DVB-SCENE

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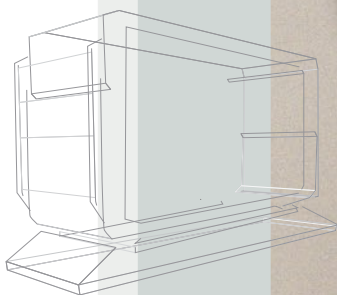
19

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This issue's highlights

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FINDING ANSWERS

A word from the DVB Project Office

Welcome to yet another packed issue of DVB-SCENE. As digital television continues its march - and issues such as analogue switch-off, handheld broadcasting, IPTV and IPR start to dominate - it is here that you'll find answers to most of your questions on DVB standards and digital television in general. The World Cup is just behind us and as we all return to our normal patterns of life, many of us continue to marvel at the HD pictures available to some, and the atmosphere which gripped the world as they watched the games - all brought by DVB standards. The World Cup also saw the coming of age of many innovative services based on the IP delivery of television - a topic which will occupy the pages of DVB- SCENE for some time to come: what should we standardise if anything? when does it need to be available? are we too late? too restrictive? Ask 10 industry experts and you'll likely get 20 different views! Then there's the thorny issue of IPR - where organisations such as DVB must seek a balance between the rights of IPR holders and those who must implement standards containing these IPRs. DVB's responsibility in this area is considerable, especially given the recent announcements from the ITU on the successful completion of the RRC-06 frequency planning conference in Geneva. This entire plan is based on

Peter MacAvock, Executive Director

DVB-T and thus some 100 European, African and Middle Eastern countries will be launching DVB-T in the coming years if they haven't already.

DVB's Technical and Commercial Modules

7-8 June 2006 saw the first joint meeting of the DVB's Technical and Commercial Modules. Part of a drive to improve efficiencies in DVB's work plan, the meeting dealt with new topics such as advanced modulation techniques for terrestrial broadcasting and their future applications, satellite services to portable handheld devices and a range of other topics. Chaired by both Graham Mills (BT) and Ulrich Reimers (TUBS), the joint meeting also oversaw progress in the key DVB work areas of IPTV, CPCM, DVB-H IP Datacast and MHP. The joint meeting's aim is to ensure that there is close coordination of the various TM and CM groups working on a given topic, and that other relevant groups (e.g. those dealing with file formats) can follow and comment on developments. With the normal cycle of DVB module meetings, it can be difficult to exploit synergies between work items in different groups in a timely manner. The DVB Steering Board will assess the success of this first joint module meeting with a view to planning similar meetings in the coming year.

NEW STANDARDS

TR 102 469 V1.1.1 'IP Datacast over DVB-H: Architecture' (23/05/06)

TS 102 472 V1.1.1 'IP Datacast over DVB-H: Content Delivery Protocols' (06/06/06)

NEW MEMBERS

Enensys Technologies - Manufacturer of DVB transmission equipment. www.enensys.com

Fastcom - Active in the markets of physical access control and data security & access control. www.fastcom-technology.com

Mavrix Technology Inc - Fabless semiconductor company providing solutions for the mobile digital TV and portable media player markets. www.mavrixtech.com

Mobile VCE - Conducts research in wireless communications. www.mobilevce.com

MStar Semiconductors Inc - Fabless semiconductor company specialising in integrated circuits for the flat panel display market. www.mstarsemi.com

NVIDIA Corp - A leader in programmable graphics, multimedia and platform processor technologies for personal computers, gaming consoles and handheld devices. www.nvidia.com

WRG Inc - Provider of hardware and software solutions for mobile devices. www.wrg.co.kr

RRC-06 Success Story

101 SOLUTIONS

Daniel Sauvet-Goichon, President of DigiTAG & DVB-TM Special Rapporteur on Frequency Planning

On June 16th 2006, a treaty agreement was concluded at the end of the ITU's Regional Radiocommunication Conference (RRC-06) in Geneva, heralding the development of 'all-digital' terrestrial broadcast services for sound and television over Europe, Africa and Middle East.

101 countries signed the Final Acts of the Geneva '06 Plan which establishes the frequency plan for Bands III, IV and V in an all-digital environment and allows for a total of 70,527 assignments/allotments.

While broadcasting requirements in previous plans have traditionally been submitted as assignments (site and technical characteristics of a transmitter are precisely defined), administrations could also submit their frequency requirements as allotments in order to enhance the flexibility of the plan. In submitting an allotment, administrations do not need to detail the number of transmitters in a given area but rather provide information on the type of network for a given area and its boundary. How coverage is provided within the area is then left for the country planners to determine at a later stage.

In comparison, the Stockholm plan of 1961 involved 38 countries and fitted in 5,300 assignments. Like the Stockholm '61 Plan which in practice over the years provided the necessary flexibility to allow ultimately for 80,000 analogue transmitters, the Geneva '06 Plan will serve as a starting point for further additions such as low-power stations or new types of services.

Even if some difficulties were caused by external political issues (Israel/Palestine and Cyprus/Turkey) and overly high demands by some geographically close countries (Italy/Tunisia), the percentage of satisfied requirements was very high. In the VHF band, 95% of DAB requirements were satisfied and 90% of DVB-T requirements while in the UHF bands, 98% of DVB-T requirements were satisfied. In the UHF, all European countries reached 100% success except Spain (96%) which could not completely finalise its coordination with Algeria.

Such high results were only possible by a reduction of requirements in countries which asked for too much at the beginning of the conference and by intensive bilateral or multilateral coordination between administrations

represented at the conference. In most European countries, 7 to 8 nationwide DVB-T frequency 'coverages' have been allocated in the UHF band and various combinations from 1 to 2 DVB-T and 3 to 5 T-DAB were obtained in the VHF band. In addition, a number of countries added stations with limited coverage in more or less great numbers.

The Conference agreed that the transition period from analogue to digital broadcasting, which begins at 0001 UTC 17 June 2006, should end on 17 June 2015, but some countries, among African and Arab countries, preferred an additional five year extension for the VHF band (174-230 MHz).

allocated frequencies to be used for applications other than DVB-T and DAB so long as they do not require more protection than is allowed in the plan nor cause more interference than the entry in the plan.

RRC-06 was a technically complex process comprising voluminous computational calculations and data processing tasks, electronic document handling and the use of five working languages. The ITU, although facing these challenges for the first time, could provide the Conference with adequate technical and regulatory expertise and support for the full satisfaction of the participating delegations.

A key ingredient for the success of the

RRC-06 Planning Area

After the transition period, countries will no longer need to protect the analogue services of their neighbour and will be fully able to use the allocated digital frequencies in the plan, and if necessary ask neighbours to switch off potentially interfering transmitters. The management of the transitional period (2006-2015) is handled between countries through bilateral agreements. The inherent flexibility offered by digital terrestrial broadcasting will support mobile reception of video, internet and multimedia data — making applications, services and information accessible and usable anywhere and at any time. It opens the door to new innovations such as Handheld TV Broadcast (DVB-H) along with HDTV. In addition, the plan does allow for

Conference was the unprecedented level of cooperation between ITU, the European Broadcasting Union (EBU) and the European Organization for Nuclear Research (CERN).

The complex planning activities conducted at this Conference and during the intersessional period were based on the software developed by EBU, which includes hundreds of thousands of programme lines. In preparing the plan for digital terrestrial broadcasting, ITU experts performed meticulous calculations within a limited timeframe using two independent infrastructures: the ITU distributed system with 100 PCs; and the CERN Grid infrastructure that is based on a few hundred dedicated CPUs from several European institutions.

In My Opinion – Phil Laven

RIGHTS & WRONGS

Philip Laven is Director of the Technical Department of the European Broadcasting Union (EBU) based in Geneva. He joined the EBU in 1997, having previously worked for the BBC (British Broadcasting Corporation) since 1966. Most of his work was associated with R&D, including being Chief Engineer R&D with responsibility for all of the BBC's R&D activities. As Controller of Engineering Policy from 1993 to 1997, he played a leading role in the development of the BBC's policy on many technical developments, such as the introduction of digital audio broadcasting and digital television. He is also active in numerous standardisation initiatives, including Chairman of the ETSI/EBU/CENELEC Joint Technical Committee, which is responsible for setting European standards for broadcasting systems.

Earlier this year, users of the DVB-MHP standard had a nasty surprise. Five years after DVB-MHP was published as an ETSI standard, a group of companies announced that they held patents essential to DVB-MHP and demanded large payments from manufacturers of MHP-capable set-top boxes and from broadcasters using DVB-MHP. Submarine patents are a widely recognised hazard in high technology: a lone inventor living in a log cabin in Nebraska might have been granted a patent some years ago and has only just realised that, for example, users of a DVB specification are infringing his/her patent. What was totally unexpected was that such a claim would be made by a patent pool which includes several major companies whose representatives on the DVB Steering Board took an active role in the discussions about DVB-MHP licensing in 1999-2000. Such actions by well-known reputable companies are, in my opinion, "disappointing" – not only for users of DVB-MHP, but more generally for the DVB Project.
DVB's policy on Intellectual Property Rights (IPR) is very clear: DVB

IPR holders, whereas DVB operates with 'negative declarations' from IPR holders in the rare cases when FRAND conditions are not applicable. If a DVB Member does not respond to DVB's call for IPR within the 90 day rule, it implies that the DVB Member either does not hold any IPR relevant to the particular specification or that it has relevant IPR

as if the IPR holders had deliberately waited until DVB-MHP had become a success (e.g. more than four million set-top boxes in use in Italy). Even if the fees could be classified as 'fair and reasonable', the five year delay has been widely condemned as 'unreasonable'.
It is to be hoped that this episode has

"...give stronger assurances about IPR issues at the earliest possible stage..."

Members are expected to license their technologies included within DVB specifications on 'fair, reasonable and non-discriminatory (FRAND) terms and conditions'. If a DVB Member cannot do so in the case of a particular DVB specification, it must make a formal declaration to the DVB Project within 90 days of the specification being approved by the DVB Project.
When DVB specifications are submitted to ETSI for standardisation, they become subject to ETSI's IPR policy, which also assumes that IPR will be made available on FRAND terms and conditions'. The subtle difference is that ETSI asks its Members to declare any patents which might be essential to each ETSI standard: the resulting declarations are publicly available on the ETSI IPR database (www.etsi.org). ETSI requires 'positive declarations' by

which will be made available on FRAND conditions. DVB's IPR policy can be summarised as 'no news is good news'. FRAND conditions are widely used despite the fact that there is no solid agreement about the meaning of 'FRAND'. Most people can agree on the meaning of 'non-discriminatory', but the meaning of 'fair and reasonable' depends on whether you are a seller or a buyer!
Until the DVB-MHP fiasco, the DVB Project had never suffered major problems with IPR. In this particular case, there were major objections about the size of the fees demanded by the IPR owners – but users of DVB-MHP were also very upset by the five year delay between publication of the ETSI standard and the unexpected announcement of IPR charges. From the perspective of the users, it looks

not damaged the atmosphere of trust amongst DVB Members. The DVB Project is fundamentally based on trust between its Members – on the understanding that all technologies will be made available on FRAND conditions. In my opinion, the only way forward is for DVB to take IPR issues even more seriously – for example by asking DVB Members to give stronger assurances about IPR issues at the earliest possible stage (ideally, before DVB submits its specifications to ETSI).

Commercialising Mobile TV

IT'S THE BUSINESS

Markus Lindqvist, Director, Mobile TV Server Solutions Multimedia, Nokia

Broadcasting has brought entertainment and information to mass audiences around the world for nearly a century. The first sixty years of broadcast technology development was based on analogue technology. During the last ten years, the digitalisation of the content has begun to reshape the broadcasting landscape around the world. A step further in the evolution of broadcast is the DVB-H standard that enables Mobile TV.

Development of mobile broadcasting and DVB-H was kicked off some five years ago. Today there is a consensus in the market that Mobile TV, will become a success and open new business opportunities. This has, however, required hard pioneering work from the industry in order to clear several perceived obstacles on the way to commercial Mobile TV services. Many of these have been solved but for some issues there is still work to do. The following gives an overview of some of the perceived main problems that have been tackled during the development of Mobile TV. Towards the end of the list, current issues are raised that still require work from the industry involved in Mobile TV.

It was originally thought that new mobile technologies such as 3G would be able to bring the new media services to consumers. This, of course, was true if there were not too many simultaneous users of the services. With the increase of users any point-to-point network would soon become congested. Today it is accepted that broadcast complements other mobile technologies and makes low cost delivery of media possible to large audiences.

DVB-H commonly uses the UHF spectrum which has many advantages but is a scarce resource. A few years ago it was often mentioned that at least in European countries it would be difficult, if not even impossible, to find spectrum for mobile TV services. Today many countries have made plans for nationwide services. Also, new radio planning regulation that takes better consideration of low power, cellular type broadcast networks is being discussed in international organisations involved in the administration of radio frequencies.

Mobile TV is not a new invention. Analogue Mobile TV devices have come to the market from time to time but they have never been a success. It was argued that no one would want the small screen and blurry picture that Mobile TV would offer. Digital technologies have changed all this.

High quality sharp video images can be enjoyed on the move and 'even the ball is visible' on the small screen. Furthermore, several consumer pilots have proven that consumers like it. Mobile TV is a concrete example of a convergent service that is difficult to handle with current regulation. Typically broadcast and telecommunications fall under two separate areas of legislation. However, national regulators are taking an increasingly positive stance towards mobile broadcasting and legislative changes are being prepared to allow new convergent services to take off.

A quality Mobile TV service requires good coverage both indoor and outdoor. Although the overall required network investment is significant, it can be as low as a couple of Euros per person to cover a densely populated area. As consumer pilots have indicated, consumers are also willing to pay for Mobile TV services. Therefore, making a return on the investment should not

the financial risk related to acquiring content distribution rights and the required broadcast capacity. For one broadcast network there can be several players having the content aggregation role.

Mobile TV service operation means:
• operating the service platform to manage content flow from a number of content sources to single frequency network cells according to the geographical coverage required for the content,
• generating the electronic service guide,
• protecting the content from illegal viewing.

It is likely that for one broadcast network there will be one player in the role of Mobile TV service operation.

Mobile TV service provisioning means:
• selling viewing rights, i.e. keys, to Mobile TV users,
• handling the billing,
• providing the help desk.

Content delivery

Revenue clearing & usage data

Content purchase & billing, keys
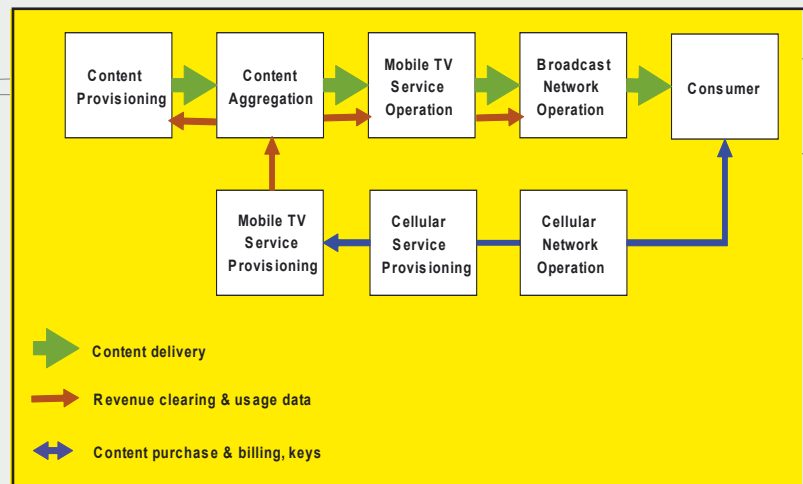
be difficult in densely populated areas even with lower penetration figures. This will facilitate getting the market started.

Mobile broadcasting has created new business opportunities for the content and media industries, the broadcast industry and the mobile industry. The challenge is to find new ways of cross-industry cooperation for all the market players to have a stake in Mobile TV. The diagram illustrates the functions that are needed in the provisioning of a Mobile TV service and the way revenues (advertisement revenues omitted) need to be shared to cover the costs and business risks involved. Content aggregation here means taking

It can also in some cases involve the distribution of terminals. There can be several players in this role.

The players that are likely to have a role in providing these functions are content companies and broadcasters, broadcast network operators, and mobile operators. Each player has its own inherent strengths, competencies and assets that will make it competitive for the various roles.

How the different roles are divided between these players will vary from case to case. On one extreme it is possible that one player would take responsibility for all the roles and functions. However, it is more likely that companies representing content,

broadcast and mobile industries will find ways to cooperate where they can best utilise their existing competencies and assets and share the revenues accordingly. Several viable business models are possible.

DVB-H is not the only radio technology developed for mobile broadcast. However, it has some clear advantages like openness, multiple sources for technology, and channel bandwidth which have made it the leading technology. DVB-H is also

turn have an effect on availability and profitability of services, as well as the overall attractiveness of the Mobile TV business.

In order to make the convergence towards one global, mainstream Mobile TV market happen the following need to be considered:

• Mobile TV is the convergence between broadcast and mobile telecommunications. Therefore, standards have to consider features other than TV, i.e. interactivity and

First commercial Mobile TV services have already begun. 2007 is likely to see a strong take off of Mobile TV business. The Beijing Olympics are likely to be the first Olympic Games where Mobile TV plays a role. There is still work to be done to clear the remaining issues leading to the commercial success of Mobile TV as has been indicated above. In this work cross-industry cooperation will play a major role as before. After all, Mobile TV is convergence.

"...content, broadcast and mobile industries will find ways to co-operate where they can best utilise their existing competencies and assets and share the revenues accordingly."

truly global as it is in use already in Australia, China, USA, South Africa, and several European and Southeast Asian countries. But within DVB-H convergence of different specifications and implementations still need to happen on the application layer. Software, especially in the long term, is the most complex and expensive part of today's multipurpose mobile devices like smart phones and multimedia computers. Having to support several non-interoperable implementations for mobile TV prevents achieving the economies of scale that has made, for example, GSM a remarkable success. Without a truly global market for Mobile TV, there will be fewer low cost devices available for the consumer. This will in

filecasting. Cross industry and cross standardisation dialogue is needed to take care of the requirements of both broadcasting and mobile business. Developing separate and competing standards will not help.

• Standards are not enough to secure multivendor interoperability mandatory for a global systems and device market. Standards often give many options for implementations and leave room for interpretations. Even though it is typical to focus on standards in early phases of market development, the industry should also focus on implementation profiles, or implementation guidelines, to secure interoperability of first phase commercial products. And last, but not least, more products will be needed.

Markus Lindqvist has worked for Nokia since 1987. He was involved in the IPDC Venture that developed technology, products and business concepts for Mobile TV leading to its commercialisation. Currently he is responsible for Mobile TV Server Solutions in the Multimedia Business Group of Nokia.

DVB WORLD

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FINNISH SECOND

Tarja Rautio, Service Marketing Manager, Digita

Finland will probably be the second European country to launch a commercial DVB-H network. Digita, the Finnish subsidary of TDF, was granted the network operating license for a DVB-H network in March 2006. The key reasons for granting the network license to Digita were its neutral position in the market and technical competence in DVB-H. Digita has participated in the DVB-H network development and standardisation since the very beginning, i.e., since 2001. According to the license terms, the network has to ready for commercial operations by the 1st December 2006. In the spring of 2005 there was a DVB-H trial with 500 paying customers in Finland, and Digita built and operated the shared trial network. The results from the trial were very promising

The Finnish government is currently finalising the programming license policies. The government is looking for a highly flexible model.

Currently, the DVB-H network covers the Helsinki area. During 2006 Digita will expand the network to cover the six biggest cities in Finland: Helsinki, Turku, Tampere, Espoo, Vantaa and Oulu. About 29 percent of the Finnish citizens live in these cities. The future expansions of the network will be decided together with the content providers and service operators. The 2007 network rollout will probably consist of some combination of the most populated areas and the main roads in Finland. According to the network license terms, the network has to provide 40 percent of the population with coverage by 1st December 2007.

used. However, it is not yet decided whether QPSK or 16QAM modulation will be used at the commercial phase. Digita has selected Nokia to provide the service platform and the system is up and running. During 2006 the network is being used by Forum Virium Helsinki for piloting purposes (www.forumvirium. fi). Forum Virium Helsinki is focusing on the development of new customer-driven digital services and content. The availability of a wide set of handsets is seen as a critical success factor for the Mobile TV market. The first terminals in the market are the Nokia N92 terminals. The Finnish market will be open to all terminal vendors whose products are interoperable with the DVB-IPDC standard. Digita Oy is the leading Finnish distributor of radio and television services, and an important developer of data communication networks and network infrastructure. Digita's nationwide organisation ensures the high quality of services 24 hours a day. Its customers include television and radio broadcasting companies, as well as mobile and

"The market will be open to all terminal vendors whose products are interoperable with the DVB-CMBS standard."

and similar to the results from other countries. Finnish consumers were highly interested in Mobile TV services and were willing to pay up to 10 € per month for the them. Also, trials with pay-per-view sport content (Formula 1) were highly successful. In the trial, the two largest Finnish mobile operators Elisa and TeliaSonera were functioning as service operators selling services to consumers. The main domestic and some international radio and TV broadcasters provided the content. The most popular TV channels in the trial were Yleisradio, MTV3 and Nelonen. The Finnish authorities promote an open business model with a shared network. Digita got the network license but according to the license terms Digita is not allowed to function as a service operator. Digita will neither participate in the consumer business nor in the content business. Both mobile operators and pay TV operators have shown interest in becoming service operators. According to the terms of the license, Digita has to sell DVB-H capacity to all programming license holders under equal terms.

The network is designed to balance the requirements from several interest groups like end users, service operators and content providers. The key design principles for the DVB-H network have been:
• Economic feasibility. The costs cannot overrun the customer's willingness to pay, while service operators and content providers have to be able to run profitable businesses. Currently, 78 percent of the population is seen as commercially responsive in Finland;
• Indoor coverage for main populated areas;
• Coverage for public and private transportation: main roads, trains in urban areas, and the underground;
• Support for regional services from the very beginning;
• High technical quality and reliability;
• Standard based solutions.
Achieving indoor coverage is slightly easier in Finland than in many other European countries, because Finnish cities are not densely built. A combination of high tower transmitters and gap fillers will be used to build the network. At the trial phase, QPSK was

broadband operators. The company employs 374 people and had a turnover of 97 million euros in 2005. Digita is part of the international TDF Group.

Tarja Rautio, M.Sc. (Computer Engineering), M.Sc. (Marketing) has over 20 years of professional experience in the ICT field, lately as a Service Marketing Manager at Digita Oy. Currently she is responsible for the DVB-H project.

The Technology of HDTV Displays

GET THE PICTURE

Richard Salmon, BBC

HDTV has finally been launched in several countries in Europe. One might ask why it has taken so long, and my answer has to be that Europe has been waiting for the availability of large, flat, affordable screens, since research shows that most people will only start to see an advantage in the domestic environment in HD on screen sizes over 28" diagonal. In this short article I will review the technologies which are currently in the market place for domestic TVs.

Plasma Display Panel
The first flat panel technology to hit the market was the Plasma Display Panel (PDP). The picture elements can be likened to very small fluorescent tubes, in that a plasma discharge generates ultra-violet light, which is then converted into Red, Green or Blue visible light by a phosphor. In this respect it has some similarities to a traditional CRT (Cathode Ray Tube) display, having the virtues of a very wide viewing angle and good colour rendition. However the plasma discharge is either on or off, and so to generate a grey-scale, the light must be pulsed very quickly. Careful arrangement of the pulses is required to prevent motion artefacts, and because the process is linear, rather than gamma-corrected, a greater bit-depth is required in the processing to generate adequate grey-scale and noise performance near black. Burn-in has traditionally been a danger with

PDPs but this, and lifetime issues, are now much less of a problem than formerly.

Because it is hard to make the plasma display cells small, PDPs are ideal for larger panels, and have cheaper materials cost than LCDs (see below). As a result they are to be found in panels above 37" (and typically 42" and 50") in diagonal. The first 1920 x 1080 resolution screens are now becoming available at larger screen sizes.
In my opinion, the best PDPs exceed the picture quality of the best LCDs, but the worst PDPs do not come close to doing justice to the picture quality we can now deliver to the home with HD over DVB!

LCD TVs to the fore
The largest market segment is the LCD (Liquid Crystal Display). The vertical alignment and in-plane switching variants on this technology have dominated the TV environment due to their improved viewing angles and colorimetry (which remain the biggest drawbacks of LCD). However, it appears that, to drive down cost still further (at the expense of picture quality), the simpler twisted nematic structure may make a come-back at smaller screen sizes.
LCD is dominant in the market because of the huge capital investment in new fabrication facilities which has been seen in the Far East. Taiwan has quickly developed capacity to challenge the dominance of Korea and Japan. 'Cost-down' has been the mantra of the panel manufacturers, and this has brought the price of LCD TVs, now available in all sizes up to 65" diagonal, down to levels where the mass market has taken off. The cost of the raw

materials is now becoming a significant component in the factory-selling price of LCD panels, and this may start to limit further price reductions in the medium term, enabling other technologies to emerge in the future, such as OLED (Organic Light Emitting Diodes), TDEL (Thick Film Dielectric Electro-luminescent), or SED (Surface-conduction Electron-emission Displays), any of which might have the potential to take market share in HDTV displays in the longer term.
Projection (or Micro) Displays should not be ignored. In Europe these have never taken a significant share of the TV market, but both the rear and front projection markets have been revolutionised by the introduction of LCD, DMD (Digital Micro-Mirror), and LCOS (Liquid Crystal on Silicon) micro-display technologies into the projection TV field. A new generation of laser projection displays may also become significant in the future.
These have the ability to provide cheaper TV sets at the larger screen sizes compared to the panel technologies, but lack the 'flat panel appeal' which appears to be driving the domestic TV market in Europe at present.

New flatter CRT
Finally the CRT, thanks to new shallower, flatter, tubes, still cannot be ignored. It can still provide unbeatable price and performance at sizes up to 32" diagonal, and the first HD Ready models are now appearing in Europe,

rather against the expectation that the HDTV market would be the exclusive domain of flat panel and projection.

Richard Salmon is a Senior Technologist (Engineering Research) with the BBC, and has worked at Kingswood Warren since graduating from the University of Cambridge, UK, in 1987. He has been involved in many different projects over the years, with a particular interest in displays, colorimetry, video compression, video watermarking, HDTV, visual perception and video systems engineering. He also spent six months on attachment to NHK's Science & Technical Research Laboratories in Japan, working on Plasma Display technology. Mr. Salmon is chairman of the EBU project group P/Display, and is a member of the Society for Information Display and the IET.

The BBC's High Definition Trial

FREE HD

Graham Plumb, Head of Distribution Technology, BBC Distribution

BBC HD Production of Dickens' Classic 'Bleak House'

The UK TV market is growing in value, driven by sales of HD Ready displays which are flooding the market. These displays already make up 27 percent of the sales volume of the UK market and this sector delivered 61 percent of the value of the TV sales market in April 2006. Increased marketing plus the World Cup is expected to have increased these figures further. Many purchasers of HD Ready screens assume that all the content they then watch will be in HD and are disappointed when they find out this is not true.

The BBC is already making HD content for other markets e.g. Japan, America and as co-productions. We have already committed to produce virtually all our programming in HD by 2010. More and more content is being captured in HD so the question is "when to make it available via broadcasting to the public?"

Kicking off with the World Cup on the 9th June 2006, the BBC started a limited duration (around 12 months) trial of HD broadcasting on digital satellite, cable, terrestrial and broadband to gauge viewer demand. BBC content includes its World Cup coverage, major Wimbledon tennis matches and programming highlights such as Planet Earth and Bleak House.

The BBC has joined forces with UK Public Service Broadcasters ITV, Channel 4 and Five to launch the UK's first HD terrestrial broadcasts using shared capacity on two new DVB-T multiplexes from the Crystal Palace transmitter in London. The broadcasters have secured an audience of 450 HD DVB-T set-top boxes (from two manufacturers – ADB and Humax). The trial is intended to measure the market demand for free-to-air HD services. We are undertaking studies into the public/social value of HD and the economic benefit that will come to the UK from HD services. DVB-T is a widely adopted and popular free-to-air platform in the UK and making provision for HD would be part of a natural quality migration for DVB-T. The BBC aims to provide its services, free at the point of reception, to all major platforms in the UK to ensure universal accessibility so it is natural for us to seek to make provision for HD on DVB-T.

There are a few lessons that have already been learnt from the HD trial. Inevitably there was much interoperability testing required between coders and receivers and through the
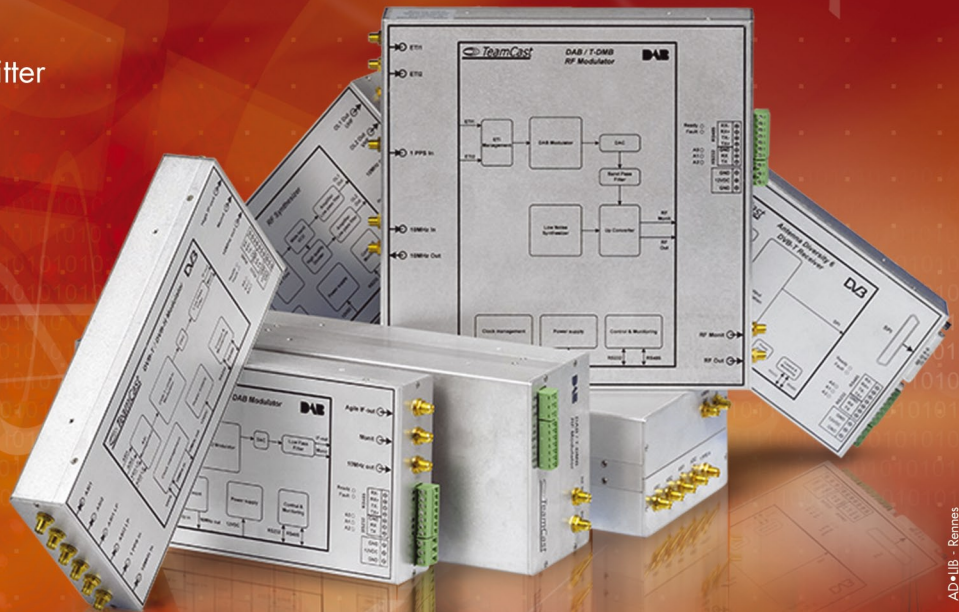
rest of the broadcast chain prior to the launch.

One thing that became particularly apparent with HD is that viewer perceptions of lip synchronisation discrepancies are much more significant with the larger displays, closer viewing distances and the increased picture resolution. So this has required particular attention to maintaining lip synchronisation throughout the production and distribution chains. Also, because different large panel displays can present different video delays, the DVB-T HD receivers were required to have an adjustable audio delay

developed, there is a need for an open standard for signalling and scheduling such programmes to suitably enabled HD DVR receivers.

Trickle download presents challenges to broadcasters: it doesn't allow live broadcasting; it requires a very flexible approach to scheduling and there could be Rights Management issues depending on the scheduling approach. Therefore we intend to undertake further trials of this technology. We have already supported a development in the DVB standard for subtitles to take advantage of the 16:9 picture area and the greater picture resolution. We will investigate further

broadcasters that use proprietary access control systems but requires additional standardisation work in signalling for the free-to-air markets. In conclusion I can say that we've come a long way in our HD trial but there's plenty more to do!

"...undertaking studies into the public/social value of HD and the economic benefit..."

compensation to maintain lip synchronisation.

Because of the capacity constraints on DVB-T, it is necessary to investigate new methods of making the most efficient use of available spectrum. We support the development of an enhanced standard to take account of the latest developments in modulation and coding particularly for the launch of future HD services.

We also support the development of new standards to make best use of existing 'spare' or opportunistic capacity (e.g. overnight), using non real-time trickle download to Digital Video Recorders (DVRs) - also known as PVRs or PDRs.

BBC R&D has already demonstrated trickle download to an experimental DVR. To enable real services to be

any issues around the implementation of DVB subtitles on different platforms. HD interactive services may eventually be needed to accompany the HD pictures. This could include simply the graphics plane and the EPG, but there may also need to be further work on navigation to ensure seamless and clear navigation between SD and HD streams and interactive content. Another key area that may need further standardisation work is in copy protection (HDCP). With very high resolution and quality audio and video content being broadcast for the first time, and the means being available for easy distribution via broadband connections, it is very important to have systems that enable rights to be protected and enforced. This is relatively straightforward for

Graham Plumb was involved in early research work into High Definition TV, the development of early digital audio editors and improvements to studio acoustics. Within BBC Strategy, he has worked towards the launch of Freeview and more recently has been responsible for the BBC's distribution strategy in the launch of its HDTV trial. He is currently the BBC's representative on the DVB Steering Board and the DVB Commercial Module.

Moore Analysis

BUDDING IPTV

**IPTV Subscribers By Region
2005-2010**

Legend:
- Latin America
- Asia Pacific
- EMEA
- North America

The budding IPTV market is defying the axiom that emerging technologies only flourish in the most technologically developed regions.

In some parts of the Asia Pacific region, for example, where the analogue-to-digital transition is still in its early stages (i.e., China and India), IPTV providers don't have to compete against a well entrenched digital pay TV industry. They can enjoy the flexibility of offering stripped down services without investing in high cost set-top boxes and expensive content packages. This increases profitability and Annual Revenue per Subscriber (ARPU) results.

This region is also where service providers are testing new pay TV business models like VOD-only services or offering micro niche Internet content combined with traditional pay TV packages. This flexibility is cultivating an environment where more IPTV services are emerging in this part of the world than any other.

Digital Tech Consulting (DTC), in its latest market research on IPTV, forecasts that the greatest number of IPTV subscribers will come from the
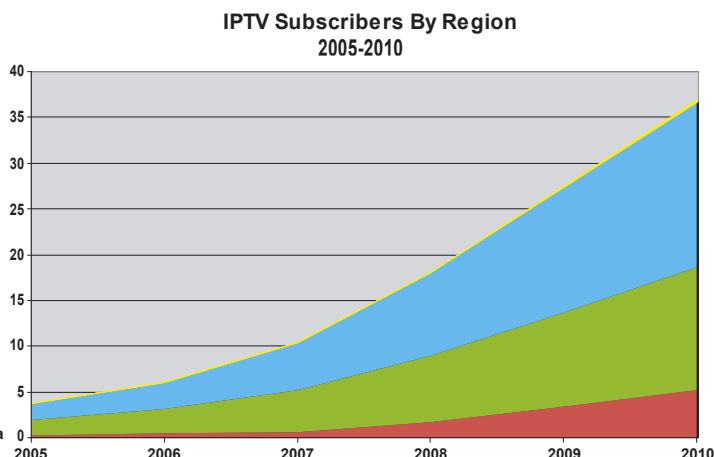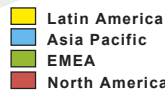
Asia Pacific region with an estimated 2.9 million IPTV subscribers in 2006 growing to more than 18 million in 2010. The European, Middle East and African region has also experienced heightened activity despite the fact that many parts of this region – particularly Western Europe – have mature digital pay TV markets. But most pay TV penetration is for one way digital DTH satellite services. IPTV allows new entrants to offer triple and quadruple play services without facing entrenched competition from incumbent providers.

DTC estimates that more than 2.6 million IPTV subscribers will come from the EMEA region growing to more than 13 million in 2010. Launches are already pending in many of these smaller EMEA markets including Poland, Estonia, Czech Republic, United Arab Emirates and Nigeria to name just a few.

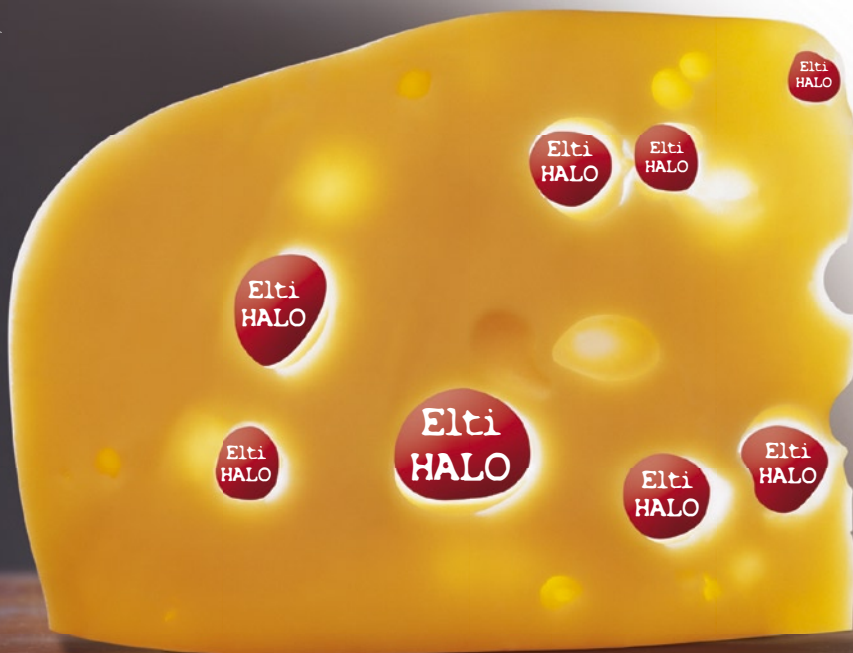Because North America is one of the largest and most technologically advanced pay TV markets, DTC

believes IPTV will be the least competitive in North America. Capital expenditures required to compete with incumbent triple play providers will be hefty. High definition programming, HD PVR STBs and VOD services don't come cheap and are mandatory to compete with incumbent operators. Most North American telcos pursuing an IPTV strategy are doing so, in part, to merely retain customers who are being seduced by triple play cable operators. Due to a hyper competitive pay TV landscape, DTC believes this region will produce the smallest number of IPTV subscribers with an estimated 400,000 in 2006 growing to more than 5 million in 2010.

Myra Moore is chief analyst for Digital Tech Consulting, a market research firm that tracks and analyses the consumer digital video marketplace. More information on the company's new report on IPTV can be found at www.dtcreports.com.

US MOBILE DTV ALLIANCE Q&A

Q: Why was the Alliance formed, and why is the focus North America centric, especially since a large portion of your membership is international?

A: The Alliance was formed as a forum to share ideas and create consistent implementation guidelines which we call 'the reference set', to allow all members of the Alliance to produce products, components, and services that constitute an interoperable network. There are over 100 companies worldwide who focus on DVB-H, but not all are necessarily coordinated to be product consistent, or offer interoperable components of a complete DVB-H network. The reason we are focusing in North America is because this market is somewhat different than the European and Asian markets - it has its own unique challenges. For example, North American operators are still uncertain about the incremental revenue opportunities and are not ready to go 'full bore' and deploy. The Alliance is an invaluable resource for operators, and other companies in the industry, as they consider the best mobile DTV solutions.

Q: How does the DVB-H standard differentiate from FLO? Operators such as Verizon are already using MediaFLO, why should they switch?

A: DVB-H and FLO are the most efficient standards to address the special needs of the mobile DTV market. They can both support the harsh multi-path urban environment as well as the open country environment. They support high mobility and parameter-wise - they are capable of very similar performance. The decision to choose one standard over the other will not be a technical decision - DVB-H is an open procedure standard, currently supported by over 100 companies, representing multiple options for the different links in the value chain. DVB-H (as part of the complete implementation guidelines created by the Mobile DTV Alliance) offers the operators choices of multiple silicon manufacturers, multiple handset manufacturers, and multiple broadcasters.

Q: Why is interoperability so important and why is standard compliance not enough?

A: Standard compliance simply means meeting all standard requirements to the letter. For very simple standards where there are no options (multiple choices) standard compliance might be enough. However, as the standard becomes more complex, and especially where there are multiple options which are not necessarily compatible with each other, interoperability carries more value. A perfect example is the 802.11 technology - the first 802.11 products that appeared in the market in 2000 all claimed standard compliance, yet they could not work together. This cannot be acceptable in an environment where one may buy different ends of the connections from more than one manufacturer. In response, Wi-Fi Alliance was created and developed an interoperability certification programme, and assured that all certified products would work well together. DVB-H is similar in nature - it has many options, and there are elements that need to be included on top of the DVB-H standard, which is an 'air interface only' standard. Those elements include digital rights management, transport layer protocol, compression, among others. The Mobile DTV Alliance will assure such interoperability, through its implementation guidelines and future 'Interoperability Certification' programme.

Q: What do you think will be the market adoption rate for DVB-H?

A: It depends. We have found in recent test pilots that with no prior exposure to the service and limited knowledge, only 5 – 11 percent of people surveyed would pay between a $10 to $20 subscription fee. However, the results are dramatically different once those surveyed are provided access to the service with a DVB-H enabled phone. The response numbers show a rate of adoption that is close to 60 percent and beyond - one trial even showed 75 percent of respondents would pay for the service. I think the adoption trend will be similar to my personal experience with satellite radio service for my car. If the last time I bought a car someone had asked me if I'd be willing to pay $14 a month for satellite radio, I probably would have said no without further thought. However, when I bought my last car I got the service as a twelve month freebie, and when the year was up I realised I used the satellite radio more than 90 percent of the time – so I signed up for it without thinking twice about it.

Q: Will Mobile TV service based on DVB-H compete with services such as V-Cast?

A: Absolutely not - the economics are completely different. Services such as V-Cast offer video on a one-to-one, or unicast topology. There needs to be bandwidth allocated for every user consuming streaming video - the bandwidth allocated for a voice conversation is around 4 Kbps and the bandwidth required for a 30 frames per second QVGA video stream is 300 Kbps. Allocating one video stream to a single subscriber is equivalent to 75 phone conversations. The transition to 3G will undoubtedly alleviate the problem, as it exponentially increases the amount of bandwidth available, and it is at a faster rate than the growth in number of subscribers. I suspect that broadcast Mobile TV (DVB-H) will be complementary to the unicast TV. Live programmes (CNN, CNBC, ESPN and the like) will be broadcasted and consumed in real-time and unicast will be used for video-on-demand to consume content that is not time sensitive.

Fraunhofer DVB-H solutions

Fraunhofer Institute for Integrated Circuits IIS has developed new software solutions for the DVB-H media player subsystem supporting H.264/AVC video, HE-AACv2 audio, RTP transport, and MP4 files. The modules are available individually or as an all in one player component and are delivered as C/C++ source code, SDKs or custom designed libraries for existing frameworks upon request. The software is designed to reduce the development time for system integrators building DVB-H terminals for PDAs and smart phones. Supported operating systems are Windows Mobile and embedded Linux. The modules enable real-time movie playback on portable devices. www.iis.fhg.de

ProTelevision Technologies has announced the release of a new digital repeater for gap filler applications. The PT 2090 Digital Repeater optimised for DVB-T/H uses digital signal processing from input to output. This concept ensures optimum signal quality within the operation range (30 – 954 MHz) and allows for seamless integration of digital non-linearity pre-correction. The extensive range of features includes agile input/output frequency, squelch, automatic/manual gain control and variable max-gain limiter for safe ISO channel operation. Echo canceller and adaptive pre-corrector will be offered as options. www.protelevision.com

ProTelevision 2090 Digital Repeater

Enensys Technologies has introduced two transmission solutions for Mobile TV applications. The DVB-H Lab Kit includes a DVB-H IP Encapsulator, H.264 encoder, DVB-H modulator, 1W amplifier, DVB-H analyzer and a DVB-H pocket receiver. The DVB-H Trial kit also includes an ESG server, additional H.264 encoder and an ESG client application on a pocket receiver. Both kits come with comprehensive training for DVB-H. The company's MobiSlice DVB-H IP encapsulator forms the core of both product kits. www.enensys.com

Enensys MobiSlice DVB-H IP Encapsulator

Comtech EF Data's CDM-710 Broadcast Satellite Modem is based on DVB-S2, and is ideally suited for HDTV contribution. DVB-S2 extends the scope of possible applications by combining functionality of previous standards developed for DTH and professional environments. The broad range of modulation and coding formats of DVB-S2 enable link performance optimisation – delivering on average 30 percent greater throughput compared to DVB-S. The ASI or optional Gigabit Ethernet interface for the CDM-710 support legacy and green field video production builds. And, beyond the DVB-S2 support, the CDM-710 offers spectral roll-off functionality that delivers additional satellite transponder cost savings. www.comtechefdata.com
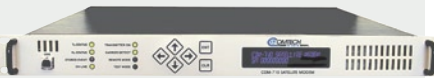
Comtech EF Data's CDM-710 Broadcast Satellite Modem

SysMedia is extending its interactive services offering with the official introduction of its complete end-to-end solutions for dynamic syndicated data feeds. Extra value has been added to process and format incoming feeds with individually tailored server and set-top box applications for fast, clear and controlled presentation allowing broadcasters to provide a unique interactive experience. Also new is the Web Edition of the Plasma Gold package for cross platform interactive content aggregation and preview. www.sysmedia.com

ViaSat has announced two important enhancements to its hub-based LinkStar VSAT networking system. LinkStarS2 now incorporates the new DVB-S2 waveform, substantially reducing network operating costs. In addition, a new LinkWayS2 mesh-networking remote terminal has been introduced, that integrates into S2 capable LinkStar hub systems, enabling powerful and flexible hybrid star/mesh network architectures. The new S2 capable LinkStar hubs and remote terminals are compatible with standard DVB-S LinkStar remotes and offer an easy, cost effective transition to the benefits of DVB-S2. www.viasat.com

ViaSat LinkStar S2 & LinkWay S2 VSAT networking System

Neotion WiFi IP MPEG-4 Module

The Neotion MPEG-4 Plug & Play WiFi IP module enables Integrated Digital (iDTV) TVs, Digital Cable Ready TVs and digital decoders to receive MPEG-4 content. Manufacturers, operators and consumers can easily convert any digital TV or receiver into an MPEG-4 compatible product and thus access interactive services and video content from the home PC or Internet. The module is introduced into the PCMCIA or CableCARD conditional access slots of any iDTV. www.neotion.com

Scientific Atlanta D9054 HDTV Encoder

Scientific Atlanta's ongoing digital encoding development programme has produced a new HDTV advanced video compression (AVC) encoder (model D9054) that claims to deliver the very best compression quality using a combination of single-slice encoding and processing power. Its full picture architecture provides HDTV quality at 8Mbit/s. A full H.264 tool set combines with sophisticated look-ahead algorithms, extensive motion and spatial prediction searches and advanced mode decision algorithms to optimise encoding efficiency. By delivering more channels over existing bandwidth, the D9054 helps expand the efficiency of current networks and enables the rapid launch of new high quality HDTV services. www.scienficatlanta.com

The **Nokia** Mobile Broadcast Solution (MBS) is a globally deployed DVB-H server platform built for commercial Mobile TV services. The system's output can be broadcast with any standards compatible DVB-H transmitter, even nationwide. MBS release 3.1 is now available and ready for roll-out. MBS 3.1 is compatible with the DVB-IPDC Release 1.0 set of specifications submitted to ETSI.
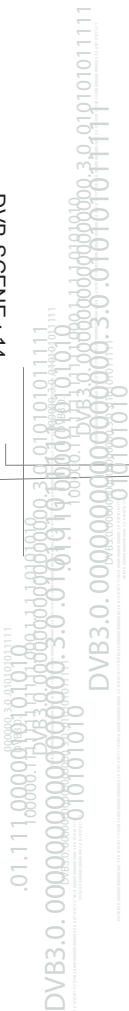
In addition, MBS 3.1 is able to broadcast (as alternatives or simultaneously) an Electronic Service Guide aligned with the OMA BCAST 1.0 standard. This ESG implementation is thoroughly documented in the Nokia DVB-H Mobile TV Implementation Guidelines available at www.nokia.com/mobiletv/ to facilitate availability of compatible terminal implementations from various vendors.

Pixelmetrix Enhanced DVStation-IP
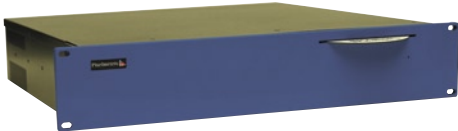
Pixelmetrix introduces its enhanced DVStation-IP, an MPEG-2 test and monitoring platform ideal for operators requiring the transmission of video and data over Internet or other IP networks. It features Service View, that spans multiple TS and audio/video parameters in a concise format, in a 19", 2RU rack mount enclosure. DVStation-IP provides MPEG-2 transport stream analysis and monitoring over an IP connection via a 10, 100 and 1000 Mbps Ethernet port. Once connected it can be set to sniff out video traffic on any set of IP address pairs, extract the MPEG-2 transport stream and perform extensive MPEG-2 verification. www.pixelmetrix.com

TeamCast's latest achievement in the development of their OEM technology range for network equipment manufacturers is the introduction of the GFX3000 - a compact and configurable transmission repeater engine. The GFX3000 allows implementers to build the different types of repeaters needed for the extension of DVB-T / DVB-H networks: on-channel and off-channel, regenerative and non-regenerative. The GFX3000 includes digital processing for improving the coverage provided by traditional digital TV repeaters. It ideally complements TeamCast's modulator range dedicated to digital TV transmitters. It provides the same robustness, compactness and ease of integration as any other module in the ModulCast family. www.teamcast.com
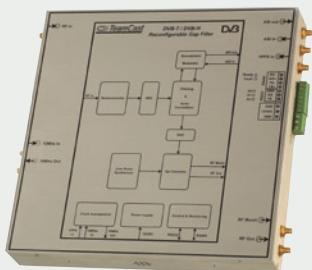
Teamcast GFX3000 Advanced Repeater Engine

Expway has launched FastESG, a DVB-H Electronic Service Guide solution to promote and enable access to broadcast TV streams on handheld devices. Compliant with DVB-IPDC

NVIDIA MobileMedia Platform

specifications, the solution offers seamless access to content over mobile networks. www.expway.tv

IInternational Datacasting Corp's (IDC) SRA3101 Satellite Router is a high speed DVB-S & DVB-S2 satellite receiver designed for high speed satellite IP multicasting. It is ideal for internet access and IPTV solutions. Its built in decryption capabilities protect content. The new SFX3101 Satellite Router Appliance incorporates the award winning Datacast XD media content distribution software. Its internal 80 Gbtye hard disk drive allows for local storage of files making the SFX3101 an ideal solution for the delivery of files and IP streams. Custom configurations are available to support professional TV and radio programme distribution with commercial insertion, One Touch Systems Interactive Distance Learning solution or MPEG AVC/H.264 video distribution. www.intldata.ca

IDC's SFX3101 Satellite Router Appliance

Radyne / Tiernan is releasing its line of H.264/MPEG-4 and simultaneous MPEG-2 video encoders. The AVC4000-SD and AVC4000-HD can encode in MPEG-2, MPEG-4 or simultaneously encode in both formats with an aggregate MCPC output. The encoders come with a variety of features such as a full colour monitor on the front panel, full front panel control and built in web browser interfaces. These encoders coupled with the optional built in award winning DM240 DVB-S and DVB-S2 modulator offer substantial bandwidth savings. www.radn.com

Radyne / Tiernan AVC4000-HD Encoder

NVIDIA has introduced the MobileMedia Platform. Designed to enable handheld manufacturers to rapidly design and release digital, media rich devices with Windows Mobile 5.0, the NVIDIA MobileMedia Platform is a complete development kit containing all of the hardware and software components for delivering everything from smooth DVB-H digital TV and H.264 video, to incredible 3D graphics for gaming and high fidelity surround sound audio. The power efficient, integrated design simplifies the device design process and allows

the shortest time to market without sacrificing features that consumers want. www.nvidia.com

UDcast is introducing the iSplicer, innovative DVB-H transmission equipment that helps to increase Mobile TV service revenues, while simplifying the deployment of networks, and reducing their Capex and Opex by up to 40 percent.
The iSplicer enables cost efficient distribution of DVB-H transport streams via satellite and terrestrial links directly to transmission sites, where it dynamically adapts the content of TV channels to the preferences of local viewers.
The high degree of localised content in conjunction with targeted advertising will multiply the revenue from TV commercials by making them more relevant and highly appealing to all segments of the audience. www.udcast.com


UDcast iSplicer

Micronas has launched MicStickD, a production ready reference design which enables watching and controlling live DVB-T broadcasts on any USB 2.0 equipped desktop and notebook PC. The pocket sized design is compatible with all DVB-T reception standards worldwide. This enables the user to roam freely across the country or throughout the home. MicStickD is built around best-in-class components to offer top quality TV images and low power consumption with excellent radio frequency performance. The MicStickD tuner and capture driver is compliant with the Microsoft Broadcast Driver Architecture standard for Windows. This ensures optimum performance and compatibility with PC software applications. OEMs can put this reference design into immediate production. www.micronas.com

Micronas MicStickD
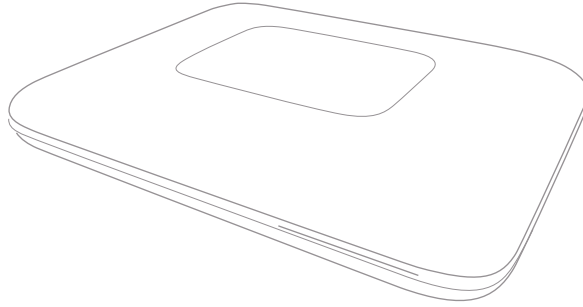
ADB. Defining Digital

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.

See ADB at IBC, Amsterdam, 8 - 12 September 2006, Hall 1, stand 111

ADB

www.adbglobal.com

CABLE ■ IPTV ■ SATELLITE ■ TERRESTRIAL ■ INTERACTIVE