guidelines for the implementation of DVB-IPTV Phase 1 specifications; Part 1: Core IPTV Functions (07/01/2010)
TS 102 542-2 Ver. 1.3.1: Guidelines for the implementation of DVB-IPTV Phase 1 specifications; Part 2: Broadband Content Guide (BCG) and Content on Demand (07/01/2010)
TS 102 542-3-1 Ver. 1.3.1: Guidelines for the implementation of DVB-IPTV Phase 1 specifications; Part 3: Error Recovery; Sub-part 1: Overview of DVB-IPTV Error Recovery (07/01/2010)
TS 102 542-3-2 Ver. 1.3.1: Guidelines for the implementation of DVB-IPTV Phase 1 specifications; Part 3: Error Recovery; Sub-part 2: Application Layer - Forward Error Correction (AL-FEC) (07/01/2010)
TS 102 542-3-3 Ver. 1.3.1: Guidelines for the implementation of DVB-IPTV Phase 1 specifications; Part 3: Error Recovery; Sub-part 3: Retransmission (RET)(07/01/2010)
TS 102 809 Ver. 1.1.1: Signalling and carriage of interactive applications and services in Hybrid broadcast/broadband environments (07/01/2010)
TS 102 851 Ver. 1.1.1: Uniform Resource Identifiers (URI) for DVB Systems (07/01/2010)
TS 102 323 Ver. 1.4.1: Carriage and signalling of TV-Anytime information in DVB transport streams (11/01/2010)
TS 102 592-2 Ver. 1.2.1: IP Datacast: Electronic Service Guide (ESG) Implementation Guidelines; Part 2: IP Datacast over DVB-SH (11/01/2010)
TS 102 611-2 Ver. 1.2.1: IP Datacast: Implementation Guidelines for Mobility; Part 2: IP Datacast over DVB-SH (18/01/2010)
TS 102 832 Ver. 1.2.1: IP Datacast over DVB-H: Notification Framework (18/01/2010)

NEW MEMBERS

Appear TV AS - Innovative company making professional head-end equipment for broadcast distribution systems whose main markets are cable and IPTV. www.appeartv.com
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AMBITIOUS **TARGETS**

What Are The Commercial Requirements That DVB-NGH Is Expected To Fulfil?

Frank Herrmann, Chairman DVB TM-H & Project Leader DVB-NGH/DVB-T2, Panasonic R&D Center Germany GmbH

Having completed the second generation broadcasting standard DVB-T2, it was a logical step for DVB to update the last of the first generation transmission standards - DVB-H. The Commercial Module had gathered the requirements for the new broadcasting system by June 2009. This was followed by the Call for NGH Technologies last November and replies were due by late February 2010. The development of the standard(s) is currently underway in the DVB TM-H group.

NGH is expected to be implemented as a standalone broadcasting system and also as a hybrid system consisting of an additional interaction channel. Besides its terrestrial branch it may also consist of a satellite branch, if this doesn't lead to unbearable compromises for the overall system characteristics.

The major element of the Commercial Requirements is the one for improved robustness and indoor coverage expressed as 50 percent higher throughput than with DVB-H. This capacity increase can be exchanged for higher robustness by, e.g., lowering code rates and hence enabling reception of the NGH signal at very low SNRs.

T2 has achieved that throughput increase in comparison to DVB-T already – so why worry? This is only half the truth, because for mobile reception it won't be possible to apply the same ultra-large FFT sizes and high degree constellations. However, the change from convolutional plus Reed-Solomon error control coding to a state-of-the-art FEC approach is a significant step in the right direction. Another step could be diversity reception (SIMO) allowing a gain of another 3 dB.

Furthermore, there is currently a huge effort invested in analysing what can be achieved with MIMO in spatial and/or cross-polarised form. First results look quite promising. However, it also means a significantly higher complexity and power consumption. Which simplifications could help to keep the complexity under control? In addition, how well does MIMO work at very low SNRs? Is a combination of cross-polarised and spatial MIMO the golden solution? Moreover, would it be a mandatory feature of all receivers or can a conventional SISO set still receive an integral part of the content? If adopted in the end, NGH would be the first broadcasting system that makes use of this technology, and with that, it would already represent the third generation.

"...number of requirements refer to the combination of mobile communication and broadcasting – a hybrid system."

If the combination of T2 and NGH on the same RF channel is required then the most straightforward approach would be to assign a part of the transmission frames to T2 and the remaining part to NGH for mobile and portable reception. This is a very smart concept and T2 was already designed for that. It helps to save investments in RF networks and makes the DVB systems even more competitive on a worldwide basis.

A number of requirements refer to the combination of mobile communication and broadcasting – a hybrid system. It might be the most promising and attractive application for NGH from a market demand point of view. The logical next step would be to look for further integration of the two systems – at least in terms of the higher layers of the protocol stacks.

Both branches of transport means shall be realised – the traditional Transport Stream and the IP-based transport. Options on top of IP are naturally OMA-BCAST and DVB-IPDC/CBMS. Anyway, the NGH physical layer shall be fully agnostic to the higher layer protocols – as is the case for T2 with its physical layer pipes (PLP).

It is clear that the IP-related overhead could already be huge on its own in the case of short datagrams, but also the DVB encapsulation and multiplexing layers below add to this overhead. A lean implementation still assuring the timely availability of the necessary metadata at the receiving end is highly desirable.

Attention was also paid to the quality and robustness that can be assigned individually to service components (video, audio, …) and even to service sub-components like the base and enhancement layers of video streams encoded with Scalable Video Coding (SVC). Here, the PLP carrying the base layer stream would be set up in the most robust way, whereas the enhancement layer(s) would enjoy a less robust setting. Also with this approach, the requirement for graceful degradation of the service quality at the edges of the coverage areas would be fulfilled. Of course, the gain achievable with SVC still needs to be verified.

In summary, the challenge reflected by the Commercial Requirements is ambitious for the group defining the DVB-NGH specification. After all, isn't it the ambitious targets that make such a development project an exciting one?

Types of targets for NGH: Apple iPad, Nokia 5330, Sony XAV-60

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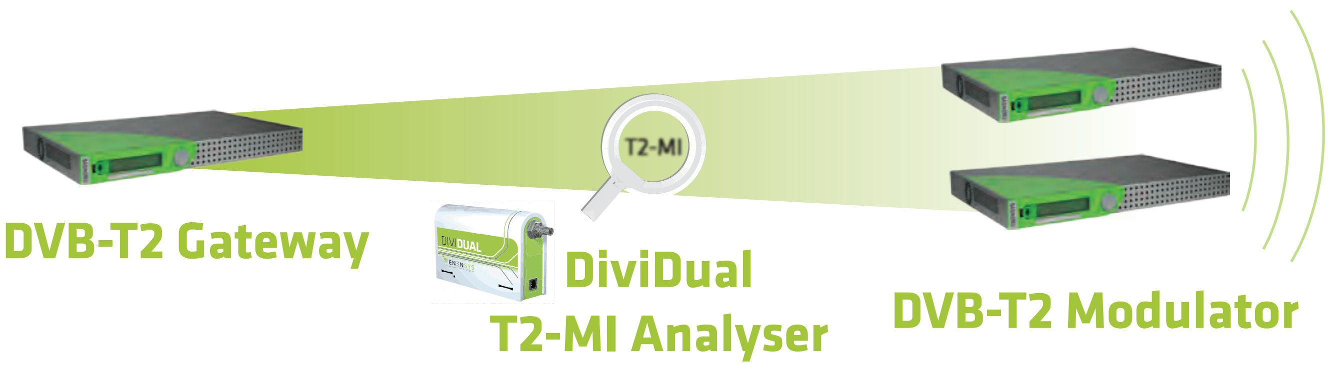

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In My Opinion – David Wood

3D TV STANDARDS: WHICH IS THE DOG, AND WHICH IS THE TAIL?

David Wood is currently Head of New Technology at the European Broadcasting Union's Headquarters in Geneva, Switzerland. He is British by accident and Belgian and Swiss by adoption. David worked for the BBC and the IBA in the UK before moving to join the EBU in Brussels and latterly in Geneva. He has managed many activities in the EBU, the European Commission's IST programme, and standards bodies such as the ITU. His standards' achievements include ITU Rec 500, 601, and Rec. 709-3, the Recommendation for High Definition Television. His favourite subject is psychophysical methods of picture and sound quality evaluation, but he knows that he is one of only five people who are so interested, so he works in other areas, too.

A neighbour once told me that "we love standards in the computer business - that's why we have so many of them".

In broadcasting, we were lucky. We lived in a well behaved standards world, largely of our own making. How many hundreds of millions of standard DVB sets are there out there? Wow! Could we feel smug.

But today, for 3D TV, we should be concerned about fragmentation. There is no shortage of options or companies working independently in 3D TV. Most of them want a common standard - just as long as it's theirs.

"In circumstances like this, you can always make equipment that copes with any and every technology."

And there is more.

Just look across the hall, and see what's happened in the Blu Ray world. Last December they announced the standard they will use for 3D TV. It is what the ITU-R categorises as a 'Service Compatible' format. It is a normal 2D picture plus an additional signal that, together with the 2D picture, creates the L/R pair needed for 3D TV. The additional signal will use technology developed in the JVT (the joint group of MPEG and the ITU-T) called 'MVC'. Blu Ray have thus made an unilateral decision on a baseband format for 3D TV.

Maybe it was understandable, but I believe this is actually the first time this has happened. Though Blu-Ray has made its own decisions about video compression, the packaged media baseband formats have always been those internationally agreed for broadcast services (that is, 625i/50, 525i/60, 720p/50_60, 1080p/24, 1080i/25_30). They had been agreed by everyone in worldwide standards bodies first.

Now, we know that the first 3D TV Pay TV broadcast services that will start later this year (at about the same time as the new 3D Blu Ray discs come out) plan to use another format called the 'Frame Compatible' approach.

This is quite different to the Service Compatible approach. The left and right pictures are 'unravelled' in quite different ways.

In circumstances like this, you can always make equipment that copes with any and every technology. First generation 3D TV displays will have to allow for a range of inputs, as will the HDMI connector.

Of course, there are good reasons for the choices - there always are. But where is the public interest? Where is the long-term interest?

Apart from Frame Compatible broadcasting, there are some broadcasters who believe they will need a 'Service Compatible' broadcast approach. Within that, there are those who believe that using the MVC system is not the best way to do it.

But what about 'Mr and Mrs Joe Public'? Will they be able to tell the difference between any of the formats?

I once calculated the cost to society of the indistinguishably different colour TV formats - PAL; SECAM, and NTSC. You would be surprised how many extra hospitals we could have built if we had just one colour TV standard.

We moved from the analogue to the digital SDTV TV age 20 years ago in a wave of euphoria for having at last just one standard worldwide - this was 'ITU-R Rec. 601'. We nearly did the same with HDTV - though the 1080i/720p debate got in the way, (by the way tests have shown they are near indistinguishable in the studio at least).

Now with 3D TV, we may even have fragmentation worse than ever - even between packaged media and broadcasting. As a DVB Chair involved in 3D TV I will work toward a consensus view, whatever DVB Members wish, but can I be forgiven for hoping that we finish with the absolute minimum number of formats? Let's not have another Blu Ray/HD DVD situation. Our grandchildren, unable to tell the difference between any of them, may ask us why we took a step backwards for 3D TV.

INTERACTIVE ITALIAN STYLE

Hybrid DVB GEM/MHP Middleware At Work: The DGTVi Deployment In Italy

Michael Lagally, Sun Microsystems, Inc. & Chairman TM-MUG

The DVB GEM/MHP specifications for interactive TV are deployed in several countries in Europe. Italy's MHP deployment started in 2004 and recently introduced a hybrid extension for an IP based broadband channel, which enables new interactive usage scenarios. Hybrid broadcast/broadband (HBB) set-top boxes were introduced in Italy in 2009.

This article describes the interactive services in Italy and highlights the recent extensions for hybrid set-top boxes, which use a broadband connection for full interactivity and Over-the-top (OTT) television support.

Digital switchover in Italy started in October 2008 with the isle of Sardinia and will be completed by 2012. When five regions, accounting for 30 percent of the population, switched off the analogue signal in 2009, including the metropolitan areas of Rome, Naples and Turin, the DTT penetration reached over 50 percent. 2010 is a turnover year, as the switchover will involve the whole plain of the river Po including Milan.

DGTVi is the association of Italian broadcasters with the task of driving/promoting the adoption of digital terrestrial TV in Italy. The member companies include national broadcasters (RAI, Mediaset, Telecom Italia Media, Dfree) and associations of local broadcasters.

DGTVi supervises the terrestrial TV market through a tight collaboration with regulatory bodies and the CE industry and creates terminal specifications based on openness, interoperability and technology neutrality.

The basis for STB certification in Italy is the DGTVi specifications for DTT, which define an interoperable, open platform based on:

- DVB-T (SD and HD services)
- Transport protocols and codecs for OTT TV services
- Java
- DVB MHP/GEM
- Multiple Conditional Access systems

A label programme has been conceived to ensure device conformance to the DGTVi specifications and to help consumers identify the products.

ADB 3810T HD Gold Label STB

Compliant devices are typically available in retail shops and not subsidised by pay TV operators. The interactive middleware is built upon Java and adopts DVB GEM/MHP.

A huge set of MHP applications has been continuously deployed during the last five years by Italian broadcasters, with the aim of controlling specific features and enabling more services for the viewer, advertising investors and broadcasters.

Examples for deployed services are:

- MHP EPG and channel information (the EPG is embedded in 70 percent of the MHP set-top boxes and will be on IDTVs soon)
- Interactive Enhancement of TV shows like 'Who wants to be a millionaire?' are the most successful interactive application with thousands of registered viewers
- Premium services portal, promotion and marketing
- Interactive ads

Interactive DGTVi application

In September 2009, DGTVi released the Broadband Addendum for the HD Book DTT 1.0, which targets HBB scenarios. It defines media delivery over broadband lines under broadcasters control (OTT) and is an integral and substantive part of the HD Book.

The specification is partially based on specifications from the Open IPTV Forum and defines profiles on media formats, services, containers and protocols.

Hybrid/DGTVi Gold label MHP HD boxes are already on the market; full Broadband Addendum support will be added via OTA update by 1Q10. Gold label Connected IDTVs from leading manufacturers will follow soon.

DGTVi member companies are constantly screening the market in search of new hybrid content/services, which benefit from the hybrid DVB-T/IP channel. Catch-up TV and interactive advertising are currently considered

Mediaset i-launcher

the most promising hybrid services. An example of a hybrid service currently prototyped is the Mediaset i-launcher, an innovative launcher/portal, which enhances the traditional viewing experience by managing media content and applications/widgets over best-effort and unmanaged networks.

Various other catch-up TV and OTT services will get developed, both for FTA and pay content. OTT counterparts of existing catch-up TV services for PCs by RAI , Mediaset and LA7 are currently being defined.

It's now been several years since an MHP/GEM based digital TV platform was successfully rolled out in Italy offering a broad range of applications. Hybrid boxes with a broadband return have been deployed for more than 6 months enabling VoD, catch-up TV and new OTT interactive services. Further new interactive services are already prototyped and will be deployed in the near future. The 'Italian profile' of GEM is very attractive and represents a powerful environment in which the development of compelling hybrid OTT TV services will soon become a reality.

Michael Lagally represents Sun Microsystems in several standard organisations such as the DVB, JCP, Open IPTV Forum and the Blu-ray Disc Association. He is a specification lead in the JCP and chairs the DVB-MUG working group, which created the GEM specifications. He would like to thank Antonio Gioia of Mediaset for his valuable contributions to this article.

4K VISION

DVB-T2: RAI Research Demonstrates Full 4K Digital Cinema Quality On Terrestrial Channels

Gino Alberico and Daniele Airola Gnota, RAI-Radiotelevisione Italiana, R&D Department

Now that HDTV is becoming a commercial reality, the research labs of the broadcasting and consumer electronic industries are exploring future TV formats capable of providing an even more immersive and captivating experience for the viewer.
The most innovative project in this domain is the Super High Vision (SHV) project from the Japanese public broadcaster, NHK, which offers an outstanding user experience with the so-called 8K format, which delivers a picture resolution of 7680 x 4320 pixels, equal to 16 times that of today's HDTV.

"...the 4K production format opens the possibility of making high value productions, such as sports, dramas and documentaries in the best possible quality..."

At IBC 2008 NHK, RAI and the BBC demonstrated the delivery of 8K SHV pictures via satellite using DVB-S2 technology ('Super Future - DVB-S2 Enables 140 Mbps Super Hi-Vision by Satellite at IBC 2008', DVB-SCENE No. 27).
In the last two years, a clear trend in the increase of display dimensions and resolution has been noticeable at the Consumer Electronics Show in Las Vegas. Several leading CE manufacturers have presented prototype flat screen displays with 4K resolution and dimensions of 60 to 180 inch diagonal.
In September 2009, in the framework of its eightieth year anniversary celebrations, the RAI Research Centre demonstrated the live transmission of 4K video over a digital terrestrial channel in the Turin area.
Why 4K resolution? This is the highest quality format currently used for digital cinema, and is also the ideal resolution for the largest display we would dare to hang on a living room wall (i.e., 80 to 100cm high) without raising too many objections from our partners.
This is also the maximum resolution we can afford on a digital terrestrial channel using today's most advanced technologies with MPEG-4 picture coding and the DVB-T2 transmission format.
For this purpose, a twelve minute 4K video clip was specially produced by the RAI Production Centre in Turin using a mix of artistic and real-life shots in Turin.

Shooting and Post Production

While 4K production for cinema is not revolutionary, it is for television. The purpose of the 4K production at RAI was to explore the typical conditions for television production in the field, employing TV professionals limited to short production times in mostly uncontrolled environments typical of live scenes.
A Red One, 4K format camera (4096 x 2304 pixel at 25 frames/s in progressive scan), with mounted Angenieux zoom-lenses (HR 25-250 T3.5 and 17-102 T2.9 models) was used for the shoot.
The Red One is equipped with a 12 Mpixel Bayer sensor (same size as Super 35mm format) and the video signal is compressed with JPEG2000 technology at 288 Mbit/s and stored on embedded hard disk drives. For monitoring purposes only an HD version live signal (1280 x 720p50) was available to the camera operators and the artistic assistants.
The post production was performed in two stages: after capture, the video material was offline post produced and edited with special effects in HD format (1920 x 1080) using an Avid Media Composer. The project was then imported onto the Avid DS platform for colour grading (correction) and conforming (finalisation) and applied to the 4K native material. A significant amount of time was required for final rendering.

Encoding & Transmission

For delivering the content, state-of-the-art technologies were required for encoding, transmission, decoding and display. Therefore, the choice was the newly born DVB-T2 standard which provides sufficient capacity to deliver 4 HDTV (1920 x 1080) signals in a terrestrial UHF channel. This is equivalent to an aggregate resolution of 3840 x 2160, which is actually very similar to the resolution provided by the Red One 4K camera. So, after scaling from 4096 x 2304 to 3840 x 2160 pixels with 25 Hz progressive scanning, the resulting video clip was then split into four full-HDTV (1920 x 1080) streams, each one software encoded using H.264 technology (High Profile Level 4). The four 1920 x 1080 streams resulting from the encoding were then multiplexed to produce a multiprogram Transport Stream.
Different configurations of useful bit rates were produced - 36 and 45 Mbit/s. Particular attention was taken to maintain the synchronisation of the streams throughout the whole end-to-end chain in order to make the 4-quadrant splitting of the picture undetectable on screen. In the near future, the use of H.264 with High Profile Level 5.1, currently under testing, will be capable of handling the

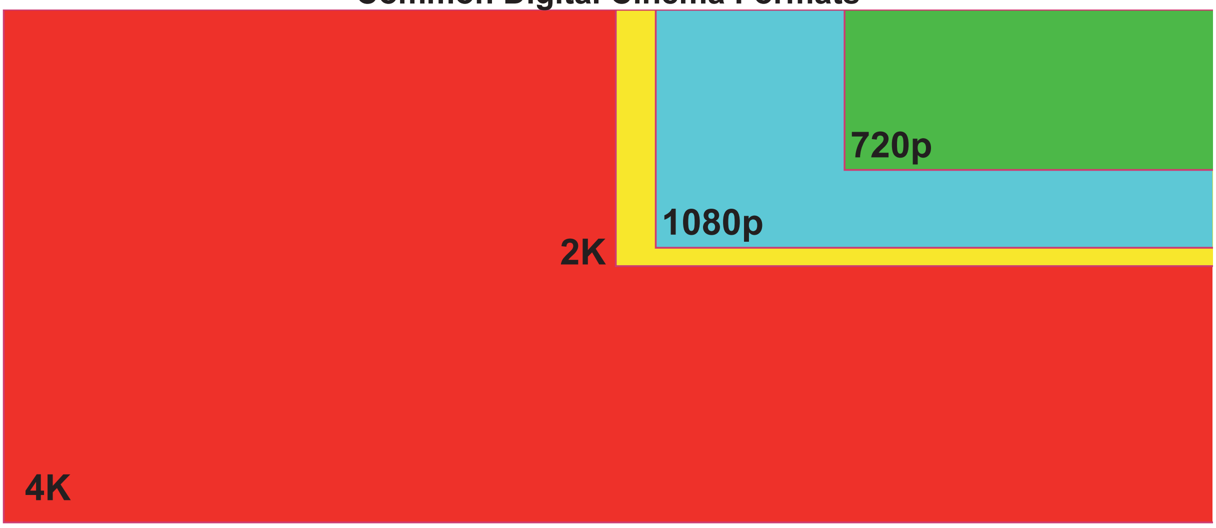
entire 4K frame, thus removing any synchronisation issues.
Real transmission on channel 29 UHF from the Torino-Eremo transmission site was carried out using DVB-T2 with the following parameters: 256QAM constellation, 32K OFDM mode, and Guard Interval 1/128. Two different FEC values were used in order to test two different configurations with a useful bitrate ranging from about 36 Mbit/s (FEC 3/5) to 45 Mbit/s (FEC 3/4), therefore allowing an average capacity for each of the four HDTV streams from 9 to 11 Mbit/s.

The DVB-T2 signal was successfully received downtown using a conventional terrestrial aerial and a DVB-T2 prototype receiver. The Transport Stream was sent to four parallel H.264 decoders with synchronised video output. The DVB-T2 configuration with FEC 3/5 and 36 Mbit/s capacity required approximately the same C/N ratio (16 dB for BER = 10^{-7}) of one typical DVB-T configuration (64-QAM, FEC=2/3, 24 Mbit/s capacity) while providing 50 percent more capacity. The configuration with FEC=3/4, providing an 88 percent capacity increase, required additional 4 dB (C/N=19.9 dB for BER = 10^{-7}). The four HD quadrants were reassembled and displayed using both an Astro Design, DM-3400, 4K x 2K (3840 x 2160) 56 inch LCD monitor and a high performance Sony 4K digital cinema projector providing really impressive pictures on a 200 inch screen.
In both cases, namely 36 and 45 Mbit/s coding/transmission, the 4K picture quality was very high and not affected by unacceptable coding degradation. Nonetheless, a future 4K delivery system should aim at 50-100 Hz progressive scanning for better motion portrayal, especially for sports and action films. We can expect that the new coding standards, currently under development by MPEG and the ITU with promised improvements of 30-50 percent in efficiency, will allow one to two high fidelity 4K programmes in a digital terrestrial channel.

Conclusions

The advantages of the 4K production format opens the possibility of making high value productions, such as sports, dramas and documentaries in the best possible quality, suitable as an optimal source for different distribution channels and media such as cinema, DVDs, pay and free broadcasting (even when downscaled to HDTV), Video-on-Demand and internet. While at the same time, in the medium term, the consumer market will offer reasonably priced 60-80 inch displays, with 4K or even higher resolution. The 4K trial in Turin has been a first and important experience to verify all the implications of such a scenario in a broadcast environment, starting from the TV production through to delivery to the home. The possibility of delivering the 4K native format quality to the viewer through a broadcast channel has proven to be realistic thanks to the DVB-T2 standard. The final emotional impact on the audience was impressive. When flat screens as large as one meter high become affordable, surely this is the quality to aim for!

Common Digital Cinema Formats



NETWORK **IDs**

Managing DVB Identifiers In Terrestrial Networks

Alexander Adolf, Condition-ALPHA & Chairman TM-GBS

In the first article of my unofficial series on DVB-T ('Warning! Warning! Television Can Save Lives', DVB-SCENE Issue 31), I looked at what features of DVB-T and DVB-SI can be used to build a warning system to assist civil defence. In this second article, I will explain some of the more basic issues around the use of SI identifiers with an eye on terrestrial DVB-T and DVB-T2 networks.
As defined in the SI specification (EN 300 468), the SI guidelines (TR 101 211) and the SI identifiers (TS 101 162), the network_id (NID) and original_network_id (ONID) have clearly distinct semantics. The ONID identifies the source of the broadcast content; in many cases a broadcaster. Whereas the NID identifies the delivery system; e.g., a satellite, a cable trunk or a terrestrial cell (see Fig.1).

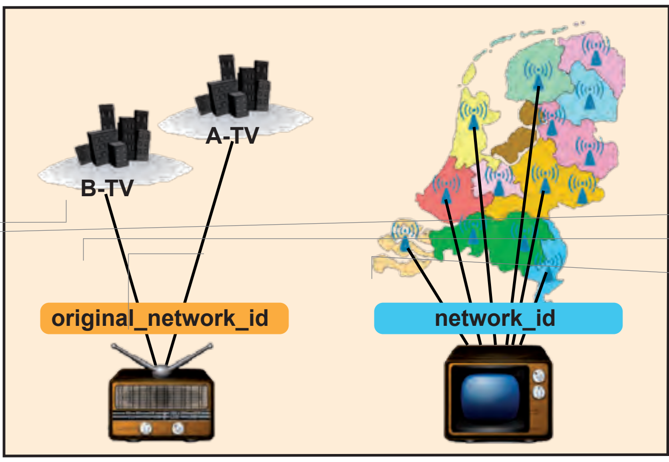


Fig.1

In satellite and cable networks, the distinction between the two identifiers is easy. The network operator obtains one or more NIDs for the frequencies they operate, whilst the broadcaster obtains a single ONID for the content they provide.
The terrestrial case is much more prone to confusion. Typically, the public national broadcaster is also the operator of the terrestrial network. But they also provide the content, so the roles are much less clearly separated. The following Q&A covers the relevant points.
Q: According to the 4-colour map and TS 101 162, our country has a NID of 0xXXXX, but we also have an ONID of 0xYYYY. Shouldn't they be the same? We already have a NID of 0xYYYY for satellite; couldn't we use that on terrestrial?
A: The short answers are no and no. Since the ONID denotes the source of the content, in your SFN case it will have to be different from the NID, which denotes the delivery system. In an MFN case you would have used multiple NID anyway.
Q: According to ISO 3166-1, our country has the country code XXX. Can we get 0x2XXX as the ONID?
A: The short answer is no. It is true that, in the past, this scheme was often used as a means for receivers to differentiate domestic from foreign terrestrial services. To provide a complete and comprehensive solution for this problem, DVB has introduced the target_region_descriptor (TRD). This descriptor gives an up to 4-level hierarchy of geographical regions and their names. It associates networks, bouquets, transports or individual services with these regions. During setup, the user picks their area of residence and then can automatically be presented the appropriate service list. No more special case handling is needed (see Fig. 2). Consequently, it is no longer appropriate to adhere to the old ONID allocation scheme.

Another, related area of questions is the identification of services. If only EN 300 468 is being followed, the triplet (ONID, transport_stream_id (TSID), service_id (SID)) uniquely identifies a service.
If TR 101 211 is being followed in addition, then the tuple (ONID, service_id) uniquely identifies a service.
Q: We are now adding commercial TV cable services to our existing DVB-T network. All terrestrial broadcasts have to use our ONID and now commercial TV SID and TSID values overlap with our regional programmes in some of the provinces. What should we do?
A: Unfortunately, this use of the ONID is not in line with EN 300 468 and TS 101 162. If there is any chance, we strongly recommend changing your regulations to allow commercial TV to use their own ONID on the terrestrial network as well. Making use of the TRD, receivers will not need to implement any special case at all for your country. Until such time you will have to employ a kludge scheme to prevent number clashes.
We recommend that you assign distinct ranges of both, SID and TSID values to your national broadcaster and to commercial TV. This scheme should be communicated to receiver manufacturers.
So in summary, the use of the four most prominent SI identifiers is quite straightforward. The picture gets more blurry however, if the same organisation assumes several roles at once.
However having studied this article, it will hopefully be much easier for you to keep in mind what each identifier's purpose is. As further reading, I recommend – and in this order - the definitions section from EN 300 468, the whole TS 101 162 and selected sections from TS 101 211.

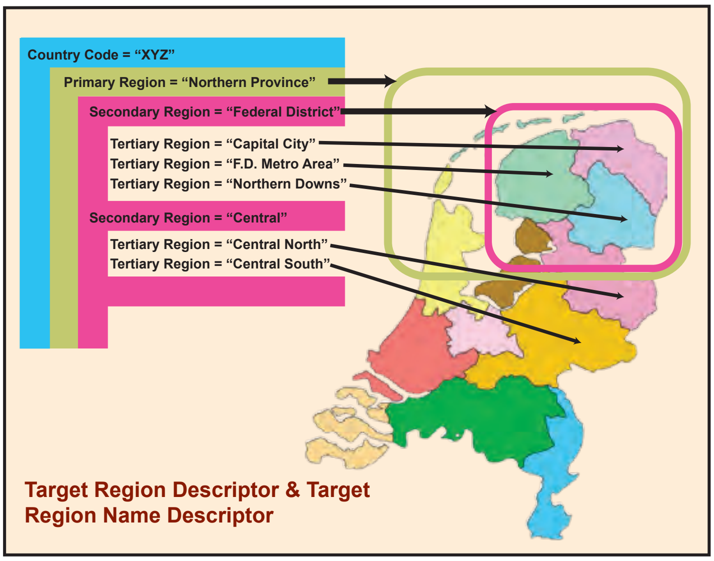


Fig.2

UNIQUE **SIGNATURES**

Transmitter Signature Signalling

Mike Brooks, Head of Development (DVB), Terrestrial Broadcast, Arqiva

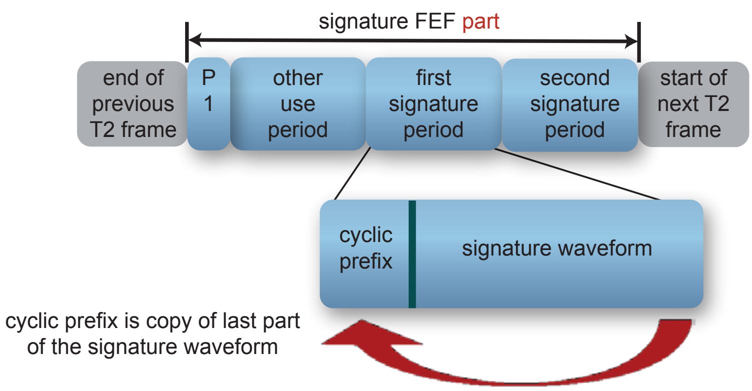
During the development of the second generation digital terrestrial transmission standard (DVB-T2) it was noted that when operating large Single Frequency Networks (SFNs), it would be advantageous to be able to identify the contribution being made by any individual transmitter at a particular location
SFNs using OFDM, as DVB-T2 does, require that the same waveform is emitted by all the constituent transmitters. By doing so, it appears to the receiver that a single transmission has been received, albeit with transmitters in the SFN appearing as 'echoes' of the primary signal.

"...intended to provide a quick and simple method of identifying which transmitters are contributing to the total field strength at a particular location"

As all transmitters are emitting the same signal, it is not easy to distinguish and identify the contributions made by each one to the total signal.
Whilst not necessary for the reception of the services by normal consumers, Network Operators could make use of information about the contributions from individual transmitters as part of:

- Commissioning a new SFN
- Adding an additional transmitter to an existing SFN
- Checking the coverage afforded by a network, including assessing the contributions provided by each transmitter
- Monitoring and troubleshooting a network during its normal operational life.

Each of these scenarios places slightly different constraints on any solution for the transmission of transmitter 'signature' information.
For example, during commissioning, it may be possible to insert symbols into the radiated signal which would cause interference to normal reception, but which obviously would not be viable during normal operation.
In addition, due to the imminent roll out of commercial networks in several countries, and the commensurate state of development of demodulator silicon, whatever solutions are proposed must not fundamentally change the DVB-T2 physical layer specification or the normal operation of a receiver.
Therefore, in order to satisfy all of these constraints, the latest specification from the T2 Ad-hoc Group of the Technical Module 'Structure and modulation of optional transmitter signatures (T2-TX-SIG) for use with the DVB-T2 second generation digital terrestrial television broadcasting system', offers two different methods of transmitter identification. The Network Operator is free to choose to use none, either one method alone or indeed both, depending on the specific application.
The first method makes use of what are called 'Auxiliary Streams', incorporated within the DVB-T2 specification as placeholders for undefined data.
Auxiliary stream data typically occupies 'spare' data cells at the end of each T2 frame.
As the exact modulation of the 'Cells' associated with these streams is not defined in the DVB-T2 physical layer specification (just the signalling of their existence and their location), all first generation T2 demodulators will ignore any data within them. It is therefore possible to insert different and unique data at each transmitter in the SFN without affecting the ability of a consumer's receiver to decode the services. A professional receiver can identify the unique signature from each transmitter and determine the signal level being received from that transmitter.
The second method makes use of another placeholder written into the DVB-T2 physical layer specification, that of Future Extension Frame, or 'FEF'.
Within the DVB-T2 physical layer specification, a FEF is a T2-like frame, the exact nature of which is undefined, but whose presence is signalled simply by 'start of frame pulse' known as a 'P1 symbol'.
As a result, again, first generation demodulators will ignore this element of the signal, allowing different data to be inserted at each transmitter site within an SFN.
This signal placed in the FEF makes use of 8 predefined signature patterns, which are orthogonal in nature, so when combined in pairs, allow up to 64 transmitters in an SFN to be unambiguously identified at the monitoring point. For SFNs of greater than 64 transmitters, the location and design of monitoring points would need consideration, but in real networks it is unlikely to represent a significant constraint.
The first approach is intended to provide a quick and simple method of identifying which transmitters are contributing to the total field strength at a particular location, such as for coverage measurement, whilst the second allows a more comprehensive monitoring of a network.
For example, by using the unique signature section of a radiated FEF, it would be possible to measure the Impulse Response of the channel from each individual transmitter to the monitoring point. From this it would also be possible to uniquely calculate the frequency offset of each transmitter in the network, thereby enabling corrective action to be taken before an unlocked transmitter becomes an interferer within the network.
Of course, both of these techniques are separate to the 'Cell_Id' which is carried in the L1-pre signalling defined within the DVB-T2 specification, and so will be identical in all transmitters within an SFN.



the structure of the signature FEF part(not to scale)

THE RUSSIAN PLAN

Dmitry Tkachenko - Head of R&D, MART - Mighty Apparatus for Radio Broadcasting & TV

On December 3, 2009, the Russian government adopted a Federal Programme for the development of TV and radio broadcasting in the Russian Federation for the years 2009 – 2015. The first intensive discussions and activities on the transition to digital TV (DTV) in Russia started in 1997 and an initial comparison of DVB-T and ATSC systems was made. In the end the DVB-T system was considered to be the more suitable for Russia, because it fits smoothly into the existing frequency plans of Russia and its neighbouring countries.

TV channels are available via free-to-air reception and cable networks. However, in the small towns and villages only a few TV channels are available and in some cases several million people have access to only one terrestrial channel or none at all.

One of the main targets of the Federal Programme is to ensure access to at least 20 terrestrial DTV channels for the entire population of the country.

On June 24, 2009, the President of the Russian Federation, Dmitry Medvedev, approved a list of obligatory national DTV channels that should be available

2015) simultaneous broadcasting of the same channels in both analogue and digital is expected. Construction of the network for the first DTV multiplex is going to be completed between 2009 – 2013, and construction of the networks for the second and the third multiplexes will be done in 2013 – 2015. The networks of the fourth and the fifth multiplexes may carry HDTV and DVB-H mobile TV channels with interactive services.

Within the framework of the Programme more than 6500 broadcast stations are going to be equipped

"...more than 17 million square kilometers located in 10 time zones, the country is divided into five broadcast time zones broadcasting national TV programmes with corresponding time shifting."

On May 25, 2004 the Russian government approved the DVB system as the basis for Russia's national DTV standard and the preparation of the DTV transition programme began. A number of pilot areas and commercial projects for DVB-T broadcasting were established. The first DTV pilot area in Russia, equipped with a MART DVB-T transmitter, was launched in Nizhny Novgorod in 2000. It was subsequently followed by numerous projects and trials in a number of cities and regions – Moscow, St. Petersburg, the Hanty-Mansijsky region, Mordovia, Kurgan, Tatarstan, the Sverdlovsky region, etc.

The transition to DTT in Russia is a very challenging proposition. With more than 17 million square kilometres located in 10 time zones, the country is divided into five broadcast time zones broadcasting national TV programmes with corresponding time shifting. The penetration of TV services is very different in the various regions. In the big cities, several tens of analogue

for free-to-air reception throughout the country. The list includes eight TV channels and three radio channels.

According to the Federal Programme, these channels will be broadcast within the first DTV multiplex (i.e. within one physical terrestrial TV channel with 8 MHz bandwidth) using MPEG-4 compression. Construction of the broadcast network for the first multiplex will be financially supported from the state budget. The second and third multiplex should be available by 2015 with the participation of private investors. By then 20 DTV channels along with some regional channels are expected to be available for the citizens of the country.

The Programme will be implemented in several stages. At the first stage, the system projects for the regional DTV networks are to be developed.

Frequency planning for the whole country is a complicated task due to lack of frequencies, because during the transition period (expected to end

with new DTV transmitters and a considerable part of the antenna feeder systems will be upgraded.

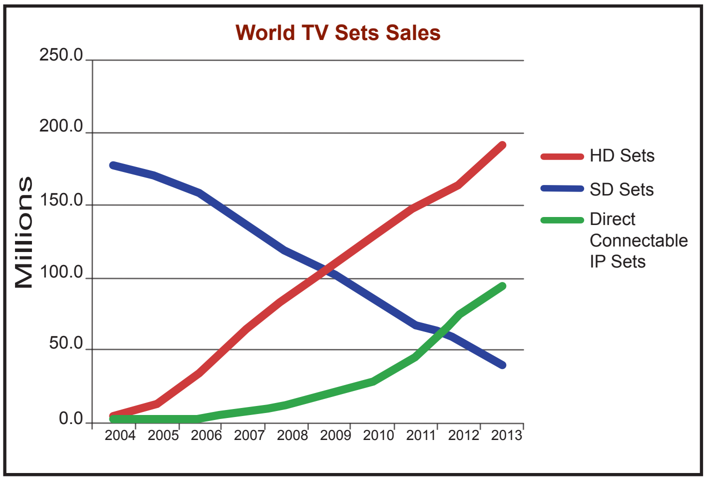
For the distribution of DTV signals to terrestrial networks, four new satellites 'Express-AM' are to be launched between 2010 and 2013. Also in the framework of the Programme, more than 200 high power DRM transmitters for LW, MW and SW bands are going to be installed as well as 370 additional FM transmitters.

The Programme is coordinated by the Ministry of Communications and Mass Media of the Russian Federation.

DRIVING OTT

KEEN ANALYSIS

Internet connectivity comes to the fore as HD displays overtake SDTVs



Global TV shipments of HD panels overtook SD panels for the first time in 2009. However, there are still five times as many SD sets installed around the world as there are HD models. Nevertheless, we estimate there will be over 420m HDTVs in homes by the end of this year.

The demand for HD has been driven in part by channel growth. Western Europe alone has 83 non-duplicated HD channels across all territories, feeding 18.5m HD set-top boxes (STB). However, there are over 95m HDTV sets, so most TVs are not watching HD content. In addition to the STB fleet, almost 20m Blu-ray Disc (BD) players and PS3 consoles are also in the market to enable Blu-ray Disc playback in the region. So even if each device is connected to a different screen, two-thirds of screens will still not have an HD content source.

Globally, the ‘content gap’ between HD capable displays and HD content sources is even more pervasive. The 300m current HD sets installed in homes globally have only 69m HD STBs.

Enabling internet connectivity in TV sets is not an expensive technological feature in terms of putting in the port. Enabling true network connectivity requires additional processing power, a user interface and ability to render information: 1080p screens have enough resolution to display web pages properly but web browsing is not the true driver for connectivity.

Over-the-top (OTT) internet video content and home networking provide more consumer value and will entice consumers to actually connect their connectable sets. OTT video requires specific middleware to integrate properly into a lean-back viewing experience, rendering content to display properly (picture-in-picture or as widgets), using only the TV remote. Unsurprisingly, the supply of this middleware has become a highly competitive space with proprietary solutions like Yahoo’s widget engine being challenged both by vendors’ own home grown technologies and by platforms seeking to become more widely adopted standards such as HbbTV and Project Canvas.

Screen Digest forecasts there will be 26m connectable TVs sold this year – about 20 percent of all HDTVs shipped in 2010.

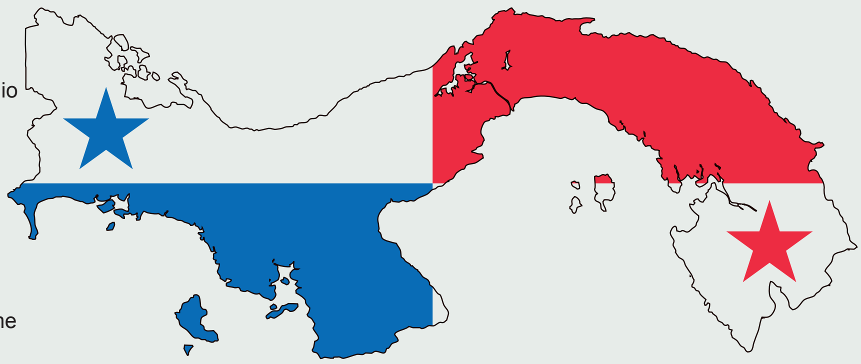
Ben Keen is chief analyst for Screen Digest, a research company focusing on the media and entertainment industries. Screen Digest is a primary source of market analysis and strategic insight for many of the world’s largest communications corporations. More information on the company and its latest research is available at www.screendigest.com.

DIGITAL DOWN PANAMA WAY

William O. Del Río, Department of Radio & Television, ASEP

Panamanian television is entering a new era. The age in which grandparents watched programmes in black and white and young people in the Eighties experienced poor quality reception while watching their favourite Japanese cartoons like Mazinger Z is soon to be consigned to history.
When the digital era came knocking it was well received by the industry and viewers alike.
The National Authority of Public Services (ASEP), the entity responsible for the digital TV project in the country, recently wrote a page in the history of the industry when it allowed the state channel SERTV to broadcast the first DVB-T signal.
December 10, 2009 will go down as the start of the digital TV era and the beginning of significant challenges for the industry, and for Panamanians who do not wish to lag behind in matters of technology. But how did it all begin?
In 2002, the country initiated the first studies into deciding the best digital format for free-to-air TV. Technical trials carried out in 2008 produced results that were a key factor in the decision to adopt DVB-T.
Before choosing DVB-T, ASEP and a committee comprised of representatives from the University of Panama, the Technological University of Panama, the National Department of Science and Technology (SENACYT), the State Radio and Television Entity (SERTV), the National Institute of Vocational Training for Human Development (INADEH), and representatives of radio and television franchises carried out tests with ATSC and DVB-T. These tests took place at 36 points across the country each with a range of 20 kilometres, to select the best digital system.
With the results in from the tests, Panama gave permission to proceed to the digital television era and became the third Latin American country to welcome the European DVB standard for free-to-air broadcasts. There are many pay TV services using DVB in a number of Latin American countries. A date has been set for the introduction of digital television to the people of Panama. This year will see advertising campaigns that will kick-off the new digital era whereby passive, silent and mundane television will be relegated to the past and transforming into the complete opposite: interactive, friendly, entertaining, affective and obliging.

It will interact with and satisfy, the information needs of viewers when they wish, employing only a remote control.
Although SERTV is currently the only digital terrestrial broadcaster, Panamanians are hopeful that DVB-T decoders and integrated TV sets will soon be on sale. Everything points to the fact that, with the appearance of trials by MEDCOM Y TVN-2, the market will begin to follow suit to establish the transmission and reception of free-to-air TV.
ASEP has completed what it set out to do. When the first digital signals were transmitted, it immediately provided the country's industry with the minimum technical parameters for the import of DVB-T IDTVs and set-top boxes.
With the adoption of the specifications, ASEP is seeking to stimulate consumer interest in viewing the new digital broadcasts and ensure that the market is prepared for the official launch on the transition date.
ASEP needs the people of Panama to understand that these trials will not affect the operation of the current television service, and analogue televisions in homes and available in stores will continue to function without any problems.
ASEP has ordered vendors to inform consumers as to whether or not a television is able to receive the digital signal with the minimum technical specifications adopted for the Republic of Panama. This will help the consumer decide whether or not they wish to purchase the item. It is estimated that the population of Panama will total 3.5 million inhabitants this year, with approximately 770,000 television receivers (calculation based on data from the Office of the Comptroller General of the Republic of Panama).
As the clock ticks on, Panamanians longingly await the service that will officially commence the transition from analogue to digital. This is why ASEP has set a deadline of November 2010 for the preparation of the technical guidelines and standards required to enable the organised implementation of the DVB-T standard in the country.



MARKET WATCH

Rover DM21 4HD Multistream Monitor

Rover's professional TV/FM & SAT multistream broadcasting analyzer, model DM21 4HD, has a light and compact design. With LCD and 4.5" TFT 16:9 colour displays, it is an ideal instrument for broadcasting station technicians and is useful in transmission and reception stations. It includes a DVB-S2 multistream demodulator, MPEG-2/MPEG-4 SD/HD decoder and can carry out RF, spectrum, MER, SNR, bBER/aBER, PER/MPER measurements and provides error counter, impulse response, constellation and cell ID indications. www.roverbroadcast.com

Fresco Microchip FM1151

Fresco Microchip recently unveiled the latest addition to its field-proven FM1100 family, the FM1151, which the company claims raises the bar for superior broadcast and advanced design flexibility while significantly lowering system solution costs. The company recently announced 'over one million units shipped' following design wins with several of the world's leading and largest TV tuner manufacturers. www.frescomicrochip.com

Neotion is launching a new security module that has Conax chipset pairing. It is aimed at pay TV operators that have chosen the latest generation system from the Norwegian based conditional access provider. These CAM modules are designed for digital TVs and CI set-top boxes. The chipset and CAM have successfully undergone the CAS vendor's security evaluation process and have received the highest security level ever reached by its modules licensees. www.neotion-pocket.com

Neotion Module With Conax Chipset Pairing

The **TeamCast** Vega RF channel simulator is a powerful tool to test and qualify mobile and fixed receivers in real time for all current digital TV standards. With a corresponding reference generator, it can reproduce signals with the typical distortions of a real channel, to verify the good behaviour and limits of receivers to be used in the field. Dedicated to the test & measurement market, it exists in rack mounting and bench unit. www.teamcast.com

Comtech EF Data's CDM-750

Comtech EF Data's CDM-750 advanced high-speed trunking modem combines DVB-S2, ACM and DoubleTalk Carrier-in-Carrier technologies, providing efficiencies and throughput that will benefit even the most demanding point-to-point and backhaul links. It was designed with the needs of telco operators and ISPs in mind. The innovative, high-performance architecture allows efficient networking and transport over satellite links for a variety of applications – IP trunking, G.703 trunking, high speed content delivery, and disaster recovery/emergency communications. www.comtechefdata.com

WORK Microwave's DVB-S2 IP Modem SK-IP is designed for high speed network layer 2 and layer 3 operation. The device uses generic stream encapsulation according to TS 102 606. In addition, the modem has a multichannel ACM system (OptiACM) to support full integration of ACM capabilities in satellite network links. The combination of these two core features provides optimised data throughput in all usage cases and under all types of environmental conditions. www.work-microwave.de

WORK Microwave DVB-S2 IP Modem SK-IP

The **Pixelmetrix** DVStation-Mini^2 QAM empowers cable operators to optimise the RF fidelity and TS integrity of their networks. It monitors EdgeQAMs in HFC delivery networks and consolidates alarms to an NMS. It also provides on-air content validation, remote service view of MPEG-2/MPEG-4 video/audio and service line-up checks based on NIT contents. Other features include video thumbnailing support for MPEG-2/H.264 SD2HD (sent in the clear) with blackout and freeze-frame tests. www.pixelmetrix.com

Verimatrix announces ViewRight Professional, which combines Appear TV's high density SC2x00 descrambler module with its own software based content security. Accommodating various input and output formats, it performs bulk decryption of multicast IP transport streams to clear multicast IP outputs, or a full decrypt and decode direct to analogue signals. It supports descrambling of streams using AES-128 algorithm, in ECB or CBC modes, and DVB-CSA. Typical applications include IPTV and DVB-IP hybrid network deployments and head-end monitoring. www.verimatrix.com

Newtec's DualFlow feature for its Azimuth product line enables a progressive migration from traditional ASI video satellite transmission networks to IP infrastructures by providing both IP and ASI interfaces. It can be used to transport IP content via satellite allowing broadcasters to transport IP over satellite and transmit traditional MPEG signals or a combination of both IP and MPEG on the same carrier. When used on a modem, it enables two-way IP interactivity over satellite. www.newtec.eu

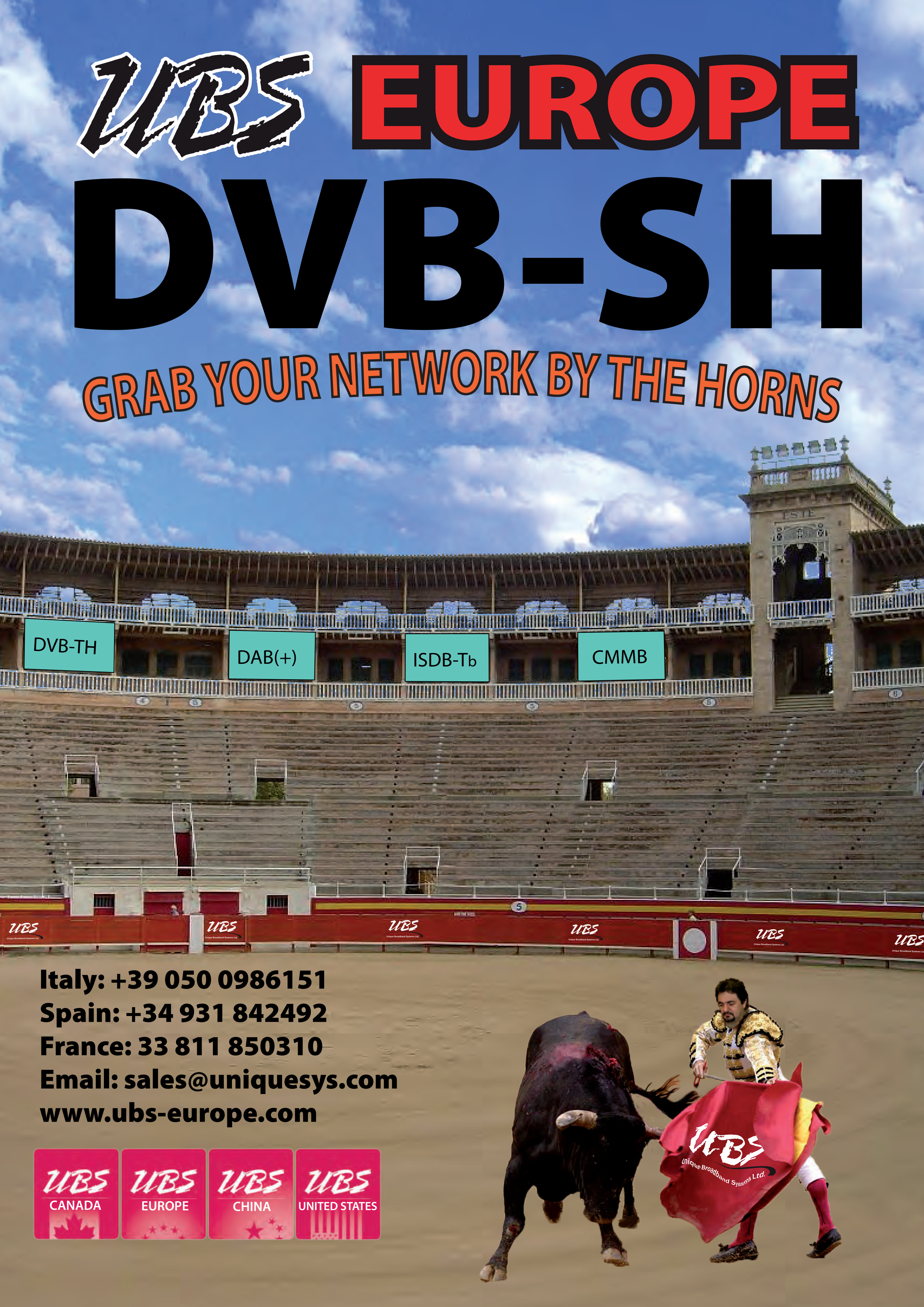
DekTec is releasing the DTU-215, a pocketsize, portable and entirely USB-2 powered multistandard RF modulator. It supports most QAM, OFDM and VSB based modulation standards, including DVB-T2 and DVB-C2. Frequency support from 47 - 1000MHz and is coupled with I/Q playout and a programmable stepped output level from -45 to -5dBm. www.dektec.com

DekTec DTU-215 USB Modulator

DiviDual T2MI, from **Enensys** allows the user to generate, play and record DVB-T2 streams in real time from ASI, IP or file sources. It offers T2MI packet analysis like SFN validation, BB frame, T2 timestamp, and L1 pre and post signalling data. As a mobile solution it is easy to use and the manufacturer claims it is the perfect answer for testing the new DVB-T2 stream from Gateway or Modulator. www.enensys.com

TechniSat's DiGYBOXX T4 VA is a high quality DTT receiver for the reception of unencrypted and encrypted DTT channels in SD and HD quality (MPEG-4). It includes Viaccess CAS with smartcard reader and is approved by Boxer TV. The user-friendly OSD is available in different languages. Due to its 12-volt power connection it is particularly well suited for use while camping. The box is also available with Conax encryption or without any CAS. www.technisat.com

TechniSat's DiGYBOXX T4 VA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DAB(+)
ISDB-Tb
CMMB
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UBS Unique Broadband Systems Ltd.