DVB-SCENE
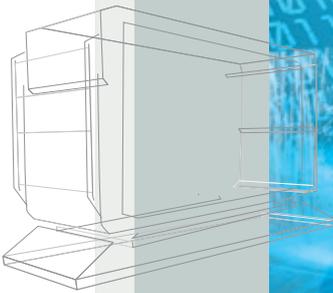
Tune in to Digital Convergence

28

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This issue's highlights

> Scalable Video Coding
> Content Protection Copy Management
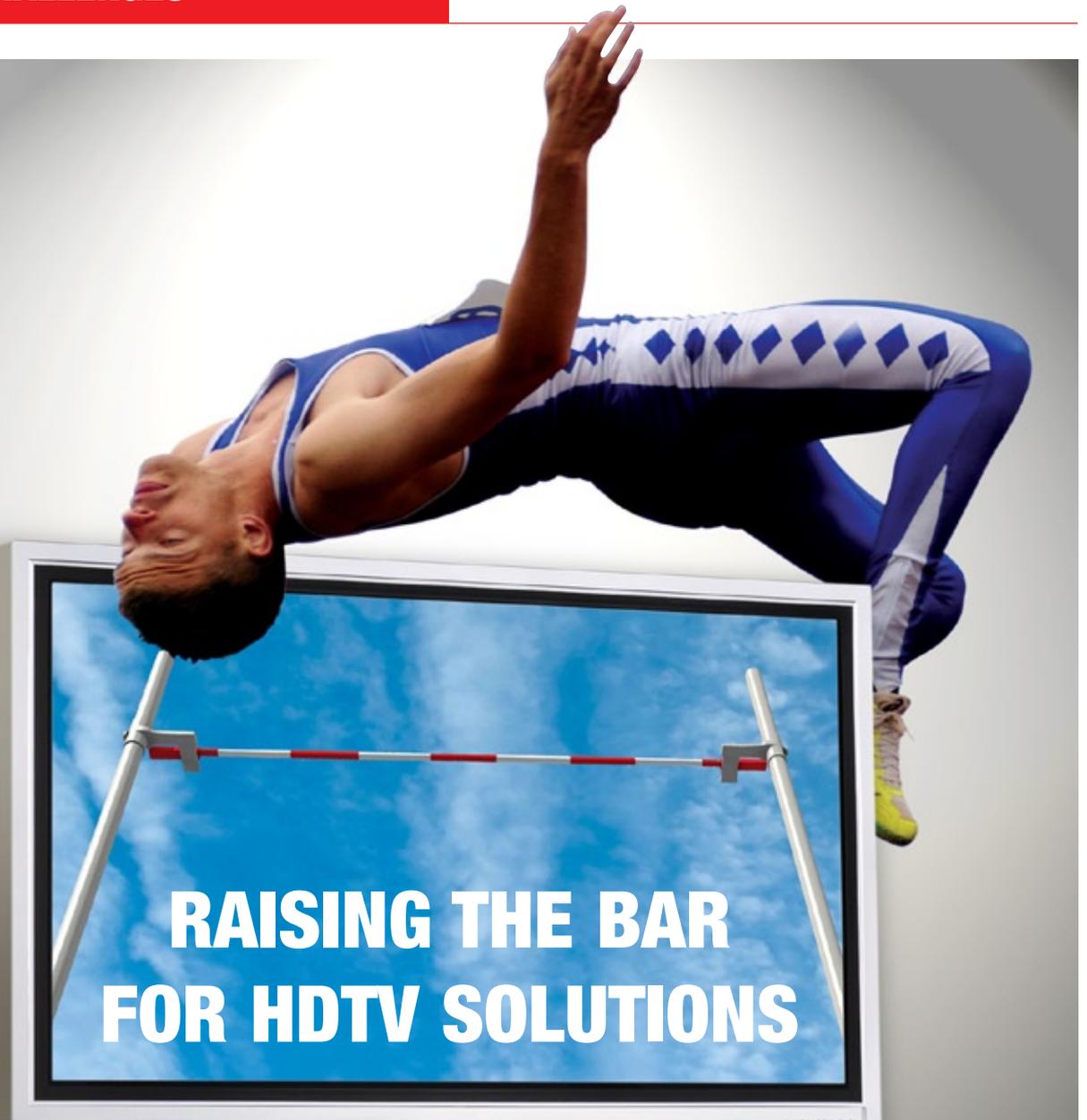> DVB: Looking Forward
> Introduction to DVB-RCS+M
> Market Watch

A RIGHTS ISSUE

THE PACE OF CHANGE

Eoghan O'Sullivan,
Marketing and Communications Executive

A word from the DVB Project Office

Change has been the buzzword of choice for politicians this year, particularly throughout the course of the US presidential elections. DVB has also seen some changes in high places and in this, the final issue of DVB-SCENE in 2008, we bid fond farewells to both Theo Peek and Peter MacAvock. Theo served the DVB Project with great distinction, in particular as Chairman for a total of 12 years. He has been awarded an Honorary Fellowship of the DVB Project and I'm pleased to report that he and his wife Siggi were in fine form on their visit to Geneva in October. Another long-standing servant of DVB that moved on this year is Peter

MacAvock, someone who had become synonymous with the DVB Project over the last fourteen years. At the beginning of October he took up a new position with the Technical Department of the EBU – and I suppose it's not out of the question that he might again be involved in DVB in the future, albeit in a different capacity. Nonetheless, the Project Office is not the same without him and we're pleased that calling on his unparalleled 'corporate memory' merely involves taking a short walk down the corridor!

Elsewhere in this issue, the focus is on innovative technical solutions. Our cover story looks at the interface

between DVB-CPCM and DVB Conditional Access Systems, a further step on the path to deployment of this groundbreaking DVB standard. We also have articles introducing Scalable Video Coding (SVC) in DVB and the new DVB-RCS+M standard, a revision of the original Return Channel Satellite standard that adds support for mobile terminals.

In 2008 we said au revoir to a couple of familiar faces, and 2009 will see the arrival of one or two new ones - and of course the work continues at pace. It's an exciting and interesting time to be involved with the DVB Project!

NEW STANDARDS

TS 102 825 V1.1.1 "Content Protection and Copy Management (DVB-CPCM)" (Published on 03/07/2008)
TS 103 197 V1.5.1 "Head-end implementation of DVB SimulCrypt" (Published on 21/10/2008)

NEW MEMBERS

Eiden Co., Ltd. – Engages in the development, manufacture, and sale of electronic applied measuring equipment for satellite broadcasting, terrestrial broadcasting, mobile communications, optical communications and CATV. www.eiden-gp.co.jp
MEDIA BROADCAST GmbH – The company's core business comprises the planning, installation and operation of multimedia transmission platforms in Germany and internationally for television and radio companies, based on modern transmitter, cable and satellite networks. www.media-broadcast.com

Cover image courtesy of Nagravision. Design by Diabolo Design

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SCALING NEW HEIGHTS

Scalable Video Coding within DVB

Ken McCann, ZetaCast, Chairman of TM Ad Hoc Group on Audio-Visual Content (TM-AVC)

The two main DVB Audio-Visual Coding specifications, for broadcast applications based on the MPEG-2 Transport Stream and for DVB applications delivered directly over IP protocols, are currently being revised to add new options to the toolboxes. Probably the most significant of these new options is Scalable Video Coding (SVC), defined by an amendment to the H.264/AVC specification. Scalable video coding is sometimes referred to as hierarchical coding or layered coding. The objective is to produce an encoded signal that has the capability of being decoded to give video, albeit at reduced quality, from

tools have been included in the MPEG-2 video specification for many years but have been rarely used in practice. However there are two very good reasons why scalable video coding is now of much greater relevance. Firstly, compression techniques have improved and the new H.264/AVC scalability tools simply work more efficiently than the old MPEG-2 tools. Secondly, there are now a range of applications being considered which are inherently more conducive to the use of scalable coding. Two key issues that affect suitability are whether any coding layer uses interlaced video and the proportion of the total bitrate that is

benefit compared to using a simple simulcast approach. In the absence of a commercially interesting DVB application where MPEG-2 scalability would have been technically beneficial, we decided that the MPEG-2 scalability tools should not be included in the DVB toolbox.

By contrast, a recent evaluation of the options for a future launch of 1080p HDTV has shown that this is a situation where SVC tools would offer significant benefits. There are three basic approaches that could be followed when launching 1080p services: single layer, simulcast or scalable video. Single layer H.264/AVC 1080p would

> **"...a recent evaluation of the options for a future launch of 1080p HDTV has shown that this is a situation where SVC tools would offer significant benefits."**

only part of the bitstream. There are three basic methods that can be used:
• Temporal scalability, where intermediate video frames are encoded in a way that allows them to be dropped
• Spatial scalability, where video is encoded in a way that allows it to be decoded at multiple spatial resolutions
• Fidelity scalability, sometimes called SNR scalability or quality scalability, where video is encoded at a single spatial resolution but in a way that allows it to be decoded at different subjective qualities
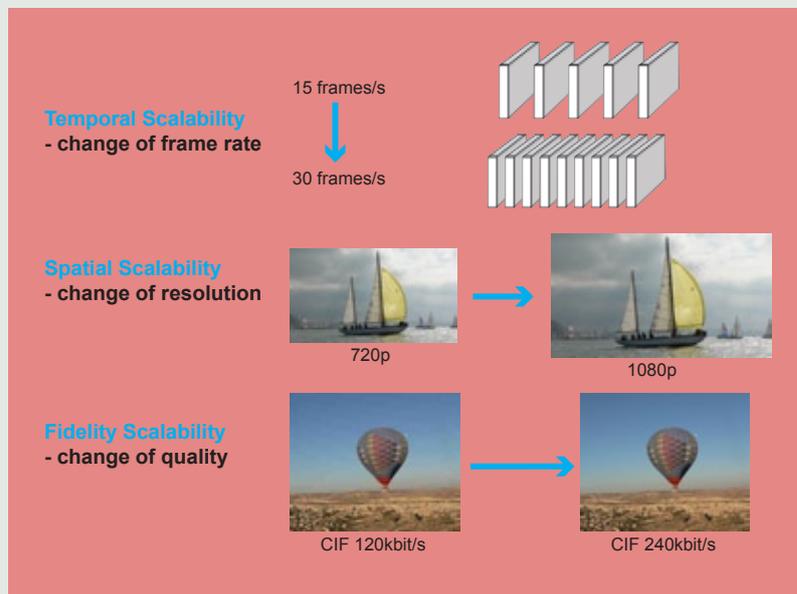At first sight, the current degree of excitement about scalable video coding might seem strange; scalable coding
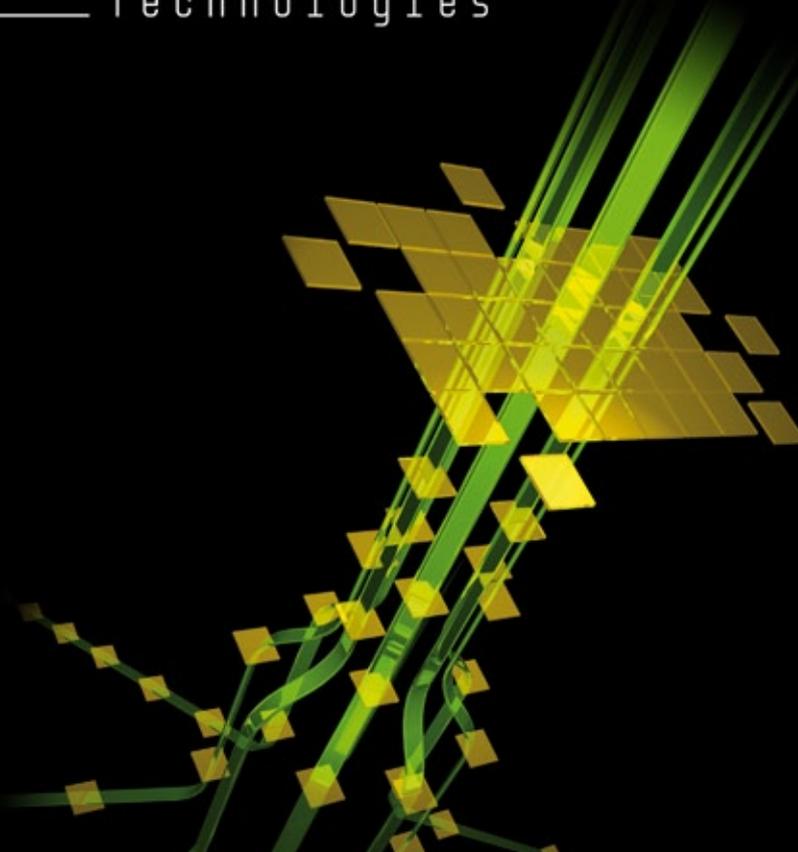
allocated to the base layer; the higher the proportion, the greater the benefit that can be gained through the use of scalable video coding.
For example, one potential application that was considered many years ago was a scalable MPEG-2 HDTV system with conventional interlaced SDTV as the base layer. This scenario was not well suited to the use of scalability, since the bitrate for the base layer was generally less than a quarter of the total and interlace was used in at least one layer. When the use of the old MPEG-2 scalability tools was evaluated for this application, the conclusion was that there was actually very little

obviously require the lowest bitrate; 13Mbit/s was found to give reasonable quality with the software-based encoder used in the evaluation. However, today's 720p/1080i HDTV receivers would be incapable of decoding this signal at all. Adding a reasonable quality 720p simulcast signal to provide backwards compatibility required a further 8Mbit/s, giving a total of 21Mbit/s. Alternatively, 15.4Mbit/s was found to be sufficient when using SVC tools to provide backwards compatibility with a two-layer 720p/1080p signal of the same subjective quality with the same encoder.
Further promising applications for SVC can be seen with IPTV and mobile TV, which tend to have a wider range of connection qualities and receiving devices than traditional broadcasting. For example, a two-layer SVC bitstream in combination with hierarchical DVB-H modulation could be used to provide a robust signal for indoor reception at slightly reduced video quality, together with full quality video for outdoor reception. In some cases, this could significantly reduce the network build costs and hence improve the viability of the business case for launching a new mobile TV service.
To conclude, SVC is a worthy addition to the DVB toolbox, applicable to a wide range of potential applications. However, as with the other tools, it should be selected for use when appropriate; it is not a 'magic bullet' that gives benefits under all circumstances.

Temporal Scalability
- change of frame rate
15 frames/s
30 frames/s

Spatial Scalability
- change of resolution
720p
1080p

Fidelity Scalability
- change of quality
CIF 120kbit/s
CIF 240kbit/s

Elements to Systems

Broadcast Network Equipment
Mobile TV, Terrestrial TV, IP Distribution

TS over IP ADAPTER

DVB-H MIP INSERTER

Channel2

Menu

MOBILE TV TRANSCODER

THE USER'S DOMAIN

CPCM: Making the Content and Device Value Chains Work for All Stakeholders

Thierry Dagaeff, PhD, Architect at Nagravision - Kudelski Group

The DVB's Content Protection and Copy Management (CPCM) open standard specifies an interoperability platform for the protection of commercial digital content. While CPCM is a Content Protection Technology (CPT) designed for consumer products, it is also the correct choice for Conditional Access System (CAS) suppliers and service providers wishing to let content flow seamlessly in the user domain to fulfil convergence needs.

A Conditional Access System is the technology used by service providers to protect access to their services. It manages personalised user entitlements and allows subscribers to access content such as movies or channel tiers if they are authorised to view them. Beyond service access, consumers would like to enjoy duly accessed content across their networked devices. Manufacturers apply themselves to support this trend toward convergence by supplying interoperable devices bridging the different technologies to make content exchange possible. In this context, service providers need a CPT to satisfy content owner requirements as well as to protect their revenue, by ensuring that content is used and redistributed in the user domain in a way that doesn't contradict the original access conditions applied to their services. CPCM allows these needs of consumers, manufacturers, service providers and content owners to be met by operating as a CPT, a Digital Rights Management (DRM) interoperability system and a business enabler.

CPCM is not a DRM: it cannot be used without a secure delivery system and bears no user management and no control of commercial relationships between the content provider and a subscriber. Thus CPCM relies on the participation in the content value chain of a service provider implementing a CAS or a DRM to protect delivery of content and usage rules. In addition, the CAS can contribute to the protection measures through key management, revocation signalling or vertical control of domains. This is affordable since the CAS security level is not downgraded by CPCM.

In return, CPCM can enrich business models of the service providers. Let's look at two basic examples. Firstly, the example of a sporting event that has a high value as long as it is broadcast live. Due to the legal restrictions, the service provider may forbid the redistribution over the internet during the match; however, using CPCM, it can notify subscribers when this limitation will be removed and the recorded version may be played remotely. Even though subscribers may not have instant access across all their devices while the match is playing live, those same users may record it for later viewing. Secondly, consider a high value pay-per-view (PPV) event such as a high definition movie. The service provider can limit the viewing to the entitled users by restricting it to the authorised domain. The subscribers may order the PPV event when it's advertised and enjoy it when it is broadcast. In either case, subscribers can enjoy their networked CPCM devices by accessing content on those devices which, up to now, was locked to the service provider's set-top box. As viewers demand to watch programming when, where and on whatever device they select, CPCM enables extending the use of subscription events or PPV in the whole user domain.

innovate by introducing original content management exploiting mechanisms offered by CPCM. Such advanced management modes will most often benefit from the capability to bind proprietary data to CPCM content usage rules. For instance, it could be used to offer the consumer the possibility to purchase content where the viewing period has expired; in that case, the proprietary data would carry information on the repurchase mode and price.

At this stage, CPCM can be capitalised on to allow occasional links to a server. In turn, security of content protection throughout content lifecycle can partly rely on a tethered model, i.e. a model going back to vertical content management at some places and times. This is a 'weak' tethering, because it's not mandatory in the standardised CPT, and therefore there is no guarantee that every user domain will include such opportunities to connect to a server. Nonetheless, a weakly tethered system

> ## "...advanced use cases will most often benefit from the capability to bind proprietary data to CPCM content usage rules."

Conditional Access Systems suppliers may phase CPCM implementation from basic to advanced levels of involvement. It can start with propagating existing business models in the home network by just re-enforcing concepts already present in CAS products, but currently limited to broadcast events; this is illustrated by the above examples. The CAS can extend existing business by using functionalities as specified by CPCM and that weren't supported by the original CAS alone; this applies, for instance, to events with Simultaneous View Count control or to rental modes. Examples have been provided by a Nagravision and Fastcom joint demo at IBC 2008. Eventually, the CAS can

provides the basis to derive innovative business models binding cost recovery to security because the extra security brought by the service provider and its CAS compliments CPCM.

Remember CPT is only the means while convergence is the goal. By utilising a CAS and CPCM, the service provider can let content flow in the user domain and the manufacturers implementing CPCM compliant devices get new sources of content. It's a win-win situation, where users demanding more content and accessibility from multiple devices can be satisfied, and where content owners, service providers and CE manufacturers have more opportunities to generate revenues.

The Content Value Chain From the CAS to CPCM

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In My Opinion – Phil Laven

LOOKING FORWARD

Looking back at the history of the DVB Project, it is interesting how frequently people have expressed opinions such as "DVB's work is almost complete" and "DVB should not expect to continue for more than another 2 or 3 years". As a matter of principle, I believe that no organisation has the right to exist in perpetuity: when an organisation has achieved its objectives, it should be closed down. In the specific case of DVB, some might argue that it should have closed down at the end of 1996

when the three basic transmission standards (DVB-S, DVB-C and DVB-T) had been completed. But DVB is not just about broadcast transmission standards: DVB has also developed many other systems (such as DVB-SNG, DVB-RCS, DVB-H, DVB-SH, etc.) together with a range of 'ancillary' specifications (such as DVB-SI) which are crucially important to the operation of DVB systems. Overall, DVB's work has led to the generation of about 100 ETSI or CENELEC standards.

In any event, if DVB had closed down in 1996, we would not have benefited from the 'next generation' of DVB transmission standards (e.g. DVB-S2 approved in 2004 and DVB-T2 in 2008). This next generation of DVB technologies offers improved performance that could simply not have been achieved in 1996.
The speed of technological innovation is now so fast that there are legitimate concerns about the timing of the transition to the next generation of

WITH THANKS...

October 2008 saw two crucial departures from the DVB Project. Theo Peek stood down as Chairman of the DVB Project after 12 years in that role and Peter MacAvock, Executive Director DVB Project, left to take up the new role of Programme Manager in the EBU Technical Department. Phill Laven pays tribute.

Theo Peek became Chairman of the DVB Project in 1996 (taking over from the first Chairman Peter Kahl). Under Theo's guidance, the DVB Project has become the undisputed global provider of digital TV specifications. His strong belief in consensus has served DVB well over the last 12 years. It has not always been easy to achieve consensus but, thanks to Theo's patience, agreement has been reached on some 'impossible' issues.
Theo's departure from DVB was marked by his appointment as Honorary Fellow of the DVB Project. In 2006, Theo stated very firmly his view that this award should not be given automatically to retiring officials of the DVB Project. It is therefore important to record that Theo's award was not an 'automatic' award - the Steering Board felt that it was richly deserved.
As incoming Chairman, I am acutely aware that Theo is a hard act to follow - a sure sign of his success!
On behalf of the entire DVB Project, I take this opportunity to wish Theo a long and healthy retirement.

Theo Peek being presented with Honorary Fellowship by Graham Mills, Chairman DVB CM

Peter MacAvock with Ulrich Reimers, Chairman DVB TM

When Peter MacAvock joined the DVB Project in 1994, it was a step into the unknown - not just for Peter, but also for the DVB Project itself. DVB had made a promising start, but it was unclear how DVB would develop or, indeed, whether it would last more than a couple of years. With the benefit of hindsight, we can see that Peter rapidly grew into his new job and stamped his unique personality on DVB.
I am sure that all of Peter's friends and colleagues around the world will join me in thanking him for his boundless energy and enthusiasm devoted to all things DVB over the past 14 years - as well as wishing him similar successes in his new role at the EBU.

technologies. For example, some DVB members were worried that the development of DVB-S2 might stifle investment in DVB-S systems: in practice, DVB-S was so well established that it was not threatened by DVB-S2. Similarly, the arrival of DVB-T2 does not invalidate the DVB-T services already on air in many countries – where, because of the huge base of DVB-T receivers, it is unlikely that such DVB-T services will be closed down in the near future. However, those countries planning to launch DVB-T in the next few years need to decide whether or not to embrace DVB-T2. The key benefit of DVB-T2 is

to be transformed into mass market products. Conversely, if a technology is delayed in standardisation, the advent of the next generation of technologies is likely to threaten its success. Technological innovations are exciting for engineers – but technology, by itself, is not sufficient to guarantee successful implementation. DVB places great emphasis on the commercial justification for new specifications: the business case for new services and applications typically depends on the availability of low cost devices, especially for mass markets. Some technocrats might want to develop the 'ultimate' technology that would result in

the Shannon limit (the best that can be achieved by theoretical systems) that DVB will not need to consider an enhanced version of DVB-S2 in his lifetime!
When we have achieved a similar state for all of DVB transmission systems, we will probably hear renewed suggestions that DVB should be closed down. As mentioned earlier, DVB continues to perform vital work in developing many other types of specification. Nevertheless, we must be aware of the risk of 'mission creep' resulting in the goals and objectives of DVB being redefined with the primary purpose of finding tasks to keep the organisation

"DVB places great emphasis on the commercial justification for new specifications..."

its improved spectral efficiency, but it requires much more complex receiving equipment. Although DVB-T2 receivers will initially be more expensive, history suggests that this price differential will become trivial in a few years. So if a developing country wants to launch digital terrestrial TV this year, it would be sensible to adopt DVB-T so as to benefit from the widespread availability of low-cost DVB-T set-top boxes. On the other hand, DVB-T2 is the logical choice if you are planning to launch an HDTV service. Such decisions often boil down to a question of timing – more generally, timing is crucial to the success of standardisation: if a technology is standardised too early, the technology can be too expensive

products being so expensive that none would be sold, but such ambitions need to be redirected towards commercially sensible specifications which will eventually benefit a wide range of DVB members – and, more importantly, consumers in the real world.
DVB cannot ignore the onward march of technology – and it would be wrong for DVB to do so. DVB can rightly claim that its second generation transmission specifications (DVB-S2, DVB-T2 and, soon, DVB-C2) are the best in the world. In my personal opinion, DVB must continue to work at the cutting edge of technology. Ulrich Reimers (Chairman of DVB's Technical Module) has frequently said that the performance of DVB-S2 is so close to

active. When there really is nothing further for DVB to do, I will lobby very hard for its closure – but, personally, I am sure that DVB has important activities that will keep it busy for, at least, the next 5 years!
Philip Laven took over as Chairman of DVB Steering Board in June 2008. He was the EBU's Technical Director from 1997 until 2007. He had previously worked for the BBC in various senior roles, including Chief Engineer R&D. As Controller of Engineering Policy from 1993 to 1997, he played a leading role in the development of the BBC's policy on many technical developments, such as the introduction of digital audio broadcasting and digital television.

A DATE IN BERLIN

With the launch of DVB-T services in November 2002, Berlin moved to the forefront of digital TV developments in Germany and beyond. Indeed Issue No. 4 of DVB-SCENE marked the occasion at the time with a cover story. Now, just over six years later and with the German terrestrial market one of the most innovative in terms of services and devices, Berlin will be centre stage

once again as the host city for DVB World 2009.
The Berliner Congress Center will be the venue, centrally located in the shadow of the TV tower at Alexanderplatz and modernised in recent years to offer top class facilities. The conference will run from Monday 9th to Wednesday 11th March. DVB World has become the biggest

annual gathering dedicated to DVB standards, services and technology. It attracts more than 200 delegates from around the world, representing both DVB member companies and non members. It offers an unequalled opportunity to hear about the latest developments, with an emphasis on useful information and informed analysis rather than commercial pitches.
DVB World 2009 will cover a wide range of topics with key sessions dedicated to IPTV and web TV, developments in the cable industry and the arrival of DVB-C2, and the impact of DVB-T2 on terrestrial services. The conference will open once again with a series of Flagship Presentations that will set the tone for the following days. Newcomers to the world of DVB or those looking for a refresher course will welcome the opportunity to register for an additional 'Masterclass' taking place ahead of the conference: Prof. Ulrich Reimers, chairman of the DVB Technical Module, will present 'A Beginners Guide to DVB Technologies'. The full conference programme and information about how to register and book accommodation can be found on the event website: www.dvbworld.org. See you in Berlin!

SYNCHRONISED
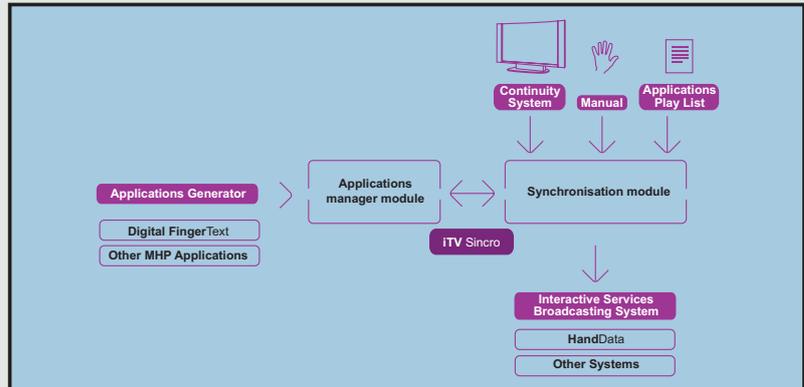## INTERACTIVITY

The Spanish public broadcaster TVE is currently testing a new interactive MHP application on its DTT platform. Developed by Activa Multimèdia, iTV Sincro enables the linking of an interactive service to a specific segment in a television programme.

The tests began in May 2008 with the long running and popular quiz show Saber y Ganar in which contestants compete to answer culture related questions. With iTV Sincro viewers at home can also take part in real time through their remote control.

At a specific time in the programme when the presenter asks a question the application is activated enabling viewers to answer at the same time as the contestant. This is the most innovative aspect of the system as it allows for exact synchronisation with programming.

In fact, the application enables three levels of synchronisation: within the continuity of the channel; through time bands; and through the manual intervention of an operator, and in all cases with to-the-second precision, and relating to the content of the programming.

iTV Sincro makes it possible for interactive TV applications to become dynamic, fully interactive and linked to content. The application could even act as a stimulus for further development of interactivity in DTT. Moreover, this generation of synchronised interactive services enables a more efficient management of the bandwidth available for interactive services, thereby offering viewers a complete range of services which otherwise could not be offered.

In addition to Activa Multimèdia and TVE, Abertis and Televisió de Catalunya are also taking part in the tests of iTV Sincro with the Saber y Ganar programme. Abertis runs the telecommunication infrastructure for broadcasting the application and Televisió de Catalunya, the public Catalan roadcaster, contributed to the development of iTV Sincro by sharing with Activa Multimedia its huge experience in DTT interactivity.

Activa Multimèdia is a research and development company specialising in interactive TV. The company pioneered the first interactive DTT applications that were broadcast on Televisió de Catalunya in 2002. Since then, the company has become the one of the leading centres in Europe for the development of MHP applications.

MOBILE RETURNS

The New Standard For Two-Way Broadband Interactive Mobile Satellite Services

Harald Skinnemoen, AnsuR Technologies AS / ESA-ESTEC & Chairman of DVB TM-RCS,
Alessandro Coralli Vanelli, UoB/Mavigex, Ana Bolea Alamanac, ESA/ESTEC and Domenico Mignolo, ESA/ESTEC

Published in 2000, DVB-RCS was the first interactive DVB system to provide an interactive broadband connection as an extension of the DVB systems. The standard defines the physical and media access control layer protocols between the satellite operator and interactive user terminals. DVB-RCS is based on DVB-S/S2.

There was a commercial need to respond to the growing demand from industrial, institutional and governmental organisations for two-way broadband interactive mobile services based on open standards. Requirements include commercial, governmental and military applications. Consequently, DVB-RCS has been enhanced with a new set of extensions called DVB-RCS+M, that support broadband communications via mobile satellite services (MSS) to mobile and typically collective terminals. These DVB-RCS mobile terminals would be mounted on mobile platforms such as airplanes, ships, trains, busses and other vehicles. It is expected that several users inside the mobile platform will share one satellite terminal. The same satellite system can provide services to both fixed and mobile
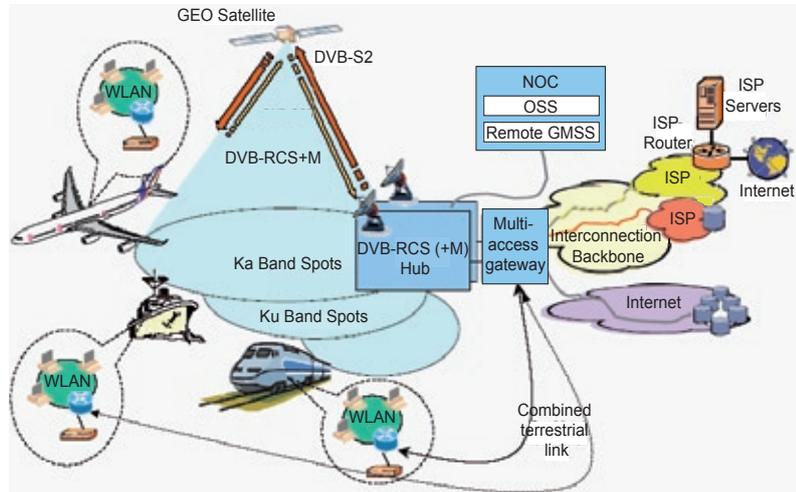
Overall System Architecture For Mobile Interactive Services Via Satellite

> **"...a key enabler for market growth in the mobile satellite communications area..."**

terminals, and the extension has no impact on already deployed terminals. The DVB-RCS+M architecture (see diagram) includes a:
• space segment, including geostationary satellites with a single or multi-beam configuration per satellite, operating in the normal frequency bands;
• terminal segment with RCS+M terminals mounted on mobile platforms, operating as local access points for users via their communications equipment, e.g., laptops, PDAs;
• ground segment consisting of Network Control Centres supporting RCS+M and gateways providing access to core network.
The DVB-RCS+M radio interface has DVB-S2 forward link and robust DVB-RCS return link with multi-frequency time division multiple access, enhanced with continuous carrier mode reusing the DVB-S2 waveform also in the return link. This allows even more efficient use of return link bandwidth when traffic from many individual users is aggregated in the same RCS+M terminal. Both modes can be used individually or in parallel. New DVB-RCS functionalities and techniques were required in order to cope with the different challenges of mobility including

the impairments associated to mobile channels, introducing solutions based on state-of-the-art technologies of satellite communication systems. Stabilised platforms are required in order for antennas to be pointed continuously to the satellite. Due to cost many vehicles may not have space for large tracking antennas. Therefore, RCS+M includes technologies supporting smaller antennas, resulting in two effects: the uplink could interfere with neighbouring satellites since the beam becomes wider, whilst on the forward link a smaller antenna will collect less energy providing reduced link budgets. Therefore, a key challenge addressed is interference mitigation. The spectrum regulation allocates MSS on a secondary basis, posing constraints on return link interference on adjacent satellites or fixed service satellites. Small antennas have less interference rejection capability and interference mitigation techniques may be required in forward links to reduce interference from adjacent satellites. Therefore, spectrum spreading techniques in both directions, if required, or burst repetition applicable in the return link only have been incorporated in DVB-RCS+M. Interference management based on exclusion zones has also been introduced to avoid unwanted emissions from RCS+M terminals entering specific zones.
Another challenge addressed is the mobile propagation channel, characterised by specific impairments such as Doppler, multipath, shadowing, and signal blockages. To counteract

these DVB-RCS+M specifies robust schemes for initial random access timing and frequency tracking, and log-on procedures for high availability where carriers can sometimes be lost. RCS+M also includes a Link Layer forward error correction scheme (LL-FEC) to counteract effects of signal blockage. The LL-FEC supports both traditional Multi Protocol Encapsulation and the novel Generic Stream Encapsulation. Additionally, proactive retransmission schemes in both forward and return link have been introduced to provide time diversity.
Since terminals can travel across different beams, even served by different gateways, beam and gateway handover procedures have been implemented. Such handovers are initiated on the basis of terminal requests.
The updated specification also incorporates several maintenance issues and support for fixed mesh networking in transparent and regenerative satellite networks. Ensuring interoperability through an open standard approach with multiple vendors, DVB-RCS+M represents a key enabler for market growth in the mobile satellite communications area. Successful trials and implementations of DVB-RCS+M have been carried out and the future looks promising. Specifications have been completed in time and the Technical Module RCS Group has had a stable and highly qualified group of participants providing steady progress.
As commercial requirements for Next Generation DVB-RCS are now approved and work is starting, work done over recent years in TM-RCS Technical Module forms an excellent basis for further evolutions.

Moore Analysis

MPEG
DOMINATION

Share of MPEG-4 AVC Devices Among All Device Categories

- Camcorders
- Mobile handsets
- PMPs
- Videogame devices
- BD PCs
- Non-PC BD devices
- Set-top boxes and TVs

Terrestrial and pay TV transmissions and services are not the only areas where MPEG-4 AVC can claim dominance among next generation codecs. Practically every product category in the consumer electronics toy box and a growing presence of Internet software and content are going over to the new MPEG standard creating a much greater video footprint for the standard than it has ever occupied.

The chart illustrates how MPEG-4 AVC has expanded into new device categories, such as mobile handsets and Personal Media Players (PMP). And those new device categories will dominate the entire MPEG-4 AVC device market for the foreseeable future. DTC forecasts that more than 207 million of these devices will ship in

2008 growing to more than 730 million in 2011.

Not only have AVC's greater compression-efficiency improvements, nonproprietary status, and lower licensing fees taken the codec into new kinds of devices, it's also making preliminary inroads onto the Internet. In 2008, DTC estimates that more than 340 million Internet media players – either bundled with PCs or downloaded from the Internet – with native MPEG-4 AVC decoding will 'ship' into the marketplace. Millions of free video segments through the use of YouTube and the Flash Media Player put the video MPEG standard on the map. Free content, however, isn't the only MPEG-4 AVC content available on the Internet. DTC estimates that more than 200 million 'buys' of MPEG-4 AVC

encoded content will be purchased on the Internet in 2009.

Before the era of iTunes and YouTube, MPEG video standards only made their way into consumer electronics products and network connected set-top boxes. Now, more than 10 years after MPEG-2 kicked off the digital video era, the MPEG family is a critical piece of the digital video entertainment revolution on the Internet.

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 size of the MPEG-4 AVC and other digital video markets is available at www.dtcreports.com.

T2 AT IBC

Peter MacAvock Giving a DVB-T2 Presentation at IBC

Chris Nokes, Lead Research Engineer, BBC Research

The DVB stand at IBC 2008, in Amsterdam last September, was probably the most successful DVB tradeshow stand ever. The focal point was the world's first, live over-air demonstration of DVB's second generation terrestrial broadcasting transmission standard, DVB-T2 (DVB BlueBook A122). In a truly remarkable timescale, less than 3 months from the approval of the standard by the DVB Steering Board, BBC Research & Innovation demonstrated a live HDTV signal transmitted across the DVB stand from their in-house modulator. The live DVB-T2 signal was received and demodulated to display HDTV pictures, using the BBC's demodulator, which could also show DVB-T2's characteristic rotated 256 QAM constellation. The rotated constellations provide increased robustness in the most difficult terrestrial transmission channels, with the only cost a small increase in receiver complexity. The HDTV pictures transmitted for the IBC demonstration included 3 HDTV services encoded using H.264 at around 11 Mb/s, carried in an RF channel with a total data capacity of 36Mb/s, a 50 percent increase in capacity compared to the equivalent available with DVB-T.

In a parallel demonstration, SIDSA were also able to show the HDTV pictures being received on their demodulator, and therefore demonstrated the interoperability between equipment from different organisations, underlining the clarity of the DVB-T2 standard.

The final part of the IBC demonstration showed some aspects of the underlying technology used in the DVB-T2 specification, using equipment from ENENSYS Technologies, NXP Semiconductors and Pace.

On another part of the DVB stand, an hourly presentation was given to visitors, introducing the concepts and features of the DVB-T2 standard. A copy of this presentation is currently available from the DVB website. During the course of the 5 days of the exhibition an estimated 1200 people attended this presentation. The DVB-T2 specification has been sent to ETSI for standardisation, and is expected to be published around April 2009 as EN 302 755.

Following **ENENSYS**' involvement and contribution to the development of the DVB-T2 specification, the company's natively designed FPGA-based multistandard modulator has been embedded with a DVB-T2 modulation core.

The company has also released SynFoNizer, a compact, cost effective solution that synchronises, seamlessly, redundant SFN feeds. The product completes the company's SFN end-to-end solution that secures SFN broadcast delivery for DTT and DVB-H markets. www.enensys.com

ENENSYS DVB-T2 Modulator

ATEME introduces the Kyrion CM3101, a multiformat 4:2:2 MPEG-4 AVC/H.264 encoder, designed for broadcast contribution and electronic news gathering over satellite and IP. With support for 4:2:0 and 4:2:2 chroma subsampling, the unit can deliver high quality video with colour preservation through multiple hops. It encodes video up to 60 Mbps in standard or low latency modes, supports ASI and IP simultaneous streaming, BISS encryption, and Pro MPEG FEC for secure transmissions. www.ateme.com

ATEME Kyrion CM3101 Encoder

Newtec FlexACM
Newtec has announced the launch of FlexACM, a solution for IP trunking and IP backbone systems that provides bandwidth efficiency gains of up to 100 percent and resists rain fades of more than 20dB. It dynamically optimises the link according to the weather conditions, maximising the data throughput at all times, and it guarantees 100 percent availability of the link in bad weather. FlexACM is available on the Elevation satellite IP product family. www.newtec.eu

Mier Comunicaciones MODULAR Series

The **Mier Comunicaciones** MODULAR series is a new range of low power equipment for digital and mobile TV, available as transmitter, retransmitter, transposer and on-channel repeater (including the internationally patented echo cancelling system for on-channel repeaters). This equipment has been designed to meet the specific needs for massive extension of digital coverage, featuring multichannel operation, modularity, wideband operation, fully automatic settings configuration, plus flexible and customisable remote control & monitoring capabilities. www.mier.es

The **Scopus** Integrated Receiver Processor is a multiformat receiving/decoding/processing platform that helps cable, satellite, terrestrial and IPTV operations expedite a smooth transition to digital broadcasting and establish mass delivery of HD services. It targets broadcasters' requirements for handling multiformat HD/SD content, offering an array of processing capabilities, including multiplexing, IP streaming, transmodulation, and descrambling, to provide a complete reception solution for content contribution and distribution over IP, ASI, or satellite infrastructures. www.scopus.net

The portable **Rohde & Schwarz** ETH offers the functionality of a TV analyzer, spectrum analyzer and network analyzer in a single box. Compact and lightweight, it can easily be transported over long distances, which makes it ideal for installing and servicing low power transmitters in remote locations. Moreover, the instrument provides a quick way for network operators to perform coverage measurements in the field, at public sites or in buildings. It supports the DVB-T and DVB-H standards. www.rohde-schwarz.com

Rohde & Schwarz ETH

DVB-SCENE : 14

Nokia N96

Nokia has announced the availability of its DVB-H capable N96 phone with advanced entertainment options. It has a 2.8" QVGA (240 x 320 pixels) LCD TFT display with up to 16 million colours and has video capture in MPEG-4 up to VGA at 30 frames per second. It comes with a battery that allows up to 220 minutes of talk time, 220 hours standby time, 5 hours video, 14 hours music or 4 hours TV playback. www.nokia.com

GCS BSR-100

GCS has introduced the BSR-100, a small, ruggedised, and powerful solution for reception of DVB-S downlink (up to 45 MBaud) with standard ASI as output. It is configurable locally through the front panel or remotely via serial interface. Flexible design allows several options, including external alarm relay control, ASI failover input, additional ASI input for decoder cascading, TS Data Output via RS-232/RS-422/RS-485, 48V supply and more. www.gcs-salzburg.at
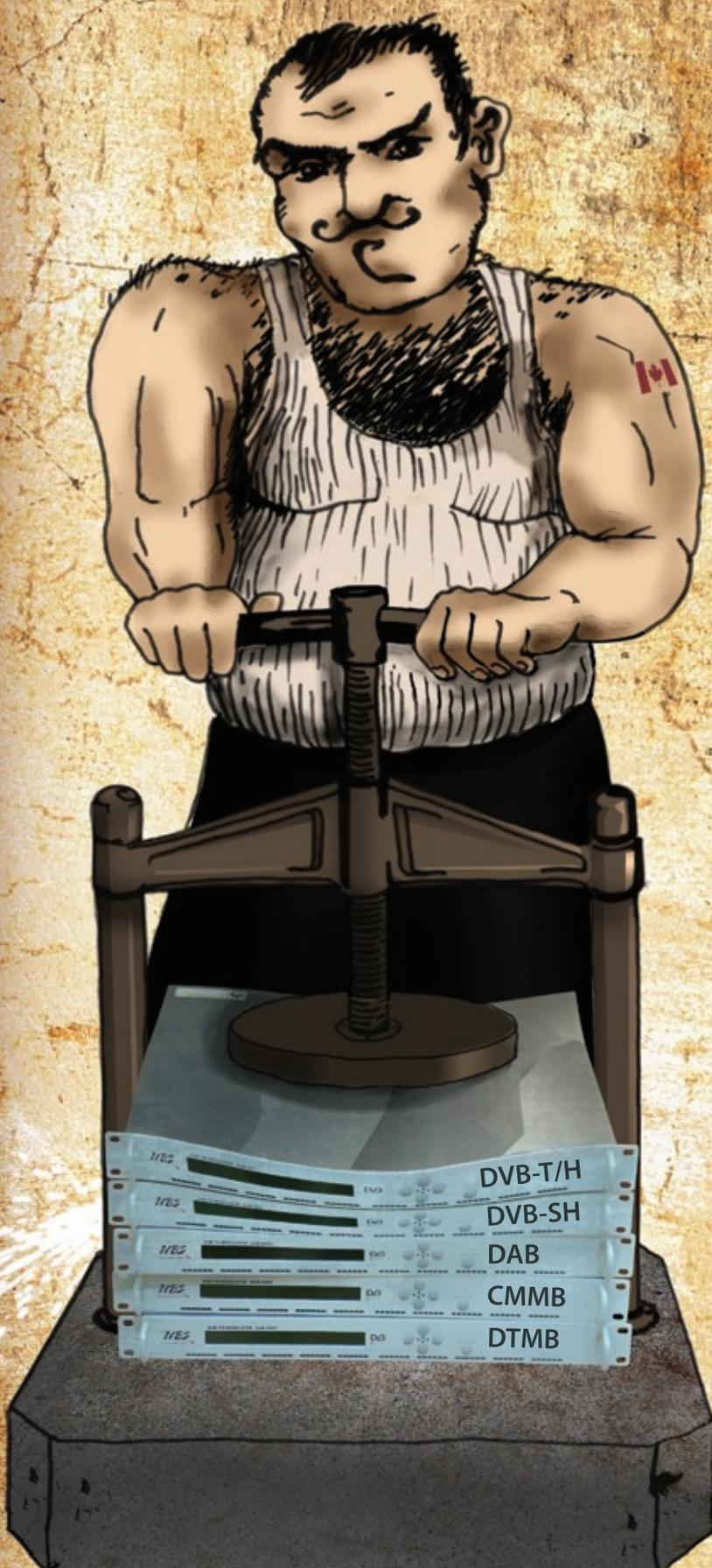
SysMedia's latest version of its InFILE subtitle inserter software for file-based workflows now supports DVB subtitles in transport stream files. The software can handle both bitmap and teletext DVB subtitles for MPEG-2, MPEG-4 and H.264 transport streams. It is ideal for many of the workflows typical of VOD content providers and saves considerable time and equipment costs when compared to traditional subtitle encoders working with linear video. www.sysmedia.com

Harris Corporation's Maxiva UAX is a 10 W to 2 kW air-cooled UHF transmitter designed for broadcasters that require a cost, space and power-efficient solution for low power transmission. This transmitter leverages proven technologies from the company, including the Apex multimedia exciter's capability to support the complete range of analogue and digital standards and real-time adaptive correction. Its field upgradeable design makes the transmitter an ideal solution for analogue broadcasters planning a future transition to digital or mobile TV, including DVB-T2. www.harris.com

Harris Maxiva UAX Transmitter

The **Pixelmetrix** DVStation-Mini DVB-T offers comprehensive and in-depth checks of both RF and TS measurements and analysis. Designed for 24/7 operational monitoring, quality assurance and continuity of DVB-T

services, it provides visibility into the quality of service when deployed on every transmitter within the network. Key features include video thumbnail generation for H.264 video streams in SD and HD, configurable thresholds for custom monitoring requirements, configurable alarm actions for contact closure support and more. www. pixelmetrix.com

Pixelmetrix DVStation-Mini DVB-T

Cisco is accelerating delivery plans for the Cisco 8485DVB PVR set-top box which offers enhanced performance with a faster processor, more memory, and increased HDD storage capacity for user recordings. In an effort to meet corporate and regulatory green objectives by embedding environmental sustainability it offers energy saving options for reduced power consumption. It is also capable of sending and receiving IP video via a dedicated rear panel Ethernet port. Commercial availability is planned for Q1 2009. www.cisco.com/cable

Cisco 8485DVB PVR

TeamCast is launching Power4-T2, a T2 compliant modulator offering the highest level of performance and reliability, to meet the QoS expectations for the new terrestrial HD services. Powered by the Power4Cast platform, the solution is able to support the most complex DVB-T2 modulation scheme, and ready for multistream operation and SFN architecture. It's designed to comply with the requirements of high power transmitters, with secure input management, high performance linear/nonlinear precorrection and peak-to-average power ratio management. www.teamcast.com

TeamCast Power4-T2

Developed partly with the assistance of the European Space Agency, **International Datacasting Corporation's** DUO, configuration of DVB-S/S2 satellite receivers, features simultaneous dual carrier operation – ideal for operating on two satellite transponders simultaneously for spatial diversity or reliability and/or to achieve high data throughputs in excess of 200 Mbps. The product line permits the company's SFX3100 and 4100 receivers to be configured for dual carrier DVB-S or S2 operation. www.datacast.com

IDC DUO Receiver

Ikusi has launched the innovative MTI-900, QPSK Transmodulator with COFDM. The unit improves the reception of the digital television signal. It can be used in areas where terrestrial cover is weak or nonexistent and a satellite signal can be used as a repeater that serves a whole town or for a home owners' association or cable network. It also means an additional digital receiver will no longer be necessary to watch satellite digital television. www.ikusi.com

Ikusi MTI-900 QPSK Transmodulator

TechniSat's DigiCorder HD-S2X, with intergrated twin tuner, is a digital HDTV hard disk drive receiver that is equipped with an HDMI, an Ethernet and a USB 2.0 interface. In addition, it features two CI slots as well as two card readers that are linked to the integrated CONAX decoding system, thus providing a wide range of decoding options making it prepared for any future developments in compression and encryption standards. Its on-screen menu is available in 14 languages and has 'AutoInstall', an installation assistant for automatic and simple installation. www.technisat.com

The **UBS** Universal modulator comes with preloaded software that allows selection from a list of world leading broadcasting standards. The key benefits of this mass manufactured, single bill of materials platform are improved quality and technical characteristics, quicker delivery time and most importantly, lower cost. Supported standards include DVB-T, DVB-H, DVB-SH as well as DAB, CMMB and DTMB. www.uniquesys.com

UBS Universal Modulator

Thanks to two **DiBcom** DIB7070 chips, Sony Playstation 3 users can now watch, pause and record free-to-air digital television while taking a break from gaming with the new PlayTV accessory. The two high performance DVB-T receiver chips provide PVR functionality for users to view, pause, and rewind a live TV programme while recording another. Other innovations are a sophisticated but user-friendly EPG, as well as remote TV streaming to any PSP game console. www.dibcom.com

DiBcom DIB7070 DVB-T Receiver Chip