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DVB Digital Video Broadcasting

Issue No. 37

March 2011

The Technology Update from DVB

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A Look Ahead

A Word From DVB

Peter Siebert
Executive Director

At the beginning of a new year we tend to look forward to new things ahead and back to the things we have achieved. 2010 was another busy year for DVB. Altogether 33 DVB documents were processed and published by ETSI which is the highest number ever. Of these 33 documents about 30% are new specifications including, for example, the 2nd generation cable specification and corresponding guidelines document. The remaining 70% are revised versions of already existing DVB documents where the reasons for the updates are typically market requests for new features. In addition to face to face meetings, a significant amount of this work has been done in telephone conferences, thus saving travel costs and reducing carbon emissions. The DVB Project Office is supporting this initiative by providing the necessary infrastructure for telephone conferences and web meetings.

2010 has also been a successful year for the adoption of our specifications, especially DVB-T2. By all accounts the market introduction of Freeview HD, which is based on T2, has been a success. In addition to the UK, Finland and Sweden have started to roll out T2 services. Following this momentum the consumer electronics industry is providing the necessary receiver equipment at attractive prices. DVB-T2 has also been successful outside of Europe. After an intensive phase of analysis, the South African Development Community representing 15 member states in Southern Africa, from the Democratic Republic of Congo in the north, down to the Republic of South Africa, recommended DVB-T2 to its member states. Already, following this recommendation the governments in South Africa as well as in Mozambique have adopted DVB-T2 as their digital terrestrial system. In addition to Africa, Australia as well as countries in Asia including India, Sri Lanka and Singapore have registered a big interest in this new technology.

After having been so successful in 2010 what is in store for the future? 2011 will see a new standard for mobile broadcast which will build on the performance and flexibility of DVB-T2. The DVB group working on the 2nd generation return channel via satellite specification will deliver a complete set of standards from the physical up to the systems layer. As I write, the Technical Module has adopted the specification for frame compatible 3DTV, including the necessary extensions for 3D subtitles. Work on the commercial requirements for a second phase of 3DTV has just started and we anticipate that there will be a lot of activity around the further development of 3DTV. Furthermore, 2011 will bring us a new version of the DVB Measurement Guidelines covering the necessary measurements for the 2nd generation broadcast standards. In addition, I'm sure there will be other developments in the pipeline.

Looking at the deployment of our technology, we will most likely see the first DVB-C2 consumer receiver in 2011. I am positive that DVB-C2, like its two older siblings S2 and T2, will revolutionize the way video, as well data, is delivered via cable systems. We will also see additional deployments and growth for T2.

So, right now, it looks as though 2011 will be an equally as busy and successful year for DVB as 2010. But, will we be able to continue this trend forever? The answer is of course open. But even when the standardization activities of DVB may one day slow down we should not forget that DVB is about more than standardization. We are also a forum bringing together all major players in the broadcast industry such as broadcasters, manufacturers, network operators and regulators. Furthermore, we facilitate the introduction of new services and technology. Finally, we also serve as an interface between the broadcast community and research institutions as well as the European Commission. As such DVB will continue to play an important role for its members as well as for everybody relying on our technology.

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New Standards

TS 101 162 Ver. 1.3.1: Allocation of identifiers and codes for Digital Video Broadcasting (DVB) systems (09/12/10)

TS 101 211 Ver. 1.10.1: Guidelines on implementation and usage of Service Information (SI) (09/12/10)

TS 102 773 Ver. 1.2.1: Modulator Interface (T2-MI) for a second generation digital terrestrial television broadcasting system (DVB-T2)(09/12/10)

TS 102 584 Ver. 1.2.1: DVB-SH Implementation Guidelines (21/01/11)

A New Powerful Platform

2nd Generation DVB Interactive Satellite System

Dr. Harald Skinnemoen, Chairman TM-RCS

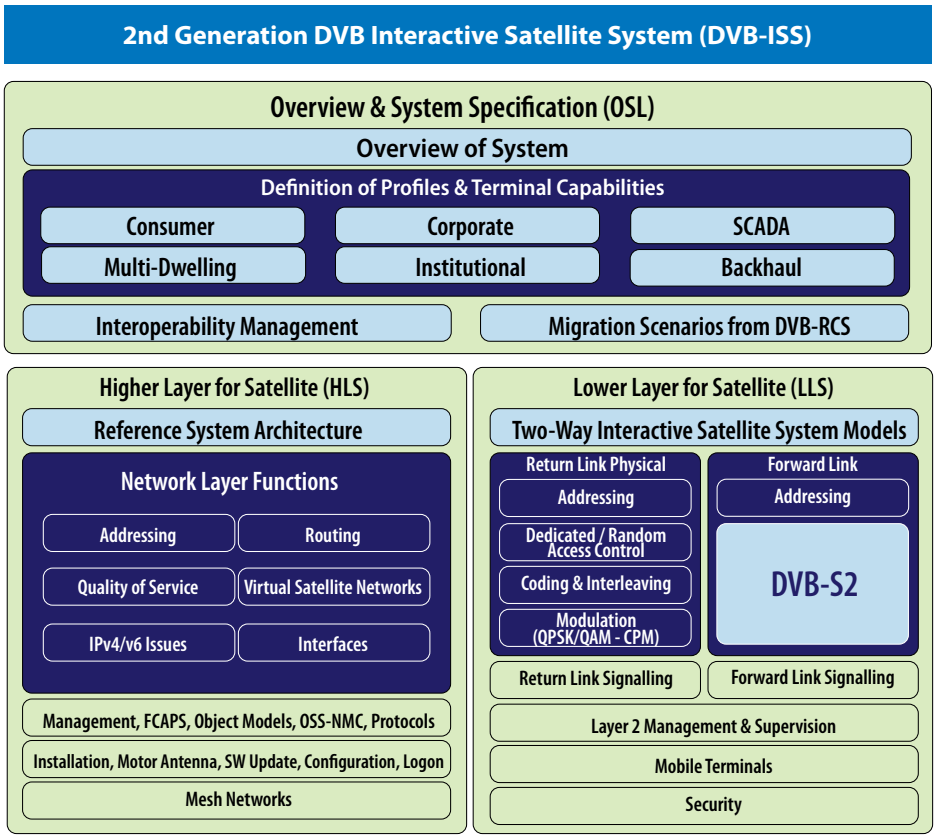
Abstract and Background
With state-of-the art technology giving substantial enhancements over 1st generation DVB-RCS, the 2nd generation DVB interactive satellite system (DVB-ISS[1]) was completed in January 2011. DVB-ISS is natively developed for IP services, and is specified for interactive satellite services in several market segments. The formal ETSI specifications are "Second Generation DVB Interactive Satellite Services" -
Part 1 - "Overview and System Level Specification", TS 101 545-1 (DVB-ISS-OSL)
Part 2 - "Lower Layers for Satellite Standard", EN 101 545-2 (DVB-ISS-LLS)
Part 3 - "Higher Layers for Satellite Specification", TS 101 545-3 (DVB-ISS-HLS)
Part 4 will come later and includes the guidelines for implementation and use (DVB-ISS-GIU).

Following substantial efforts from key players, DVB-ISS forms a flexible basis for modern interactive satellite services in these times when the industry increasingly turns to open standards. More than just a return channel specification it is the first system to take advantage of Generic Stream Encapsulation (GSE), DVB-ISS, which is a powerful platform for interactive services.

Main 2nd Generation Enhancements Include:

- **Adaptive Coding & Modulation (ACM)**, optimizes performance to the available capacity rather than worst case scenario. It provides significant increase in capacity/availability. Forward link is DVB-S2, and return link modulation schemes are CPM, QPSK, 8PSK and 16QAM. Per timeslot, ACM configuration allows more granular and flexible just-in-time timeslot adaptation.
- **Continuous Phase Modulation (CPM)** may result in lower-cost terminals, since CPM tolerates non-linear signals and cheaper amplifiers. Savings depend on production volume, specific designs and references. DVB-ISS terminals support both modulation types. TM-RCS Study Group found comparable QAM/CPM performance up to about 1.5 b/s/Hz with optimum working point and stable amplifier. Instabilities make CPM relatively better. At higher spectral efficiency QAM modulations are best.
- **A 16-state turboΦ code** for QPSK, 8PSK and 16QAM benefits substantially from coding developments in the last decade. The FEC for CPM is based on convolutional code.
- **Continuous Carrier return link** option in adaptive or variable mode (ACM/VCM) will be lifted from RCS+M to DVB-ISS. It is adapted to low rates with a coding scheme based on shorter 4k blocks.
- **Random Access** option for traffic, based on slotted aloha burst replicas using a specific transmission scheme will, since not required to request capacity in advance, be more responsive with less delay for intermittent data transfer.
- **Configurable waveform characteristics** for adaptation to different applications. Normative reference waveforms for interoperability. Balanced use of preamble, postamble and pilots allows balanced decoder synchronization and payload decoding sensitivity.
- **GSE** with strengthened integrity control. Return link packet encapsulation (RLE) is an adaptation of GSE. IP packets are fragmented just in time so fragments fit exactly onto remaining varying size free space transmission payloads, without intermediate fixed ATM or MPEG TS frame layer.
- **Power headroom reporting** supports an optional control mode aiming for constant power spectrum density over carriers of different BW as an alternative to control the EIRP.
- **Improved security,** not handled as one specific technology, but as a careful review of all technologies and overall architecture. The strong governmental markets position is maintained. Security provides sufficient confidentially, integrity, availability and non-repudiation performance.
- **Simplified antenna installation** and the use of motors for adjusting pointing.
- **Improved QoS system architecture** and support for cross-layer optimization, performance enhancing proxies.
- **Support for IPv6,** and specifications for addressing, routing and management. SatLabs recommendations partly integrated into higher layers.
- **System profiles** defining use of HLS/LLS capabilities for various applications/markets. Definition of profiles for test and interoperability.

DVB-ISS will, along with some other issues, be updated with mesh and mobile specifications from DVB-RCS+M (EN 301 790 v1.5.1). After implementation and testing, another clarifying update will be released. DVB-ISS is then expected to be a stable, robust and flexible platform from which both true interoperability and future evolution is secured under a collaborative international spirit, allowing innovation to take place within the DVB-ISS community.



[1] DVB-ISS is an abbreviation of the ETSI work item. At the time of writing a commercial name has not been released.

Rising to the Challenge

Semiconductor solutions for 2nd generation DVB receivers

Steve Beck, Sony Semiconductor Europe

Steve Beck is an Engineering Programme Manager and has worked at Sony Semiconductor for the past 13 years leading IC developments for digital TV receiver products. Recently the role has been focusing on the specification and validation of DVB-T2 and DVB-C2 solutions.

In 2005 the DVB updated the physical layer specification for satellite TV broadcasting to allow for greater capacity, e.g., for HDTV services. Terrestrial and cable broadcasters also needed greater capacity and so there were widely supported activities within the DVB to develop 2nd generation standards for terrestrial (2007-9) and cable TV systems (2008-10).

A change to the technology used to broadcast the TV signal has the greatest impact on the channel decoder in a digital TV receiver.

Simply speaking, the channel decoder takes the analog signal from the RF tuner and converts it into a digital signal which is demodulated to a bit stream and passed to an error correction function. The resultant bit stream is processed into a form suitable for A/V decoders, e.g., MPEG-2 transport stream.

All the 2nd generation standards use a very powerful error correction algorithm, Low Density Parity Check (LDPC). Implementing LDPC and the other technologies that enhance capacity, robustness and flexibility have significantly increased the complexity of the channel decoder.

Therefore the implementation of 2nd generation channel decoders presents two major challenges; (1) maximize features and performance while minimizing the cost of the complete receiver and (2) verification and validation of the new technology in time for the launch of new services.

To address these challenges it is necessary for a semiconductor vendor to run several tasks in parallel.

Early engagement with the DVB standardization process allows experts from a global company like Sony to contribute technologies from its R&D activities that strengthen the standard. Also, knowledge of IC implementation can be shared so others can appreciate the cost/performance trade-offs.

To move forward quickly it is vital all those involved have a common understanding of the standard, so a strong verification and validation activity within DVB is vital. This was particularly evident within the TM-T2.

While the DVB standard is being developed, the semiconductor vendor engages with the makers of TVs and set-top boxes, network operators and broadcasters. This leads to a set of requirements that define the function, performance, business case and time scale of the channel decoder.

The high cost of silicon manufacture at the small geometries required means business plans can fail if a major rework is necessary. Thankfully advanced FPGA technology allows real-time prototypes including driver software to be constructed. These prototypes are used in the laboratory to verify the implementation and in field trials to validate the standard.

The implementation of the integrated circuit (IC) begins in parallel with the verification of the prototype. Where possible, circuits are reused from previous designs. Key macros such as A-D converters, memory and I/O cells are selected from libraries that exist within the semiconductor company or from external organizations that develop intellectual property for ICs.

Before being released to customers the first silicon implementation is mounted on an evaluation PCB and thoroughly tested in the laboratory.

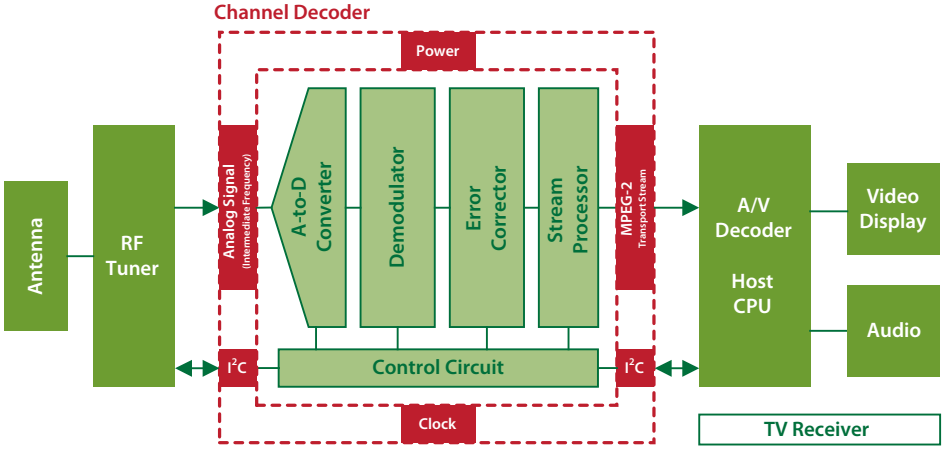
The early silicon samples allow the semiconductor vendor to work with lead TV and STB customers to develop complete, prototype receivers. These prototypes are subjected to further laboratory tests and field trials.

In parallel with the customer activity, the IC is subjected to many quality assurance tests such as life test and immunity to electrostatic discharge. A comprehensive manufacturing test program is developed to ensure that only fully working samples are shipped to customers.

The support for the customer continues as their receiver is tested for conformance in the relevant country and as the receiver is launched to market. Any new information learned is captured by the ongoing requirements process for the next version of the IC.

DVB's foresight has led to a family of 2nd generation broadcast TV standards. The error correction technology is common to satellite (DVB-S2), terrestrial (DVB-T2) and cable (DVB-C2). The modulation scheme is common to DVB-T2 and DVB-C2. This will allow future channel decoders to cost-effectively support multiple standards and continue the tradition of offering maximum performance at the lowest possible cost.

The Channel Decoder's Position Within a Typical TV Receiver



Enhancing Success

Innovative Upper Layer Services for DVB-T2

Laurent Roul, Product Manager, ENENSYS Technologies

In September 2008, DVB had just completed the physical layer specification for the second generation terrestrial network, DVB-T2, standard and the new T2-MI (Modulator Interface) protocol was born. Nobody could have anticipated at this time that it was the dawn of a tremendous success story with rapid adoption two years later.

As defined within the new specification, the broadcasting of digital TV services over a DVB-T2 network involves several new components and interfaces. The T2 gateway, operating at the headend after the regular multiplexer, provides for the encapsulation of the MPEG-2 transport stream into a DVB-T2 stream (baseband frames). It inserts synchronization information for SFN broadcasting, manages the allocation of baseband frames into Multiple Physical Layer Pipes (MPLP) for offering service specific robustness, and outputs T2-MI packets containing baseband frames data, synchronization information, transmission parameters and MPLP scheduling. These T2-MI packets are data piped into MPEG-2 transport streams to be distributed to DVB-T2 modulators. The latter are the only parts to be updated at the transmission sites. The same amplifiers remain, using less power for the same coverage as DVB-T2 and provides greater performance and efficiencies. In households, set-top boxes and iDTVs need to be updated to integrate a DVB-T2 chipset however the same roof-top antenna can be used. Up until now, no end-to-end DVB-T2 system has been tested combining the DVB-T2 features SFN, MISO and MPLP. Also, besides DVB-SI, no other service layer (e.g., EPG) has been deployed in combination with DVB-T2.

The objective of the endT2end project is to implement a comprehensive endT2end system from the T2 gateway to the T2 modulator, up to a complete DVB-T2 set-top box to validate and utilize the advanced techniques of the DVB-T2 standard. This would enable appealing services through an advanced service guide.

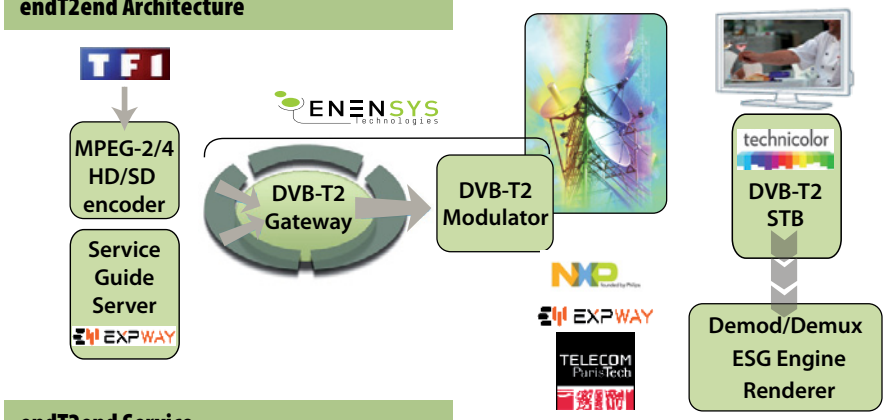
The project started in September 2009 and will run until September 2011. The endT2end project is sponsored by the French business associations Images & Réseaux and Cap Digital, which are comprised of private companies and universities involved in the digital industry. Funding for the project comes from Région Bretagne, DGCIS and Rennes Metropole.

To date, the project has tested and successfully validated the SFN/MISO broadcasting. The MPLP feature has also been implemented within the DVB-T2 Gateway and modulator to enable attractive business models with the delivery of HD and SD services as well as radio to fixed or mobile devices within a single DVB-T2 multiplex. The MPLP technique can also be used to offer regional services.

For the upper layer service, several service guide solutions have been studied. Within the endT2end platform the service guide that describes all the services and their related information or metadata is carried over a dedicated PLP so that the STB tunes first to that PLP to discover all the services available in the DVB-T2 multiplex. The service guide toolbox enables the endT2end platform to offer advanced and interactive services. The services range from enriched EPG and service information, interactive services, PVR, Connected TV, push VOD to convergence services with IPTV systems such as catch-up services. Several service guide candidates (DVB-IPDC, OMA-BCAST, TV-Anytime, DVP-IPI) fulfilled the criteria to enable the aforementioned services. Although it was decided to use DVB-IPDC to demonstrate the various advanced services, the endT2end platform supports other service guide tools.

There was a question raised at the last DVB-T2 Technical Module meeting that remains to be answered and that is "Does DVB need to specify a upper layer service to leverage the DVB-T2 sophisticated transmission channel and to offer an advanced toolbox for describing evolved services?" This potentially needs to be addressed in the future.

endT2end Architecture



endT2end Service

DVB Goes To Brussels

On November 30th 2010 DVB organized a lunchtime briefing at the Marriott Renaissance Hotel in Brussels.

The briefing was intended to update European policymakers and regulators on the success of DVB, the DVB's second generation broadcasting standards, and to generate EU support for the international promotion of DVB open standards.

DVB Chairman Phil Laven welcomed the group of EU and other officials and gave a brief introduction to DVB. Even though DVB is now a global consortium, it all started in 1993 with a core group of European companies and the connection with the European broadcasting industry and the EU is obvious.

Peter Siebert, DVB's Executive Director, continued the briefing with a technical overview of the three DVB second generation standards: DVB-S2, DVB-C2 and DVB-T2. The scarcity of available spectrum in Europe and the increasing demand for HD and even 3D content created the requirement for much more efficient broadcast systems. The common highlights of these three standards are the 30 to 50% increase in capacity and the increased robustness, creating three very efficient, flexible and future proof broadcast standards.

Helmut Stein, Chairman of the DVB Promotions & Communications Module, gave an overview of DVB deployment and promotional activities. With DVB standards in use in nearly every country in the world, DVB's success is well established and is expected to grow even faster with the anticipated mass deployment of DVB-T2 and DVB-C2 services. A recent research report from IHS Screen Digest indicates that 60% of all global digital broadcast receivers are DVB devices and expects the total DVB receiver deployment figure to rise from 500 to 870 million over the next four years. With the recent selection of DVB-T2 as the terrestrial standard for the Southern African region and India, and strong interest in many other regions, this is a crucial time to maintain the momentum and align any potential EU support.

The briefing closed with a lively audience discussion about the benefits derived from the development and international promotion of DVB standards for both DVB Members and the EU alike. Conclusion: DVB may have had its inception in Europe, but today its membership is comprised of companies from around the globe making it the biggest broadcast club in the world.

Hybrid Options

The Amino Freedom media center is a good example of upcoming hybrid STBs combining DVB 2nd generation standards and broadband connectivity. This concept helps to meet the growing consumer demand for TV based entertainment from any source - including broadcast, the internet, social networking and local content.

Powered by the Intel Atom Media Processor CE4100, it includes a DVB-T2 tuner option to support both HD and SD broadcast programing over the terrestrial spectrum. Examples of this are Freeview HD and plans for the YouView service.

Typically hybrid devices will be equipped with a fully functional web browser, supporting all major formats of internet delivered video including Adobe FlashT and both MPEG-2 and MPEG-4. This means that content available on popular video websites is now immediately accessible through a fully interactive TV guide. Additionally, an integrated hard disk drive delivers time-shift recording of multiple channels, pause live TV and push VOD. Users can also access all their locally stored music, video and pictures from anywhere in their home network using technology certified by the Digital Living Network Alliance (DLNA).

Hybrid devices, such as the Amino Freedom will bring together a wide range of unique and innovative features such as broadcast, on-demand content, open internet and local content together in one single device. A wide range of powerful, cost efficient system on chips is now available to provide the necessary hardware resources for today's demanding multimedia applications. The hardware is complemented by flexible operating systems which allow easy integration and adaptation of these applications. It can be expected that in addition to multimedia applications, social media such as Facebook will be popular on these devices. Hybrid devices also need to be integrated into the in-home network. This can be done, for example, by implementing DNLA specifications or the in-home specifications from DVB.

Setting a Standard

The Road to DVB-T2 in Southern Africa

Gerhard Petrick

Gerhard Petrick is Manager of Research and Development at Multichoice Technical Operations, South Africa and an active member of SADIBA. He writes in his personal capacity.

The year 2010 was a momentous year for Africa.

One key event that stands out was the successful hosting of the first football World Cup on the African continent. It was awesome to see a nation previously divided, now unified in extending a warm South African welcome to the world and to experience the unified African support for Ghana's Black Stars as they carried Africa's hopes and dreams into the quarter finals of the competition.

Far less glamorous but arguably as significant for the future of the continent and its people was the decision by Southern African Communications Ministers in November 2010, confirming DVB-T2 as the standard for digital terrestrial television (DTT) in the region.

It has been a long haul getting here though. Back in 2000 European Broadcasters approached the ITU (International Telecommunication Union) on re-visiting the analogue television frequency band plan to facilitate the roll out of digital terrestrial broadcasting services. Hearing about the process and realizing the potential of a harmonized rollout of DVB-T across all of ITU Region 1, Member States from across Africa requested to be part of such a planning conference. European member states acceded to the empathic requests and delayed their planning conference.

Numerous national and regional preparatory conferences followed as nations prepared their frequency band plans and deliberated on the standards to be used and the policy matters that would drive the migration in their country. The subsequent ITU Regional Radio Conference held in Geneva in June 2006 culminated in a comprehensive agreement on the implementation of DVB-T for television services (Geneva 2006 or GE-06 agreement). The agreement provides clarity on all technical planning parameters, captures approved national frequency plans and spells out notification and coordination procedures. African Member States of the ITU and signatories to GE-06 thus clearly adopted DVB-T as the standard for DTT.

However, in early 2010 lobbyists seemed to suggest that Africa and specifically Southern Africa had not actually decided on a standard for DTT. It was suggested that previous national consultations and engineering analysis on the standards topic were ill-informed, biased and steered by clandestine international forces. These broad statements coupled with unfounded claims of 'superior' performance, rhetoric on the threat of neocolonialism and wild promises on developmental benefits and even internet access to the poor via a certain DTT standard proliferated.

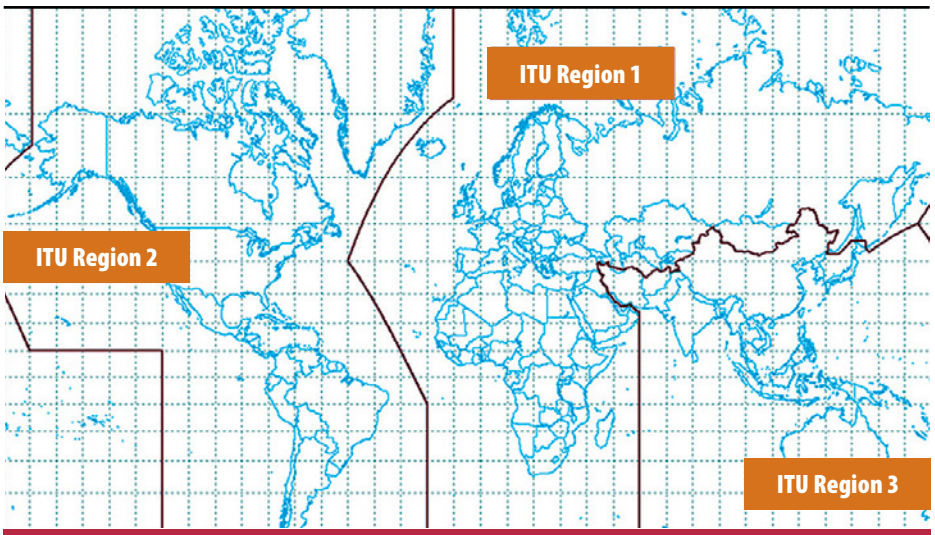
Driven by the new intense need for clear, objective and factually correct information a small regional industry forum known as SADIBA (the Southern African Digital Broadcasting Association) mobilized its members, engaged the academia in the region and became vocal in the standards debate.

Noting that the lobbyists were able to access decision makers at the highest political level, SADIBA focused on sharing accurate and reliable information that would allow both political and engineering stakeholders to analyze the information presented and draw their own conclusions on the accuracy of the data and claims made.

Pushed by the ISDB-T lobbyists the pre GE-06 standards debate was formally reopened. A key event was the SADC (Southern African Development Community) / CRASA (Communications Regulators' Association of Southern Africa) forum held in Maseru, Lesotho in April 2010. Proponents of the respective DTT systems and technologies were given an opportunity to present. An ITU representative from the Terrestrial Services Department was invited to contextualize a renewed standards discussion within the GE-06 agreement whilst SADIBA was awarded an opportunity to present a local perspective. The DVB was represented by Phil Laven and John Bigeni.

It was astonishing to see how completely opposing views on the technical capabilities of the respective technology standards were presented. All of a sudden maps depicting the adoption of standards worldwide showed the entire continent of Africa as 'undecided'. This in a context where SADC countries Namibia, Mauritius and South Africa had already made significant strides towards DVB-T network roll-out, trials, and in the case of Namibia and Mauritius had launched commercial operations.

The presentations made generated many questions and healthy debate. SADIBA presented on the challenges of implementing a system and standard deployed only in a 6 MHz channel



ITU Region Map

bandwidth into a SADC context governed by GE-06 and 8 MHz channel spacing. It was curious to hear the head fn one government delegation formally distancing that country from the SADIBA presentation.

The ITU representative reviewed the Final Acts of GE-06 and discussed the implications of considering a technology other than the adopted DVB-T. This presentation although courteous and factually accurate generated heated responses and was followed by a formal complaint of bias and misrepresentation lodged with the Secretary General of the ITU against its representative in attendance in Maseru. Clearly the gloves were off in this standards battle.

Briefed on the findings of the Maseru forum and again receiving presentations by ISDB-T proponents and the DVB Project, SADC Ministers responsible for broadcasting at their meeting in Luanda, Angola in May 2010 recommended the establishment of an ad-hoc subcommittee to undertake further investigations and advise SADC Member States on the viability of the different standards.

It quickly became apparent that the debates on performance differences between DVB-T and ISDB-T were marginal. Both standards essentially rely on the same core technologies. Any claims of massive superior performance of one system would thus be an exaggeration of marginal differences.

A more relevant comparison would assess the merits and performance capability of implementing a second generation standard for digital terrestrial television rather than splitting hairs on first generation systems - even if these are likely to remain relevant in established markets for many years to come.

Whilst the SADC study group visited Europe and Brazil, South African broadcast engineers researched DVB-T2 and specified, installed and commissioned the equipment required to upgrade the DVB-T trail transmission in Johannesburg to DVB-T2. In mid September 2010 commercial television broadcasters and SADIBA members, e.tv and M-Net with signal distributor Orbicom switched on the first DVB-T2 transmissions in Africa.

The DVB-T2 transmission was configured to deliver 18 free-to-air standard definition (SD) channels. Broadcasters invited residents of Mzimhlope in Soweto Township to participate in the trial and provided access to the required set-top box receivers.

All of a sudden award winning DVB-T2 that had been driven by a desire to deliver high definition services (HD) to high-end users was delivering multichannel television to ordinary South Africans. The enthusiasm and interest from DVB-T2 trialists previously dependent on poor analogue reception of 3-4 channels was truly contagious. Numerous delegations from across Africa visited Soweto, spoke to the residents and experienced DVB-T2 in operation.

The switch-on of DVB-T2 did however not deter proponents of ISDB-T and in early November 2010 a highly problematic and sporadic 4 day ISDB-T 8 MHz transmission was on air over Pretoria, South Africa.

On 24 November 2010 the SADC Ministers met in Lusaka, Zambia and considered the report and recommendations of the SADC study group on digital standards. The Ministers agreed that SADC Member States should adopt DVB-T2 with MPEG-4 compression as the recommended digital terrestrial standard for the Region.

Whilst the SADC decision also allows Member States to consider alternatives within the GE-06 context, only Angola and Botswana are allowing for further research and analysis. ISDB-T trials

Telkom Tower in Hillbrow, Johannesburg

Recruiting Trialists

are currently on-air in Botswana and a DVB-T2 transmission will be added within weeks.

Just as the year 2010 has left a legacy of world class football stadia and showcased Africa's ability to deliver, it has also demonstrated resilience of the policy and communications engineering base in the SADC region and witnessed visionary and clear decision making that will establish world class broadcast networks and services for many years to come. Truly, a year to remember!

For more information visit: www.sadiba.org

Delegates at the SADC / CRASA Forum held in Maseru, Lesotho in April 2010

Setting the Record Straight

The truth behind the claims

Phil Laven, DVB Chairman

Phil Laven

The ITU's Geneva Plan of 2006 was based on the assumption that DVB-T would be used throughout the entire planning area (Europe, Africa and parts of the Middle East) – but it made provision for other standards to be used on the understanding that such transmissions would cause no more interference than DVB-T and would also not require any additional protection. Various countries in Africa had formally selected DVB-T, such as South Africa where, in 2008, the Cabinet endorsed the use of DVB-T with MPEG-4 AVC video compression.

However, in April 2010, a South African newspaper published an article by the then President Lula da Silva of Brazil which included the statement "During my forthcoming visit to South Africa, an action plan for our strategic partnership is to be adopted. We look forward to a common Digital TV standard". Given that Brazil uses 6 MHz channels and that South Africa uses 7 MHz or 8 MHz channels, the idea of a 'common standard' seemed alien to most engineers. Around this time, a senior civil servant in South Africa was reported to have said "DVB-T has been found to be somewhat problematic and this is why Europe is now moving to DVB-T2." Of course, it is easy to correct such misunderstandings – especially as DVB-T has been the key ingredient in the success of analogue switch-off in various European countries! Nevertheless, heavy lobbying in favor of ISDB-T produced many other gems of misinformation as "DVB-T does not support HDTV" – despite clear evidence to the contrary in many countries such as Norway, France and Australia.

Even stranger statements had previously been made by Helio Costa, Brazil's Communications Minister, who said "The European system has been totally outdated, it is ancient. An example of this is that the video compressor used in European and American systems is not made any more. It is so old that Germany, which is one of the leading producers of inputs of DVB, considered switching to Japanese".

In May 2011, SADC Ministers responsible for ICT decided to establish an ad-hoc committee "to undertake further investigations and advise Member States on the viability of the different technical standards with the view for us as a region to move towards adopting a common standard." Members of the ad-hoc committee subsequently visited France, UK and Brazil to investigate the viability of the various standards for digital terrestrial TV.

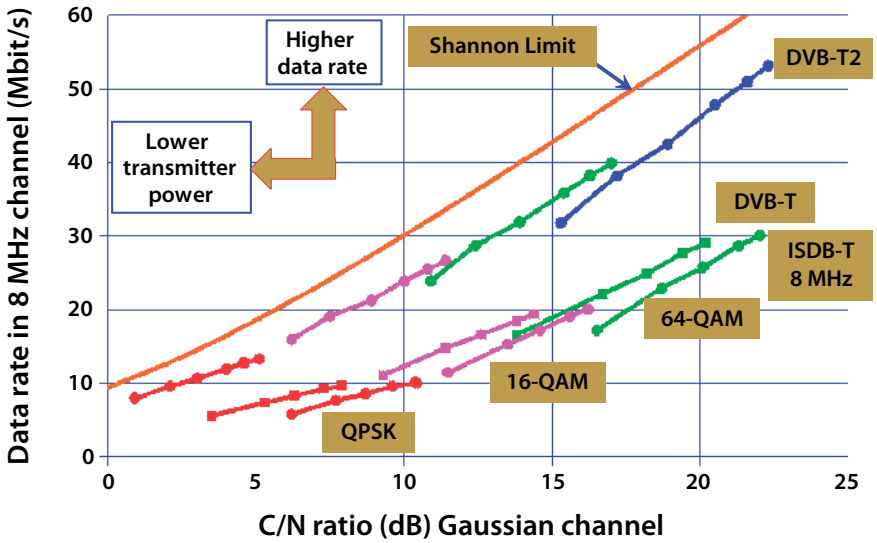
Colleagues from Japan and Brazil made numerous claims about the technical superiority of the ISDB-T standard over DVB-T. On the other hand, advocates of DVB presented technical information (such as the accompanying graph derived from published information) which suggested that DVB-T performed slightly better than an 8 MHz version of ISDB-T and that DVB-T2 was dramatically better than DVB-T and ISDB-T.

DVB repeatedly offered to participate in comparative tests of DVB-T, ISDB-T and DVB-T2 on the basis that independent scientific test would resolve any arguments about technical performance. Despite the reluctance of the Japanese and Brazilians to undertake such tests, the Japanese organized over-air demonstrations of an 8 MHz variant of ISDB-T in Pretoria, (South Africa) in September 2011. These demonstrations proved very little – mainly because they were conducted in Pretoria rather than in Johannesburg where it would have been possible to have made direct comparisons with the existing DVB-T and DVB-T2 test transmissions. As one engineer commented "Why are the Japanese so frightened by the prospect of side-by-side tests?"

Another key issue was that of affordability of consumer equipment. Although digital TV has been on the air in Brazil for 3 or 4 years, the high prices of set-top boxes is widely seen as a deterrent to consumer adoption of digital TV: for example, only 3 or 4 models of set-top boxes seem to be on sale in Brazil – and they cost at least US $160. On the other hand, the mass markets for DVB products around the world have resulted in intense competition between many suppliers offering extremely low prices, such as DVB-T2 set-top boxes selling for UK £50 (less than US $80) – even though DVB-T2 is a much more complex standard than ISDB-T.

In November 2011, having received the report of the ad-hoc committee, a further meeting of SADC Ministers concluded that "SADC Member States should adopt DVB-T2 with MPEG-4 compression as the recommended digital terrestrial standard for the Region".

DVB-T, DVB-T2 & ISDB-T (8 MHz)



Finnish Style

DVB-T2 Broadcasting with New Type of Topology

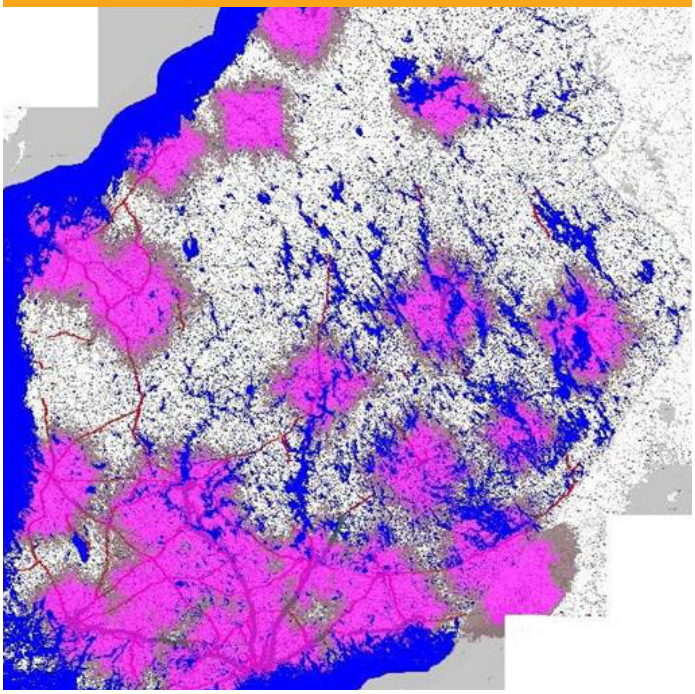
Juhani Simpanen,
Development Manager, DNA

It was back in December 2009 when, after having been awarded the contract by Finland's Ministry of Transport and Telecommunications to provide both the network and HD services, DNA Oy, Finland's largest cable TV operator, began DVB-T2 test transmissions. The testing took place in Lahti, about 100 kilometers northeast of Helsinki, through the use of two DTT HDTV multiplexes in VHF band III using the DVB-T2 standard and MPEG-4 coding. However, it was not until the Vancouver Olympics, in March 2010 that viewers in the Helsinki and Lahti areas received their first taste of the HD broadcasts.

As of January 2011 the HD services are encrypted and viewers are required to have compatible equipment including a DVB-T2 tuner and a DNA smartcard or CI Plus module to receive the service. DNA's current channel offering consists of the Animal Planet HD, MTVN HD, Canal+ Film HD and Nelonen PRO 1 HD. The broadcasts are free of charge until the end of March 2011. It is anticipated that the remaining channels that obtained licenses for the network will launch HD services in the spring.

From the beginning, DNA's plan was to make HDTV services commercially available to over 40 percent of Finnish households by the end of 2010 and extend the coverage to 60 percent by the end of 2011. Today, these plans are being revised. Finland is a sparsely populated country and as DNA rolls out its planned DVB-T2 network in locations that have the highest number of antenna households, it is now thought that by mid-2011 the network will enable 80 percent of the population to receive HD services. There is also the possibility of expanding further, however this decision will not be made until later in the spring.

DVB-T2 DTT Network Coverage 2Q/2011



DNA's antenna television network is the world's largest Single Frequency Network (SFN). In an SFN, the frequency bands are used with particular efficiency, since the same broadcast frequency is used in multiple adjacent transmission bases. They are able to cover large geographical areas using the SFN transmitters, thereby saving frequencies. At the moment, DNA has two nationwide channel packages in the VHF frequency range. Efficiency savings enabled by DVB-T2 led the Finnish Communications Regulatory Authority (FICORA) to hold successful frequency coordination negotiations with the other countries in the region and DNA, owing to its frequency use model is now able to apply for a third VHF C channel package.

The transmitters have been positioned in existing mobile phone and local radio towers allowing the network to be flexibly modified as coverage requirements change in relation to, for instance, the expansion in population of cities. During the construction of the network it was quickly noticed that in terms of frequency technology, the VHF range is very good, and the superiority of low frequencies could be utilized as a commercial factor. The transmitter towers are typically around 100 meters high, with transmitting power ranging from 1.2 to 3.4 kW in ERP power, depending on the site. The only adverse factor of the VHF frequency range is a channel grid that is merely 7 MHz. Compared to the UHF frequency range, it uses more capacity. In order to circumvent this problem the parameters have been set in such a manner as to reach a capacity exceeding 37 Mbps with the current Muxes. This has been achieved by altering the FEC value to 4/5 from its current 3/4. Computationally, the change reduces the area of coverage by two percent at the most.

DNA has paid particular attention to matters such as energy-efficiency with regard to its selection of transmitters. When the efficiency coefficient related to electricity consumption is usually 21 to 23 percent, DNA's water-cooled models can reach up to a 24 percent efficiency coefficient. Thanks to water-cooling, a separate ventilation system is not required; instead, the heat is pumped out in liquid form and condensed in an energy-efficient manner. Compared with air-cooled systems, this solution reduces the total energy need by more than 50 percent.

These new technology solutions allow DNA to utilize its broadcast capacity in an efficient manner to not only save energy, but also to significantly reduce costs.

DNA DVB-T2 Network Parameters

Frequency Band	VHF III 174-230MHz
Modulation	256 QAM
FEC	4/5
Guard Interval	19/256
Pilot Pattern	PP4
Carrier Mode	32k
Capacity / MUX	37,4 Mbps

Incentive to Innovate

3DTV at Sky

David Daniels, Senior Technologist, BSkyB

Due to the incentive that all pay-TV operators share - to invest in both the content and the functionality that differentiates pay from what you get for free - innovation is in Sky's DNA.

In the past this has led directly to products including the Sky+ PVR and to Sky being able to offer our HD subscribers a choice of more than 50 high definition channels.

This same incentive to innovate has been key in driving the growth of Sky 3D, to the point where at the end of January this year, we were able to announce that 70,000 homes had already subscribed to Sky 3D. That's not bad for a channel that only launched in October 2010.

Sky's success in three dimensions is also down to having an infrastructure that is ideal for delivering 3D: using a hybrid delivery method of both satellite and IP, we can efficiently deliver 3D & HD in high volumes through existing Sky+HD boxes, and unlike some broadcast platforms, we are not constrained by bandwidth or spectrum issues.

Then, of course, there is the most important thing: the content. The Sky 3D channel is emphatically about big and bold event TV: it's about the whole family sitting down together to watch the big movie, match, documentary, and about offering viewers a selection of the very best sports, movies, arts, documentary and entertainment programmes, all in immersive 3D.

Despite having only been televising 3D content for less than a year, we are already approaching our 100th live 3D sports broadcast, and have even managed to attract broadcasting icon David Attenborough to make the groundbreaking Flying Monsters 3D for the channel.

Having myself chaired the TM-3DTV working group, we enjoy a close and fruitful relationship with the DVB, and are delighted with the approval of TS 101 547 by the Technical Module, which will allow us to make further improvements to our 3D service.

We've made a great start, but there's still a long way to go, and we'll keep on forging ahead.

Sky 3D

TM Approves 3DTV Specification

On January 27, 2011 the Technical Module met and approved the specification for 'Frame Compatible Plano-Stereoscopic 3DTV', DVB-3DTV. The ad-hoc group TM-3D, chaired by David Daniels (BSkyB), presented the specification document for approval. The specification is the result of the work carried out in the TM-3D and of the co-operation of TM-3D with the ad-hoc groups TM-AVC, chaired by Ken McCann (ZetaCast), TM-GBS, chaired by Alexander Adolf (Condition-ALPHA), and the ad-hoc group TM-SUB, chaired by Nick Tanton (BBC).

This new specification follows agreement by the 3D Commercial Module in July 2010 on the DVB-3DTV commercial requirements from the key industry groups.

Plano-stereoscopic imaging systems deliver two images (left and right) that are arranged to be seen simultaneously, or near simultaneously, by the left and right eyes. Viewers perceive increased depth in the picture, which becomes more like the natural binocular viewing experience. Since 2010 many 3DTV capable consumer products have been launched in the market.

The present document specifies the delivery system for frame compatible plano-stereoscopic 3DTV services, enabling service providers to utilize their existing HDTV infrastructures to deliver 3DTV services that are compatible with 3DTV capable displays already in the market. This system covers both use cases of a STB delivering 3DTV services to a 3DTV capable display device via an HDMI connection, and a 3DTV capable display device receiving 3DTV services directly via a built-in tuner and decoder.

The next stage is for the specification to be sent to the DVB Steering Board for formal approval. Upon approval a BlueBook will be published pending formal standardization by ETSI.

Terrestrial Still Dominates

Ben Keen, Chief Analyst, IFI Head of Research, IHS Screen Digest
IHS Screen Digest is a research company focusing on the media and entertainment industries. Screen Digest is a primary source of market analysis and strategic insight for many of the world's largest communications corporations. More information on the company and its latest research is available at **www.screendigest.com**

The free-to-air (FTA) terrestrial sector still forms the largest single broadcast platform worldwide. Despite the rise of the pay TV industry, particularly in developed countries, for many consumers FTA terrestrial still represents the most affordable access to TV content, requiring just a single one-off payment for a terrestrial receiver. These receivers can come in many forms. Here we define a DTT receiver as either an integrated digital television set (iDTV), which contains an integrated digital terrestrial tuner, or a set-top box.

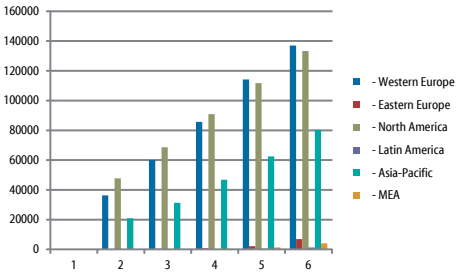
Digitalization of terrestrial television has progressed rapidly since the turn of the millennium, with countries around the world eager to free up spectrum and lower operating costs. By 2010, the USA and much of Western Europe had already completed analogue switch-off, and by 2015, the majority of Eastern Europe and Asia-Pacific will have followed suit.

As digital switchover becomes more frequent globally, there has naturally been a huge demand for DTT receivers. By the end of 2010, IHS Screen Digest estimates there were 364m active DTT receivers worldwide, up from just 4m in 2001. With the aggressive analogue switch-off dates being pursued by developed countries, the majority of this growth has thus far occurred across Western Europe, USA and Japan. Together these territories accounted for 85% of all active DTT receivers in 2010. Sales and revenues of both iDTVs and DTT set-top boxes have increased year on year until 2009. That year the terrestrial set-top box market was valued at €2.8bn, and 64m DTT set-top boxes were sold globally, a total greater than any other single platform in 2009.

From the end of 2010 until the end of 2014, the overall FTA DTT market is projected to remain in good health, growing at an average year-on-year rate of 17% to reach 674m active DTT receivers by 2014. However, in 2010 and 2011 the DTT set-top box market is actually beginning to fall. We expect that only 44m DTT boxes will ship in 2011, and the market value will fall to €2bn. This change is a direct consequence of the growing prevalence of iDTVs, as the vast majority of new TV displays sold become capable of supporting DTT.

From 2012 onwards, almost all major developed nations will have completed analogue switch-off, and sales instead become driven by the growth of FTA DTT in emerging countries such as Brazil and especially China. Indeed, we expect that China will begin to dominate FTA DTT growth over the next few years, accounting for 43% of all worldwide set-top box shipments by 2014.

Total Active DTT Receivers



MARKET WATCH

www.rohde-schwarz.com

The R&S DVMS4 from Rohde & Schwarz monitors transport streams and DVB-T/H and DVB-S/S2 signals to ensure high operational reliability. One of the most compact monitoring instruments in its class, it measures just one height unit. It can simultaneously monitor the RF and transport stream characteristics of up to four signals, which makes it ideal for sites with multiple transmitters. Because it detects all relevant errors, network operators do not have to invest in more complex monitoring solutions.

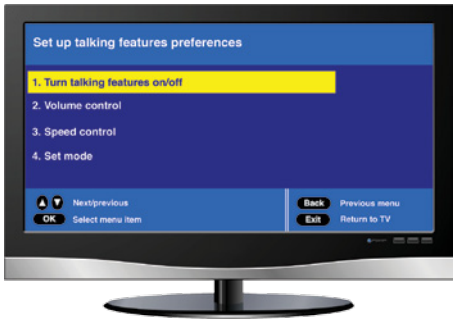
www.verimatrix.com

After pioneering hybrid DVB-IP content security with the Video Content Authority System (VCAS), Verimatrix now offers DVB operators the opportunity to add hybrid DVB-OTT (over-the-top) services by deploying its new hybrid DVB & Web set-top box client, which decrypts both DVB and HTTP adaptive rate streaming services. The VCAS 3 multiscreen solution also enables DVB operators to reach out to iPhones/iPads and Android based mobile devices, plus PC/Macs and connected TVs, from a single headend.

www.technisat.com

TechniSat is developing a hybrid HDTV satellite set-top-box with IP and browser functionality, called the Digit ISIO. This product contains a twin tuner concept, Conax and Nagravision CA-systems, 2 CI-slots with CI+ support, Linux operation system, Opera web browser and is HbbTV capable. With a new designed on-screen display, an app bar which may be filled optionally and a link list for websites.

www.oceanbluesoftware.com

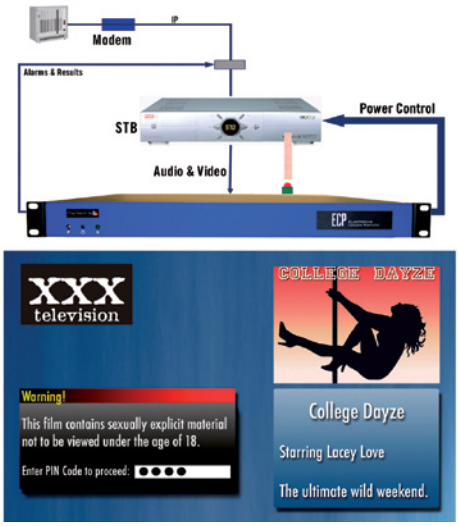


Ocean Blue Software's Talking TV STB has been developed with the UK's Royal National Institute of Blind as part of a consortium, including STMicroelectronics and TW Electronics, to develop advanced technology for digital set-top boxes and TVs. The assistive technology benefits users who have visual impairments and other disabilities, by voicing the program guide and menu items. The technology incorporates an enhanced user interface and advanced text-to-speech, specifically designed for varied levels of visual impairment.

www.newtec.eu

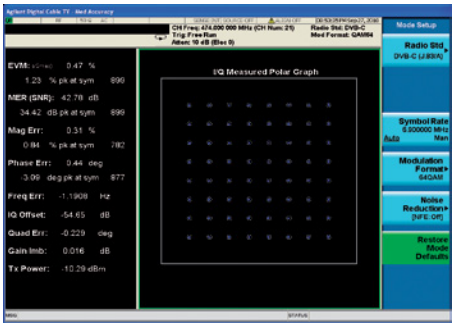
Newtec has announced support for secure transmissions in accordance with the Advanced Encryption Standard (AES) on its Azimuth and Elevation satellite modulation equipment. AES encryption provides high level security for satellite transmissions over commercial and government networks. This new security feature combined with its DualFlow technology provides a solution for securing simultaneous transmission of data and real-time video streams over the same carrier.

www.pixelmetrix.com



The Pixelmetrix Electronic Couch Potato (ECP) can be used to prevent adult content from inadvertently reaching children through the use of a password to view such content. With programmable test scripting ability combined with screen section detection, it provides fully automated validation by instantly inputting the PIN code and then confirming correct video playout upon identifying locked screen messages.

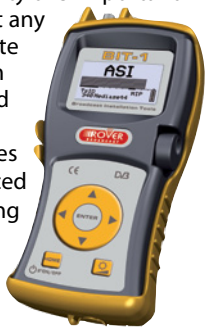
www.agilent.com



Agilent's new digital cable TV measurement application, N6152A, for its X-Series signal analyzer PXA/MXA/EXA or W6152A for CXA, provides standard-based power and modulation analysis capabilities like channel power, SEM, constellation, MER, BER etc for DVB-C (J.83 Annex A/C) and J.83/B standards. The application can be used to help the design, evaluation and manufacture of modulators, transmitters, amplifiers and tuners. It can provide the flexibility of measuring signal quality and modulation accuracy with RF input or analog IQ input.

www.roverbroadcast.com

The BIT-1 is a lightweight, easy-to-use, battery operated broadcast installation tool from Rover Broadcast. With this new product, professionals in the broadcasting sector can verify the quality of 3 important signals present in almost any DVB-T/T2 transmitting site and key digital television facilities: ASI, 10 MHz and 1PPS and perform MIP analysis. The unit provides a USB 2.0 port for advanced transport stream recording and analysis and audio/ video MPEG-2 & MPEG-4 decoding.



www.humaxdigital.com

The Humax Freeview HD range, consisting of the HD-FOX T2 and HDR-FOX T2, provides users with access to a whole host of the UK's Freeview channels including HD offerings, subscription free. The new TV portal also offers a variety of on-demand and internet services on both boxes; Sky Player, BBC iPlayer, Flickr, Wiki@TV and internet radio can be sent straight to the TV screen once the box is connected to a home broadband network.

www.advantechwireless.com

The AMT75e modem combines the Advantech Wireless DVB-S/S2 modulator and demodulator in a single 1 RU chassis. It offers powerful Forward Error Correction (FEC) choices, compliant with DVB-S, DVB-DSNG, and DVB-S2. The DVB-S2 implementation includes 16APSK/32APSK with both16k (SHORT) and 64k (NORMAL). The modem includes 8 ASI inputs, an available GbE IP interface with optional MPE and GSE encapsulation. The manufacturer claims it is an ideal universal mod/demod/modem.

www.funke.nl

Funke Digital TV has recently developed a state of the art active antenna with an all-in-one solution that will be available in May 2011. The DSC 500 can be used as an indoor and outdoor antenna. With a simple slide, it is possible to add additional elements to the basic antenna which increases the passive gain up to 3 dB.

www.kathrein.de

KATHREIN offers an extended range of wideband UHF superturnstile antennas, particularly suitable for digital TV applications. The top-mounted horizontal polarized plug-and-play antennas offer excellent omnidirectional radiation characteristic over the entire UHF frequency range 470 - 862 MHz. They come fully assembled in a slim self-supporting GRP cylinder with low weight and low windload. These antennas are also characterized with low VSWR/Return Loss and are available for low, medium and high transmitter powers.

www.blankom-digital.de

The QUAD Multistream Processor DRD 700 Falcon is the newest member of the sophisticated Blankom Digital B-IRD family. It can receive and descramble 4 transport streams simultaneously coming from different sources such as DVB-S/S2, DVB-T/T2, DVB-C, ASI or IP. The unit supports MPTS and SPTS IP streaming and can also feed modulators and decoders via ASI. It has four DVB-CI-slots supporting all major CA systems including multiple service descrambling.

www.broadcast.harris.com

Harris Corporation offers a complete production-to-broadcast workflow solution for the DVB-T2 digital terrestrial transmission standard. This solution includes the Apex M2X software-defined single-box broadcast exciter, HD/SD encoding and DVB-T2 gateway equipment. Through a simple software upgrade, customers can seamlessly migrate to high-efficiency DVB-T2, allowing for increased capabilities for HD, SD, 3D, mobile and multicast content, while reducing costs.

www.enensys.com

ENENSYS, through its Test Systems division, leverages its test & monitoring solution for DVB-T2 with the ReFeree T2 Measurement Receiver. The system provides a complete test solution for DVB-T2, from RF down to video. Featuring RF, T2-MI and MPEG2-TS analysis, it checks the signal integrity everywhere on the DVB-T2 network. It also enables capture of the DVB-T2 signal in the field for offline analysis in the lab. The unit is portable and USB powered.

www.teamcast.com

TeamCast offers, for DVB-S/S2 satellite solutions, a modulator and demodulator with both SNMP and web browser control. Vyper, the DVB-S/S2 modulator, covers the full BIS band (950/2150 MHz), providing an input bitrate up to 200 Mbps with up to 45Mbaud, and operating in CMM as well as VCM and ACM modes. Syper, the DVB-S/S2 demodulator, supports multi-streams and multi-outputs, plus the full DVB-S/S2 specification with embedded LNB control.

www.t-vips.com

The T-VIPS CP546 provides efficient and continuous monitoring of DVB-ASI transport streams, enabling fast fault detection and diagnostics in an easy-to-use and intuitive web user interface. Error detection and alarms are based on ETSI TR 101 290 and are provided through the web interface as well as through SNMP. In addition to its monitoring capabilities, the unit also allows in depth analysis of signal, services, components as well as PSI, SI and PSIP table decoding.

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www.saywhen.tv

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