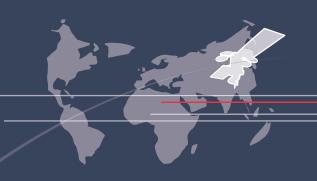




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DVB-H IP Encapsulator

DVE 6000

What makes DVE 6000 the best product on the market today?

- Dynamic Time Slicing[™] Technique delivering unprecedented bandwidth utilization and network efficiency (Statistical Multiplexing)
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- Internal SFN Adapter
- Internal stream recorder and player
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DVB-T/H Modulator —

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- Web Browser & SNMP Remote Control
- Available with +10 dBm amplifier for lab tests
 - Available in portable version

DVB-T/H Exciter

DVX 5500

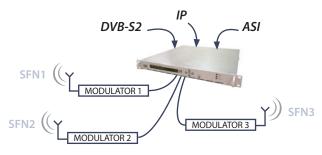
- Fully DVB-H Compliant
- Management of complete repeater system
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BALANCING ACTS

Winter in Europe is always a busy time in DVB, with much development work going on and a heightened meeting schedule. It's also the ski season in Switzerland, but that's another story. DVB is working on a number of very important projects at present. DVB-SH - the handheld specification for S-Band frequencies is being completed, and the DVB-T2 work is just starting. Both specifications promise much and are typical of DVB's role in a changing world. One can no longer expect a core DVB technology NEVER to change. DVB's role is not only to develop new technologies, but to ensure that existing ones are updated at opportune moments. The functionalities included

A word from the DVB Project Office

and the timing are the responsibility of DVB's Commercial Module as it drafts its Commercial Requirements. The Commercial Module must balance the sometimes conflicting requirements of ensuring stability and facilitating the innovation which is inevitable today. This is a delicate task, for producing a new specification which does not correctly meet the requirements of industry would have dire consequences for the stability users have come to expect from DVB.

T2 seeks to exploit a unique opportunity for the broadcasting industry: analogue switch-off. The technology development will start during the course of 2007, but in many ways this is easier than the



complex task which DVB's Commercial Module has done in defining the commercial requirements which will drive the process. And T2 is only one of many technologies: SH, IPTV and others that are covered in this issue of DVB-SCENE. Enjoy.

Cover: image courtesy of Scientific Atlanta, a Cisco company

NEW STANDARDS

TS 102 005 V1.2.1 "Specification for the use of Video and Audio Coding in DVB services delivered directly over IP protocols" (06/05/06) EN 300 468 V1.7.1 "Specification for Service Information (SI) in DVB systems" (23/05/06) EN 302 307 V1.1.2 "Second generation framing structure, channel coding and modulation systems for Broadcasting, Interactive Services, News Gathering and other broadband satellite applications (DVB-S2)" (13/06/06) TR 101 790 V1.3.1 "Guidelines for the Implementation and Usage of the DVB Interaction Channel for Satellite Distribution Systems" (14/09/06) TS 102 034 V1.2.1 "Transport of MPEG-2 Based DVB Services over IP Based Networks" (28/09/06) TS 102 523 V1.1.1 "Portable Content Formats (PCF)" (05/10/06) TR 102 542 V1.1.1 "Guidelines for DVB IP Phase 1 Handbook" (14/11/06) TS 102 539 V1.1.1 "Carriage of Broadband Content Guide (BCG) information over Internet Protocol (IP)" (14/11/06) TS 102 471 V1.2.1 "IP Datacast over DVB-H: ESG" (17/11/06) EN 300 743 V1.3.1 "Subtitling systems" (29/11/06) TS 102 472 V1.2.1 "IP Datacast over DVB-H: Content Delivery Protocols" (13/12/06) **NEW** MEMBERS

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science and engineering. www.surrey.ac.uk

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CONVERGENCE UTOPIA

In My Opinion – Ian Childs

Ian Childs stepped down as Vice-Chairman of the DVB Technical Module last June, following his retirement from the BBC where he was Chief Scientist at their Research and Development Department. His career with the BBC spanned nearly 35 years, during which time he worked on many important broadcasting developments which included digital television, DAB and high definition television. He continues to take an active role in digital television developments, however, and is Chairman of Technical Council for the UK's Digital Television Group. He is an Honorary Fellow of the DVB Project and a Visiting Professor at Essex University.

Ten years ago, it was not uncommon to read articles in the technical press predicting and analysing 'convergence' between the areas of broadcasting, telecommunications and computing. In the year during which analogue television starts to be turned off in the UK - the market with which I am personally most familiar - it is interesting to examine where we are in the convergence process. One very significant engine driving convergence has been the standards developed by DVB. They are used by the vast majority of the digital broadcasting services in operation around the globe - whether transmitted via satellite, cable or terrestrially. Such digital broadcasts have increased the number of programme offerings to the consumer, as well as increasing the picture and sound quality. And new interactive services have become

digital television platform now exceeds 60 percent - take-up being relatively equally spread between satellite, cable and terrestrial (Freeview) platforms. One resulting development, perhaps spurred by this competition between distribution methods, has been that service providers have started to offer new enhancements to the basic services. High definition channels have been launched on satellite and cable, and PVR set-top boxes are becoming increasingly available (e.g. Sky+ and/or Freeview Playback). Increasingly, with the exception of live events, viewers no longer care how the programmes reach their screen or when they arrive at their set-top box - the only important factor is that they are available by the time they wish to watch.

As this migration towards PVR viewing gathers momentum, it will have an interesting effect on the use of

the same path as online booksellers such as Amazon, we can predict the availability of a 'long tail' of programmes – each of which attracts only a small audience but, when aggregated together, becomes a worthwhile commercial proposition.

Taking all of these factors together, we can make an educated guess as to what the future broadcasting landscape might look like. There will be a smaller number of overall digital channels than today, but the majority will be broadcast at an HD quality level. After the first showing of a given programme, there will be one repeat two or three days later for viewers who did not capture the first showing - perhaps because they did not realise the programme was worth watching until they heard their friends and colleagues discussing it at work or in the pub. After that, the programme will be available on an on-

"...we can make an educated guess as to what the future broadcasting landscape might look like."

possible – modernising and updating what was previously available on teletext beyond all recognition. Viewed in the broader context, therefore, we can say with some degree of confidence that the convergence between broadcasting and computing is well under way.

Nor is the convergence between broadcast and telecommunications lagging far behind. With the growing use of the internet to deliver IPTV services, and the augmentation of conventional GSM and 3G mobile networks with new broadcasts delivered via DVB-H, the boundaries between one-to-one and one-to-many services are rapidly eroding.

However the more we travel down the convergence road, the more it is clear that we still have some distance further to go. For example, returning to the UK, the number of homes with at least one spectrum for broadcasting. Currently it is not uncommon to find the more popular programmes being transmitted in five or six different 'slots' on different digital channels during the week. Such repetition is used to allow 'time shifting' to suit the convenience of different viewers, and hence increase the total audience. However, if there were a PVR in every household, many of these repeats would become unnecessary, and the impact on the frequency spectrum would be reduced. Indeed such a move is probably essential to offset the increased demands made on spectrum by the move towards high definition.

And, of course, the growing number of 'view again' IPTV services available to broadband-connected viewers will further erode the need for broadcasters to offer repeat showings of the same programme. If broadcasting follows demand basis from any of a number of suitable view-again websites, together with a wide range of other, more specialised, programmes. The only obstacle to such a Utopian future is that currently it is difficult for broadcasters to decide how best to split the total number of programmes between one-to-many broadcast channels using the scarce frequency spectrum and one-to-one internet distribution. Perhaps the development of suitable tools to ease the automation of this decision process is something in which DVB can assist. Either way, it is clear that DVB will continue to have a worthwhile role in the future until the convergence process is finally complete.

IPTV IS GROWING UP

Jeff Goldberg, Technical Leader for a Chief Technical Officer of Cisco Systems

2000. Who can forget the fireworks and celebrations at the beginning of the year when one era ended and another began? This was also the year DVB first started the TM-IPI working group (Internet Protocol Infrastructures) to look at IPTV. We're now in our seventh year and the industry has started to grow up, with real services being launched in many countries and significant penetration in some. The survival of consumerfacing telecommunications providers is now seen to be in the combination simulations of various forward error correction (FEC) schemes. The result is an optional layered protocol based on a combination of two FEC codes, a base layer and one or more optional enhancement layers: the base layer is a simple packet-based interleaved parity code and the enhancement layer is a raptor code. It allows for simultaneous support of the two codes and the combination at the receiver to achieve error correction performance better than a single code alone. Home networking has always been in TM-IPI available globally to try to work on minimising the differences between IPTV standards worldwide. For example TM-IPI has contributed to the ITU, ETSI and ATIS groups on IPTV, and given tutorials at these meetings on what the IPI specification provides. One of the results of the standards cooperation with CableLabs and the DSL Forum is the significant updates and changes to the Remote Management Specification (RMS) in the current specification. Due to be ready for 1.4, this will bring the RMS

"Home networking has always been in the roadmap of the specification..."

of voice, broadband data and IPTV services delivered over a broadband infrastructure.

DVB has always been led by commercial requirements which have evolved as services have been delivered. In the immature world of IPTV, some new requirements became clear over time: error protection, regionalisation, home networking and more flexibility of stream transport. At the same time some requirements disappeared, such as using IEEE-1394 for connecting the home network. The new version of the 'Transport of MPEG-2 TS Based DVB Services over IP Based Networks v1.3' specification approved by the DVB Steering Board in February 2007 reflects this. Let's look at two aspects of this in more detail: error protection and home networking. TM-IPI spent a significant time considering all aspects of error protection including some detailed

the roadmap of the specification but the reference architecture in the first release only allowed for a limited home network, e.g. it was only possible to have a single gateway per network. The new Home Network Reference Model, available as a separate DVB Blue Book, breaks these barriers to describe a complete home network, based on DLNA (Digital Living Network Alliance) specifications. A large amount of work is going into making it complete in the next major version (1.4). This will make it possible to combine different forms of DVB service on a home network with the possibility of true media sharing across devices, where rights allow, within a home.

TM-IPI has worked with many standards organisations, e.g. DLNA, over the past 6 years, however, we are seeing many existing standards organisations taking an interest in IPTV. We are trying to make the work of specification in line with DSL Forum's TR-069 series of specifications, and allows for CableLabs' PACM equivalents. It will also add significant improvements such as a multicast firmware uploading system (FUS) and specific management for IP settop boxes. The FUS effort is being paralleled with the need to provide a Content Downloading System (CDS) to download non real-time content to the set-top box to try to avoid duplicating protocols.

In its seventh year, TM-IPI is a vibrant and productive part of DVB in an immature IPTV market. We commend you to look at the current (1.3) version and work with the TM-IPI to improve it still further.

Jeff Goldberg has been working on IPTV since 1999, leading Cisco's efforts in IPTV standardisation and designing several leading edge products in his 13 years at Cisco.



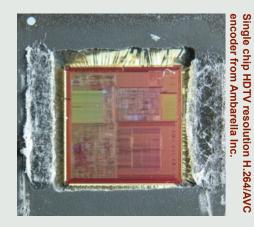
Ken McCann, ZetaCast Chairman of TM AHG on Audio-Visual Content (TM-AVC)



DVB specifications have supported HDTV since 1998 and the first commercial HDTV deployment in the DVB world began in Australia in 2001. But HDTV really took off for DVB in 2006 with the availability of second generation systems, e.g. using DVB-S2 transmission and H.264/AVC video compression coding. Initially regarded as very challenging, the technology required to perform HDTV compression has advanced rapidly and it is now possible to perform H.264/AVC • '1080p/50-60', i.e. 1080 lines x 1920 pixels at 50 or 60 frames/s (progressive) This provides good quality downsampling to either 720p or else 1080i, hence maintaining the value of a content provider's archive.

The smallest object that a person with normal vision can discern subtends an angle of about 1 minute of arc. The line structure of a 720p system would therefore not be visible unless the screen occupied an angle of more than about 12° vertically, corresponding to just over 20° horizontally for a 16:9 screen.

A BBC study of domestic viewing arrangements found that the viewer sat an average of about 2.7m from the screen. From this distance, the pixel structure of a 720p system would be invisible unless the diagonal screen size was greater than about 45 inches. The spatial resolution of the 720p format is therefore well suited to the typical



decoder. A 1080p/50-60 decoder requires double the memory bandwidth of 1080i, a significant technical problem when the current HDTV standards were devised. Although much less of a technical challenge today, the growing number of deployed HDTV receivers and screens would not be compatible with new 1080p/50-60 transmissions. It may be that 1080p/50-60 would not give enough of a step change in quality to justify destabilising this established HDTV market.

For the longer term, we can consider 'Ultra HDTV' formats, giving a truly immersive viewing experience. A 2160-line system would allow a maximum viewing angle of about 60°, corresponding to a 135 inch screen viewed from 2.7m. A 4320-line system would allow a maximum viewing angle of around 100°, which would be rather challenging to fit in many living rooms; a display occupying an entire wall is

"For the longer term, we can consider 'Ultra HDTV' formats, giving a truly immersive viewing experience."

encoding at HDTV resolution using a single chip. With the success of HDTV now looking assured, a reasonable question is 'what next?'. The current HDTV transmissions use one of two video formats: • '720p', i.e. 720 lines x 1280 pixels at 50 or 60 frames/s (progressive) • '1080i', i.e. 1080 lines x 1920 pixels at 25 or 30 frames/s (interlaced) There has been fierce debate over the relative merits of the two formats, with advocates of 720p pointing to its better motion portrayal and more efficient compression, whilst proponents of 1080i highlight its superior static resolution. From the point of view of a content provider, the existence of the two formats is an unwanted complication. The best way to be able to provide content in either format is to actually shoot it in a third format:

usage scenarios of today. Furthermore, with bit-rate being a scarce resource it is likely that the threshold for annoyance will be set by the visibility of compression coding artefacts rather than the visibility of pixel structure. If the 1080p/50-60 production format were used for transmission and display, then the maximum horizontal angle with invisible pixel structure would increase to about 30°. This would correspond to upgrading to a 67 inch display, when viewed from 2.7m. The EBU has recently performed a study which concluded that encoding 1080p/50 without visible artefacts did not actually require a greater bit-rate than 1080i/25, due to the higher pixel rate being offset by the more efficient compression encoding of non-interlaced content. However, the main barrier to using 1080p/50-60 for transmission is the

Format	Approximate maximum horizontal viewing angle	
720 lines x 1280 pixels ("720p")	20°	
1080 lines x 1920 pixels ("1080p/50-60")	30°	
2160 lines x 3840 pixels	60°	
4320 lines x 7680 pixels	100°	

probably the logical end point in the search for ever larger screens. A 4320line TV system may seem fanciful, but NHK demonstrated just such a system, accompanied by 22.2 channel audio, at NAB and IBC in 2006. However, this would not be practical in the average home for a few decades!

Of course, it may be that ever higher resolution is not the main way that TV will evolve in the future. The next big thing could be 3D TV or even adding support for other senses beyond sight and vision. Anyone for smellyvision? Ken McCann is a director and co-

founder of ZetaCast, an independent technology consultancy company specialising in digital TV. Prior to founding ZetaCast, Ken worked at NTL, Symbionics and Philips. He was responsible for the development of the world's first broadcast quality MPEG-1 decoding equipment and the world's first real-time MPEG-2 encoding system. Ken contributed significantly to the development of the MPEG-1 and MPEG-2 standards and has chaired the DVB technical group responsible for audio visual coding specifications (TM-AVC) since its inception over 10 years ago.

FUTURE FOCUS

Ed Wilson, European Broadcasting Union, Project Manager of DigiTAG and Secretary to the Commercial Module

Last June, the DVB Commercial Module (CM) met in joint session with the Technical Module where the technical experts presented the results of their Study Mission into the potential improvements they foresee for a second generation terrestrial technology. There was a real sense of excitement as the engineers unveiled a whole range of great ideas and offerings for the future enhancement of DVB-T, and the Commercial Module members decided to start a new work item on Advanced Modulation for Terrestrial.

But if we encourage the designers to do what they do best, and research, invent, improve, adjust and optimise has been the technology of first choice. Many other countries have been building experience of DVB-T through field tests and service trials, and government regulators are keen to go all-digital in the next few years. Some are under pressure from the European Union which has set 2012 as the target for the 27 Member States to switch off all their analogue TV services. Clearly a country cannot switch off analogue until the coverage of digital services and the penetration into consumers homes asymptotes towards 100 percent.

But why even contemplate changing a winning system? Well, with close to ten years of practical experience and

upgrading of the existing specification. Where are we today? As I write, the CM has endorsed the view that the prime target for second generation terrestrial specification is for the fixed, roof-top antenna market. The demand for capacity for new programme services continues to be high, and in several countries, programme services have been rapidly filling up the available frequency channels. Although more sophisticated statistical multiplexing and in some cases more efficient audio and video codecs (MPEG-4 AVC) can help to relieve the crush, the goal of achieving a significant increase in capacity for the same levels of coverage and

"...getting a great offer of HDTV programming to existing terrestrial antenna and the widening installed base of HD-Ready displays by around 2009."

or even replace the contents of the building blocks which make up the DVB-T system, is there not a risk of confusing the emerging markets? After all there are many countries which have launched digital terrestrial TV services and have established DVB-T as the preferred technology. Whether branded as Freeview (UK), Das UberallFernsehen (Germany), TNT (France), TDT (Italy and Spain) their great success in the mass market has been the offer of an attractive variety of programme services in combination with inexpensive, high performance consumer products. The toolkit approach that was inherent in DVB-T means that for diverse applications from HDTV in Australia, to robust portable services in Germany, DVB-T

many very successful applications of DVB-T worldwide, DVB members think that it's time to consider refreshing the system. We did this with DVB-S2 in 2004 after ten years of success with DVB-S, and the result has been very much welcomed by the market. So, against this background the Commercial Module has set about capturing an appropriate set of commercial requirements for a new generation DVB terrestrial specification. The CM's working group is taking a very pragmatic approach. They are demanding that the new terrestrial specification should not simply be a 'gilding of the DVB-T lily', but should exceed a significant threshold for the performance improvement in order to justify an

robustness, from the same transmitter power is a very tempting idea. Interest in HDTV is growing with the runaway success of flat screen HD ready TV displays, and in the longer term, the Geneva 06 Agreement will make more spectrums available when analogue TV is turned off.

So the present focus is on getting a great offer of HDTV programming to existing terrestrial antenna and the widening installed base of HD ready displays by around 2009. Later requirements may well tackle the tough reception environment of 'deep indoor' use of portable TVs, of course, as always, making the maximum use of the DVB building blocks so that we can exploit our industry-wide knowledge base to minimise time to market.

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DTT launch	ASO date	Estimated ASO
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2004	2010	
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The birth of any child can be a stressful time, ask any parent. Those of you present at the birth of DVB-IPDC will therefore understand the great amount of concern, stress and sleepless nights the parents (CM & TM) went through! I understand it was a particularly difficult birth that produced a pair of troublesome twins! Now let's fast forward into present day and we find the twins, let's just call them IPDC twin 'a' and IPDC twin 'b' alive and well in rude health and just as troublesome as ever! Not so much Tweedle Dee and Tweedle Dum as maybe Romulus and Remus! Seriously, the brief tongue-in-cheek history lesson aside, today we are faced with a DVB-IPDC service specification fast segmenting into a series of commercial DVB-H IPDC solution profiles supported and promoted globally. This commercial IPDC profile segmentation now poses a couple of significant questions,

1. Why is the DVB-H IPDC specification segmenting into significantly different commercial profiles?

DVB-SCENE

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2. Is this IPDC commercial profile segmentation of major concern to the mobile broadcast industry at large? 1: In hindsight the segmentation of the IPDC specification into several commercial profiles based around either of the two service purchase protection profiles was somewhat inevitable given the make up of the industry forces thrown together by market globalisation and industry convergence. Fundamental business model differences and legacy market perspectives conspired to produce two fundamentally different technical service and content protection approaches each supported by companies with significantly differing business perspectives. It's therefore little wonder the marketplace is now faced with a DVB-H IPDC service laver specification and system segmentation choice with several industry consortia keen to deploy their respective commercial implementation profiles. Then again who ever said choice was a particularly bad thing? Little surprise either that these DVB-H and IPDC specifications are in fact finding favour with a number of early adopter companies and countries keen to establish their particular commercial profiles in the first two or three early markets. These commercially deployed networks and services can be described today as country and/or network specific implementations with little or no requirement to be interoperable with each other at least from the network standpoint.

DVB-H mass market adoption and the emergence of multiple commercial profiles

THE QUESTION OF INTEROPERABILITY

Steve Turner, Business Development Manager, Mobile Broadcast Solutions, Business Unit Mobile and Personal, NXP Semiconductors

2: Today however things are changing with a number of mobile broadcast services-focussed industry consortia busy reviewing the first generation specifications and commercial implementations, their aim, the production of real commercial implementation guideline and interoperability (IOP) documents in support of its membership. Members now require DVB-H, IPDC systems and network profiles that are clearly interoperable with each other at any number of levels. These levels include for example RF receiver, bearer layer, component, module, sub-system, terminal, network, service etc. Two such industry consortia already

experienced in these types of activities both in the cellular and digital television fields.

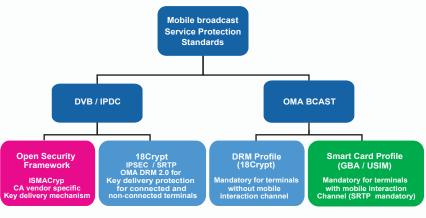
Given the consortia's support and promotion of these DVB-H and IPDC specifications it's no great surprise that the technology is increasing its global market popularity whilst at the same time the commercial profiles, implementation guidelines and IOP (interoperability) documents ensure that the necessary levels of technical, component and service interoperability are promoted wherever possible. With additional success comes potential for further segmentation with several additional industry consortia now positioning themselves to endorse and

"...the industry itself will ultimately determine the level of interoperability necessary..."

tackling DVB-H, IPDC system and commercial profile interoperability are the Mobile DTV Alliance and the bmcoforum. The Mobile DTV Alliance (mdtvalliance.org) is an open industry consortium that focuses on promoting the best practices and open standards to deliver premium quality broadcast television to mobile devices in North America. The Broadcast Mobile Convergence Forum (www.bmcoforum. org) is an international organisation of companies targeting to shape an open market environment for mobile broadcast services.

Both these mobile broadcast focussed consortia have already established interoperability work groups and are in the process of generating DVB-H, IPDC Implementation Guideline documents to establish a large measure of interoperability within their respective markets and commercial profiles. These working groups are also considering test and conformance regimes and are busy communicating their intentions to like minded test consortia already exploit the DVB-H specification. Within the bmcoforum for example members of OMA BCAST have requested support for two additional commercial IOP (interoperability) work items. This suggests further commercial DVB-H implementation profiles emerging in 2007, 2008 timeframe. Given these additional market demands it remains to be seen how truly interoperable these multiple commercial implementation profiles will be. Much may well depend upon the level of sophistication of both the network(s) and terminal(s) the industry considers necessary. It is for this reason that NXP Semiconductors is readying its ICs, modules and complete System Solutions by fully supporting the interoperability and commercial profile activities of the likes of the Mobile DTV Alliance and bmcoforum in partnership with its customer base. After all it is the industry itself that will ultimately determine the level of interoperability necessary for the emergence of a truly global market success story.

DVB-H Service Purchase Protection Systems



Ulrich Reimers, Chariman DVB Technical Module



The DVB Project proudly announces the birth of a new star. DVB-SH (Satellite services to Handhelds) is the name of a system which is able to deliver media content and data to personalised terminals like mobile phones and PDAs. The key feature of DVB-SH is the fact that users in large regions or even a whole country can be reached via just one satellite. Whenever a line of sight between terminal and satellite does not exist terrestrial gap fillers will be able to provide the missing coverage. The DVB-SH system was developed in the course of 2006 by an ad-hoc group of the DVB Technical Module (TM) chaired by Philip Kelley (Alcatel). A large team of companies and individuals devoted an enormous amount of effort and many, many weekends to create the system which is definitively one of the most important deliverables of the DVB Project in 2007

The diagram shows the architecture of a typical DVB-SH network in a somewhat simplified form. The DVB-SH system has been designed for frequencies below 3 GHz. A typical range in which it will be used is the S-Band (app. 2.3 GHz). Two versions exist. The first (SH-A) uses Orthogonal Frequency Division Multiplexing (OFDM) both on the satellite link and on the terrestrial link. This version requires satellite transponders to be operated in a linear mode. The second version (SH-B) targets satellite transponders operated in full saturation. A Time Division Multiplex (TDM) signal is used on the satellite link but the OFDM signal is maintained on the terrestrial link. A typical phenomenon of satellite reception with mobile terminals are long interruptions of the line of sight resulting for instance from the shading by buildings and bridges. In order to be able to cope with such interruptions a number of tools can be used. The most straightforward would be terrestrial gap fillers covering areas in which a satellite signal is not available. In addition, the DVB-SH system has builtin features which help to overcome the problem. Two types of receivers have been defined. The first (Class 1 Receiver) is able to cope with rather short interruptions using appropriate

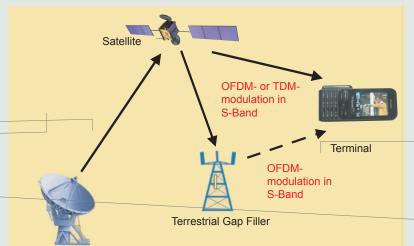
A NEW STAR IN THE SKY

Prof. Dr.-Ing. Ulrich Reimers is the Managing Director of Institut fuer Nachrichtentechnik (Institute for Communications Technology) at Technische Universitaet Braunschweig (Braunschweig Technical University), Germany. He is one of the founders of the DVB Project and the Chairman of the Technical Module of the DVB Project.

mechanisms on the physical layer but supports the handling of long interruptions using tools on the link layer. This receiver was defined for SH-A and SH-B. The second (Class 2 Receiver) is able to handle long interruptions (in the order of magnitude of 10 seconds) on the physical layer. This receiver has only been defined for SH-B.

The S-Band is very demanding in terms of signal coverage. Its short wavelength (app. 13 cm) requires a rather dense It is to be expected that the burden placed on DVB-SH by the high frequency band it will have to operate in will be compensated for by the selection of new tools for enhancing the signal robustness.

DVB-SH is a transmission system. It does not define transport protocols, audio and video coding solutions, an Electronic Service Guide (ESG) etc. Like in all other DVB transmission systems such 'higher layer' issues are defined elsewhere. The set of IP



Satellite Earth Station

Simplified Architecture Of A Typical DVB-SH Network

terrestrial repeater network in towns and cities. It is obvious that the cost of this network can be reduced if the signal-to-noise-ratio (SNR) required for stable reception is low. Therefore, it was paramount to design the terrestrial component of DVB-SH in such a way that it provides the best possible SNR performance. Backwards compatibility with DVB-T was a commercial requirement that was important when DVB-H was developed. This backwards compatibility allows a DVB-H signal to be transmitted in a DVB-T channel together with the more classical DVB-T signal. The S-Band is not used for broadcasting and therefore backwards compatibility with DVB-T was not an issue. In consequence, DVB-SH uses, for instance, turbo coding instead of the more traditional forward error correction (FEC) mechanisms incorporated in DVB-T.

Datacast specifications was originally defined to turn the DVB-H transmission system into an end-to-end solution. IP Datacast will now be amended - if necessary - in order to act as the 'higher layer' of DVB-SH. Audio and video formats will be defined by what DVB calls 'A/V implementation guidelines', officially called TS 102 005v1.3 'Digital Video Broadcasting (DVB); Specification for the use of Video and Audio Coding in DVB services delivered directly over IP protocols'.

It needs to be seen how well the world will adopt the new star in the DVB sky. Announcements have been made to the effect that a satellite to be used for DVB-SH services will become operational in 2009. But maybe DVB-SH operations will start with terrestrial networks in certain regions of the world.

LAS VEGAS HIWIRE ACT



Franco Ferri, General Manager, RRD Reti Radiotelevisive Digitali SpA

While the United States mobile communications markets were generally considered to lag behind their counterparts in other regions such as Europe and Asia Pacific, the increasing growth and popularity of mobile video services in the US may finally narrow this gap. The mobile TV audience grew 45 percent to 3.7 million subscribers in Q2 2006, according to Telephia, the largest provider of consumer research to the communications and new media markets. Total guarterly mobile TV revenues increased to \$86 million last quarter, an increase of 67 percent since Q1.

During the CES in Las Vegas this year, both Modeo and Qualcomm showcased · PVR functionality on a DVB-H handheld device

At present, the system created by RRD is transmitting to LG U900 mobile phones and pocket TV handheld devices from Quantum. In the future Motorola, Nokia and other mobile vendors will join the trial.

For first the time in Las Vegas, the RRD platform will broadcast up to 24 channels for DVB-H capable devices, managing a seamless delivery over two different 6MHz frequencies. This trial will deliver twice the number of channels and higher quality pictures than any other current mobile broadcast TV platform.

The impressive results are obtained

"Given such openness all the mobile operators, broadcasters and carriers can benefit from the ongoing competitiveness between manufactures."

their mobile TV services with DVB-H and MediaFLO technology respectively, announcing a commercial service sometime during 2007. Moreover, after the world's first DVB-H commercial launch in Italy, RRD Reti Radiotelevisive Digitali is on the way to facilitating the DVB-H business in the US by partnering with Hiwire. The subsidiary of Aloha Partners, the largest owner of 700 MHz spectrum in the US, launched a DVB-H commercial trial in

Las Vegas with T-Mobile USA early this vear. Las Vegas, the capital of gambling, will

be also the capital of mobile TV being the only market to test the two rival mobile TV technologies at the same time, DVB-H and MediaFLO. RRD has set up a DVB-H service centre at Network Operating Centre (NOC) in Vernon Valley NJ and developed, together with its partners, some unique features for the Hiwire

- case: Statistical Multiplexing
- Single ESG for two different RF
- channels or timeslot
- MFN Handover
- · Simulcrypt for different CAS

due to the unmatched 12 MHz capability Hiwire is capable of delivering in the 700 MHz UHF spectrum (CH54 and CH59).

Viewers will be able to watch up to 24 A/V channels at 30fps in excellent quality thanks to H.264 encoding technology.

The modulation chosen is similar to the modulation already tested and in use in the DVB-H roll out in Italy. The parameters are:

- OPSK
- · Nonhierarchical mode
- 2/3 of FEC
- 1/8 Guard Interval
- · 8k transmission mode
- 3/4 MPE-FEC

The Hiwire signal is transmitted from the Vernon Valley NOC to the Las Vegas sites over satellite link. The two sites in Las Vegas broadcast the signal to DVB-H capable devices supplied by the selected vendors. One site is located on Black Mountain with about 50 Kw ERP and the other is located in the centre of the city on top of the Rio Hotel having about 1 Kw ERP. The Las Vegas Hiwire trial can be considered the biggest ever seen in

mobile TV in terms of the number of channels. This is also thanks to the openness of the DVB-H standard. Given such openness all the mobile operators, broadcasters and carriers can benefit from the ongoing competitiveness between manufacturers.

This drives collaboration and forces competition among technology developers and was a key success factor for RRD to aggregate several vendors (like encoder and transmitter manufacturers, ESG providers, IPE and Conditional Access vendors). For the trial in Las Vegas RRD delivers a bestof-breed technology platform. Ready for any future extension and technical innovations driven by the DVB-H standards.

RRD believes that nonproprietary and open standard technology, as DVB-H, delivers so many economical, strategic and commercial benefits for markets where it is adopted than any proprietary solution.

The choice for DVB-H will thus be a business choice and not a technical one



Joining RRD in 2006, Franco Ferri was responsible for the overall DVB-H project in 3 Italy, He has been a driving force in the growth of the mobile TV industry from the launch of the world's first and largest DVB-H service in Italy to the development of several other DVB-H projects worldwide.

LATIN AMERICAN STAGE Julián Seseña & Roberto Lauro





Julián Seseña (left) holds a PhD in Radio communications. He has worked for: the Spanish Ministry of Science and Technology Administration as Head of R&D, Director of Telecommunications at Hispasat and Executive Director at Teledesic. Since 2003 he has worked as an independent consultant at ROSE Vision. He represents Sidsa in the DVB-TM and supports DVB on Latin American affairs.

Roberto Lauro is an Electronic Engineer from the National Technological University, Argentina. He was Technical Director for DTV at Argentina's Canal 9 and Telecapri in Italy from 1990 to 2006. He has represented the DVB Project in Latin America since 2006.

The promotion of DVB specifications in the world, and in Latin America in particular, has been intense since the early days of the DVB Project. The use of the DVB-S and DVB-C standards for satellite and cable broadcasting has led to the growth of successful commercial businesses throughout the whole American continent, including the USA. The choice of a digital terrestrial television (DTT) system is now at a critical stage for a number of Latin American countries including, amongst others, Argentina and Chile. Recent months have seen a significant increase in activities through which the DVB community aims to present the DVB-T system as the right option for DTT in Spanish-speaking Latin America

DVB coalitions have been formed in Argentina and Chile and are in the process of being formed in other countries. As far as DVB-T is concerned, significant contributions are being made on a voluntary basis by a variety of entities around Europe and Latin America. The Spanish Ministry of Industry has been to the forefront of these efforts, aggregating the many contributions and offers of support and ensuring that the efforts of multiple associations, consortiums, broadcasters, administrations and equipment manufacturers are efficiently targeted.

In this context, workshops and specialised sessions have been held in Bogota, Santiago and Buenos Aires. Others are planned for Lima, Montevideo, Cartagena. In these workshops, a united DVB community has presented the main features and advantages of the DVB-T solution, in friendly, open and transparent ways. The DVB community approach emphasises the importance of sharing experiences with regulators, broadcasters and manufacturers from Europe and elsewhere, in order to assist Latin American partners on the best and most efficient ways to implement DVB-T. This approach has been appreciated by Latin American partners and a close spirit of cooperation is maintained. Many diverse activities have been carried out, especially in Argentina and Chile. In Argentina, a DVB coalition of Siemens, Telefónica Argentina, Telecom Italia, Nokia, and others with the support from the European Commission, has been working to successfully satisfy the specific requirements of the Argentinean situation. A concentrated effort was made during the CAPER trade show in Buenos Aires last November with a view to demonstrating DVB-T as the optimum standard for Argentina. In Chile, specific trials were launched in late October 2006 with equipment provided by the companies Soluziona

and SIDSA, and with the contribution of many others. The trials broadcast HD and SD programmes to the city of Santiago de Chile and are presented in a showroom of the Chilean broadcaster Canal13. The Chilean authorities and stakeholders have the ability to test the signals and to monitor the performance of the system. The key message is that the DVB concept of a toolbox of specifications, capable of working with different channelisations (including 6 MHz) is ideally suited to the Chilean broadcast market.

In both countries the support and assistance provided by Abertis Telecom, RTVE, AETIC, CDTI, Universidad Politecnica de Madrid, AEQ, Mier Comunicaciones and Integrated Digital Consortium is notable. Additional efforts, workshops and seminars are planned in Lima, Cartagena, Montevideo, San José, etc. The whole DVB community is invited to join this promotion effort and contribute through the DVB coalitions being formed in each country. Some of these activities are also supported by the ETSI/@lis programme. The European Commission is intensively supporting DVB-T, organising sustainable cooperation links with science and technology broadcasting departments around the Latin American continent, by using the tools available in the new Research and Development Framework Programme.

In all these promotional activities, the synergies between DVB-T and DVB-H show DVB as a futureproof technology and, uniquely, the DTT standard capable of offering a range of new opportunities to broadcasters in Latin America.

We would like, on behalf of DVB, to express our profound gratitude to all those experts from the cooperating entities that are facilitating these activities. Special thanks are due to the Ministry of Industry of Spain for its key role in the promotion of DVB-T in Latin America.



GROUNDBREAKING DEMOS

Eoghan O'Sullivan, DVB Project Office

Last year was the eleventh in a row that the DVB Project had a booth at NAB in Las Vegas. The very first booth, in 1996, featured a DVB-S interoperability demonstration. It's very possible that those who were there might have felt that the work of the DVB Project would be over by now. Well, here we are in 2007 and not only is the Project alive and well – with membership and meetings on the increase – but NAB remains an important fixture in our annual event calendar. Some of the names and faces involved have changed over the years, but each time we return to Las Vegas we find a real thirst for knowledge about what's on the horizon for DVB.

At NAB 2007 the focus is on three key DVB technologies: DVB-T, DVB-H and DVB-IPTV. This year sees a demonstration of the state of the art in digital terrestrial television, with a presentation of HDTV and DVB-H mobile TV incorporated into one DVB-T multiplex in a 6MHz channel. This is an important demonstration on two fronts. On one hand, North America is likely to be one of the most important markets for mobile TV, and on the other hand, for the many NAB visitors from Latin America, it will be a chance to see first hand a key technology under consideration in their DTT standards selection processes. There will also be a presentation of the latest implementation of DVB standards for the delivery of MPEG services over IP networks. Visit us at booth C2239!



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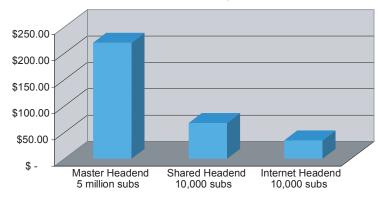


Further information at: www.teamcast.com

Upfront Deployment Costs/Sub



Moore Analysis



IPTV BUSINESS

Sometimes emerging technologies become overachievers.

Digital video compression was first slated as a more efficient way to deliver better quality pictures to over-the-air TV receivers. But it earned its blockbuster status as a way to put better quality video onto a new optical disc format - the DVD. What was intended as an improvement on an existing delivery system ended up revolutionising the packaged media business. The use of IP to deliver TV programming is destined to go through a similar transformation. Today, IPTV, to most industry players, means traditional pay TV services delivered over telco infrastructure. This seems radical because it introduces new competitors into a well established industry, but it's likely that the existence of telco TV services will ultimately be viewed as a pedestrian occurrence in the life of IPTV. Far more radical is the potential of IP delivered video to TV devices to smash video business models,

threaten incumbent service providers, give content owners direct access to their customers, and allow consumers a more democratic way to choose their TV programming.

In DTC's latest IPTV report, we analyse three business models for this new delivery platform. Of these three, it is the 'Internet Headend' model that is most likely to enable dramatic changes in the business of delivering TV programming. This model allows direct marketing of content to TV viewers with Internet access, thus bypassing traditional distribution channels. NeuLion, for example, allows content providers, such as the Chinese language KyLin TV, to upload their content to a central server for a fee, where users with a corresponding settop box can then access it. The STB is marketed by the content provider, either as part of the monthly content package, or as an upfront consumer purchase. It is easy to see how players from ISPs and consumer electronics

retailers, to media companies can assemble a package of content and/or VOD offerings and market them directly to consumers.

Using this model for service, DTC estimates upfront deployment costs per subscriber of just \$35 for the "Internet Headend" model, compared to \$220 and \$68 for the 'Master Headend' and 'Shared Headend' models that mirror current pay TV business models. As IPTV standards solidify and STB suppliers create more hybrid receivers (i.e., DTT/IPTV receivers), the opportunities for new service and content providers multiplies. The low cost for entry just elevates IPTV's status as a disruptive overachiever.

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 research can be found at www.dtcreports.com.

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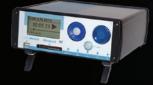
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MARKET WATCH

TeamCast is introducing the RXH-1000 multi mode receiver module able to provide spatial diversity reception, full hierarchical demodulation, double channel demodulation, or secured reception for applications such as monitoring and retransmission of DVB-T/H signals. It comes with two separate inputs and two demodulation circuits. Also new, the DVB-H POD is a professional portable receiver module for connecting to a computer via a USB port. Delivered with simple control software or a development kit, it provides monitoring functions for mobile TV field trials or application development. www.teamcast.com



a new series of DVB-T and DVB-H antennas for low and medium power applications. The lightweight, low windload, vertical polarised UHF omni antennas are available with 3 dBd up to 7 dBd gain. www.kathrein.de



The **Elti** ECOS 3000 is a complete solution for central monitoring and managing of all devices connected to it. It is a result of the integration of the company's Central Operating and Change Over systems. Access to all devices connected to ECOS 3000 is managed by a simplified GUI. The system allows for local and remote control of log files, SNMP tags over supported protocols TCP/IP, HTTP, SNMP and GSM messaging. www.elti.com

Fraunhofer IIS is introducing DVB-H in 5.1 MPEG Surround sound for the transmission of true multichannel sound and features realistic playback of surround sound over headphones. The software supports MPEG-4 and HE-AAC with MPEG Surround decoding. The binaural rendering for output of surround sound over headphones happens in real-time in the player. It enables broadcasters, IC vendors and receiver manufactures to introduce or enrich mobile TV services with high quality picture and surround audio. www.iis.fraunhofer.de The **ProTelevision** MIP Carousel function which becomes available when option PT8727 is mounted in PT5879 provides a user friendly method for sending optional MIP data. The optional MIP data is easily inserted and managed using the WebLink GUI provided by PT8727. The unique 'anytag' feature offered by PT8727 allows immediate support of any new function tag that might be added in the future to the list of tags currently defined in paragraph 6.1 of the TS 101 191 standard. www.protelevision.com

ProTV PT5879

Tiernan has released its IP enabled video encoders and decoders. The 10/100/Gig-E Pro-MPEG CoP3 compliant IP option is now available on Tiernan's popular line of MPEG-2 and MPEG-4 video encoders. Existing owners of Tiernan's HE4000, SE4000 and AVC-MPEG4 encoders and associated decoders can be upgraded to add this capability. Pro-MPEG CoP3 allows video to be transported over Ethernet while protecting against: packet loss, packet jitter, duplicate packets and lost packets. www.tiernan.com



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Advanced Digital Broadcast supplies a diverse range of high-quality digital set-top boxes integrating the world's leading conditional access and middleware solutions. Whatever the technology platform, ADB maintains its position in not just leading the industry, but defining it.



Expway FastESG V3

Expway has launched the FastESG V3 mobileTV platform. It provides a full platform solution to design, manage and deliver ESG, interactive and datacasting services compliant to the DVB-IPDC standard helping operators to generate revenue opportunities through SMS traffic or cross selling with cellular network web sites (DVB-H & 3G networks convergence). www.expway.com



The **Neotion** Pocket HD comprises advanced security modes, including HDMI-HDCP capabilities. It also performs downscaling functions enabling non HD iDTV to be viewed, in SD format, HDTV broadcast in MPEG-4. www.neotion.com

Rohde & Schwarz presents a new universal multi standard platform for analysing TV signals. The R&S ETL combines the functionality of a TV test receiver and spectrum analyser in a single instrument while maintaining high measurement accuracy. The concept allows new TV standards to be implemented on a software/hardware basis. Rohde & Schwarz will continue using real-time demodulation with the R&S ETL. www.rohde-schwarz.com



Rohde & Schwarz R&S ETL

The Pixelmetrix DVShift, MPEG TS Time Shifter, is now enhanced to provide dynamic programmable shift delay for accommodating changes in the time gap between two time zones, due to daylight savings. In countries where restrictions on a bulk of television programmes are imposed, the DVShift can resolve such issues with a playlist configuration that specifies substituted media to be broadcasted instead of the usual shift. The improved DVShift time shifting webpage displays the default and current shift delay, including constantly updated date/time details of current transmissions. www.pixelmetrix.com

Newtec is launching its Elevation product line of professional satellite modems and receivers designed

and optimised for IP applications. The cost effective design based on the efficient implementation of the DVB-S2 standard is ideal for medium rate data applications where investment and operational costs are factors. New IP encapsulation protocols, high modulation schemes and advanced VCM and ACM allow for maximum bandwidth efficiency and operational flexibility in applications such as primary distribution for IPTV, corporate networking, IP trunking, GSM backhauling and IP-based DSNG. ww.newtec.eu

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Newtec Elevation

UDcast is introducing the compact DVB-H NAVIGATOR for off-site measurement and analysis of DVB-H and DVB-T networks. Measurement campaigns can be dedicated to single or multiple channels at the same time. Compatible with all DVB-H broadcasting systems, it provides real-time, multi-layer protocol analysis (RF, MPEG2, MPE/DVB-H, IP). The main functionalities include: real-time off-the-air measurements, recording of measurement data for further processing and automatic GPS positioning for mapping representation. www.udcast.com



UDcast DVB-H Navigator

Harmonic's Electra 7000 HD and Electra 5400 SD MPEG-4 encoders enable a range of new revenue generating services for IPTV and satellite operators. Providing superior video quality and dramatically improved bandwidth efficiency, the 1-RU Electras flexibly deliver up to four simultaneous full and low resolution video services to a variety of devices. The ProStream 1000 stream processing platform is easily configured to deliver multiple digital video processing functions, including multiplexing, scrambling/bulk descrambling, re-encoding and SFN over IP, in an integrated 1-RU system. www.harmonicinc.com

Harmonic Electra 7000 HD Encoder

Advanced Digital Broadcast's (ADB) 5800S interactive digital hybrid satellite/IPTV set-top box enables HD and SD reception to DVB-S and DVB-S2. Shipping now, with an integrated single chip solution, ADB's state of the art HD technology and multimedia interface, the 5800S offers crystal clear viewing and enhanced performance including fast channel change and swift rendering of applications. The

ADB's 5800S

4082

product can connect directly to a broadband return channel via Ethernet for high bandwidth services including Video on Demand. The 5800S is compatible with all leading conditional access and middleware technologies and comes with MHP as standard. www.adbglobal.com

Tektronix has announced new monitoring capabilities for video services carried across an IP network. The MTM400 MPEG Transport Stream Monitor now provides simultaneous monitoring of critical Key Performance Indicators for up to 500 MPEG transport streams. It supports rapid fault resolution by expanding the monitoring coverage of simultaneous IP streams, with the ability to drill down through the IP layer and analyse the MPEG layer in depth. www.tek.com/video



DVB - SCENE

71.00000100

Tektronix MTM400 MPEG Transport Stream Monitor

Envivio's 4Caster M2 is a multi-rate, multi-resolution and multi-standard H.263/H.264 mobile TV encoder that outputs eight simultaneous profiles from a single video input. M2 includes IP statistical multiplexing, WM9 support, IP input and DRM integration capabilities. M2 delivers video to any network (2.5G, 3G, 5G, DVB-H and next generation Wifi and Wimax networks). www.envivio.com

The UBS Modular Exciter system for the terrestrial repeater/transmitter market consists of: DVB-S2/S1 satellite receiver, GPS receiver for SFN sync., optional GPS elimination, COFDM modulator to generate all standard broadcast waveforms (DVB, Eu147, T-DMB, STiMi), system controller to control transmitter functionality. The Exciter is fully capable of remote network management using SNMP. An internal COFDM engine can produce multiple channels for diversity. Exciter supports hierarchical modulation and custom waveforms such as XM and Sirius. High level RF output can be connected directly to HPA. Linear and nonlinear precorrectors are adjustable to compensate for filter delay and amplifier non linearities. www.uniquesys.com

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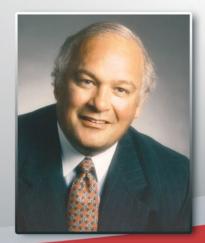


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