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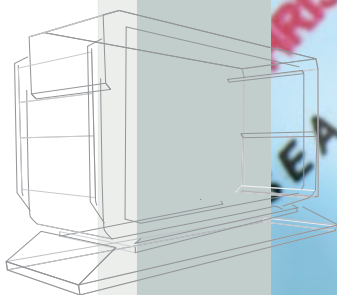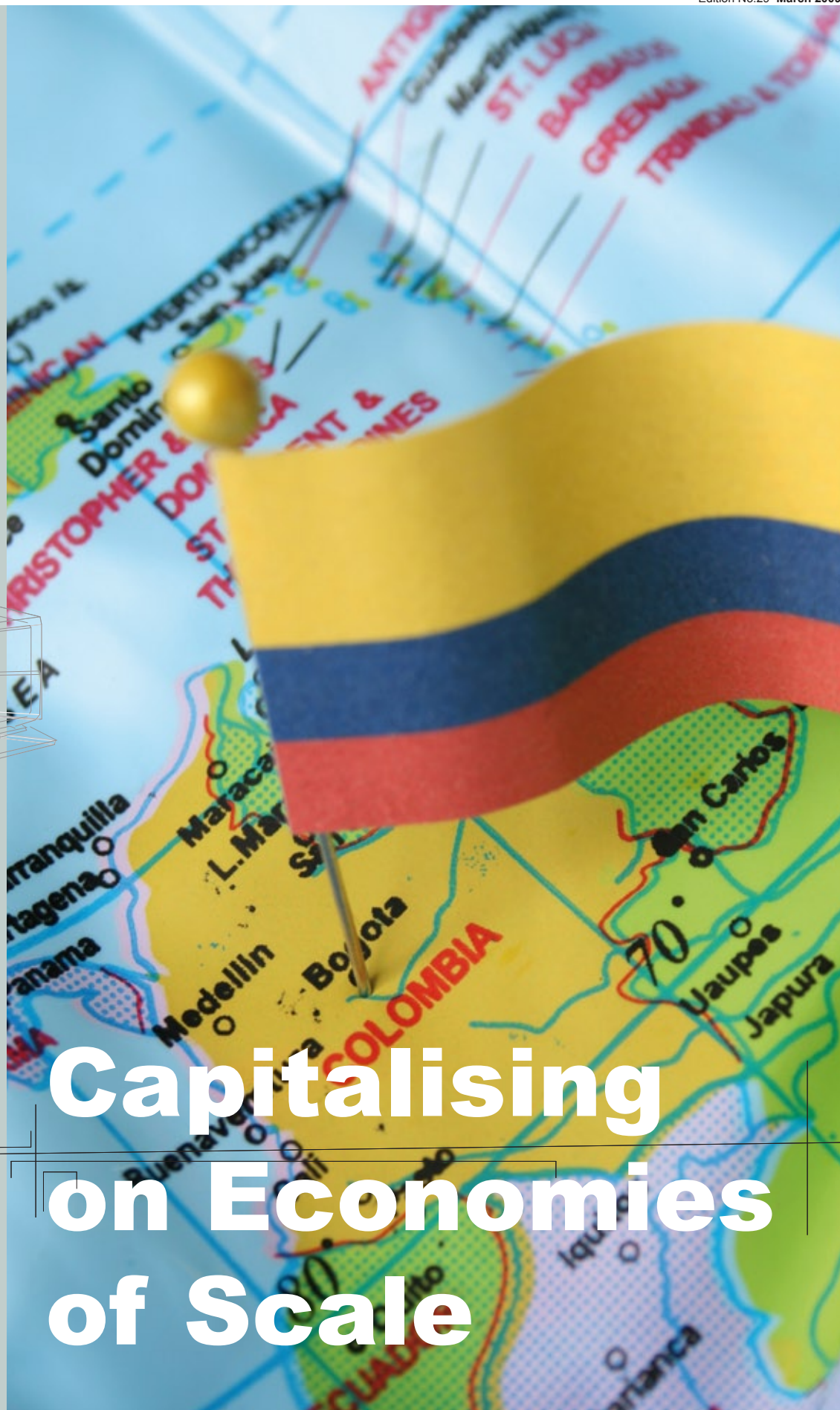
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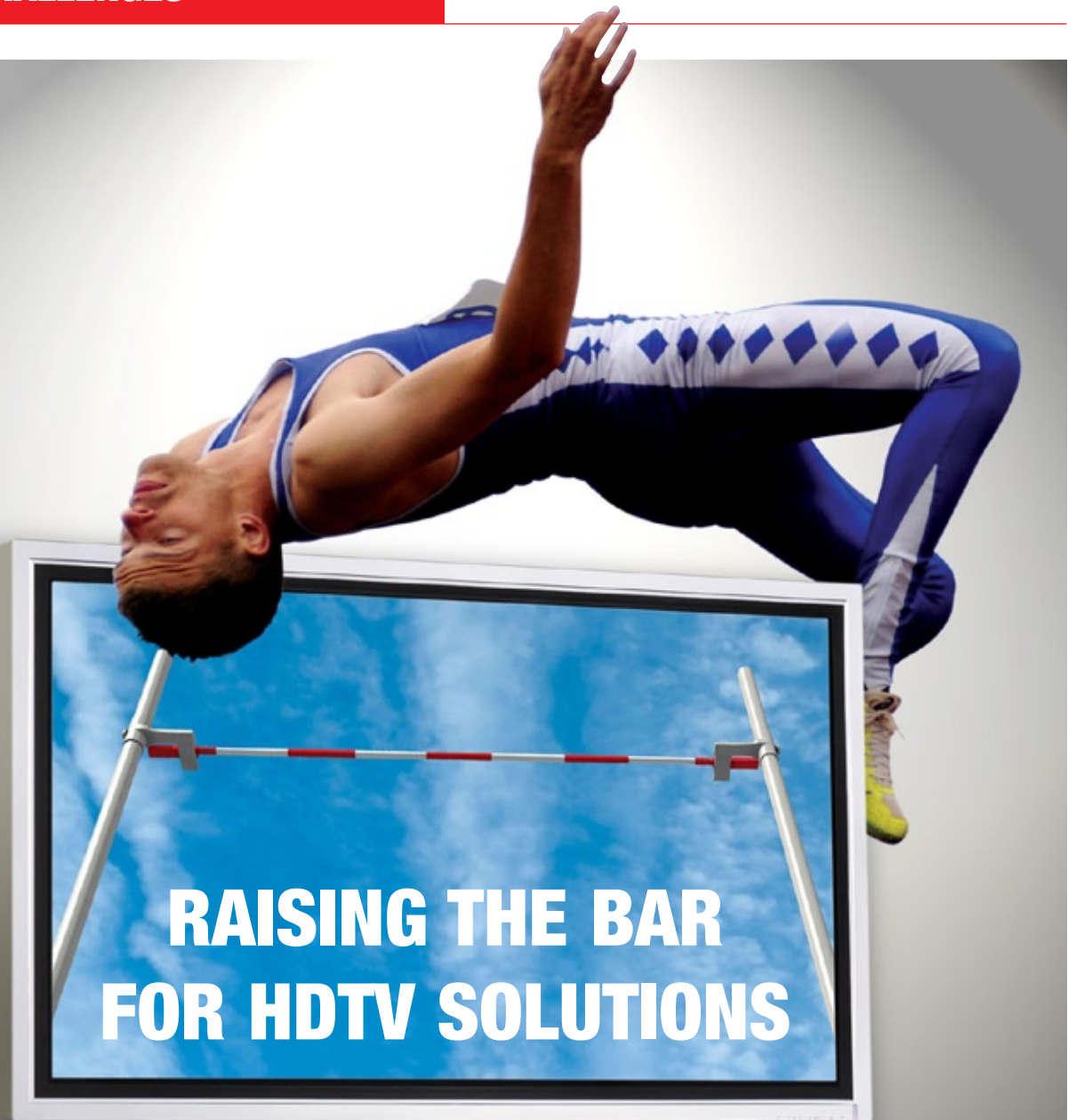
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SPRING TIDES

A word from the DVB Project Office

Eoghan O'Sullivan,
Marketing and Communications Executive

In springtime we see the first shoots of new life; and as the season takes hold (in the northern hemisphere at least), optimism is growing amongst the interactive TV fraternity. The arrival of tru2way – the brand used to market OCAP to consumers – looks set to be the stimulus for interactive to make the big breakthrough for cable markets in North America.

Our guest contributor for the In My Opinion slot in this edition, CableLabs' So Vang, says 2009 will see tru2way being rolled out to a majority of the 70 million US cable households. This could bring the number of deployed devices based on DVB's GEM (Globally Executable MHP) specification towards 100 million, including MHP, GEM-IPTV and Blu-ray. That's a rising tide that's likely to lift a lot of interactive boats!

Looking towards Latin America, we welcomed Colombia into the fold with last year's adoption of DVB-T (following the decision of Uruguay in 2007). This issue brings you an update on progress towards getting services on air – and hopefully creating further momentum towards more widespread adoption of DVB standards in the region. Certainly the figures presented in our Moore Analysis column suggest that DVB's terrestrial standards will continue to drive worldwide growth of receiver sales, delivering further economies of scale.

Finally, I'd like to take a few lines to wish a warm "Willkommen" to Dr. Peter Siebert, who will join us as the new Director of the DVB Project Office in early May, (continuing the tradition of having a Peter in this role!). A German national, Peter has been working with Siemens Switzerland (now Albis Technologies) in Zurich since 2001, having previously worked with SES Astra and Philips. His future colleagues in the Project Office are looking forward to helping him to settle into his new role. So, springtime brings new life to DVB on many fronts!

NEW STANDARDS

TR 101 190 V1.3.1 - Implementation Guidelines for DVB Terrestrial Services; Transmission Aspects (Published 17/10/2008)
TS 102 833 V1.1.1 - File Format Specification for the Storage and Playback of DVB Services (Published 18/11/2008)
TS 102 584 V1.1.1 - Guidelines for Implementation for Satellite Services to Handheld Devices (SH) below 3GHz (Published 18/11/2008)
EN 300 744 V1.5.1 - Framing Structure, Channel Coding and Modulation for Digital Terrestrial Television (DVB-T) (Published 26/01/2009)

NEW MEMBERS

Miniweb - Interactive Service Provider enabling targeted, web-style advertising and interactivity on TV. www.miniweb.tv

TCL Belgium - Electronics manufacturer whose products include mobile phones, personal computers, home appliances, electric lighting, and digital media sold globally. www. tcl.com

TU Berlin - Technische Universität Berlin is one of the leading universities in Germany with an excellent reputation in communication systems and media processing. www.tu-berlin.de

RO.VE.R Laboratories S.p.A. - Develops and manufactures professional equipment for satellite and terrestrial broadcasting. www.roverlaboratories.com

Ximaera Technologies Canada - Provides engineering research and development services for the advanced broadband satellite communications market. www.ximaera.ca

To subscribe free of charge to DVB-SCENE visit: www.dvb.org/subscribe.

FAMILY VALUES

DVB-C2 Joins Family Of Second Generation Transmission Systems

Christoph Schaaf, Kabel Deutschland & Chairman of DVB TM-C2 Group

DVB-C2 is the third specification to join DVB's family of second generation transmission systems. Developed in 1994, today DVB-C is deployed in more than 50 million cable tuners worldwide. With the hunger for bandwidth for both broadcasting and narrowcast services continuing to grow, cable operators asked DVB to develop a specification incorporating enhanced coding and modulation technologies for cable systems.

DVB conducted a study mission and was able to identify several cutting edge technology candidates for a second generation DVB transmission system. The commercial requirements set out by DVB challenged engineers to create a transmission system that combined a high degree of efficiency and flexibility. The target set was to achieve at least 30 percent more spectrum efficiency and to provide the technical flexibility needed to transmit present and future services. Another requirement was that the new specification should contribute to improving the position of cable in what is a very competitive environment. One prerequisite for the development was the clear commercial guidance to follow the successful approach used to formulate DVB-S2 and DVB-T2.

The DVB TM-C2 group was set up and after lively debate decided to select a COFDM modulation scheme that featured the highest spectrum efficiency and required flexibility. A revolutionary element of DVB-C2 is the provision for flexible channel bandwidth allocation that enables the operator to establish big data pipes to the consumer. This is necessary for achieving the maximum benefit from statistical multiplexing for HDTV and for enhancing the quality of high speed Internet access services. While the DVB Transport Stream (TS) is still the preferred protocol in digital broadcasting, DVB-C2 also supports any packetised and continuous input format as well as Generic Stream Encapsulation. All input streams are multiplexed into a Baseband Frame format. The Forward Error Correction (FEC) scheme is applied to these Baseband Frames. In line with the other DVB second generation systems, DVB-C2 uses a combination of LDPC and BCH codes. This powerful FEC provides about 5dB improvement of carrier-to-noise ratio over DVB-C. Appropriate bit-interleaving schemes

optimise the overall robustness of the FEC system. Extended by a header, these frames are called Physical Layer Pipes (PLP). One or more of these PLPs are multiplexed into a data slice. Two dimensional interleaving (in the time and frequency domains) is applied to each slice enabling the receiver to eliminate the impact of burst impairments and frequency selective interference such as single frequency ingress. There are one or more data slices that compose the payload of a C2 frame. The frame building process includes, among other things, the insertion of continual and scattered pilots. The first symbol of a DVB-C2 frame, the so-called preamble, carries the signalling data. In the following step, the OFDM symbols are generated by means of an Inverse Fast Fourier Transformation (IFFT). A 4K-IFFT algorithm is applied generating a total of 4096 sub-carriers, 3409 of which are actively used for the transmission of data and pilots within a frequency band of 8 MHz. The guard interval used between the OFDM symbols has a relative length of either 1/128 or 1/64 in reference to the symbol length (646 µs). DVB-C2 fully meets the commercial requirements in terms of spectrum efficiency. In relation to DVB-C it offers more than 30 percent higher bit rates per cable channel and provides headroom for enhanced CATV networks (see diagram).

Although DVB-C2 is perfectly in line with the European 8 MHz channel raster implemented in cable, one of the outstanding features of DVB-C2 is its flexibility in terms of bandwidth

allocation. Signals broader than 8 MHz will contain different data slices with a maximum bandwidth of 7.61 MHz. Based on DVB-C2 signalling, the receiver will be able to find out which data slice and which PLP is carrying the service it is targeting. It will adjust its fixed 8 MHz wide receiving window accordingly. Hence DVB-C2 allows increased spectrum efficiency and broader transmission signals entailing a higher gain for statistical multiplexing while still maintaining the support for simple receivers with a fixed 8 MHz receiving window. For the implementation of future broadband tuner concepts, DVB-C2 opens more options for all kinds of broadband applications.

One of the big advantages of the COFDM modulation scheme is its flexibility in the handling of cable relevant interference scenarios. The guard interval eliminates the impact of echoes up to 3.5 µs. The scheme is very insensitive in relation to narrowband interference due to the interleaving schemes applied. Narrowband and broadband notching is possible.

The development of the specification is almost finalised and the DVB TM-C2 group plans to present their draft specification to the DVB Technical Module in March 2009.

In my capacity of Chairman of the TM-C2 group I wish to thank all the experts who have participated in the development of the DVB-C2 specification as well as their companies which made their expertise available. My thanks go also to the ReDeSign project for their support.
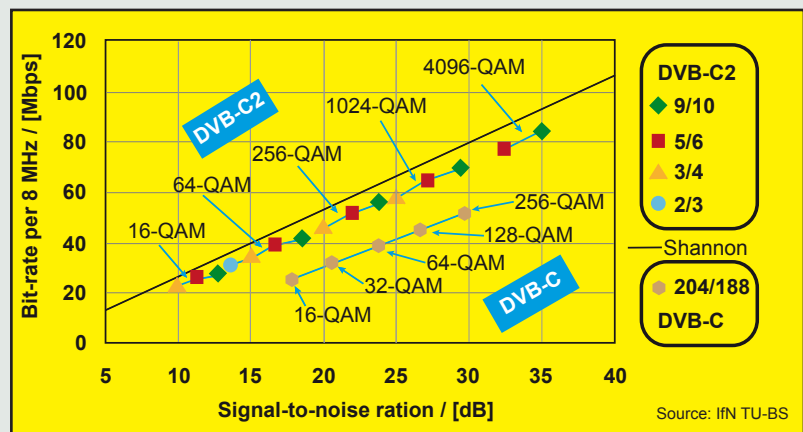
Bit-rate achieved in 8 MHz channels as a function of SNR for DVB-C2 & DVB-C

Source: IfN TU-BS

HOW TO T2

DVB-T2 Implementation Guidelines

Nick Wells, BBC, Chairman of DVB-TM-T2 Group & Oliver Haffenden, BBC, Editor of T2 Implementation Guidelines

DVB-T2 is a new standard for digital terrestrial television broadcasting, offering the benefits of many new techniques not previously used in the DVB family of standards. Some of the techniques are well known in the literature but were modified and optimised for DVB-T2; others are completely novel and were developed specially for DVB-T2. The new technologies include:

a) A 'P1 preamble' which is used to indicate the start of the T2 framing structure,

b) Physical Layer Pipes (PLPs) which can be used to carry individual data streams with individually assigned individual levels of ruggedness,

c) Rotated Constellations, which can provide significantly improved levels of robustness in difficult broadcast channels,

d) Peak-to-Average power reduction mechanisms involving a combination of reserved OFDM carriers and constellation distortions, and

e) Modifications of data cells and scattered pilot patterns in order to enable optimised reception when using transmitter diversity.

The DVB-T2 Implementation Guidelines (IGs) document, recently published as DVB BlueBook A133, gives information about the benefits and use of these new techniques as well as all the other techniques used in T2.

The precise definition of the DVB-T2 physical layer is contained in the T2 physical layer specification, currently available as DVB BlueBook A122r1, which will be published in due course as an ETSI specification. This specification is intended to be precise and accurate but it is not intended that it should contain explanations of the various techniques just in order to help the reader's understanding. The IGs therefore aim to give more extended explanations of the various elements in the specification together with some of the reasons behind the design of the

"Flexibility has been deliberately retained in the standard to allow optimisation for capacity and ruggedness..."

various features of the DVB-T2 system. The IGs attempt to capture as much as possible of the common understanding arrived at by the working group developing the standard. It also gives additional information intended to make implementation easier, to act as a cross-check, and to help implementers to avoid some of the more common pitfalls.

As is conventional for DVB, the specification only describes the generation of the signal on the air. The IGs aim to explain how the features of this signal are intended to be used in the receiver. Also, on the signal generation side, the specification is not always fully prescriptive and the IGs give suggestions for ways to implement certain features; for example, the scheduling of individual transport streams within PLPs within the T2 framing structure may be performed

in any manner provided certain constraints or conditions are met. The IGs suggest some methods by which this scheduling can be carried out. The specification describes a set of conceptual processing blocks which convert the input data streams into the modulated signal to be broadcast. Each processing block does not necessarily correspond directly to a physical module of equipment. For example, the IGs explain how a T2 modulator actually contains elements of a 'T2 gateway' (from which a common, T2 specific, data stream is distributed

to multiple transmitters in a single-frequency network) as well as elements of a simple modulator that produces the final OFDM waveform.

Finally, the DVB-T2 standard allows a large number of options and combinations. Flexibility has been deliberately retained in the standard to allow optimisation for capacity and ruggedness according to various channel models and to tailor a T2 system to the requirements of the broadcaster or network operator. It is expected that initial T2 implementations will use a small subset of the possible combinations and the IGs give guidance on the choice of parameters. The guidelines therefore contain sections specifically to help implementers of T2 gateways, modulators, transmitters, receivers and tuners; network planners; and broadcasters; together with sections describing fundamental features of the system common to all users. These sections include:

• An introduction to the DVB-T2 system and a summary of its advantages;

• Guidance on the choice of parameters together with performance figures from simulation results;

• Explanations of the key concepts of the framing and interleaving structures used in T2;

• Descriptions of the intended transmit-side infrastructures, in particular introducing the newly standardised DVB-T2 Modulator Interface;

• Guidance on equipment and receiver design.

DVB BlueBooks are available for download at: www.dvb.org.
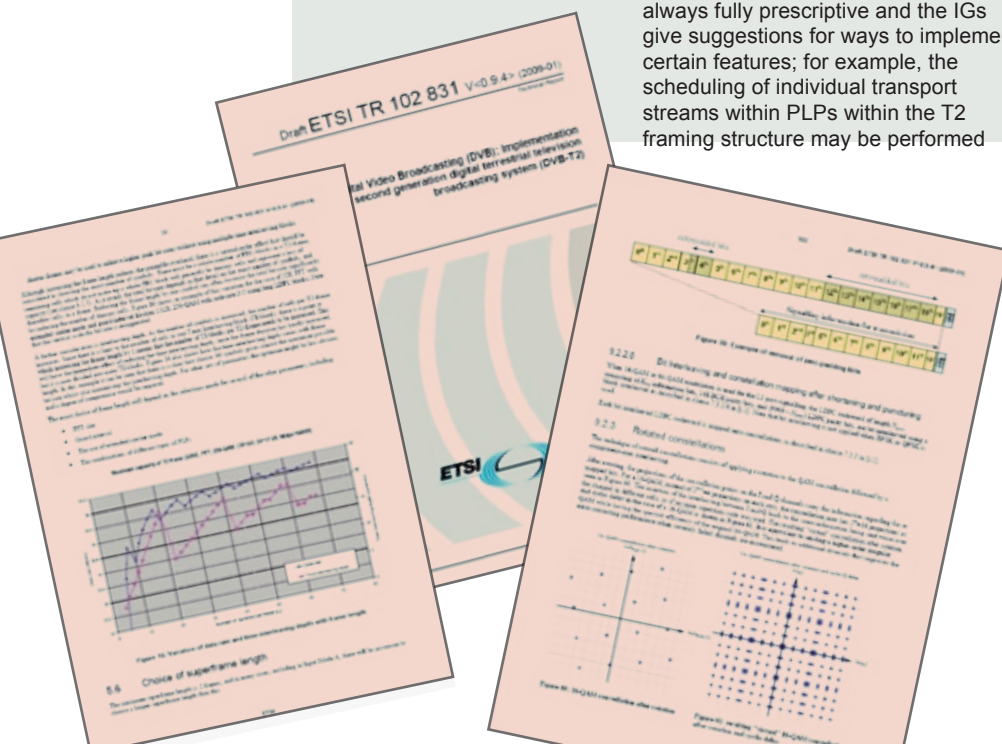
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HIT THE ROAD

Trial Update: An Interactive Satellite-Terrestrial Network for DVB-SH

Mariam Sorond, Director of Network Systems, ICO

2008 was a watershed year for the evolution of DVB-SH in the US. In January 2008, ICO Global Communications (ICO) conducted the first ever demonstrations of DVB-SH at the International Consumer Electronics Show (CES) in Las Vegas, delivering a DVB-SH signal via a terrestrial repeater to vehicles and portable devices. In April, 2008, company launched the largest commercial satellite, ICO G1, into orbit, and in May, it was awarded 20 MHz of nationwide radio spectrum by the Federal Communications Commission. By the end of 2008, alpha trials for the ICO mim (Mobile Interactive Media) service commenced in Las Vegas, Nevada and Raleigh-Durham, North Carolina and the trials will continue through 2009.

At the heart of ICO mim is live nationwide mobile television using DVB-SH. Other services delivered include interactive, assisted navigation and two-way communications capability for end users. For its alpha trials, ICO announced content agreements in 2008 with leading national brands, including NBC Universal, Discovery Networks, Turner and Viacom/MTV Networks. These brands deliver a compelling mix of news, entertainment, children's and educational programming featuring channels such as MSNBC, CNBC, Discovery, Discovery Kids, Animal Planet, The Learning Channel, Cartoon Network, Nickelodeon and Comedy Central. Extensive market research is being conducted, during the alpha trials, on the appropriate mix of programming for the go-to-market ICO mim offering. Las Vegas was chosen for the trial, as the city features a dense urban core with surrounding areas that feature open desert terrain and mountainous

regions, allowing for testing of city centre coverage and typical western US desert environs. A robust terrestrial coverage footprint using two repeaters has been established in Las Vegas. Raleigh-Durham has both a city centre and a heavily tree lined suburban environment, which is similar to most eastern US population centres. To meet the challenges of this eastern terrain 14 terrestrial repeaters have been deployed to cover the Raleigh-Durham market.

In both cities, the ICO G1 satellite provides coverage and service outside of the terrestrial network. It is capable of providing coverage to all 50 US states, plus Puerto Rico and the US Virgin Islands.

The initial market focus is to deliver DVB-SH live television and interactive services directly to vehicles via an ICO mim modem and roof mount vehicle antennas. Over time, services will be offered to a full range of portable and mobile devices. The unique satellite-terrestrial network allows for the provision of uninterrupted nationwide coverage, unlike any other mobile video service available today in the US. ICO mim redefines how consumers will access information, services, and entertainment in a mobile environment. The offering is further differentiated by the high quality of DVB-SH video, delivered to larger 7 to 10 inch screens found in most video entertainment systems, and can be used with the existing installed base of rear-seat entertainment systems already present in tens of millions of automobiles in the US.

At this year's CES, ICO showcased the first real-world demonstrations of an integrated, satellite-terrestrial interactive network for mobile video. Demonstration vehicles featured full satellite interactivity and mobile

> **"...redefines how consumers will access information, services, and entertainment in a mobile environment."**

television, a unique polarised 'Dual-View' screen which introduces entertainment viewing to front seat passengers without compromising driver safety, and innovative portable devices and personal entertainment players that further highlight the potential for a wide array of DVB-SH mobile devices.

ICO's efforts are supported by a world class ecosystem for DVB-SH. Alcatel-Lucent has served as the master network integrator supporting efforts around the DVB-SH standard and in supporting the terrestrial network build in the test cities. DiBcom has developed DVB-SH chipsets, and Hughes has provided its Geo Mobile Radio technology (GMR) for satellite interactivity during the trials. Also in 2008, ICO and Delphi Corporation, a world leader in automotive electronics, executed an exclusive three year North American agreement for development of DVB-SH services in the S-band. As 2009 gets underway, DVB-SH not only has a foothold in the US, but is also leading the way for ushering in a new era of nationwide mobile video services. For more information on the alpha trials, visit www.ico.com.

NEXT STEPS

**DVB's Julian Seseña & Eoghan O'Sullivan
Take a Look at Colombia's Switch to Digital**

On August 28th last year it was announced by the Colombian National Committee for Television (CNTV) that DVB-T had been adopted as the national standard for digital terrestrial television (DTT). The decision followed a two year period of studies comparing the various available systems under a range of criteria and represented the unanimous agreement of the five-person committee. It was also announced that MPEG-4 AVC video compression would be used for the launch of services.

The adoption of DVB-T by Colombia was warmly welcomed by the DVB Project and the wider community of DVB supporters, particularly as it came one year after a similar decision by Uruguay, which was the first country in Latin America to adopt DVB-T. There now seems to be a momentum in the region towards DVB standards:

it's almost three years since Brazil chose to adopt a version of ISDB-T as its DTT system. So far, with the SBTVD (Sistema Brasileiro de Televisão Digital), Brazil is the only country worldwide to have adopted the Japanese system. In contrast, DVB-T services have been launched in almost forty countries and the system has been adopted by 120 countries globally. (Visit www.dvb.org for details.) Progress in Colombia towards launching DVB-T services has been swift. Preparations are under way to launch a pilot service in May 2009, less than a year after the adoption decision was announced. The first transmissions will cover about 11 million households in central regions, served by a transmitter located in the hills outside Bogotá. The public broadcasters will be the first to have their services on the digital platform, with private broadcasters set to follow. A full launch of services is scheduled to take place in 2010.

The CNTV's strategic plan, which was published in January this year, sets aside 90,000 million pesos (approx. EUR 28 million) for the implementation of digital terrestrial television. Already more than 3,500 million pesos has been invested in preparation for the launch of the pilot service. A further 300,000 million pesos is earmarked for strengthening public television. Other aspects of the strategic plan include commitments to promote universal access to services, improvements in service quality, and a strengthening of the national production industry. The strategic plan also calls for the addition of a third private channel. There are six national TV channels in Colombia, two of which are private broadcasters. One of the key factors that led Colombia towards a decision in favour of DVB-T was the potential socio-economic impact of the system chosen. With a population of 45 million and a per capita GDP of USD $9,000, a successful transition from analogue to digital in Colombia will be dependent on the abundant availability

of cheap set-top boxes. In this regard the economies of scale engendered by DVB-T being the most widely adopted and deployed system are evident, with set-top boxes retailing at less than EUR20. (Projections from DTC – see page 12 – predict that sales of DVB-T receivers will far outpace those of ATSC and ISDB-T receivers in the next five years. Greater economies of scale will lead to even lower prices.) October 2008 saw the initiation of a new phase of cooperation between Europe and Colombia covering a wide range of activities including: technical and business model assistance; spectrum management; scientific and technological cooperation to launch common projects under the European Union Seventh Framework Programme; etc. The governments of Spain, France, Finland and associated experts are engaged in setting up cooperation agreements with the Colombian government.

Having adopted DVB-T, it is not surprising that the Colombian authorities are also promoting the use of DVB-H for mobile TV services. An announcement in January this year from the CNTV indicated that licences to broadcast DVB-H services would be made available at zero cost later in the year. According to Rapid TV News, Mexican-owned América Móvil has already expressed an interest in applying for a licence.

A number of other countries in the region are in engaged in selecting a DTT system, amongst them Peru, Ecuador, Panama, Venezuela, Bolivia, Paraguay and the Dominican Republic. All of these countries, and others, will have noted the decisions of Uruguay and Colombia. DVB supporters in Latin America, with support from the DVB Project, the European Commission and European governments, are fully committed to providing demonstrations, holding seminars and responding to consultation documents. The potential is there for DVB-T to become the system of choice for the region as a whole.

THE FORMAT FILES

The Why & The What of The DVB File Format

Kevin Murray, System Architect, NDS Research and Collaboration, Chair of DVB TM-FF Group

Broadcasters have traditionally just streamed content to viewers, so why is there a need for a DVB file format? After all, DVR devices work happily with a proprietary format. But that is because content is created only within, and stays within, the DVR. Now viewers want to be able to move content between a wide range of devices, including multiple DVRs (possibly from different manufacturers), PC, mobile phone, or a PMP. A defined interchange format is one key element that helps to achieve this capability, and one reason that the DVB File Format is both needed and timely. Other motivations include the trend for broadcasters to provide content not as real-time streams, but as files delivered to a variety of devices. This article is a quick tour of the DVB File Format, and the motivation behind the functionality it supports.

So what is the DVB File Format? Put simply, it is a set of extensions to the widespread ISO Base Media File Format (ISO/IEC 14496-12 – itself the basis of 'mp4' and 3GPP file formats). Why wasn't 14496-12 (or mp4) enough? Well, one of the goals of the file format was to allow the direct recording of the received transmissions, either a stream of MPEG-2 transport packets or RTP packets. When work started in early 2007 none of the main file formats provided this support. Extending 14496-12, rather than starting from scratch, was both simpler and meant that the DVB File Format began life with a range of useful tools and well understood flexibility.

The format of a 14496-12 file is a sequence of boxes (or KLV – key, length, value – structures) that can be nested. At the heart are one or more 'mdat' boxes that hold the media data
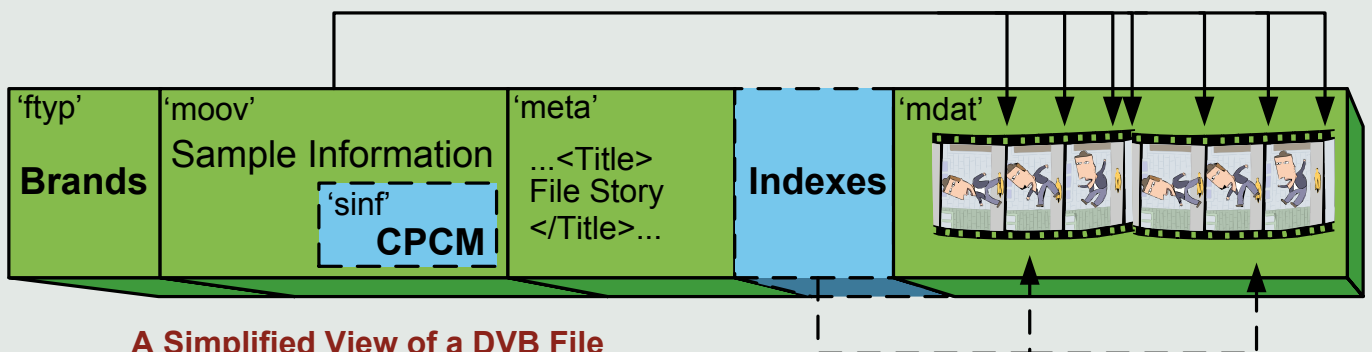
(the four characters in 'mdat' are the key that identifies the box structure). The format uses the terms 'track' and 'sample' to describe and structure the media data, and an mdat box can hold many samples from many tracks. Other boxes (such as 'stbl') are used to hold the location, timing and format of each sample, as well as a range of other optional information. Thus a file might contain one 'mdat' box holding two tracks: the video track where each sample is a single video frame and an audio track where each sample is an audio frame of 32ms, and with audio and video samples interleaved. We have extended 14496-12 by adding two new media formats, one

for storing MPEG-2 Transport Stream Packets ('rm2t') and one for storing RTP Packets ('rrtp'). We've based both on an approach called Reception Hint Tracks. Put simply, this means that each received packet is placed into the file as a sample, with the timing based on the packet's time (or the stream's system clock). For 'rm2t', the samples make up a single track, but with 'rrtp', each RTP stream is in its own track. Saving the packets in the form in which they are received simplifies the storage process as there is no need to parse the received packets when generating the file. In addition, the 'rrtp' format is designed to closely follow the existing RTP Server Hint Track in 14496-12 (which allows received RTP packets to be grouped together into a single sample corresponding to a sample in the underlying media data of the RTP packets).

Because a file format is more than just media, we also added support for indexing, descriptions and protection. Indexing is important as it provides the ability to find locations quickly and easily in a file. Given our somewhat unique requirements, we developed our own indexing mechanisms for events that vary from changes to SDP information (for RTP streams) or PSI information (for transport streams) through to errors detected during recordings, as well as locations of segments of interest within a program. Descriptive information is vital as it allows people to find out what a file contains. So every DVB file must include a description of the content,

"...allowing content to be more mobile, and opening up more standardised ways of allowing content to flow into and around the home."

based primarily on the TV-Anytime textual XML format. This may be as simple as just a title, or it can provide far more information in a well-known, textual, common format that can be used even if the device cannot display the media contained within the file. Finally, to ensure that content can be protected, we adapted the existing 14496-12 mechanism for signalling protected content to our new media formats, and we defined how to support CPCM within a DVB file.

In summary, the DVB File Format is a simple way of encapsulating known DVB formats into a well known file format, linked with descriptions, indexes and protection information. The use of the format is beyond just recordings – it is about allowing content to be more mobile, and about opening up more standardised ways of allowing content to flow into and around the home.

'ftyp'   'moov'   'meta'   'mdat'

Brands   Sample Information   ...<Title> File Story </Title>...   **Indexes**

'sinf'   **CPCM**

A Simplified View of a DVB File

Moore Analysis

WHERE WILL DTV GROWTH COME FROM?

The worldwide recession and the maturation of the digital TV market in developed territories have many DVB proponents frantically looking for the next growth opportunity and evaluating how well the DVB standard will stack up for selling DTV services and devices. There are two basic places growth can come from – undeveloped DTV territories or new services/devices that resonate with consumers without thinning out their wallets anymore than the recession already has. Terrestrial deployments are where DTC projects the greatest amount of growth and industry players can take some comfort in the DVB standard's position. Current conditions will likely keep growth modest, but the following are potential bright spots:

• Early stage developments for digital terrestrial TV rollouts in more undeveloped territories such as Eastern Europe and India

• Individual government desires to clear spectrum
• Early market development of HDTV services in DVB territories

With the exception of China's home grown DTT technology, DVB-T/ DVB-T2 is projected to log the most growth among the established DTT transmission standards. ATSC receivers shipped in record numbers in 2008 due to the US's impending analogue TV shut off, and 2009 shipments will be strong, but growth will basically flatten after that with the exception of a bump when Canada makes its transition in 2011. ISDB-T has been officially adopted only in Japan and Brazil, minimising its growth potential. The terrestrial module of the DVB standard is forecasted to significantly outperform those standards in future shipments (see chart).

The wide adoption of DVB's terrestrial standard across multiple territories and timetables positions it well against competing standards for future growth. Late adoption of high definition services and transmissions (compared to

North America and Japan) lays the groundwork for incremental, rather than short term, growth. The introduction of DTT in the US and Japan was all about enabling HD. The need for greater channel capacity in the early years of DTT deployments in Europe paved the way for a two-pronged time table – first SD, then HD.

Although the good news is that there will be an elongated time period for rolling out HD transmissions and receivers, demand for higher priced HD receivers will undoubtedly be tamped down during the recession by cautious consumers. Growth may not be dramatic, but in this economic environment, slow and steady may be the best that can be realised.

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.

Source: Digital Tech Consulting

ISDB-T Receivers
ATSC Receivers
DVB-T Receivers

In My Opinion – So Vang

STANDARD SUCCESS

So Vang is Vice President, OpenCable Software, Advanced Platforms and Services for Cable Television Laboratories, Inc. (CableLabs). Founded in 1988 by cable operating companies, CableLabs is a non-profit research and development consortium that is dedicated to pursuing new cable telecommunications technologies and to helping its cable operator members integrate those technical advancements into their business objectives.

Interactive television has been years in the making, starting with the Qube service in 1977 and followed by other attempts, all of which unfortunately never met with much success. Thirty years later, with the introduction of tru2way technology, I think we have a winner.

What makes me believe that the recently launched tru2way brand will catch on? There are several factors, but the most important ones are that the tru2way technology follows internationally accepted standards and has the full backing of the cable industry and a number of key consumer electronics manufacturers. And, it is also building support from a growing number of content developers.

at the DVB Project in the Multimedia Home Platform (MHP) specification. The Blu-ray disc specification later adopted the same core Java technology from Sun Microsystems—Globally Executable MHP or GEM. With such synergies, it is possible to contemplate 'write once, run everywhere' applications that run on multiple platforms such as TVs, mobile phones and Blu-ray disc players.

With the specification set, and consumers demanding interactive services on their television sets as a result of years of Internet connectivity, the cable TV industry and consumer electronics manufacturers soon realised now was the time to move forward with tru2way.

Of even greater impact, the tru2way initiative will benefit consumers, who will be able to enjoy a simplified installation process with fewer wires, a single remote control and the option to own, rather than lease equipment which will now be interoperable among cable systems. All of these consumer benefits can be attributed to tru2way's adherence to standards drawing from DVB-MHP and Java.

But tru2way isn't just about hardware and ease of installation. It continues to proactively evolve as a solid work environment for applications developers, too. In May of 2008 and in early February of this year CableLabs co-hosted content developer conferences. Earlier in the year, CableLabs and Sun

"...immediately gain access to a national footprint of 70 million households..."

In the past year, major cable operators and top consumer electronics manufacturers agreed to work together to ensure tru2way technology will be rolled out to a majority of US households in 2009. That means tru2way TVs and set-top boxes immediately gain access to a national footprint of the approximately 70 million households served by cable television. But before I get into the details, I'd like to provide a bit of historical reference. CableLabs and some of our leading members founded the OpenCable Project in 1997 to facilitate interoperability of set-top boxes among cable operators, promote the sale of set-tops and DTVs, and to meet certain regulatory requirements for separable security. Within the CableLabs' OpenCable Project, the OCAP (OpenCable Applications Platform) specification was authored. OpenCable and the OCAP acronym were, of course, technical in reference. In early 2008, the industry developed the tru2way brand, which is the consumer facing brand name for OpenCable. To further the standards-based nature of OCAP, CableLabs chose to base the specification on the excellent work done

In 2008, a Memorandum of Understanding (MOU) was signed by leaders from both the cable and consumer electronics industries to mutually agree that tru2way was the best path forward to bring interactive TV to consumers. The cable industry undertook obligations to enable its headends for tru2way interactivity, and to deploy tru2way middleware on its set-top boxes. By meeting the terms of the MOU, the participants create a common technological footprint across most North American cable operators. It also provides manufacturers with a market for their products. I believe that the framework is now in place for an interactive television platform to flourish in North America.

Throughout 2008, cable providers continued to light up more geographic regions and internal back office systems for tru2way devices which will enter cable systems in one of two ways: in the form of retail devices, or via the digital set-top boxes cable operators purchase and lease to consumers. Time Warner Cable has been especially active, with a footprint which, according to the latest public figures, counted more than 2.5 million tru2way set-tops deployed.

Microsystems established a tru2way presence on java.net by launching The OpenCable Project located at opencable.dev.java.net. Because tru2way's technical foundations are in Java, it made sense to build a work area for applications developers. Of course having such common standards allows application developers to draw from their existing knowledge base, while providing cross-platform application development opportunities going forward. From there, and as a national tru2way footprint gels, the stage will be set to accommodate both 'bound' (appearing clickably within a particular show) and 'unbound' (appearing as a button on a remote control) interactive applications. Tru2way interactivity will put consumers in greater control of their television viewing experience as they enjoy customised screens, engaging with their favourite programmes through voting or polling, or gaining access to their choice of long-form advertisements. I am looking forward to a new era of cable television, and it is through adherence to standards that the cable industry has reached this tru2way milestone.

MARKET WATCH

UBS DVB-SH Terrestrial Repeater

The **UBS** DVB-SH 50W Terrestrial Repeater is a fully integrated indoor unit including a DVB-SH exciter (comprising a DVB-S/S2 satellite receiver, DVB-SH modulator, up-converter, GPS receiver and main controller) and a 50W power amplifier that can be provided with an external output filter. It is designed to work in S-band frequency and can be used for both DVB-SH A and B applications. www.uniquesys.com

Verimatrix has launched the ViewRight STB for DVB as part of its Video Content Authority System. The system offers multilevel client security: a) Software-based clients for low cost STBs; b) Software-based clients utilising secure system-on-a-chip technology; and c) Hardware-based removable security. Software-based clients can be upgraded to hardware-based security without requiring a truck roll. All client types can be mixed in a network, allowing operators to match STB and client technology to optimise the content security. www.verimatrix.com
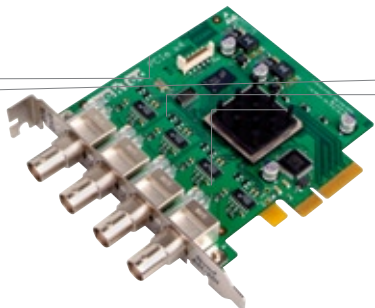
DekTec DTA-2144 PCI-Express Adapter

DekTec's newest release is the DTA-2144, a PCI-Express adapter providing quad ASI/SDI ports. Each port can be programmed input or output. The card complements the company's real-time multiplexer MuxXpert and the 24/7 monitoring application Xpect. Drivers are available for Windows and Linux, in 32- and 64-bit variations. www. dektec.com

Advance Digital Broadcasting's ADB-4820C is an OCAP set-top box that mounts behind a flat screen TV and requires no dedicated remote control. It has CableLabs tru2way certification and features a high speed DOCSIS return channel to support high-bandwidth two-way communications. Leveraging HDMI-CEC's bidirectional communication capabilities common on most flat screen TVs, it uses the TV's own remote to control the hidden set back box. www.adbglobal.com

ADB-4820C STB

Operators and equipment manufacturers employing backbone distribution of DVB transport streams over IP can verify IPv6 systems in design and deployment with the **Tektronix** MTX100B. The unit supports transport stream generation and recording in a portable form factor with real-time updating of timestamps and timetables for error-free looping, video over IP stress test generation for STB test or migrating to IP interface technology, including support for IPv6 and TTS standards is provided. www.tektronix.com/mpeg

Tektronix MTX100B

The **Spectracom** Epsilon Clock Model EC22S is a fully redundant master clock designed for precise time and frequency synchronisation of DVB networks. The master clock has no single point of failure. The chassis contains two completely redundant hot swappable GPS clock modules, each with a unique GPS receiver and power supply. An automatic failover switch continues to output precise 1PPS (8x) and 10 MHz (8x) upon failure of one clock with minimal phase shift. www. spectracomcorp.com

Spectracom Epsilon Clock

After showcasing its DVB-T2 modulator live at IBC, **ENENSYS** is now commercially launching LabMod DVB-T2. Taking advantage of the large panel of features from the LabMod family, it becomes the perfect solution for evaluating/validating this new efficient standard. It offers multipath configuration thanks to the optional channel simulator which allows for generating up to 6 independent paths making chipset/set-top box validation much easier. www.enensys.com

ENENSYS LabMod DVB-T2

NetUP Inc., developers of a complete set of products for IPTV, has developed a new generation middleware system

that uses the thick client approach. The system includes two parts: STB client, a fast native application loaded into a set-top box, and the server. The company claims the new approach allows a much higher performance of the user's graphical interface than JavaScript-based systems by directly accessing the hardware resources of the set-top box. www.netup.tv

ProTelevision's PT2000 product line now offers versatile inputs from the traditional ASI format to the now increasingly popular TS over IP format. The PT2720 option offers transport stream over IP input and a DVB-S/S2 input is obtained by the PT2730 option. There are 2 ASI inputs that can be used in a redundancy solution with automatic switchover from primary to secondary input status in case the primary signal is lost. Another option provides 2 ASI inputs for a redundant hierarchical modulator. www. protelevision.com
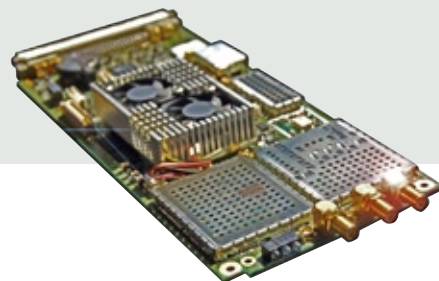
ProTelevision's PT2000

Cisco's Digital Content Manager is an established platform for many broadcast, cable and IPTV applications, including multiplexing, transrating, SI processing, scrambling and programme insertion. Now it has been further enhanced to offer integrated MIP insertion capability - providing SFN compatibility for DVB-T broadcasts. The device offers unrivalled integration with up to 24 SFN compliant outputs from a single unit giving operational benefits and capex savings to DVB-T operators. www.cisco.com

Cisco Digital Content Manager

For years, the R&S ETL has enabled commissioning engineers to perform complete acceptance tests on digital transmitters. Now, **Rohde & Schwarz** has enhanced its R&S ETL TV analyzer with two new analogue options that provide analogue video line analysis capability and video generator functionality. The compact solution analyzes and generates both analogue and digital test signals in a single box. Transmitter manufacturers, network operators and service technicians can perform their most important measurements without additional equipment. www.rohde-schwarz.com

MARKET WATCH

Harris Apex M2X Multimedia Exciter

Harris Corporation's Apex M2X multimedia exciter for global analogue and digital standards brings digital and mobile TV to a new level of performance. This software-defined exciter features the company's exclusive real-time adaptive correction and supports multiple digital standards, including DVB-T/H and a range of analogue TV standards. The RoHS and CE compliant Apex M2X exciter provides a flawless digital signal with complete technical and regulatory compliance for the company's tube and solid-state digital transmitters. www.broadcast.harris.com

The MDM-2000 modulators from **TeamCast** fully support the so-called TDM (time division multiplex) modes for the satellite downlink of DVB-SH mobile TV infrastructures, delivering directly S-band or L-band signals.
The range of DVB-SH modulators from TeamCast now supports all DVB-SH operational modes, including SH-A (COFDM on satellite link and COFDM on terrestrial link) and SH-B (TDM / single carrier on satellite link and COFDM on terrestrial link). www.teamcast.com
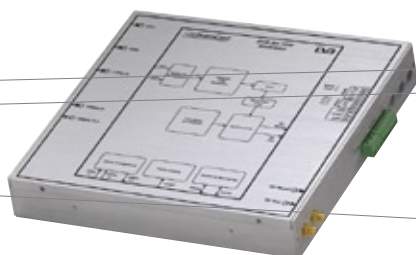
TeamCast MDM-2000 Modulator

Based on **Scopus** IRD technology, the compact and cost-effective IRP-2010 Integrated Receiver Processor features a variety of front-end options, TS descrambling of two full transport streams, re-multiplexing capabilities, web-based management, and SNMP monitoring. The system offers powerful multiplexing including integrated ASI aggregation for up to eight inputs, thereby eliminating the need for external multiplexers. It is also capable of regenerating PSI/SI and MPEG tables including PID/service filtering and replacement, for maximum processing versatility. www.scopus.net

Scopus IRP-2010

With the support of CA companies, **SMiT** presents its new generation Secure CAM for the operator market. It is based on SOC technology which can be used to protect the revenue of

operators by increasing security and stopping card sharing piracy. Right now, NDS, for head end use, Viaccess ACS3.0, and Conax chipset pairing CAM are available, with Irdeto softcell3 coming soon. The company is also developing for Secure CAM supporting CI+. www.smit.com.cn

SMiT Secure CAM

The **Newtec** multistream solution consists of the AZ810 Stream Aggregator, which allows transport streams to be combined before the satellite modulation stage, and the HZ914 sultistream satellite receiver capable of receiving and outputting several streams simultaneously. The system is designed to optimise the efficiency of satellite bandwidth usage for the primary distribution of terrestrial and mobile TV via satellite. It provides a solution to transmit several television transport streams simultaneously on a single satellite carrier. www.newtec.eu

Newtec Multistream Solution

The **Neotion** Pocket Recorder (NPR) is a miniature digital recorder for DVB integrated flat panel TV sets that leverages on ubiquitous SD-Cards to get control over live TV (pause and rewind) and digitally record programmes, all without cluttering the living room with cables or an extra box. www.neotion.com

DiBcom DIB10098

DiBcom launches the DIB10098, the first of a new generation of integrated circuits derived from the versatile and universal Octopus platform. The board comprises a quad-band RF tuner and a demodulator that integrates a broadcast specific, programmable vector signal processor with a multi-mode channel decoder, MAC, memory and a power management unit, in a small footprint package. The platform enables a design to be fully compliant with DVB-T/H/SH and the new DVB-T2 standard. www. dibcom.fr

Kathrein has recently launched a new UHF wide-band omnidirectional antenna for top mounting, series 750 10180. The antenna is particularly suitable for sites where low windload is required. VSWR is < 1.10 over the whole band 470 - 862 MHz, gain is 12 dBd at midband. The maximum power capability is 15 kW rms. Versions for higher or lower power are available on request. The antenna comes fully pre-mounted in a GRP radome for plug-and-play installations. Obstruction light and hook-in-ladder are available as an option. www.kathrein.de

Kathrein Omnidirectional Antenna

Imagination Technologies' UCCP310 IP core is designed to support the increasing number of standards for communications and broadcast. It can change between handling multiple DVB streams (or diversity) and DVB+WiFi, creating a uniquely flexible IPTV + DVB solution.
It delivers multi-standard demodulation support for 802.11a/b/g standards, digital TV, mobile TV and digital radio reception. www.imgtec.com

DMT's DSO is a versatile repeater, aimed at the digitalisation of TV networks. It can be configured as a SFN gap-filler, with multiple echo canceller, or as a re-transmitter, capable of restoring the pristine condition of the digital stream. In a transparent configuration, it is capable of processing analogue signals. The 1RU repeater delivers 10Wrms (30W p.s.) and more with external PAs. It has an effective and flexible user interface with keyboard/display, web browser or SNMP/RS232. www.dmtonline.com
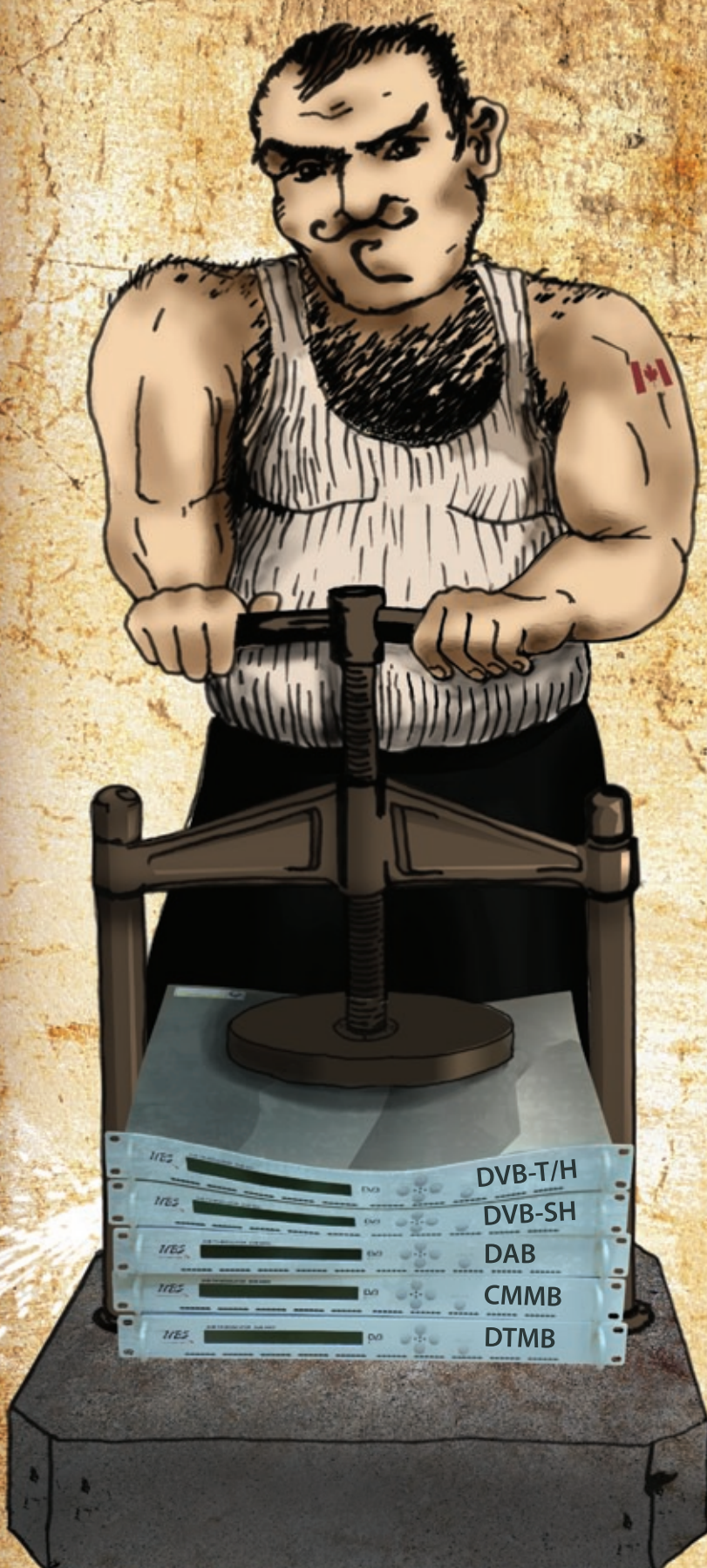

DMT DSO Repeater

The VISUALmpeg Qualify is an expansion of the **Pixelmetrix** array of video and audio quality analyzers, offering a new level of offline quality assessment for audiovisual streams with comprehensive support for most current industry video and audio encoding standards and media containers.
With a new and scalable distributed architecture, the analyzer allows for parallel test administration and browsing of results. It provides static file-based video and audio analysis for VOD content. www.pixelmetrix.com

Pixelmetrix VISUALmpeg Qualify