DVBSCENE
DVB
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ISSUE 66



DVB NATIVE IP ON LAND AND AT SEA

Plus...

DVB-I in Australia and New Zealand

Coexistence of DVB-T2 and 5G Broadcast • 2038 rollover: DVB's Y2K bug?

DVBSCENE

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On the cover: DVB Native IP (DVB-NIP) brings a new wave of possibilities for the satellite industry. On page 5, read about a proof of concept that targets improved well-being for tanker crews that are required to be at sea for long periods; and on page 6, read about new land-based deployments in several markets. © Adobe Stock

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From Kuala Lumpur to Berlin – one mission, different journeys



Emily Dubs
Head of Technology, DVB Project

Over the last few months, I gave presentations at three different events. Each – the presentations and the events – had a distinct focus and was tailored to differing market needs, varied mixes of established infrastructures, and diverse cultural contexts. Yet in each case, the same idea kept coming up: DVB's value lies in bridging technologies, sectors, and even eras, enabling future-proof solutions that get the best out of both legacy and new-generation systems.

In Kuala Lumpur, at the ABU Digital Broadcasting Symposium, the focus was on transition and how to navigate from legacy to next-gen media delivery in an increasingly complex environment. My talk highlighted how DVB offers a pragmatic migration path to an evolved media delivery landscape.

To me, such a modern ecosystem should be based on a hybrid architecture: incorporating satellite and terrestrial components, including fixed broadband and cellular networks in addition to the well-established DTT systems, with their high-power high-tower infrastructure. And to make this happen smoothly and seamlessly, DVB-I is the secret sauce! Indeed, it not only allows viewers to navigate services delivered through such a mix of networks (without even being aware), but also – and as a consequence – enables migration journeys that progressively embrace new networks as they become relevant, to reach full population coverage, high resilience, and both economic and environmental sustainability.

A few weeks later, at BroadcastAsia in Singapore, I gave a presentation at the Rohde & Schwarz Tech Talks. This time the theme was 5G and DVB's relevance in a mobile-first world. Whether it was about feeding base stations via satellite using DVB-NIP or enabling seamless user experiences through DVB-I over 5G, the message landed well: DVB's standards are not relics of the broadcast past, but enablers of a hybrid, resilient future.

Then came Berlin, and a slightly more disruptive conversation. Speaking at the Fraunhofer FOKUS Media Web Symposium, I was eager to present DVB-I from a fresh angle: what if streaming platforms could work more like podcasting – open, interoperable, and fair? I explored how DVB-I, playing a similar role to the RSS open standard in the podcasting world, can be seen as offering a strong foundation for an open media ecosystem where content discovery isn't locked behind proprietary walls, but powered by standards that enable viewer choice, creator freedom, and media plurality. This idea resonated deeply, positioning DVB-I not just as a technical enabler, but as a vehicle for broader societal impact. It also marked a bold shift in how we frame interoperability, no longer only as a means to connect devices or systems, but as a foundational value that empowers openness, fairness, and choice. The enthusiastic response confirmed that this perspective is not only timely, but deeply relevant.

These three distinct talks all demonstrated that DVB's role remains highly relevant, while also more challenged than it has ever been. Whether the goal is national migration, global harmonization, or a more open and fair digital media space, our tools are sharp and ready – like a Swiss army knife, they adapt to the task.

Perhaps the real lesson of these journeys is that interoperability is not just about devices or networks; it's about aligning around a shared purpose, and that is what DVB does best.

NEW DVB MEMBERS

Find out how to join the DVB Project by visiting: dvb.org/join

Corporació Catalana de Mitjans Audiovisuals (CCMA) is the public radio and television company owned by the government of Catalonia and known since 2023 under the name 3Cat. *"In joining DVB, we're excited to contribute to the collaborative development of open standards that are shaping the future of digital media distribution. Through our involvement in the DVB-I standard, we aim to contribute meaningful insights and support the successful implementation of this next-generation media distribution standard across Europe."* **Natàlia Prats**, CTO
https://www.3cat.cat

BCi Digital is a leader in broadcast technology and addressable advertising solutions, delivering innovation and expertise to broadcasters worldwide. *"Joining the DVB Project marks a significant step for BCi Digital as we continue to champion open innovation in the media and broadcast industry. We're excited to collaborate with fellow members to shape the future of addressable advertising through open specifications, ensuring broadcasters, platforms, and advertisers can deliver more relevant, effective, and scalable solutions for audiences worldwide."* **John Bartlett**, Founder and CTO
https://bcidigital.com/

Freeview New Zealand offers free-to-view television services through terrestrial transmitters that reach over 85% of homes, supplemented with a nationwide satellite service. It uses HbbTV to offer access to associated on-demand services. *"DVB standards have been foundational in the delivery of free-to-air TV in New Zealand since 2008. Freeview NZ is incredibly grateful for the work of the DVB organization, which allows cost-effective delivery of services, especially for small markets like NZ. We look forward to participating in DVB work for the future of TV."*
Leon Mead, General Manager
https://freeviewnz.tv/

HD Forum Italia is an association created to promote, support and disseminate the use of audiovisual and multimedia content, products and technologies in High Definition, Ultra High Definition, 3D and other advanced audiovisual solutions. *"HDFI has always considered DVB standards to be a relevant benchmark and a reference source for recommending technical specifications applicable to TV receivers in national markets. HD Forum Italia has worked with great commitment to promote these DVB specifications and ETSI standards, harmonizing them with the Italian market profile."*
Tonio Di Stefano, President
https://www.hdforumitalia.it/

NEW & UPDATED DOCUMENTS

Visit our our library: dvb.org/specifications

Guidelines for the Implementation and Use of EN 301 545-2 (DVB-RCS2 Lower Layer)
August 2025 • BlueBook A155-4r1 (Draft TR 101 545-4 V1.2.1)

Service Discovery and Programme Metadata for DVB-I
July 2025 • BlueBook A177r7 (Interim draft TS 103 770 V1.3.1)

Implementation Guidelines for DVB-I
July 2025 • DVB BlueBook A184r2

Study mission report on Film Grain Synthesis
July 2025 • DVB BlueBook S103

Commercial Requirements for DVB-I – Enhanced DRM, Service & Service List Protection, Customization for Service Discovery, Accessibility Services and Application Support
July 2025 • DVB BlueBook C108r1

Specification for data broadcasting (DVB-DATA)
June 2025 • EN 301 192 V1.8.1

DVB MPEG-DASH Profile for Transport of ISO BMFF Based DVB Services over IP Based Networks (DVB-DASH)
June 2025 • BlueBook A168r9 (Interim draft TS 103 285 V1.5.1)

Study mission report on Object-Based Media
May 2025 • DVB BlueBook S102

Specification for the use of Video and Audio Coding in Broadcast and Broadband Applications (DVB-AVC)
May 2025 • TS 101 154 V2.9.1

Adaptive media streaming over IP multicast (DVB-MABR)
March 2025 • BlueBook A176r7 (Interim draft TS 103 769 V1.3.1)

Native IP Broadcasting (DVB-NIP)
March 2025 • BlueBook A180r4 (Interim draft TS 103 876 V1.2.1)

Update on patent pools

Virtually since its foundation, DVB has favoured the formation of patent pools covering its standards. These provide transparency, lower aggregate royalties, efficient licensing, and early market certainty of the royalty burden for new standards.

All active DVB pools are today administered by Sisvel, for licensing of patents essential to: terrestrial broadcasting (DVB-T2); satellite transmission (DVB-S2, DVB-S2X and DVB-SIS); and multiple generations of DVB's Common Scrambling Algorithm (DVB-CSA). The status of these pools is set out in a table here: https://dvb.org/pools

DVB World 2026: destination Amsterdam!

Following two great years in Munich, we're on the road again with DVB World. Accessibility is an important factor for our attendees – being able to get to and from the event efficiently means less time away from the office. We've therefore picked another well-connected hub in taking next year's edition to Amsterdam on 17 and 18 March. We'll be at the Postillion Hotel & Convention Centre in the southeast of the city, offering a modern space that is flexible enough to take DVB World's combination of conference, unconference and exhibition. *See*: https://dvbworld.org

A word from the PCM chair

Elfed Howells (Huawei), Chair of the DVB Promotion & Communications Module



I often write here about the progress the PCM has made in worldwide outreach. 2025 has already been a bumper year for events – the team from the DVB Project Office, our chairs and our Members have travelled far and wide, presenting DVB-I and DVB-NIP at various events in Asia, Europe and beyond. Singapore, Kuala Lumpur, Jakarta, Beijing, Las Vegas, Berlin, Munich and Geneva to name but a few!

What I rarely talk about here, however, is how the spirit of DVB has evolved in the last years. DVB has always been a place of community, friendly rivalry between competitors who appreciate the value of standards, and occasionally a place of intense debate and negotiation as we form new specifications for the world to adopt.

All these remain as constants, but we've also seen periods where DVB gains a new spirit that elevates the discussion and injects renewed energy and passion into the work. These periods happen when the organization and its Members witness a new wave of adoption, a renewed interest in the work, and a new tentative optimism for how the world is reacting to what we have developed.

We are currently in the midst of such a wave of pioneering optimism at DVB, where new trials, software, requirements and implementations are appearing with increased regularity in a world with a thirst for knowledge about our latest solutions and an eagerness to try them out.

But there is something different about the current wave, more inclusive of new voices (through our micro-membership tier), more open to dialogue and participation (through our unconference formats for open discussions), and more hands-on and practical (through our new implementation task force, reference implementations, and regular launch-support calls).

We have also opened our doors even wider, embracing academic work relating to our specifications (inviting universities to join DVB and our events such as DVB World) and recently, with the launch of our UI competition for DVB-I (https://dvb.tv/competition) we have engaged successfully with a whole new community of developers who will work with our standards.

We will bring this pioneering optimism and sense of an expanding community to our IBC2025 booth, with a new open format of live discussions, pop-up community discussions, showcases of technology, and drop-in sessions with experts. You will still see the latest demos of our specifications in action, but you will also get a chance to become imbibed with our new spirit. The theme of TV2030 is not a fanciful crystal-ball gazing concept, but a practical embrace of how DVB will play its role in delivering the TV we watch over the next few years.



Calling all UI/UX developers

While DVB-I's technical capabilities have been well established, a competition launched by the DVB Project Office and the Promotion & Communications Module spotlights the key role of creative design and usability in the success of media apps and platforms.

Announced at DVB World 2025, this global competition – with a prize fund of €17,000 – aims to foster the development of innovative and user-friendly DVB-I clients and applications. Open to individuals, startups, academic teams, and established companies worldwide, this competition invites participants to reimagine television interfaces and shape the future of viewer interaction across various devices, all leveraging DVB-I service lists and metadata.

While potential participants were invited to submit an expression of interest (and over 30 entities have done so), it's not obligatory. The deadline for actually submitting a competition entry is 23:00 CET on 31 October 2025.

For detailed information see: https://dvb-i.tv/competition

NEWS FLASH

As we go to press, we have been informed that a significant DVB-I trial is to be launched in France, with involvement from a wide cross-section of industry stakeholders.

THANKS TO OUR DVB WORLD 2025 SUPPORTERS
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Preparing for a future that's already in sight

Remo Vogel, Chair of the DVB Project



Tomas Hercog

DVB's theme at IBC2025 is TV 2030, a future that is not as far away as it might seem. Let us take a joint look at the opportunities and challenges that come with it. In this spirit, the concept for this year's booth will also change. We will place less emphasis on detailed technology demos and more on the transformation process and the next steps for our industry.

DVB-I: GAME-CHANGER

I'm not going out on a limb when I predict that in five years, DVB-I will be established in several key European markets. In some countries, this will accelerate the transition to OTT streaming, while others will continue to rely on broadcast. What excites me most is that DVB-I can seamlessly serve this diversity. We might even see DVB-I deployments in major international markets. In parallel, we will see increased adoption by operators – in that space, the technology is a true game-changer.

With the DVB-I Implementers Task Force, DVB has launched a working group to support the deployment process and ensure that national specificities can be addressed with the most uniform implementations possible. In addition, the task force is tackling technologically complex requirements – with native DRM currently in the spotlight.

Looking at recent developments in the TV market, one thing is clear: television remains popular, while the streaming market has reached a saturation point. With DVB-I, we have a technology that seamlessly connects both worlds. I strongly encourage streaming tech players who want to expand their business to get in touch with DVB – *this* is the place to be part of this evolution.

BROADCAST'S FUTURE

I am very curious to see how new broadcast technologies will establish themselves in the coming years. I am convinced that a hybrid infrastructure is the best approach. However, an entrenched 'the future is streaming' narrative in the industry makes it difficult to successfully introduce broadcast innovations today. Even though streaming infrastructures are still not of sufficient scale to take over all television distribution, the old rule of thumb that 'broadcast is cheaper than streaming' no longer applies without qualification. In a global environment that is likely to remain turbulent in the coming years, aspects such as availability and network resilience should take centre stage.

DVB Native IP is the bridge between traditional broadcasting and an all-IP future. It makes broadcast fit for devices and applications beyond traditional television – without giving up the scalability advantages of broadcasting. At the same time, DVB aligns with 5G Broadcast technology, the solution for delivering broadcast services to mobile devices.

SUSTAINABILITY STALLING?

Sustainability should be just as central a criterion in television distribution as cost and quality: efficient technologies save not only bandwidth but also energy and resources. For this reason, in 2024 we launched a working group on energy efficiency. To be candid, so far we have struggled to bring this group and topic to life.

My impression is that while sustainability is regularly mentioned as an important topic, it too often remains limited to certificates, regulatory compliance, and formal sustainability reports as opposed to concrete actions that reduce energy consumption. I therefore invite everyone to see DVB as an overarching consortium and to actively participate in this working group.

Let's talk about all of this, and more, in Amsterdam. See you there!

Remo Vogel, in addition to chairing the DVB Project, is responsible for the strategic development of distribution technology for Rundfunk Berlin Brandenburg, part of the ARD network in Germany. His focus is on hybrid systems for programme publication. He also leads DVB-I-related activities for both the EBU and the Deutsche TV-Plattform.



Connectivity and entertainment options are important for the welfare of tanker crew, who spend long periods at sea

Native IP: enhancing life at sea

Rami Moussawi (ST Engineering iDirect)

The COVID-19 pandemic highlighted the importance of crew connectivity when thousands of stranded crew members had very limited access to communications with home. It woke the maritime industry up to the fact that access to reliable connectivity is interwoven with crew welfare and their mental health.

NEED FOR CONNECTION

Life at sea is isolating, placing immense strain on seafarers who are often away from home for long periods. As the heartbeat of any ship, crew members must feel supported and looked after by their employers. Today, connectivity to vessels has become an overriding consideration when seafarers browse employment opportunities, with many turning down positions offering sub-standard access to connectivity for contacting home, social media, and entertainment.

ISWAN (International Seafarers Welfare Assistance Network) reported that there was a 44% quarter-on-quarter increase in calls and messages relating to mental health challenges in 2023. According to the Seafarers Happiness Index, in the second quarter of 2024, tankers, container ships, offshore vessels, and general cargo fleets were at the bottom of the pile for crew contentment.

Crew demographics are also changing, as younger crew members are digital natives and users of multiple devices with high expectations of a connected, living room experience no matter where they are.

STREAMING SERVICES POC

Germany-based satellite service provider MediaMobil specializes in the provision of secure communications to remote regions and is familiar with the needs of the shipping industry. The company is focused on adding crew welfare to its portfolio of value-added services and is working with German Tanker Shipping, a shipping company based in Bremen with a fleet comprising 14 oil tankers.

In partnership with satellite operator Eutelsat, content delivery solutions provider Inverto, streaming provider Airmont, and ST Engineering iDirect, MediaMobil has delivered a proof of concept (PoC) to provide streaming services to crew on board the tanker fleet. The services will enhance the on-board experience for crew, enabling them to tune into news, sports, movies, documentaries, and much more while at sea.

LIVE & FILE-BASED

The PoC utilizes the DVB Native IP standard (DVB-NIP), which enables a truly converged media distribution solution. Using the efficiency of broadcast networks, it enables distribution of large-scale content to modern IP devices. Live and linear distribution can be enabled both unidirectionally or bi-directionally, the latter using a VSAT platform for the satellite return path.

DVB-NIP also facilitates file-based content delivery, enabling crew to gain access to educational material so that they can focus their time on developing other skills such as learning a language or gaining a qualification.

A questionnaire was distributed to the German Tanker Shipping crews to find out their specific content requirements so that the partners can then start the process of securing content rights to develop the bouquets that are right for the crew on each vessel, who may be of diverse nationalities. The service will initially be deployed on board four vessels.

The use of DVB-NIP is ideal for the maritime market as it provides a way of using the existing bandwidth and capacity more efficiently. It's optimized for video, which accounts for at least 80% of internet traffic. The ability to deliver highly relevant content to crews in an efficient way results in a happier workforce with easy access to familiar content, and German Tanker Shipping will have a unique service to attract and retain crew in an industry where recruitment and retention is a constant challenge.



Rami Moussawi is Senior Product Manager at ST Engineering iDirect. He leads the company's Media & Broadcast product portfolio and headed up the development and launch of the company's multi-carrier satellite gateway solution.

Progress towards DVB-NIP deployment in several markets

Jeff Yin (SEI Robotics)

As the digital broadcasting landscape continues to evolve rapidly, the fusion of traditional satellite and IP technologies is becoming a vital aspect of modern content delivery. This can be seen in several projects globally, where significant steps are being made towards deploying DVB Native IP solutions. These initiatives focus on leveraging open standards like DVB-NIP, along with DVB-I and DVB-S2X to enable robust and flexible content solutions.

SEI Robotics has partnered with SES, which is actively working on the deployment of DVB-NIP technology in partnership with local operators in several markets, on initiatives that effectively combine direct-to-home (DTH) satellite broadcasts with IP streaming capabilities, converting a single satellite delivery system into a comprehensive home entertainment network. Such integration allows consumers to enjoy both traditional television content and over-the-top (OTT) services concurrently, offering an enhanced and flexible viewing experience.

DUAL DEMODULATORS

One of the most notable advancements in the planned deployments is the innovative set-top box (STB) technology developed for DVB-NIP. These advanced STBs from SEI Robotics incorporate dual DVB-S2X demodulators, which facilitate the simultaneous reception of conventional DVB broadcast channels and satellite-based IP streams. This synergy ensures a hybrid viewing experience that is particularly advantageous during transitional phases – moving from traditional DTH systems towards fully native IP-based systems.

The STB serves as a gateway for the home, to receive all content via satellite and deliver it not only to the primary television but also to other screens in the home. The gateway presents the video feed on the connected TV (via HDMI) and simultaneously streams content over the home network to additional devices such as secondary TVs, smartphones, or tablets. This effectively turns one satellite receiver into a whole-home video distribution hub, with companion mobile apps available on Android and iOS.



The set-top box serves as a gateway for the home

To further streamline this integration, these projects employ the DVB-I service discovery specification, which enables the automation of channel management through service lists delivered via satellite. These encompass electronic programme guide (EPG) data and metadata, allowing for dynamic updates to channel line-ups and maintaining consistency across various devices. Such functionality is crucial for complying with regulatory requirements, including signaling for accessibility features.

The use of multicast adaptive bitrate (MABR) technology enhances the efficiency of OTT content delivery over satellite, combining the scalability of multicast with the personalized experience of adaptive quality. Through this, large numbers of users can access high-demand content without overwhelming terrestrial network resources. Additionally, the push video-on-demand capability ensures users have immediate access to a locally stored library of content on their STBs, an invaluable feature in regions with limited internet infrastructure.

CONNECTIVITY GAP

South Africa is poised to adopt a similar model, with ongoing discussions between SEI Robotics and a local broadcaster to establish a DVB-NIP solution tailored for the African market. This initiative aims to deliver hybrid broadcast and OTT services via satellite, effectively bridging the connectivity gap in regions with limited broadband infrastructure.

By utilizing DVB-NIP for sending multicast streams over satellite, South African households could significantly improve their viewing experiences, addressing challenges of digital inclusion and expanding access to diverse content offerings. This model demonstrates the versatility of DVB technology for providing rich, broadband-like services in areas with unreliable internet access.

SHIFT TO HYBRID

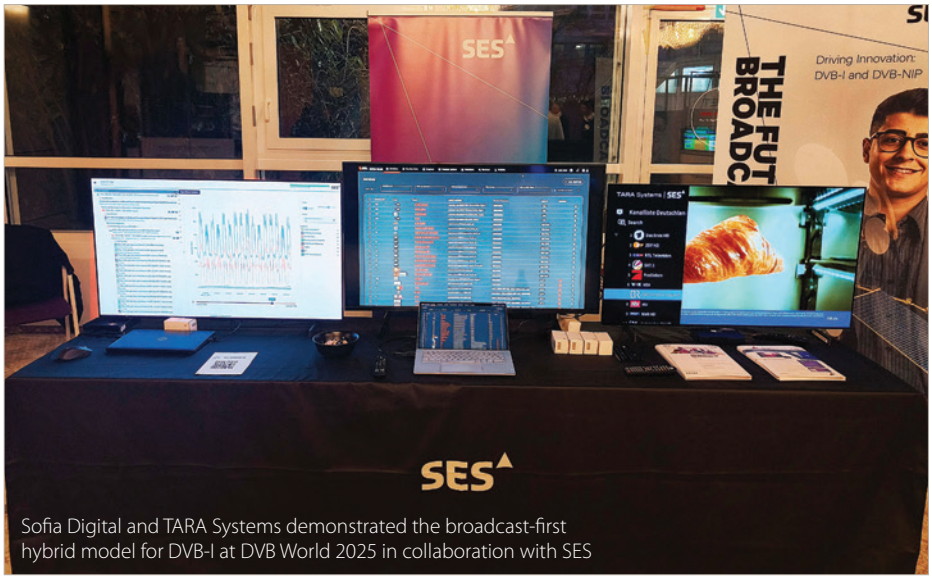
The advancement of DVB-NIP technology, whether through operators like SES or via the anticipated developments in South Africa, highlights a profound shift towards hybrid broadcast models. By adopting open standards such as DVB-NIP and DVB-I, these projects showcase the transformative potential of satellite technology in offering scalable, flexible, and dynamic content delivery solutions. As DVB-NIP deployments expand, they promise to greatly enhance the global multimedia content ecosystem, providing more accessible and comprehensive entertainment options.

Jeff Yin is the Founder and CEO of Shenzhen SEI Robotics, a leading global OEM/ODM specializing in Android TV and AIoT devices. He established the company in June 2009, and has guided it through collaborations with major international partners, helping position the company at the forefront of smart home innovation.



Broadcast at the core: a pragmatic blueprint for hybrid DVB-I

Juha Joki (Sofia Digital) and Michael Schäfer (TARA Systems)



Sofia Digital and TARA Systems demonstrated the broadcast-first hybrid model for DVB-I at DVB World 2025 in collaboration with SES

DVB-I was created as the unifying standard for television's future. The key question for established broadcasters and operators is not *if*, but *how* to adopt it practically and cost-effectively. Our joint development and demo for DVB World 2025 in Munich, initiated by SES, answered this with a live, end-to-end solution that champions a 'broadcast-first' hybrid model, introducing a robust path to DVB-I by enhancing existing DVB transmissions, not replacing them.

OBJECT CAROUSEL

Instead of using an internet connection for initial discovery, this approach embeds DVB-I service discovery directly in the primary broadcast stream. We use a well-proven DSM-CC object carousel to deliver the data. This design, orchestrated by Sofia Digital's DVB-I Backend, removes the dependency on broadband, with the necessary setup data arriving via broadcast. The backend has three main components:

- Central Service Registry (CSR) – the master list of available services, allowing operators to manage offerings and regions per satellite network.
- Service List Management (SLM) – provides the channel lineup with tuning and broadband stream data, eliminating satellite re-scans. The SLM is periodically updated with SatScan data from the satellite fleet, keeping it synchronized with the broadcast environment.
- Content Guide Manager (CGM) – provides rich metadata including detailed programme and schedule info and images for a modern EPG, delivered without initial reliance on broadband.

When building the carousel file, to keep loading times and memory consumption in check, decisions must be taken on, for example, how many service logos to carry and at what quality, and how much data should be included for the CGM. The system simplifies service management and provides satellite providers with a mechanism for rapid customer onboarding and robust change management, while offering a seamless path to extended IP-based features.

On the client side, the cost-effective set-top box, powered by TARA Systems' DVB/IPTV Solution, exemplifies this broadcast-first philosophy. Upon startup, the device tunes to the broadcast and instantly discovers the DVB-I service list. The DVB-I client recognizes the DVB-SI announcement and downloads the DVB-I service list either directly from the DSM-CC object carousel or via HTTP. For the DVB World demo, all service lists and related material were carried in the carousel.

This approach enables instant setup, populating a full, regionalized channel list without requiring a long satellite scan. Once this initial setup is done, IP enters the picture for a full hybrid experience by adding OTT streams. The client manages multiple delivery paths, e.g., DVB-S or IP, per service, depending on availability and following the operator's defined priority.

FAST SWITCHING

The key challenge for reaching user adoption is the UX and performance of the client. The transition between DVB broadcast and DVB-DASH broadband streams must be instant, even on cost-sensitive hardware. The player ensures high viewing quality and fast channel-change speed regardless of the source. In the Munich demo, services were combined in a common channel list, with the user unaware of the underlying technical complexity.

By building on existing infrastructure, users get instant channel lists, regional content, and extra IP channels. Core metadata comes via broadcast, while IP adds richer data for a modern UI. If the broadcast fails, the client can switch to unicast OTT. This broadcast-first approach also saves energy by avoiding streaming-only delivery.

Our DVB World 2025 demo proved that migrating to DVB-I doesn't require abandoning broadcasting's inherent strengths. Placing broadcast at the core and utilizing DVB-I's feature set with IP as a powerful enhancement layer offers a pragmatic, reliable, and feature-rich blueprint for the future of television. Users benefit from quick and regionalized device setup, improved UX and better resilience, while broadcasters and operators benefit from higher sustainability and a clear migration path.



Juha Joki is Director, Broadcast and Testing at Sofia Digital, working for more than 15 years with operators and device manufacturers on end-to-end DVB, DVB-I and streaming solutions. **Michael Schäfer** is a Senior Software Engineer and Project Manager at TARA Systems, focused on developing, improving, and launching innovative TV and streaming products for operators.

Collaboration for innovation: Mediaset PoC enhances DVB-I and HbbTV

Stefano Braghieri (Mediaset)

When we lived in a broadcast-only world, HbbTV came along as a means of enriching broadcast services with new functionalities and user experiences. Now DVB-I is extending the traditional linear television model to IP networks – with streaming used for content delivery, for example, via DVB-DASH – providing a seamless, high-quality viewing experience across a wide range of devices. Here too, HbbTV provides a way of enhancing the functionality and user experience: having an application layer running on top of a native DVB-I client provides a means of implementing functionalities that are not available natively.

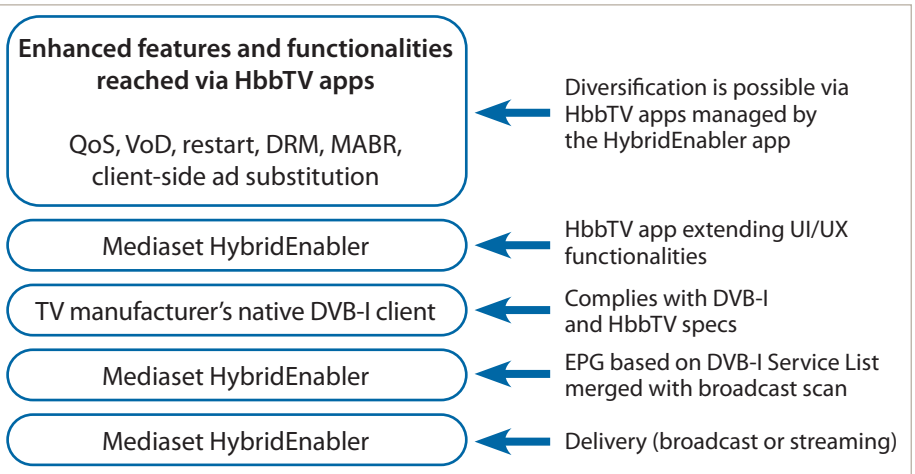
An article contributed by the author to the HbbTV Developer Portal* gives examples of some of the functionalities that cannot be implemented by the terminal itself, for example:

- Standardized technologies where implementation approaches may nevertheless vary, e.g. Multicast ABR (MABR);
- Service-provider customizations, e.g. Quality of Service monitoring;
- Technology-provider customizations, e.g. handling digital rights management (DRM); and
- Client-side ad insertion or substitution.

The Developer Portal article explains how close collaboration between the DVB Project and the HbbTV Association ensured the availability of specifications that enable a standardized solution for all use cases identified – up to now – by the associations' members.

DVB-I POC ACTIVITIES

As a natural consequence of Mediaset's proactive deployment of both DVB-I and HbbTV, the priority project within the current phase of the company's DVB-I proof-of-concept (PoC) has been the creation of single application (named HybridEnabler) that is able to keep running on different media, fulfilling the requirement to comprehensively extend the UI/UX (user interface and experience) available on broadcast to the hybrid environment. Such an application behaves in the expected way when a broadband instance is selected, acting as a linked application (1.2), and behaves as a typical 'red button' application when the selected content is a broadcast instance.



In the PoC, when the user selects a Mediaset service, broadcast or streaming, the HybridEnabler app ensures consistent availability of additional functionality.

This was made possible through the implementation of the functionalities introduced in 'Annex O' of the HbbTV 2.0.4 core specification, which in turn rely on the native level defined by the A177r7 version of the DVB-I specification.

With this basic capability available, functionalities such as DRM management or MABR, can be integrated in the HybridEnabler and turned on when required. The PoC has verified the correct implementation of the following enablers:

- Lifecycle: regardless of the nature of the service, the application survives on service change.
- Hybrid channel list: the application is able to access the hybrid channel list, created by the terminal during the installation process, so the user can select a different medium.
- Smarter fallback mechanism: with access to the hybrid channel list, the application is able to manage a lack of instance in agreement with whatever policy is defined by the broadcaster.

Integration of use cases developed one-by-one in previous PoC phases required a lot of careful harmonization with the hybrid application lifecycle, with respect to functionalities natively performed by the terminal, e.g., parental control. Enabling smart fallback also required considerable effort, due to the many different situations that could arise and the need to have collaboration between DVB-I and HbbTV. The solution to this complexity came thanks to good collaboration between the PoC partners and the outcomes from this activity represented valuable feedback to both DVB and HbbTV to refine the corresponding specifications.

With the completion of phase 3 of the PoC, a broadcaster already having HbbTV applications running in a broadcast-only environment can now extend them to the hybrid environment, demonstrating sustainability and consistency of the application user experience as well as portability of broadcaster business models towards a hybrid context. It also provides clear proof that collaboration between DVB(-I) and HbbTV benefits both standards!

**https://tinyurl.com/hbbtv-dvb-i*

Stefano Braghieri has 30 years' experience in broadcast technologies in various capacities, from writing code to standards development and testing. He has been with Mediaset since 2011, working on support for new technologies and product innovation.



DVB-I opportunities in Australia and New Zealand

William Cooper (Service List Registry)

Australia and New Zealand have many similarities and some differences as television markets. They share some commonalities with markets in Europe, making them strong candidates for a common approach to service development. They also share the name Freeview for their free-to-view services, following the success of the digital terrestrial television platform in the United Kingdom. Most homes in Australia and New Zealand still use free-to-view services, but broadcasters also have strong online video-on-demand offerings that face competition from global online video subscription services. Both countries use DVB standards for television transmission, offer services in high definition, and use HbbTV as the standard for interactive applications. They are also both exploring the potential use of DVB-I for service discovery.

AUSTRALIA

Three main commercial networks compete to serve major metropolitan markets and many regional markets in Australia: Seven, Nine, and Ten. Some regions are still served by affiliated regional broadcasters. There are two networks that are government-funded public services: the Australian Broadcasting Corporation and the Special Broadcasting Service. ABC provides five non-commercial channels and produces local news bulletins for eight regions. SBS operates six channels, partially supported by advertising, including NITV or National Indigenous Television. These services are jointly marketed under the Freeview brand, using a trademark licenced from their counterpart in the United Kingdom. There are over 30 channels available in all, together with live streaming and video-on-demand applications: 7plus, 9Now, 10, ABC iview, and SBS On Demand.

The country covers three standard time zones. The flight from Sydney to Perth takes five hours. You could easily fit all Western Europe within the Australian landmass. The enormous geography makes terrestrial television transmission challenging, although most people live in metropolitan regions around the coast, with a total population of 27 million. Over three quarters of homes in Australia still rely on digital terrestrial television as their primary source of television, although around half of homes have a smart television that can also receive online services. There is a separate satellite service for remote regions.

Subscription television came relatively late to Australia and levels of adoption have been low compared to some other countries. Online video subscription services have been more successful. DAZN recently acquired the Foxtel Group, which includes the online services Kayo Sports and BINGE.

Sport remains a key element of programming, particularly for free-to-air channels. Certain listed events are protected by anti-siphoning rules to make them available through free-to-air television before subscription services can secure exclusive rights.

Free TV Australia, the industry body for the commercial television networks, commissioned a study from informitv in 2018 to consider the future platform for free-to-view television services. One of the recommendations that came out of that was to establish a platform specification including support for HbbTV 2.x and the emerging DVB-I specification.

To demonstrate how this might work, informitv created a proof-of-concept implementation. This became the technical basis of what is now the Service List Registry unified service platform, designed to provide a cloud-native, globally scalable service discovery system. This led to internal demonstrations to the Freeview board in 2024. At the time, there were no native DVB-I televisions available in Australia, so it was demonstrated on the only commercially available model, specially imported from Italy, where one manufacturer had released a product to support a public trial.

One of the advantages of DVB-I is the potential to offer a conventional television channel line-up to an increasing number of homes that do not have access to a traditional television antenna. It also allows for seamless navigation between linear channels and online services.

Broadcasters are concerned about losing prominence in a world where apps compete for attention on television home screens. New regulations are being introduced to preserve prominence, but these are particular to the Australian market. DVB-I supports regulated service lists that can provide an approach based on open international standards.

> "Although separate organizations, Freeview Australia and Freeview New Zealand recognize the benefits of harmonizing their approaches. They are also keen to maintain the independence of their platforms, rather than relying on applications designed for and developed in other markets with different commercial requirements."



Dr William Cooper is the Chief Executive of the Service List Registry, which supports the international development and deployment of DVB-I services through a unified service platform for service discovery. Further information is available at slrdb.org.

NEW ZEALAND

A close cultural cousin to Australia, New Zealand has a friendly rivalry with its neighbour. The two countries are further apart than many might think. The flight from Sydney to Auckland is about the same as flying from London to Rome, while from Perth to Auckland is further than London to New York.

New Zealand, or Aotearoa in Māori, is a smaller market with a population of 5 million. The public broadcaster, TVNZ, is state-owned but carries advertising across its three channels and its online platform. There is also a state-funded Whakaata Māori channel and several community and faith channels. A commercial channel, Three, formerly TV3, is now owned by Warner Bros. Discovery. Sky offers subscription television services, together with a free-to-view commercial service, Sky Open.

Freeview New Zealand is jointly owned by Television New Zealand, Warner Bros. Discovery, Whakaata Māori, and Radio New Zealand. Freeview offers free-to-view television services through terrestrial transmitters that reach over 85% of homes, supplemented with a nationwide satellite service. It uses HbbTV to offer access to associated on-demand services.

Two-thirds of all homes in the country have Freeview, most of them currently receiving digital terrestrial television. TVNZ has stated that it plans to be a digital-first media organization by the end of the decade and will sunset its broadcast television distribution over time.

Like its Australian counterpart, Freeview New Zealand is actively exploring the opportunity to use DVB-I. In the case of New Zealand, where there is already an alignment of logical channel numbers across satellite, terrestrial, and online services, there is the potential to create a fully multiplatform offering.

Although separate organizations, Freeview Australia and Freeview New Zealand recognize the benefits of harmonizing their approaches. They are also keen to maintain the independence of their platforms, rather than relying on applications designed for and developed in other markets with different commercial requirements.

CHALLENGES

The main limitation inhibiting public trials or wider rollouts of DVB-I so far has been the lack of compatible consumer products with native support. Multiple manufacturers have plans to provide products, but there are currently no compatible televisions available through retailers. Without live services, there is limited incentive for manufacturers to provide support for them. This requires a commitment from both broadcasters and manufacturers. It is a classic chicken-and-egg problem.

Australia and New Zealand are both too small economically as markets to justify the development of entirely new television products. Although they span a vast geographic area, there is not enough money in the system to support bespoke development, either for media providers or consumer electronics manufacturers.

OPPORTUNITIES

Compared to the cost of operating satellite services or upgrading terrestrial television transmission networks, DVB-I offers a relatively inexpensive way to modernize distribution and provide a more contemporary viewer experience that is competitive with global online video services. It has the benefit of being interoperable and backward compatible with existing DVB transmission systems, while allowing an incremental migration to services delivered online.

Building on established standards is the only viable way to deliver a more modern television experience that blends the best of broadcast and broadband delivery. It enables manufacturers to address Australia and New Zealand as markets with products developed for Europe and elsewhere.

By embracing DVB-I as a common framework, free-to-view television platforms in Australia and New Zealand have the potential to shape a new generation of services that are open, interoperable, and meet the expectations of viewers in a connected world.

Unlocking the potential of UHD with DRM and DVB-I integration

Wenhua Ding (Pengcheng Laboratory)

Ultra-high-definition (UHD) television is driving the global audiovisual industry's evolution, with improvements in UHD content production, services, and intelligent consumer experiences. However, the industry is still in its early stages, with limited content and widespread piracy posing major challenges. With networked dissemination as the main method, emerging trends like short video editing, secondary creation, and generative AI are fueling copyright disputes, impacting the professional content creation and distribution sector.

Since its establishment in 2004, the ChinaDRM Forum has been committed to promoting the development of the global digital rights management (DRM) ecosystem. Its members have built a DRM technology ecosystem that is integrated, unified, trustworthy, open, and secure, through standardized terminal technology and security assessment, and enforced DRM trust management. ChinaDRM's ToPlayDRM technology has spread to many countries and regions worldwide; its copyright protection model is recognized by the international media industry, including in Hollywood.

ECOSYSTEM CHALLENGES

The global end-to-end DRM ecosystem for audiovisual content still has shortcomings and weaknesses, including the following:

1 There are challenges in protecting the copyright of high-value UHD content for linear broadcasting. High-value sports programming such as the Olympics and major football competitions face a dilemma between delivering a 4K high-quality viewing experience and ensuring seamless content reuse, which hinders global broadcasters' adoption of 4K linear broadcasting and raises concerns over copyright issues. Although DVB-I provides an efficient framework for the convergence of linear and non-linear programmes, there is still an urgent need for effective and convenient end-to-end solutions in terms of linear programme copyright protection.

2 The global hybrid approach combining software and hardware security is decentralizing the DRM ecosystem. However, piracy exploits DRM's security weaknesses, with low-security deployments becoming the primary target for attacks. As a result, the threat of DRM technology being cracked continues to grow.

3 Several mainstream DRM technology systems, including WideVine, PlayReady, FairPlay and ToPlayDRM, as well as numerous private DRM protection schemes, have been established. Due to the decentralization and complexity of the DRM device ecosystem, major international players typically adopt MultiDRM, which integrates multiple DRM technologies, to provide a compromise solution for content providers and service providers. Service providers need to deploy multiple DRM solutions such as the aforementioned in the MultiDRM system, using different encryption methods and providing multiple encrypted streams for different media formats (TS, mp4, etc.) and protocols (HLS, DASH, CMAF, RTP, etc.) to cover all device ecosystems, greatly increasing the cost and system complexity of DRM implementation, hindering the establishment of a trusted terminal ecosystem.

Based on this, ChinaDRM is committed to continuously innovating to address these challenges. At the same time, as in other countries, China is actively exploring the DVB-I technical architecture and working towards its commercial implementation. ChinaDRM Forum is keen to share China's practical experience in the integration of DRM and DVB-I with the industry, and to jointly explore sustainable development solutions for the DRM industry ecosystem.

THREE PROPOSALS

First, the industry should thoroughly understand the 'barrel effect', where the overall security of a system is only as strong as its weakest point, often exploited by inadequate DRM implementations. It should accelerate the deployment of DRM client applications based on hardware-level security, address key industry vulnerabilities, and reinforce the overall content protection security system.

Second, major participants in the global DRM ecosystem should join in building an open platform for cooperation and exchange, taking into account the existing ecosystem, jointly facing future challenges, and promoting the comprehensive upgrade of the global media content protection ecosystem.

Third, we must strengthen collaboration to establish unified trust management, DRM client security, and audiovisual asset protection mechanisms, driving DRM advancements to ensure robust content protection alongside high-quality user experiences.

ChinaDRM
中国广播影视数字版权管理论坛



Wenhua Ding, Academician of the Chinese Academy of Engineering and Chairman of the China DRMForum, has over 40 years of experience in the broadcasting and media industry. Formerly the Chief Engineer of China Central Television (CCTV), he now leads the media technology direction at Pengcheng Laboratory.

DVB-T2 and 5G Broadcast – tackling spectrum scarcity through coexistence

Javier Rodriguez Fernandez (Qualcomm) & Johann Mika (Big Blue Marble)

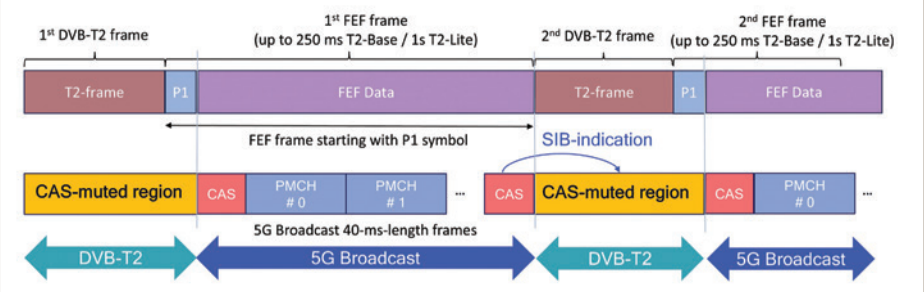
DVB-T2 is a widely deployed and proven broadcast standard, reaching millions of households across Europe and beyond. At the same time, 5G Broadcast is technically mature and ready to bring television, radio and other broadcast services directly to mobile devices. One of the greatest challenges in deploying new broadcast technologies like 5G Broadcast is the limited availability of spectrum and the significant up-front investment typically required for new infrastructure. Broadcasters may want to continue supporting legacy technologies like DVB-T2, while also introducing new capabilities that cater to modern consumption habits, particularly mobile devices. The core problem is this: how can 5G Broadcast and DVB-T2 share the same UHF channel to support both legacy TV sets and mobile-first use cases without requiring additional spectrum or disrupting existing services?

This is where the concept of coordinated time-division multiplexing (TDM) shines. It allows broadcasters to deliver content using both DVB-T2 and 5G Broadcast over a single physical radiofrequency (RF) channel, enabling a seamless transition to mobile-optimized broadcasting while continuing to serve traditional DVB-T2 receivers.

BROADCASTERS & OPERATORS

This approach offers several strategic and technical benefits for broadcasters and broadcast network operators.

- Service continuity: broadcasters can evolve their infrastructure without disrupting services to households still relying on DVB-T2.
- Expanded reach: 5G Broadcast enables direct-to-mobile content delivery (television, radio, streaming, ...), expanding the potential audience to include smartphones, tablets, and connected vehicles.
- Risk mitigation for early deployments: by using existing DVB-T2 infrastructure instead of a complete roll-out of a new 5G Broadcast multiplex from day one, upfront investments can be reduced while mitigating business failure and other risks.
- New use cases: from live sports to emergency alerts and software updates, 5G Broadcast supports a range of new, flexible services that are not supported in legacy systems.
- Flexible multiplex transition strategies: broadcasters can use free capacity in existing DVB-T2 carriers and gradually shift it from DVB-T2 to 5G Broadcast as device penetration increases and audience behaviour evolves.



Example of co-existence of DVB-T2 and 5G Broadcast in which 5G Broadcast data is transmitted within FEF frames (as adapted from J. Rodriguez Fernandez, A. Sengupta, A. Rico Alvarino, T. Stockhammer, "Smart Introduction of 5G Broadcast in Co-existence with Legacy Broadcast Systems," IBC Conference, Sep. 2024.

HOW IT WORKS

The contribution of DVB-T2, which was designed with extensibility in mind, is the concept of Future Extension Frames (FEFs). These are special slots in the DVB-T2 frame structure (up to 250 ms in duration) that can be used to carry different types of signals or technologies, multiplexed in time on the same RF carrier. These FEFs can be occupied with 5G Broadcast signals, enabling coordinated insertion of new signals between DVB-T2 programme frames without impacting legacy receivers.

On the 5G Broadcast side, 3GPP Release 19 standards (to be published at the end of 2025) now support Cell Acquisition Subframe (CAS) muting for coexistence. This allows the 5G Broadcast transmission to be flexibly activated or deactivated over time, making it possible to insert the signal in the FEFs (as illustrated), alongside DVB-T2 content within a shared carrier. CAS muting can be aligned with the FEF structure, enabling both systems to schedule their transmissions without overlapping in time. By coordinating the timing of DVB-T2 FEFs and 5G Broadcast CAS-muting windows, a time-multiplexed system is created.

DVB-T2-compatible TV sets continue to receive regular programming, while mobile devices receive 5G Broadcast content during alternating time slots – all over the same carrier.

This coexistence model enables broadcasters to:

- Launch hybrid deployments without additional frequency allocations.
- Offer next-generation services while retaining backwards compatibility.

Beyond traditional linear programming, 5G Broadcast introduces flexibility and intelligence to content delivery. It supports dynamic, data-driven distribution models, enabling broadcasters to tailor content by time of day, audience preferences, regional demand, or real-time events, all entirely under the broadcaster's control.

The result is a future-proof and interoperable broadcasting system, ready to serve both TV screens and mobile displays.

Javier Rodriguez Fernandez is a Senior Engineer with Qualcomm, working on 3GPP standardization related to 4G, 5G and 6G. **Johann Mika** is Chief Innovation Officer at Big Blue Marble (formerly ORS Group), focused on emerging technologies with strategic relevance.





The year of the rollover: DVB's solution for 2038 and beyond

Peter Cherriman (BBC Research and Development)

Last year, both BBC R&D and Nagra discovered that the DVB Service Information specification (DVB-SI, EN 300 468) has a problem with how it signals dates in DVB transport streams, which may affect almost all DVB television receivers from 23 April 2038. After realising this, BBC R&D tested representative transport streams with dates near the rollover and found degraded behaviour in all tested receivers.

If our testing is representative then receivers will likely continue to function in terms of video, audio and subtitles from 23 April 2038. However, EPGs are unlikely to work correctly, potentially disrupting content guidance, age ratings, and accessibility signalling. Additionally, users may experience problems with internet connectivity, as encrypted TLS traffic could fail if the receiver uses the broadcast time and date to set its real-time clock. DRM schemes relying on the broadcast date may also be affected.

Our tests were performed on a small number of UK DVB-T/T2 receivers, so the full impact of the problem isn't yet known. And the impact could be worse in other markets.

'OUR' Y2K BUG

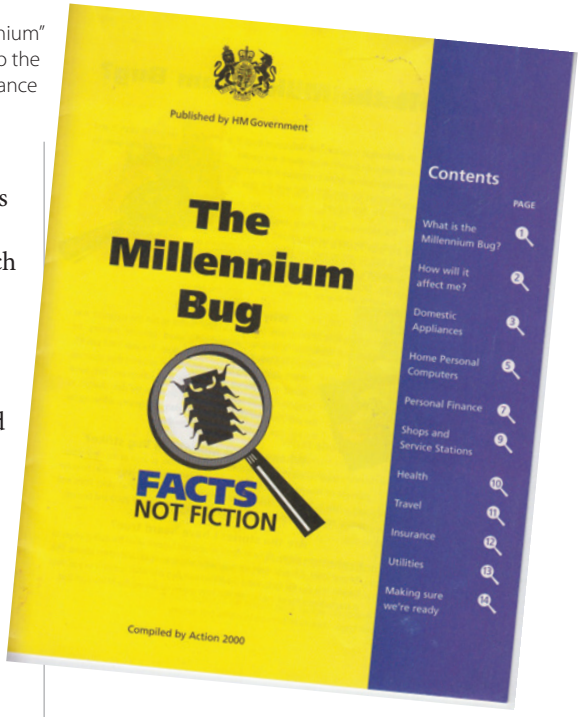
This problem is similar to the Y2K issue that some will remember from the year 2000. At that time, many computers stored the year as a two-digit decimal number, rolling over from 99 to 00 at the start of the year 2000. Unpatched systems interpreted 00 as 1900, leading to errors.

DVB specifications use a date format called Modified Julian Date (MJD), essentially the number of days since 17 November 1858. In DVB transport streams, only the least significant 16 bits of the MJD are transmitted. This is sufficient until 22 April 2038, after which the 16-bit value will roll over to zero at midnight UTC on 23 April.

The decision to signal dates this way predates my time in DVB. The specification was clear that the signalled value represents the lower 16 bits of the MJD. When the specification was first written the 16-bit value was more than 75% through its range. A warning about the possibility of a rollover in 2038 might have helped avoid some implementers mistakenly treating the 16-bit field as the full MJD instead. Perhaps the lesson from this for new standards is 'don't underestimate how long standards will be in active use'.

With no spare bits available to increase the number used to signal the date, DVB devised a solution that gives at least 75 more years of usage, with potential for a further extension in 50 years or so. The 16-bit field continues to signal the least significant bits of the MJD but with clearer guidance for receivers.

The solution is akin to one Y2K workaround, where the values 0-49 represented years 2000-2049, and 50-99 represented 1950-1999. For DVB-SI, values 32768–65535 will continue to represent MJDs from 5 August 1948 to 22 April 2038, while values 0–32767 will represent MJDs from 23 April 2038 through 9 January 2127, calculated as MJD = value + 65536.



There are parallels with the Y2K or "Millennium" bug, which had a limited impact thanks to the fixes that were put in place in advance

Image: computinghistory.org.uk

EQUIPMENT AFFECTED

Headend systems producing DVB-SI tables will need no changes provided they correctly output the least significant 16 bits of the MJD. However, we have found headend and test equipment that doesn't handle the date rollover correctly, meaning this issue affects not only receivers but potentially many DVB systems, all of which will need fixes before 2038.

DVB is currently updating the EN 300 468 specification. When complete, it will be published on the DVB website as DVB BlueBook A038r19. If you wish to verify device compatibility with dates beyond 23 April 2038 (and don't have a flux capacitor or a TARDIS), the test streams used for our experiments are available at: https://dvb.org/date-teststreams

Perhaps 2038 should be named the 'year of the rollover', since the DVB-SI date rollover won't be the only one. In January of that year, the 32-bit Unix/Linux timestamp will roll over, and in November, GPS will experience its third week-number rollover.

"Perhaps the lesson from this for new standards is 'don't underestimate how long standards will be in active use'."



Peter Cherriman is a Senior R&D Engineer at the BBC Research and Development's London laboratory in the UK. His main areas of work include access services, PSI/SI signalling and digital television testing. He has been an active member of DVB for many years and currently chairs the subtitle technical working group TM-SUB.

One ONID to rule them all! Kenya's steps to a smarter TV future

Kenneth Wenzel



Zapping through endless, mismatched TV menus will soon be a thing of the past for Kenyan viewers. In the third quarter of 2025, the Communications Authority of Kenya (CA) will roll out a new mandatory implementation of DVB Logical Channel Numbering (LCN), aimed at simplifying channel navigation on digital terrestrial television (DTT).

Until now, the way TV channels are arranged in Kenya has been confusing. Each network operator uses its own channel numbering system, making it difficult for viewers to locate familiar content. Jeff Schon, the co-founder and CEO of Akili Network, the company behind Akili TV, one of Kenya's most trusted family channels, has been a vocal advocate for using LCNs to address this challenge.

"Having a unique, unified channel number across all DTT networks is a game changer for Kenyan viewers. At Akili Network, we're thrilled that the CA listened to our call back in 2023 and took decisive action to simplify the TV experience for everyone. This step not only benefits broadcasters like us but also makes it so much easier for audiences to find and enjoy their favourite content."

WELL-PLANNED PROGRESS

This isn't just a technical update – it's the result of coordinated planning since 2023, when the CA was approached with a request to introduce harmonized channel numbering in Kenya. In response, the regulator developed a comprehensive Framework on the Application and Usage of DVB Identifiers.

After public consultation, the framework was formally adopted in May 2025. It sets the foundation for unified channel numbering and establishes rules for clear, consistent listings.

To enable this transition, the CA took the crucial step of securing a DVB identifier: the Original Network ID (ONID) 0x2194 has been allocated by DVB Services Sàrl to Kenya. This ONID is key because, from now on, all four DTT network operators in the country – SIGNET, PANG (StarTimes), GOtv (MultiChoice Group), and ADLN – will share the same ONID. Previously, each operator had its own ONID, which made unified numbering impossible.

In addition to the ONID, the CA also received a block of Network IDs, which make it possible to manage regional variations and multiple network configurations within the national DTT platform, and a Private Data Specifier, for the identification of proprietary information in the broadcast stream, such as custom channel lists or receiver behaviour.

REFLECTING MEDIA DIVERSITY

Kenya's broadcast environment is one of the most vibrant in Africa. Today, more than 250 free-to-air TV channels, a variety of pay TV options, and a growing number of digital radio stations are available over DTT.

These services are delivered in multiple languages, including Kenya's official languages, English and Swahili, as well as several vernacular languages. Some channels target local audiences, while others offer nationwide reach.

The new framework introduces better categorization of channels – by type (e.g., entertainment, thematic, religious, radio), language, and geographic coverage. This will help viewers discover relevant content quickly and easily.

RECEIVER STANDARDS

In parallel with channel numbering, the CA has also upgraded the minimum technical requirements for DVB-T2 receivers in Kenya. From 1 July 2025, all standard receivers shall support SD and HD signals in MPEG-4 format, improving on the previous SD-only requirement. Furthermore, UHD receivers shall support HEVC, regardless of whether reception is in SD, HD, or UHD.

These changes are part of Kenya's ambitious fifth Strategic Plan, for 2023–2028, which aims to expand DTT coverage and increase household adoption of digital television. By streamlining how channels are accessed and improving device capabilities, the CA is making digital TV more accessible, practical, and enjoyable for millions of Kenyans. And beyond that, it's a bold step towards a more connected, user-friendly, and inclusive media future.

To apply for DVB identifiers, visit:
https://dvbservices.com

Kenneth Wenzel, M.Sc.Eng., is an independent international consultant specializing in technology, media, and broadcast innovation, and serves as Adviser for Technology & Innovation to Akili Network. His technical input into Kenya's new LCN and receiver framework was appreciated by the national regulator for its positive contribution to broadcasting policy.





David Wood at DVB World 2025 in Munich, where he was made an Honorary Fellow of the DVB Project

Open your eyes, look up to the screens: baseline image parameters matter

David Wood

Our media delivery actions today rightly focus on managing the transition to internet-based delivery, where DVB-I may well be a key technology. There are superb tools from DVB for the media future. But are there other technology-determined elements that are less well understood? One may be the impact on the viewer of the baseline video signal format. Let's look in more detail.

First, step into your time machine and return to the ITU – the International Telecommunication Union – in the late 2000s. The global standards for Enhanced Definition Television, EDTV (ITU Rec 601) and High Definition Television, HDTV (ITU Rec 709) had been agreed in earlier years and the world asked, "What's next?" The author chaired the ITU standards group charged with trying to find the answer. Our assumption was that the only way forward for image quality was 'up'.

We knew that making a sufficiently large quality improvement over HDTV images would demand a huge jump in technical parameter values. We turned to the meticulous work done by the famed research lab at NHK in Japan. They had concluded that, since the perceived quality improvement curve is logarithmic, the next jump needed to be from HDTV's 1920x1080 16:9 images, to 16:9 images with 16 times the total detail (today called an 8K system). This could provide a quality jump similar to that from EDTV to HDTV.

IMPACT OF IMAGE QUALITY

Putting aside the obvious influence of the content itself, how does its combination with baseline image parameters influence viewers? One way being suggested back then, based in part on research done in France on HDTV, was that image quality affects how long a viewer stays watching a programme – the 'time to zapping' to another programme. Another was that the higher the image quality, the longer the viewer may recall the content after watching it.

Other ideas were that, for news, the quality of the image can affect the credibility of the content. Poor image quality can make content seem less reliable or less engaging. High quality images were thought to also be more likely to evoke strong emotions. So, we believed that baseline image quality does indeed influence the user, but entirely how and how much, we didn't know.

TWO SOLUTIONS

With small adjustments to the original NHK-proposed parameter values, we were ready to standardize. But there were objections. Receiver manufacturers wanted the standard to include not one but two quality levels: the first, easier to bring to market with available technology, with four times as much detail as HDTV (now called a 4K UHDTV or UHDTV1 system), and the other, the original idea, with 16 times the detail of HDTV (now called an 8K UHDTV or UHDTV2 system). And, of course, including both as ITU standards could, it was argued, over time provide twice the opportunity to make and sell TV sets.

Thus, there are today two ITU UHDTV levels (ITU Rec 2020) – 4K and 8K. Both have been deployed.

The fact is, however, that we still do not have quantitative research on user quality relationships between baseline parameter values for EDTV, HDTV, UHDTV1 and UHDTV2, nor on their impact on the human psyche. Such studies could be valuable for regulators, DVB Members and programme makers.

The answers won't come without effort but this ageing rock fan thinks it's worth asking, as Queen famously did, "*Is this the real life? Is this just fantasy?*" Only by diving deeper can we separate perception from assumption and discover the true influence of image quality. Could you be the one to champion this research? After all, "*nothing really matters*" more than understanding our viewers on a deeper level.

P.S. The effects of parameter values may well go beyond those above. The higher 'spectral occupancy' of the increasingly-used down-converted content may also affect our psyche – but maybe that's an article for another day.



David Wood, aside from being an ageing rock fan, played a central role in the development of DVB specifications, digital television, and UHDTV during his decades-long career with the EBU, BBC, and IBA. He was made an Honorary Fellow of the DVB Project in March 2025.

Pay TV has peaked, but new opportunities arise with IP-based content distribution

Ophélie Boucaud (Dataxis)

Fixed pay TV (excluding OTT) peaked in volume in 2023 at 1.2 billion subscriptions and is expected to decline slowly in the coming years. When taking into account TV plans on OTT services, the trend is more optimistic and total subscriptions should grow to 1.4 billion by 2030. At this point, IP-based pay TV plans will account for over 65% of total subscriptions, compared to around 55% currently, and only 40% in 2020.

Other access technologies are experiencing a decline across all territories. This is particularly the case for cable companies in North America, which have been haemorrhaging subscribers under the weight of cord-cutting. With the decline of their video business, most cable operators have made connectivity – especially broadband – their number one focus for the years to come, and some of them have even ditched their own pay TV services, in favour of a vMPVD* approach. For instance, WOW! and Frontier Communications deployed YouTube TV across their footprints. Comcast, in its joint venture with Charter, released the Xumo Stream Box in 2023, which combines the most prominent streaming apps with access to FAST channels through Xumo Play. This service has since been rolled out by other cable operators, such as Mediacom, GCI or Cox, as a replacement for their legacy TV offer, and/or as a complement for their broadband-only customers.

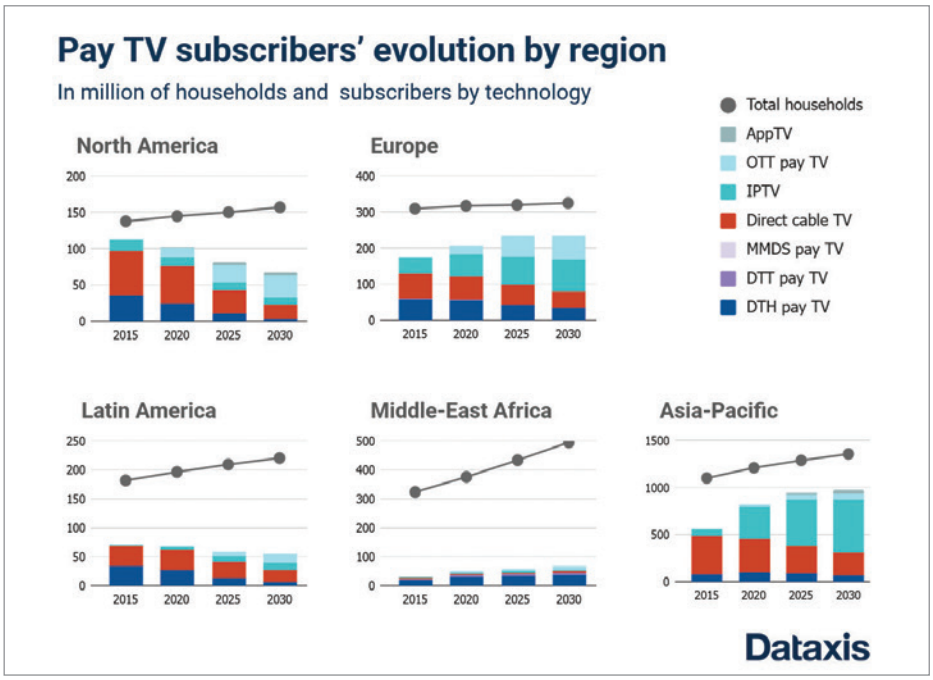
In Latin America meanwhile, satellite operators are rapidly losing their appeal while the transition to IP plans can't compensate for those subscription losses. In MEA, on the other hand, DTH remains resilient as it is often the only available access in a region with limited reach for fixed networks.

In Europe, legacy pay TV subscriptions are also declining, but the cord-cutting phenomenon is nowhere near as prevalent as in the US. IPTV and OTT packages are still progressing significantly as fibre spreads across the region, with cable companies also investing to migrate their customer base towards IP-based TV plans. Similar to the US, European viewers are increasingly choosing IP-based services when switching their TV access. For example, in Germany in the second half of 2024, Deutsche Telekom's IPTV and OTT apps like Waipu.TV and Zattoo had the largest customer intake following the shutdown of indirect cable distribution.

It is a similar situation in Asia-Pacific, where China accounts for the vast majority of IPTV subscriptions, but other countries in Southern and Eastern Asia are also experiencing rapid IPTV growth with the rollout of fibre networks. In the coming years, India is set to experience a boom in standalone subscriptions to packages that bring together TV plans and streaming apps, like JioTV+.

With the growing penetration of connected TV screens across the world, legacy pay TV operators are experiencing strong competition that directly affects their set-top box-based business. But the transition towards IP-based and standalone plans for TV services is also enabling them to cater to viewers' needs in new ways, for example by outsourcing TV services to dedicated platforms with vast aggregated app ecosystems. Connected TV enables viewers to gain access to a wide variety of OTT services, across both paid and free options, and this is enabling a boost of advertising-based content distribution in key markets like North America and Europe, where broadcaster VOD has become a key pillar for TV broadcasters' monetization.

* virtual Multichannel Video Programming Distributor



Ophélie Boucaud is a Principal Analyst for Dataxis in charge of research and data analysis related to the television, telecoms and OTT industries in EMEA. She regularly publishes strategic insights on streaming markets, advanced advertising and telecom technologies, and is a regular conference panellist.



DVB World 2025: ideas and inspiration from highly engaged community

We take a look back to DVB World 2025, which took place in Munich for the second year running. Next year the event moves to Amsterdam, on 17 and 18 March, keeping the now firmly established unconference format at its core. Registration for DVB World 2026 will open in December. Visit: dvbworld.org
Photos by Tomas Hercog



Analysts Ophélie Boucaud (Dataxis) and Ed Barton (Caretta Research) provided presentations looking at some of the latest trends in Europe's media ecosystem.



In his first DVB World as Chair of the DVB Project, Remo Vogel outlined some of the challenges facing the broader media industry and how he planned to ensure DVB could help its Members to address these challenges through open standards.



The opening keynotes came from Wen Gao (AVS Workgroup of China), Richard Lindsay-Davies (Digital TV Group), and Xavier Leclercq (Broadpeak).







A session on the future of free TV platforms included presentations on Freely (top left) and Sat.tv Connect (above), among others. The main challenges and opportunities were discussed by the panel, featuring (left to right) Orpheus Warr (Everyone TV), Frank Heineberg (RTL), Jean-Luc Deroudhile (Eutelsat), Elfed Howells (DVB PCM Chair) and Remo Vogel (DVB Chair).



Graziano Casale (Rohde & Schwarz) and Djamel Leroul (TDF) examined the prospects for mobile television and other 5G Broadcast applications.





Matthew Huntington (above left) presented an analysis of the economics of today's television industry, with Vincent Grivet (HbbTV Association) and Johan Bolin (Ateliere Creative Technologies) then offering their insights.

Raj Patel (Yotta Media) and Simone Ferrara (V-Nova) took a look at next-generation television deployments the USA, the Caribbean, Brazil and India.



The first day closed with fun and games, including darts, giant Jenga, and an impromptu table-football tournament, with the Italian team seeing off a strong German challenge in the final.



Nick Thorne, Thomas Schierbaum and Thomas Stockhammer each won a much-prized DVB 'disco cube' in the Big DVB Quiz.





















The rest of the unconference day saw participants deep in discussion in rooms around the venue, with 22 sessions across four blocks, each lasting an hour. A report was filed for each session, providing an outline of the main takeaways, and participants gathered in plenary again at the end of the day for the closing circle, where the 'next steps' were captured.

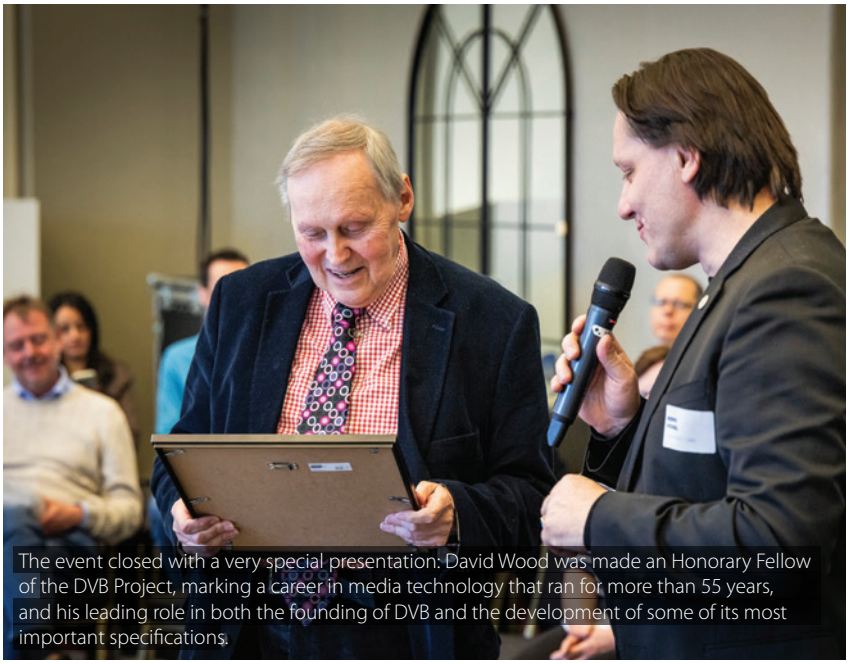
Day 2 started with the now traditional opening circle, where host Eoghan O'Sullivan invited participants to pitch unconference sessions.











The event closed with a very special presentation: David Wood was made an Honorary Fellow of the DVB Project, marking a career in media technology that ran for more than 55 years, and his leading role in both the founding of DVB and the development of some of its most important specifications.

The DVB World exhibition featured nine booths showcasing implementations of the latest specs and solutions.





Our Members. And you?

dvb.org/join