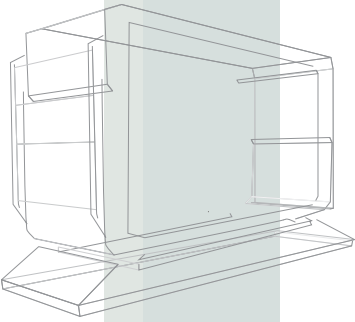


Tune in to Digital Convergence

DVB - SCENE



13



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This issue's highlights

- > IPTV Evolution
- > DVB-H
- > Focus: France
- > OCAP
- > Market Watch

TV In Hand



A word from the DVB Project Office

INSIGHTS AND REWARDS

Welcome to another issue of DVB-SCENE. This issue focuses mainly on DVB-H, an introduction to IPTV and the ramifications of recent announcements about the launch of DVB-T in France.

Our opinion piece deals with China and provides an interesting insight into the developments in digital terrestrial television there. Clearly, China has enormous potential for digital TV and the size of its market already makes it a significant force in DVB-T. This despite

the stated aims of developing their own system: one which will interact with the DVB-S, DVB-C and DVB-T networks already in place.

French DTT is on the way. Recent announcements mean that France's services will be unlike any in the other large European countries. The announcement of the adoption of MPEG-4 Part 10 as the video codec of choice for the crucial pay-TV element of the offering means that the race is






on to produce affordable consumer reception equipment.

And the work on DVB-H continues. Applications specifically targeting the DVB-H area are going to be a key factor in determining the success of services, and DVB is working hard at bringing together the philosophies and protocols associated with DVB broadcasting and mobile telecommunications. It's not easy, but the rewards are promising indeed.

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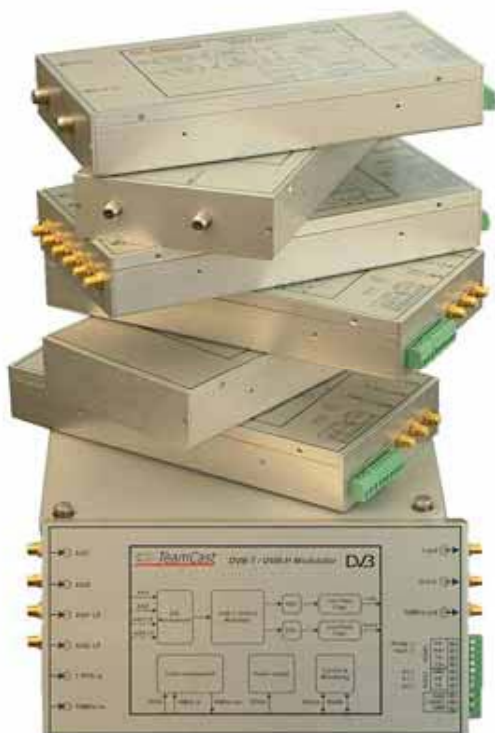
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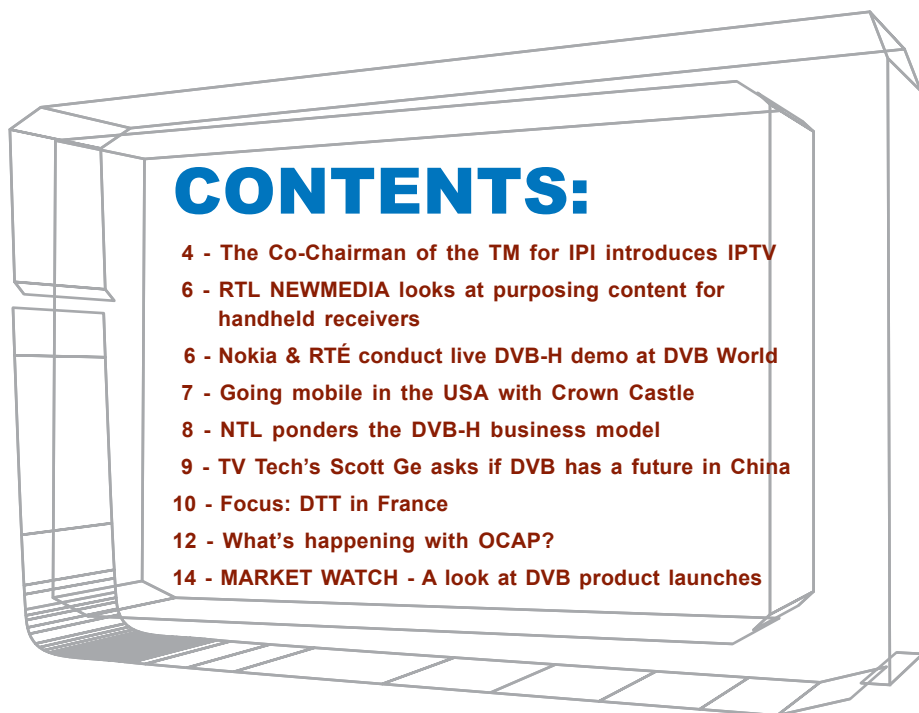
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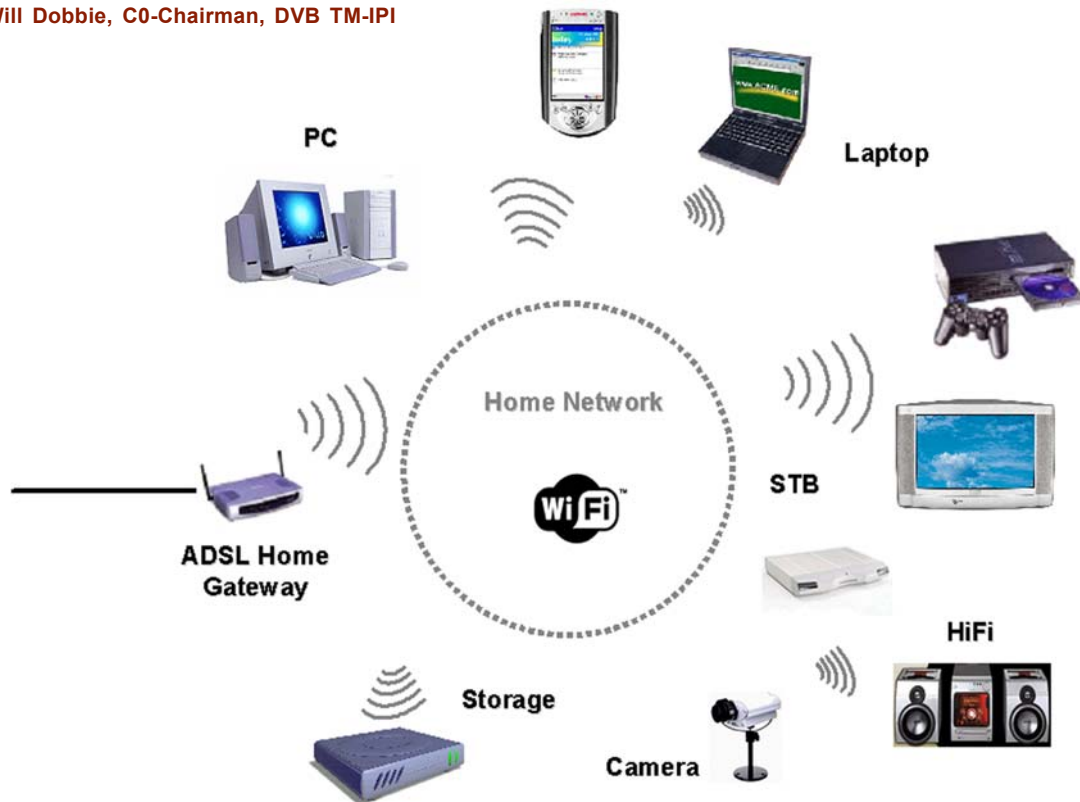
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IPTV EVOLUTION

Will Dobbie, CO-Chairman, DVB TM-IPI



The IP Infrastructure group within the DVB Technical Module (TM-IPI) has recently completed a specification referred to as the Phase 1 IPI Handbook. This describes the delivery of MPEG-2 transport stream based services over IP networks and covers transport, service discovery and selection plus signalling.

Complementary work on metadata for content-on-demand services has also been completed. The first release of

The primary goal of the DVB IPTV workshop was to inform the DVB community of the progress that has been made and the commercial case for further DVB work in this area. The morning session dealt with developments in enabling technology and broadband network infrastructure. It included some fascinating case studies from European operators that are now introducing IPTV services plus views

and some are now introducing 'triple play' bundles that include broadcast TV and video-on-demand services.

The DVB vision is to build a content environment that combines the stability and interoperability of the world of broadcasting with the vigour, innovation and multiplicity of services of the world of the Internet. Many within DVB now agree with the approach to fixed IPTV services presented by Telefonica at the

"Telcos are increasingly planning for the broadband world where telephony and digital TV become Internet applications..."

the DVB-IP specification was recognised as an excellent start for any IPTV system at a major workshop held at the EBU recently. It is already being implemented by one European telco (France Telecom) and others are seriously considering it. However, further work is needed to meet all of the industry requirements and to build on new standards from other industry bodies. The DVB IPTV and Home Networking commercial groups are therefore producing a series of new commercial requirements and the IPI group is starting to work on some of them.

from the EBU, the European Commission and consumer electronics companies. The afternoon session presented technical elements of the first release of the DVB-IP specification, the status of work on commercial requirements for next releases and addressed questions over what DVB should do and when. Broadband Internet is growing fast (even faster than cellular phones at the same point in the development cycle). Telcos are increasingly planning for the broadband world where telephony and digital TV become Internet applications

workshop. This assumes the use of ADSL to deliver triple play services to a wide range of consumer terminals via a home network which would be wired for demanding links but wireless wherever possible. DVB has an excellent track record of enabling key elements of new systems to be implemented in an interoperable manner. It is therefore seen as important for DVB to work with other industry and standards bodies (e.g. IETF, DSL Forum, DLNA) to extend the current DVB specifications. The following list of requirements was (among others)

identified during the IPTV workshop:

- Carriage of all DVB A/V formats over MPEG-2 Transport Streams (inc. H264/AVC)
- Implementation of end-to-end IP QoS plus IP level FEC, as an option
- Downloading of content to PVRs
- Hybrid services using a combination of IPTV and over-air delivery
- An extended metadata specification allowing for live TV, content downloaded to PVRs and hybrid delivery
- A common approach to application environments plus authoring guidelines for 'network service provider' applications aimed at TVs
- Home Networking specification allowing for wired and wireless networks that is easy to setup and use (building on DLNA guidelines)
- Specification for an interface to a residential home gateway

- Remote configuration and management
- Content security and DRM covering IPTV access and home network (building on the DVB-CPCM specifications)
- Network level security (including authorisation, authentication, DDoS attacks etc.)
- Carriage of all DVB A/V formats directly over IP

Some of these requirements are already recognised as essential in the near term and work on them is well advanced. Others are accepted as necessary but effort has not yet been found to progress them. Some are new and these (plus others) will be discussed in the commercial groups. If your company is interested in IPTV or home networks you would be very welcome to contribute to either the commercial or technical work (or ideally both). Please contact the DVB Project Office to find out more.



Will Dobbie is a consultant in the field of interactive multimedia networks and services and currently represents BT within DVB. He started his career in the Royal Air Force then worked for a variety of companies including MCSL before settling at BT Laboratories for 19 years. During that time he was involved with a number of major broadcasting and interactive TV initiatives. Will has a PhD from Essex University.



AUTHORING TOOL FOR MHP AND DVB-H MULTIMEDIA TERMINALS

Cardinal Studio is an MHP authoring tool with versions for content producers and Java developers, and a client-server based content automation and aggregation solution for broadcasters. In February 2005, Cardinal released a new version of the authoring tool, capable of generating content for DVB-H multimedia terminals.

With Cardinal Studio, no additional players or codecs are required, as the software generates native Java code which can be freely modified, deployed or imported back into the Studio.

MIDDLEWARE FOR DVB-H AND IP DATACAST TERMINALS

DVB-H gives new revenue opportunities for all industry players from handset manufacturers, content providers, broadcasters and mobile operators to mobile network operators and broadcast network operators. As one of the key issues in the development of DVB-H so far has been the lack of appropriate middleware, this middleware provides a true short cut for speeding up the development, and brings the revenue potential one step closer for all industry players.

The middleware supports and is ported to Embedded Linux, PocketPC and Symbian OS. A middleware porting kit is available for worldwide localisation, including support for Asian characters and glyph substitution engine for Arabic characters.

DVB PLAYOUT SERVERS

Cardinal offers a wide range of DVB servers for real-time generation and playout of AV content, bootloading and set-top box firmware upgrades, EPGs, DVB-H, MPEG-4 as well as MHP-based interactive content. All Playout products are entirely software-based, provided on standardised Intel-based servers. Cardinal Playout products provide cost-efficient and reliable solutions to broadcasters around the world.



PURPOSING CONTENT

RTL Television is the source for the streaming content that RTL NEWMEDIA repurposes and converts into the various mobile formats. For this a content management system with an interface to the existing internet CMS was designed for editing.

Now with the next generation of mobile technology emerging, DVB-H will be a new challenge for us, whether it will be a standalone or a hybrid solution with UMTS or GPRS. Many important questions regarding the roll out of DVB-H are still to be answered. What will be the most suitable transmission network? Will it be the old television network in combination with the new mobile networks or the radio DAB network? Will DVB-H content be strong enough to be autonomous from the mobile phone industry? Will television content be the engine for DVB-H? Which API, browser or streaming technology should be chosen? Will DVB-H offer an additional way to deliver TV for portable reception on small TV screens in kitchens, bedrooms and gardens throughout Germany in a hybrid system with DVB-T?

To discuss these questions and find solutions the Deutsche TV-Plattform has formed the M3 working group consisting of public and private



broadcasters, T-Systems, the IRT, ICCM and Philips. Most of the M3 participants are also DVB members, which makes for an efficient and productive discussion.

Vodafone and T-Mobile in Germany are working with RTL to offer their respective customers a variety of mobile services. The RTL Mobile portal, available on Vodafone, offers magazine, weather, comedy, advice/guidebook, TV and film information as well as video clips from popular RTL programmes. The 'RTL aktuell mobile' portal operated by T-Mobile offers news with RTL's anchorman Peter Kloeppel, which can be received one hour before the live TV transmission. Content of the news portal can also be accessed via UMTS streaming, MMS (including video) or SMS.

Currently there are seven different types of UMTS mobile phone available in the German market. For the conversion of content into the different mobile formats specific know how and equipment is necessary. The experience with WAP content shows us that with hundreds of different types of mobile phones, content has to be converted into up to 300 different formats. As a consequence WAP business is no business.

WIDESCREEN DUBLIN



Nokia and RTÉ collaborated to demonstrate DVB-H during the DVB World 2005 Conference in Dublin in March.

For the demonstration RTÉ NL transmitted four television channels – RTÉ One, RTÉ Two, TV3 and TG4 - from a low power transmitter situated at its Donnybrook Tower in Dublin, some two kilometers from the conference venue at Jury's Hotel and Towers. The DVB-H signal coverage was Dublin's city centre.

The Nokia 7710 Widescreen Smartphone and the Nokia Streamer SU-22 were used in the mobileTV demonstration.

The Nokia Streamer SU-22 is an active back cover solution for the Nokia 7710 with an integrated DVB-H antenna. It has more than three hours continuous AV streaming time with a 1500 mAh battery. Interactivity with online web links through existing cellular networks and separate content rights delivery are also supported.

The 7710 and the Streamer SU-22 were designed for commercial trials in Europe and APAC during Spring 2005. Commercial pilots are confirmed for Helsinki, Finland and Oxford, England.

Nokia will bring a Series 60 based smart device to market with integrated DVB-H feature in 2006. Several discussions on DVB-H related issues are ongoing in different countries with broadcasters, mobile & network operators.

MOBILE IN THE USA

**Nick Davies, CTO, Crown Castle
Mobile Media**

Not long ago, quality delivery of television content to mobile devices was little more than a dream. Today, Crown Castle International is helping make the dream become both a technological and commercial reality.

The path to reality began in May 2003 when Crown Castle, an independent owner and operator of wireless network infrastructure, acquired 5MHz of nationwide radio spectrum in the USA. This licence, along with Crown Castle's 10,000 plus tower network, provides Crown Castle the opportunity to deploy a high quality, coast to coast DVB-H network for mobile phones and other mobile devices.

"...fast becoming the global standard with the support of a critical range of broadcasters, mobile operators, infrastructure providers, handset vendors, and content providers."

Crown Castle's interest in delivering multimedia content to handsets was driven by market research showing nearly 50 percent of mobile users interested in and willing to pay for pay-TV services. Crown Castle recognised the limitations of existing unicast and broadcast networks to effectively and efficiently deliver rich content presented a compelling commercial opportunity.

Combining advanced telecom networks knowledge in the US and UK with digital broadcast expertise in the UK, Crown Castle had the unique in-house expertise to advance the development of a convergent mobile media service. The first step was evaluating candidate technologies, including ISDB-T, DAB, DMB, and DVB-H.

DVB-H emerged as the technology of choice. DVB-H's attributes combine the best spectrum efficiency, RF performance and efficiency of handset battery power usage. It is fast becoming the global standard with the support of a critical range of broadcasters, mobile operators,



infrastructure providers, handset vendors, and content providers.

Crown Castle's three site Single Frequency test network, located in Pittsburgh, PA, went live in August 2004. The system accommodates a variety of live and stored video and audio content, which is encoded and streamed to the IPDC System - an IP encapsulator and service system with

functionalities including ESG insertion and MPE-FEC. The content is then distributed as a single stream to transmitters on Crown Castle sites and broadcast to receivers including DiBcom's engineering test receivers and Nokia's 7700 handsets, both specifically engineered to work in Crown Castle's 1670MHz band of spectrum.

The Pittsburgh DVB-H network is the first example of true convergence of broadcast and mobile technology, and serves as a test bed to define technical, service and commercial models for the future. Crown Castle is supported in this effort by major players such as Nokia, Thales, Axcera, Kathrein and DiBcom.

Since launch, Crown Castle has held demonstrations for over 100 industry stakeholders including wireless operators, broadcasters, content providers, equipment suppliers, technology consultants, potential investors, and representatives of the US government.

In 2Q 2005, Crown Castle intends to expand the Pittsburgh network to an

'always on' nine-site network. This will enable Crown Castle to conduct an in depth, friendly-user trial. The trial will broaden the evaluation to include DVB-H configuration choices (e.g. MPE-FEC rates, 2/4/8k Modes), network quality issues (indoor and outdoor penetration/coverage, radio modelling, infrastructure equipment, mobility, SFN gain), and end user service (codecs, ESGs, payload budgets, and display resolutions/frame rates). During the trial, Crown Castle will continue to work with major content providers who are developing specific programming for the mobile environment and to work with end users to optimise the consumer experience.

Through efforts to-date, Crown Castle has established a leadership position in the development of DVB-H as the Mobile Media global standard. This progress embodies Crown Castle's vision of the efficient sharing of wireless network infrastructure.



Nick Davies is CTO at Crown Castle Mobile Media. He was previously Crown Castle's Project Director for the Freeview DTT relaunch, 3G Director, and Head of Broadcast Sales for the original UK DTT launches.

IT'S THE BUSINESS

Terry Howard, Head of Media Business Development, NTL Broadcast

With increasing public expectations for mobile communication, information and entertainment, it is vital that broadcasters and content providers address the clear gap in the market for mobile TV. TV is an obvious missing element from today's mobile handsets and mobile TV is an obvious missing element from broadcasting. The technology now exists to provide a truly converged and interactive multimedia experience – anywhere, anytime. The technical trials are largely done and now it's time to test commercial propositions and consumer preferences.

So what are the best ways of achieving all this? Should conventional broadcasters regard new methods of delivery as a threat or an opportunity? Should the mobile phone companies regard broadcasting to mobiles as competition? How should content

seeking increased viewership and additional potential revenues. For mobile operators it provides a low-cost and efficient delivery method for value-added services.

NTL Broadcast has carried out extensive market research about consumer demand and likely viewing habits for mobile TV. The results look very positive and exciting but they need to be validated in a trial environment in conjunction with key players in the industry. That's why we're mounting a large-scale commercial trial in the Oxford area this spring in conjunction with mobile operator O2. With our significant broadcasting assets, close relationships with content companies and track record of technology innovation, we're ideally positioned to pull this together and we expect the results of the trial to help us shape any future UK service deployment.

"...provides a new channel to market for existing media players seeking increased viewership and additional potential revenues."

providers go about finding new outlets and new users? How can content owners protect their premium assets? And how will the end user consume this content?

Mobile TV provides a new channel to market for existing media players

International interest is certainly on the up, too; major trials of video/multimedia to mobile phones are underway in several European countries.

The latest advanced video coding techniques make it possible to introduce



mobile TV with relatively modest amounts of bandwidth. A DVB-H platform could support an IP stream carrying 20 or more pay-TV channels to a mobile phone with good quality. Increasingly large amounts of video, audio and other data can readily be stored on handheld devices with the arrival of small, high-capacity hard drives and memory cards. Content can be trickled into devices when reception is possible and then 'snacked-on' by the user even when it is not. It is likely that consumers will want to take with them previously recorded material in addition to viewing live transmissions and updated files on-the-move. NTL Broadcast research shows that there is a demand for a wide variety of content, provided it can be consumed reliably and conveniently in any location.

For any commercial service, it is apparent that diverse and naturally competing organisations will need to cooperate and form partnerships, each playing to their own strengths. Broadcasters are good at making and managing content, mobile phone companies are good at billing and customer relationships, service providers like NTL Broadcast have the network infrastructure to deliver the content.

The technology was never really in doubt, but what is becoming clear is the commercial basis for the applications that are emerging, just what the general public is willing to pay for and on what basis. Getting it right will be crucial to the success of an important new interactive delivery platform.

In My Opinion - Scott Ge

MOBILE TV: WILL DVB HAVE A MARKET IN CHINA?

Digital technology for TV has opened the possibility for watching TV on public transport and even on mobile phones. 2004 saw much progress in the deployment of digital mobile TV in China.

In January 2003, the Shanghai Oriental Pearl Mobile TV Multimedia Co. Ltd. launched the first mobile TV service in Shanghai using DVB-T, generating significant revenues. In June 2004, the Beijing All Media & Culture Group officially launched DVB-T based mobile TV services to buses in the city. Mr. Ding Wenhui, Chief Engineer of Mobile TV Co. Beijing All Media & Culture Group said the service was profitable for the company. By the year end of 2004, the service had also been extended to some 20,000 taxis in Beijing.

In all, Shanghai, Beijing, Changsha in southern China's Hunan province, Nanjing the capital of the eastern Chinese province of Jiangsu and the port city of Tianjin in northern China

Scott Ge is the Editor of Broadcast & Production China (www.imaschina.com) a China based monthly trade publication (circulation 22,000). He covers technology and business issues on Radio, TV, Digital Cable, Post Production and Pro Audio.

some cities in China have turned to Digital Multimedia Broadcast Terrestrial standard (DMB-T), the Tsinghua made DTT technology.

Beside the multi carrier technology based COFDM solution DMB-T, another competent standard that has been submitted to the country's decision makers is the single carrier technology based Advanced Digital Television Broadcast Terrestrial (ADTB-T) from Shanghai Jiaotong University. Both DMB-T and ADTB-T have a long list of supporters from the manufacturing industry. Fierce

set to launch DTT services in 2005, with complete digital conversion by 2015. But without a common national standard, what can broadcasters comply with? While satellite broadcasting in China adopts DVB-S and cable uses the de facto standard DVB-C, the digital terrestrial television broadcast standard is now among the hottest debates in the industry. It seems the broadcasting industry has now reached a common understanding that the country should develop its own standard, which must have independent intellectual property

"...the digital terrestrial television broadcast standard is now among the hottest debates in the industry."

tested DVB-T based mobile TV services in 2004. There were also further trials in the provinces of Gansu and Hunan taking the total number of cities/provinces exploring mobile TV to around 20. Among them, about half adopted the proven European standard DVB-T.

Although DVB-T remains the favourite choice for Chinese broadcasters, with its proven business models in over 30 countries, chances for DVB-T of becoming China's national standard are becoming more and more slim. China has vowed to develop its own standard, taking into consideration the patent fee risks experienced by the country's DVD and colour TV industries. As a matter of fact, under the effective lobbying efforts by Shenzhen Tsinghua Leaguer Digital Television Co. Ltd., the high tech venture arm of Research Institute of Tsinghua University in Shenzhen,

competition between the two groups has delayed China again and again in announcing its choice. "The patent fee issue has made coordination between the two very difficult," said Mr. Zhang Zhijian, Chairman, Technical Research Committee, China Radio & TV Society and Senior Consultant, Science & Technology Committee of SARFT, in Beijing on 16 November 2004. Zhang also holds the title of Director of Digital Television Standard Group, SARFT. "We're also worried that it will affect the 'Digital Olympics' in the 2008 29th Olympiad if it fails to come out by the end of this year (2004), since the optimising process will also take at least one year," said Zhang. According to Zhang, the Chinese Academy of Engineering (CAE) has sped up the integration of the two DTT candidate standards.

According to SARFT's 'Three-Step' digital conversion strategy, China is

rights with technological advancement and be economically viable.

Does this mean 'no chance for DVB'? Things are never that simple. In fact, both satellite and cable broadcasting in China uses DVB standards. In 2003, Cable broadcasting in China began digital conversion with DVB-C, with a goal to migrate 30 million subscribers to digital by 2005. Recent developments say China will launch Direct Broadcasting Satellite (DBS) in 2006, with DVB-S.

Back to DVB-T and the new DVB-H, it's still early to say there won't be a market for them. "DVB-T is a proven standard, with a lot of geographical and coverage tests worldwide, which is a critical criteria for operators to make decisions," says Mr. Ding Wenhui. Ding's remarks also reflect the fact that most of the mobile television explorers in China are DVB-T based.

FOCUS: FRANCE

Laurent Jabiol, Managing Director & Co-founder, Neotion



After years of DTT debates, France has eventually decided to combine both MPEG-2 and MPEG-4 standards, thus being the very first country to make MPEG-4 mandatory for pay-DTT.

Such a pioneering decision deserves more than a simple translation: it effectively reflects the French DTV long term vision.

Starting late has some advantages, like the ability to use the most advanced technology. That is the point that TF1 made last spring when they first started to actively promote MPEG-4 AVC and to skip MPEG-2.

Beyond the intense and conflicting lobbying activities that then took place, the French authorities safely decided to carry out extensive surveys, thus evaluating the opportunity to make bandwidth provisions to enable both HDTV and DVB-H. Taking the right decision was not simple. On one hand, France always likes to be a pioneer when it comes to TV technologies (backing up a cultural heritage that was probably first inspired by the Lumière brothers who invented Cinema in La Ciotat). On the other hand, being the first could result in being the only one, thus duplicating past isolation like Secam and D2Mac.

The decision to go along with two standards is actually ideal for preparing French DTT for future decades. Far more than being just another network, DTT will drive the nation's objective to eventually fulfil the analogue switch-off obligation. Following the tremendous success of the British and German deployments, French DTT will first leverage on free channels (today 14, and soon more). The cost of equipment is key, and MPEG-2 was really the only way to take advantage of the global economy of scale to obtain a 50 Euro price point objective for digital adapters.

Also, there was definitely a consensus for HDTV and DVB-H, but simply not enough room to fit in high definition and the 15 pay-TV channels already licensed. Therefore, it made sense to impose MPEG-4 standard definition for pay-TV, so that one multiplex could remain free for DVB-H. With better MPEG-2 and MPEG-4 compression performances expected by 2006, the way is open for 4 to 5 additional MPEG-4 high definition services.

Anticipating the emergence of IDTV, which in Europe is by law MPEG-2 and CI compliant, French distribution will probably favour MPEG-4 modules turning CI adapters or IDTVs into decoders by adding Conditional Access and MPEG-4 capabilities. To make this happen in the consumer marketplace, the Ministry of Industry and the National Cinema Association have given subsidies to a number of French companies.



ANALYSIS

Alexander Shulzycki, Senior Media Analyst, EBU

France is the last of the Big Five to launch DTT - how successful will the platform be? With strong growth in the UK and Italy, expectations will be high that French DTT will match their results, but that is not a forgone conclusion. In fact, growth in the early period may be rather anaemic and slow growth means more headaches for analogue switch-off planners down the road.

DTT was set to launch in France in autumn 2003 with a strong free channel offer and a key role given to the public broadcaster. The plan now is for DTT to carry a roughly even free/pay mix of about thirty channels with the free component launching at the end of March. All the pay television services may not be available until spring 2006 (although individual players may launch earlier).

There will be no subsidy programme as in Italy and no large free-to-air offer as in the UK.

On the plus side, France has a high level of terrestrial-only households at about 14 million (64 percent), but on average only half of these households will be in DTT coverage areas through the first year after launch. Assuming that coverage roll-out proceeds on schedule and that a competitive set-top box market develops, take up in the first year will depend heavily on the free-to-air offer and more specifically on the new free channels. This is risky because these channels are unknown and even if they do prove popular it will take time.

Moreover, the primary benefit for these channels may not be their presence on DTT but guaranteed

distribution over cable and satellite platforms through a 'must carry' status. Considering growth curves from non-subsidised free-to-air DTT in other countries one could expect perhaps one million DTT households after a year, but because of the strong pay orientation of the French platform it may be more reasonable to expect closer to half this amount. That may not be enough.

The pay-TV component² as driver? - Several ADSL offers, two DTH platforms, and a consolidating cable sector mean a highly competitive pay-TV market in France. A pay component could certainly be a part of a DTT platform after penetration has grown - TopUp TV on Freeview is a good model - however, there is no evidence that a pay oriented DTT platform by itself can generate mass market demand.

In short, a mixed model could mean mixed results and France maybe leaning too heavily on the pay side. Fortunately, it's not too late. There are several licences still to be reallocated and the sixth multiplex is up for grabs. It may be prudent for DTT planners to remain flexible and consider other

New Free DTT Channels In France		
Channel	Owner	Programming
Direct 8	Bolloré	Primarily live shows, cinema, culture
NRJ TV	NRJ	General entertainment targeting 11 - 49 yrs
NT 1	AB Groupe	Entertainment with news, dialogue and service programmes
TMC	Pathé	Generalist
M6 Music	M6	Music channel targeting 15 - 34 yrs
Chaîne Parlementaire	State Owned	Parliament Channel

options in case growth does not meet expectations. Adjusting the model towards more free channels and enhancing the role of public broadcasters has been proven to work in other markets.

¹ In the initial phase, 35 percent of the population will have access to DTT services. In September, coverage is expected to reach 50 percent followed by 65 percent by March 2006. By 2007, it is expected that 80 percent will have access to DTT services.

² Pay channels are to launch in MPEG-4. This ruling, which left some broadcasters 'stupidified' and one astonished network operator calling the decision 'inopportune', will lead to market confusion, and technical complexity. Although a lot of credit is due to the pioneering nature of this initiative it may be at the expense of driving growth.

S2 COVERS AMERICA

Following the world's first demonstration of a second generation HDTV transmission, by DVB on its stand at IBC 2004, utilising the new DVB-S2 satellite specification coupled with the latest generation of coding technologies - H.264/AVC and Windows Media 9 (Enhanced Profile), DirecTV demonstrated a live MPEG-4 AVC/DVB-S2 HD transmission via satellite at the 2005 International Consumer Electronics Show (CES).

The new standard in transmission will be used by DirecTV to expand its video offer by launching hundreds of local and national HD channels later this year and in 2007.

Twelve of the largest designated market areas in the US will be among the first to receive DirecTV delivered local channels in HD in the second half of this year. DirecTV will begin the expansion of its capacity with the planned launch of four next generation satellites that will deliver more than 1,500 local HD and more than 150 national HD channels and other advanced programming services to consumers nationwide by 2007.

The first market areas to receive local HD channels are: New York, Los Angeles, Chicago, Philadelphia, Boston, San Francisco, Dallas, Washington D.C., Atlanta, Detroit, Houston and Tampa. These markets represent nearly 36 million homes or 32.8 percent of all U.S. TV households.

Initially DirecTV will carry each of the primary broadcast networks that offer an HD feed in the market and customers who subscribe to a local channel package will receive both the standard and HD signal. HD local programming will be received via a single dish - slightly larger than the current standard dish - and customers will require new HD set-top boxes due to the new compression technology.



ProTelevision DVB-T/H Modulators
- market leading through research

At ProTelevision everything is developed in-house from a clean sheet of paper. As a fab-less semiconductor company our innovative ASIC design offers digital signal processing quality and signal integrity unparalleled by any other C-OFDM engine in the market. This dedication to research and development

together with our commitment to customer satisfaction is why ProTelevision is the leading manufacturer of C-OFDM Modulators for **DVB-T/H** in the market today - as verified by the installed base of several thousands of modulators bringing **digital TV** to viewers all over the world in this very minute.

ProTelevision TECHNOLOGIES
ProTelevision Technologies A/S
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THE CABLE GUYS

OCAP is a GEM-based (Globally Executable MHP) terminal specification designed to fit the technical and business environment of the cable industry in the US. It solves the problem of proprietary operating system software by creating a common platform upon which interactive services may be deployed.

Cable television and consumer electronics (CE) have made significant progress lately in their pursuit of a successful digital delivery system that meets both their business objectives.

That rate of progress increased significantly in Q4 2004 and in early 2005 with groundbreaking announcements that CableLabs reached agreements with both Samsung and LG Electronics.

Throughout 2004, the fruits of the December 2002 unidirectional agreement between cable and CE providers began to appear in increasing quantities on retail shelves. These are digital and HDTV sets equipped with the CableCARD slot, to descramble premium cable programmes without the need for an external set-top box.

A point of context: Three years ago, a handful of CableCARD-equipped TVs showed up at the International Consumer Electronics Show (CES).

“...programme networks have been reluctant to develop interactive materials that run on a portion of cable’s national coverage area.”

By the holiday selling season of 2004, an estimated 1 million CableCARD-equipped devices were in the retail pipeline headed toward customers. By early 2005, the cable industry had installed some 25,000 CableCARDs.

As of early 2005, 14 consumer electronics manufacturers had been approved or self certified to market CableCARD enabled products and there were 161 CableCARD-enabled consumer electronics products being marketed.

As of late 2004, 12 manufacturers had 120 digital television models that had either been self verified or had received verification from CableLabs as being compliant with the unidirectional test suite.

CE makers and cable MSOs continue to negotiate for an agreement on bidirectional devices. By contrast, the agreements between Samsung and

CableLabs and LG Electronics and CableLabs serve to accelerate the development of digital products that include interactive elements, such as navigational guides, on-demand video ordering, and other interactive applications.

The agreement with Samsung and with LG is available to all consumer electronics manufacturers. It grants intellectual property rights required to build interactive devices that are in compliance with the OpenCable hardware and software specifications. The agreement is known industrially as ‘CHILA’ — the CableCARD Host Interface Licensing Agreement. At the heart of the agreement is the OpenCable Applications Platform, or OCAP.

What is OCAP? We define it as middleware software that enables the developers of interactive television services and applications to design

products that run successfully on any cable television system in North America, independent of set-top or television receiver hardware, or operating system software choices.

Although it is technically possible for cable providers to host applications from programme networks without OCAP, it is a decidedly sub-optimal situation, because the programmer would have to separately port the application to dozens of proprietary CE or set-top operating systems.

Without a standard and ubiquitous software environment, like OCAP, content providers are faced with having to make a choice among available software platforms, which don’t always interoperate. As a direct result, programme networks have been reluctant to develop interactive materials that run on only a portion of cable’s national coverage area.

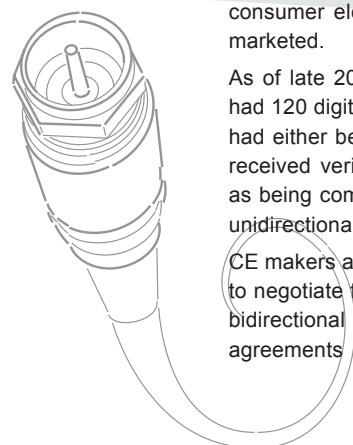
By transitioning to a single software environment, cable providers and programme networks can work to deploy a single set of applications to OCAP-enabled devices — such as what Samsung agreed to build when it signed the CableLabs agreement in October.

Interoperability events continue for OCAP developers. In summer 2004, two dozen companies participated in an OCAP interoperability effort at CableLabs, the third such interoperability event. The intent was to assure that applications written independently by content providers can run successfully on an OCAP stack built into consumer electronics devices or cable set-tops.

It is anticipated that the number of OCAP-based hardware devices such as CableCARD-equipped digital and HDTV sets will grow in the same fashion as did OpenCable hardware items. Samsung set the first marker on OCAP inclusion; other CE manufacturers are welcome to get a similar head start.



Donald P. Dulchinos directs and manages the OpenCable project, and oversees the development of the OpenCable hardware specification and the OpenCable Application Platform (OCAP) and the removable security module called CableCARD.



OCAP DEBUT



In the midst of the growing proliferation of open standards interactive television throughout the world, Korean cable operator, CJ CableNet, has launched the world's first commercial deployment of OCAP services in February.

As a major MSO in Korea with over 1.2 million subscribers, CJ CableNet is now providing several value added OCAP services as part of its compelling digital cable TV offering. Subscribers are currently enjoying interactive services that include weather and news portals, mosaic EPG, horoscope, lottery, games, SMS, cinema information and ticketing, digital audio portal, and real VOD. Additional services that are scheduled for later this year with the MSO are T-commerce, T-banking, network games, TV karaoke, polling, golf information, enhanced cooking, flash player, and T-government.

CJ CableNet made its decision to implement OCAP services in order to leverage the significant benefits that open standard technologies provide. With the wide availability of world class technologies that the open standard industry promotes, the company selected Alticast as the prime integrator for its project. In addition, Alticast provided its comprehensive OCAP solutions and services, including various OCAP applications. Humax and Samsung are initially supplying the MSO with the set-top boxes embedded with the Alticast Alticaptor OCAP middleware, which is based on its widely adopted MHP solution.

"We are pleased to be the very first cable operator in the world to deploy value-added OCAP services for our subscribers," said Mr. Yong Hoon Wang, General Manager at CJ CableNet. "We are confident that our decision to implement our new platform based on open standards will exceed our expectations technologically and economically."

"As the prime integrator for this project, Alticast's main focus was to enable CJ CableNet to deploy their new services smoothly, rapidly, and successfully," said Mr. Thomas Jung, Project Director at Alticast. "We welcomed the challenge of their tight schedule, and believe that our worldwide experiences in open standard iTV deployments helped us to complete the project in just seven months, from project start to commercial deployment."

DVB-SCENE : 13

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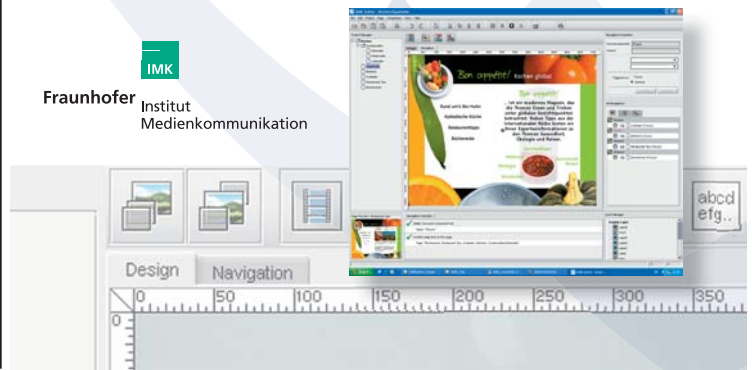
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Fraunhofer Institut Medienkommunikation



MARKET WATCH

Kreotel IP-STB 1520



The **Kreotel IP-STB 1520** is a hybrid IP set-top box that integrates a DVB-T receiver for free-to-air DTV in addition to services and interactivity over Ethernet. The STB is intended for telecom operators and broadband services deploying enhanced video and communication services over IP. Premium television content can also be a part of the service bundling, either offered in partnership with terrestrial broadcasters, or offered as MPEG2 over IP multicast.

Although the set-top box normally receives its software over an Ethernet connection, it has functionality stored in flash memory to be able to run in standalone mode, i.e. only DVB-T broadcasts and no IP-based services.

Micronas FRC 9429A



Micronas has introduced the FRC 9429A, its latest generation of frame rate converter with vector-based motion estimation and compensation. With this technology, the chip calculates the shift in position of every object on the screen between each frame. It then uses this information to precisely interpolate the object's location in intermediate frames. The result is smooth real motion, instead of the edgy movements and blurring common to conventional DTV displays.

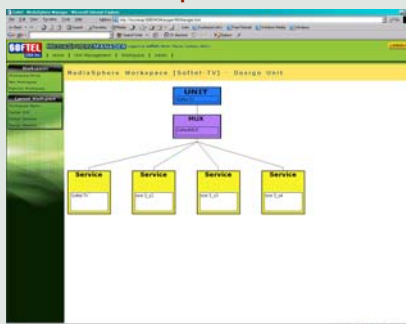
ProTelevision Technologies is launching a DVB-H Trial Kit. Included in a compact rack are the core building blocks necessary for creating and encapsulating a DVB-H transport stream in a DVB-H compliant COFDM spectrum as required for delivering content to mobile handheld devices: IPE Manager, IPE Encapsulator (DVB-H), MIP Inserter, and DVB-T/H Modulator.



ProTelevision DVB-H Trial Kit

IDway has launched its MHP product range for the Italian market. Embedded in 32 MB total RAM, the company believes that it is the smallest footprint MHP product currently available for that market. Optimised for STMicroelectronics (OS20) and IBM ppc (VxWorks, Linux or Sagem Microto) chipsets, it comprises certified 1.02b middleware, and a set of applications that makes a STB ready for production. The MHP suite includes conditional access, such as NagraVision, Irdeto and the specific applications required for Italy's Mediaset Premium and La 7 services.

Softel MediaSphere



Softel has announced support for outputting OCAP applications. In addition to OCAP, its MediaSphere TX and MediaSphere Lab carousels are capable of outputting MHP, ACAP, GEM, MHEG and other proprietary streams applications.

DVStation-IP Portable



Pixelmetrix is introducing the following new products: Visualmpeg, a complete family of analysis tools for evaluating and testing MPEG-based advanced coding; the DVStation-IP Portable, a new standalone product ideal for anyone involved in the transmission on MPEG-2 data over the internet or other IP networks, and its DVStor product line which now boasts a storage range from 100 GB to 2 TB. The company has also announced that the DVStation now supports DVB-H.

The R&S SFU from **Rohde & Schwarz** is a system platform for developing and thoroughly testing new digital transmission methods in TV. Besides DVB-T, the R&S SFU also

supports the standards DVB-H and DVB-S2. The R&S SFU, which is upgradeable for future developments, can replace a system consisting of various individual instruments. It combines a test transmitter, a signal generator for MPEG-2 streams, a channel simulator, a digital AWGN noise source and an ARB generator plus an RF modulator in a single platform.



Rohde & Schwarz SFU

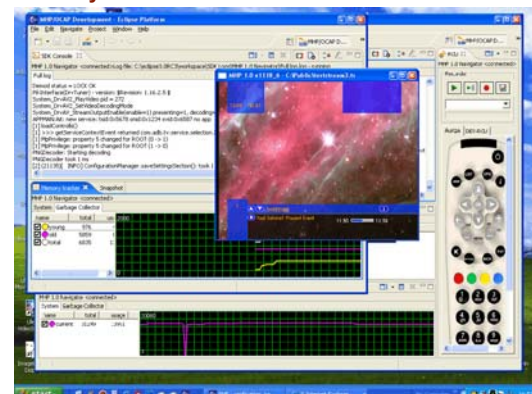
Harris Corporation is strengthening its role as a leading provider of digital broadcast equipment by introducing full DVB-H functionality for its DVB-T transmitter series Atlas DTV660 covering the power range from 5W to 3.4KW. In addition Harris is now offering its SFN Adapter Synchrony in a fully DVB-H compliant version.

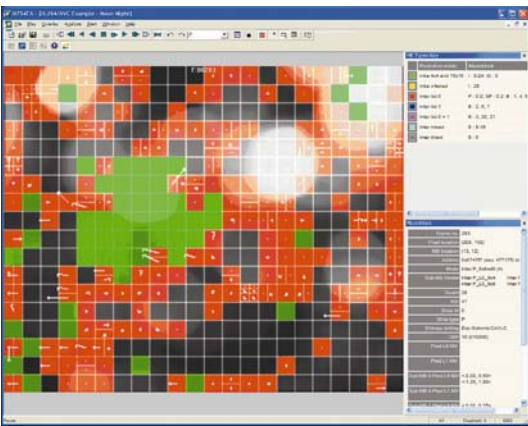


Harris Synchrony SFN Adapter

Osmosys SDK 2.0 (Software Development Kit) is a complete Java Integrated Development Environment (IDE) for development and testing of MHP & OCAP applications on Windows based PC systems. It is seamlessly integrated with Eclipse, a well known free Java IDE. SDK2.0 contains all the features from SDK1.0 plus a lot of new ones. The company also offers a full Developer Programme with SDK 2.0. for those wishing to benefit from the company's technical and business expertise.

Osmosys SDK 2.0





Tektronix MTS4EA

The new **Tektronix MTS4EA** Video Elementary Stream Analyzer is a software product that offers a flexible, upgradeable test solution for next and current generation video compression technologies. It provides complete elementary stream analysis support for MPEG-2, MPEG-4, H.264/AVC, H.261, H.263, H.263+ and 3GPP standards. Next generation video compression standards such as H.264/AVC are becoming critical for future high volume consumer products, such as: DVB-H mobile phones, broadband DSL set top boxes and high definition DVD.

SIDSA has announced the introduction of its SID16000 DVB-T/H demodulator IC for portable television devices such as mobile phones, PDAs, notebook PCs and in-car set-top boxes, which provides high quality reception in both fixed or handheld environments.

Also new from **SIDSA** is the DVB-H IP Encapsulator (Gateway) for generating a DVB-H transport stream ready for modulation and transmission. All possible time-slicing and FEC operational modes are supported as well as mode combination with different time-slice periods and detailed reporting of burst allocation and timing. Optional features are DVB-T signal re-multiplexing, as well as MPEG-2 to MPEG-4 recoding.



SIDSA DVB-H IP Encapsulator

The new **Scopus DSNG E-1720** combines encoding, modulation and up-conversion in a one rack mounted unit that provides broadcast quality of 70/140 IF and 950-2150 Mhz L-band outputs as well as a separate L-band monitoring output. Various satellite modulation schemes are supported in the form of QPSK /8PSK /16QAM.

The company has also announced that its universal encoding platform UE-9000, now implements dual channel MPEG-2 real time encoding and provides broadcasters with a migration path from MPEG-2 to new compression algorithms such as the

standard and high definition MPEG-4 Part 10 (H.264) and VC1 formats.



Scopus UE-9000

EchoStar has launched the PVR-5020, a satellite television receiver with two tuners, a hard disk, an MP3 player and many games. The dual tuner configuration lets you watch and record simultaneously, automatically assigning the tuners to the desired activities. It can record up to four programmes while watching another and a second one in picture-in-picture. The receiver is available with an 80, 160 or 250 Gbyte hard disk.



EchoStar PVR-5020

Philips is releasing the DSR 2010, a digital satellite receiver certified by German operator Premiere. The new set-top box is designed for the reception of free-to-air and Premiere pay-TV standard definition

Philips DSR 2010

programmes. The receiver is provided with the Nagravision conditional access system. The EPG allows simple timer programming and the receiver is fitted with recording control for most Philips VCR/DVD+RW recorders. Unique horizontal or vertical positioning and rotatable four-digit display allow the viewer to read the channel number in either position.



Cardinal Systems has released its middleware for IP Datacast Media Terminals and DVB-H handsets. It provides a Java2ME CDC run time environment, a rendering engine with plug-ins for both software based and hardware accelerated A/V players as well as an extensive Java API.

Middleware functionality includes tuning DVB-H receivers, playing audio and video received over a broadcast bearer and rendering XHTML-based content. The middleware also enables support for worldwide localisation and over-the-air software updates. Cardinal IPDC middleware can be ported to any embedded operating system, and is already available for Embedded Linux, Pocket PC and Symbian operating systems.

See SysMedia and S&T at NAB 2005.

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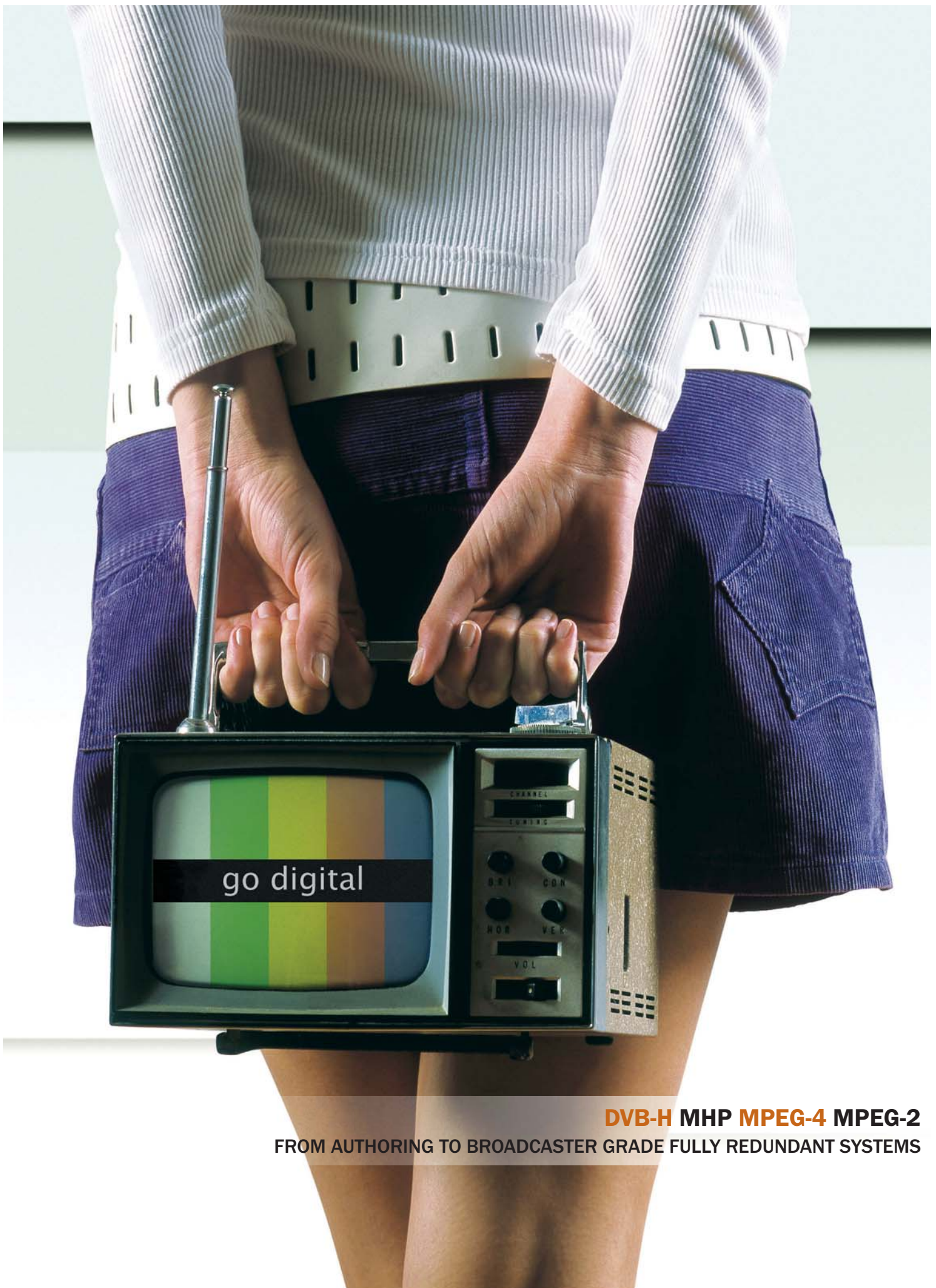
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Cardinal Systems, established in 1993, is a recognised forerunner among its field providing innovative software-based digital broadcasting solutions, with the focus on authoring, managing and broadcasting DVB-based content. Cardinal's products are deployed and used in over 30 countries worldwide. For additional information, visit www.cardinal.fi or call +358 424 7921.

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