

tech-1

A producer's paradise: France TV's fiction factory

Plus

- Content at the heart of CyBC's modern production platform
 - NRK's Heidrun Reisæter on delivering big changes with small teams
 - 5G-EMERGE: a new EBU-led project with the European Space Agency
- and more...*

EBU

OPERATING EUROVISION AND EURORADIO



tech.ebu.ch/subscribe

Cover story: The France Télévisions production hub in Vendargues is a one-stop shop for producing films and series, with studios, sets – real and virtual – and post-production facilities all available on-site. It is used to film an incredible 260 episodes of the soap opera *Un si grand soleil* each year, taking advantage of the on-site expertise in the use of virtual sets to attain high-quality production values. See pages 10-11. (Photo: Cédric Jaffray)

Editor-in-Chief: Antonio Arcidiacono
Managing Editor: Patrick Wauthier
Editor: Eoghan O'Sullivan
tech@ebu.ch

Design: Louise Tait

Printed on FSC certified paper by
Graphius (FSC CO14767)

© European Broadcasting Union
All rights reserved. The reproduction of articles in tech-i is authorized only with the written permission of the publishers. The responsibility for views expressed in tech-i rests solely with the authors.

EBU

OPERATING EUROVISION AND EURORADIO

TECHNOLOGY & INNOVATION

Get an edge

- Our goal is to be an incubator to advance media technology.
- We catalyse innovations so they deliver for all players.
- We stimulate active collaboration so that you get more than innovative technology – you get a real competitive advantage.

Sign up to receive tech-i magazine, EBU Technology & Innovation newsletters or event alerts:
tech.ebu.ch/subscribe

EBU Members are encouraged to follow and contribute to the work of our Strategic Programmes and Communities of Practice.

Visit: tech.ebu.ch/ourwork



5



5G-EMERGE

7



8



10



19

Contents

3 Designing resilient media distribution networks for resilient societies

Antonio Arcidiacono on the urgent need to build resilient infrastructure

4 News

6 Taking a position on UHF spectrum

Statements from four coalitions sounding the alarm ahead of WRC-23

7 Pushing the set-top box to the edge

The EBU is leading 5G-EMERGE, a new project funded by the European Space Agency

8 Putting content – and archives – at the heart of a modern production platform

Yioula Kyriacou on Cyprus Broadcasting Corporation's new unified platform

10 A director's dream, a producer's paradise: France TV's studios in Vendargues

The production hub is a one-stop shop for producing films and series

12 Is Starlink ready for prime time?

VRT has been testing whether the service from SpaceX is suitable for media contribution

13 Doing more with PSM podcasts

EBU T&I has launched a new pilot targeting improved reach and prominence for podcasts

14 Bringing clarity to the implementation of Live IP standards

A practical checklist to help implementers and end users get the most from SMPTE ST 2110

15 Telling sustainability stories goes hand in hand with taking action

Simon Tuff (BBC) reports from the recent EBU Sustainability Summit

16 In my opinion: Delivering big changes with small teams

Director of Technology at NRK, Heidrun Reisæter

17 Partner Profiles: European Space Agency

Maria Guta on the critical role of satellites in fuelling the 5G and 6G media sector economy

18 The precarious financial position of public service media

The latest research from the EBU Media Intelligence Service

19 In the spotlight: Susanne Rath

Senior Engineer, Competence Center International Frequency Management, ARD/BR; Chair of EBU Project Group on PMSE

Designing resilient media distribution networks for resilient societies

Antonio Arcidiacono, Director of Technology & Innovation, EBU

“The absence of information in a blockade accomplishes two goals. Chaos is the first. People don’t know what’s going on, and they panic. At first I couldn’t understand why Mariupol fell apart so quickly. Now I know it was because of the lack of communication.

Impunity is the second goal. With no information coming out of a city, no pictures of demolished buildings and dying children, the Russian forces could do whatever they wanted. If not for us, there would be nothing.”

These are the words of Mstyslav Chernov, a video reporter for The Associated Press. He was among a tiny group of international journalists who remained in Mariupol in mid-March, eventually evacuated by Ukrainian forces.

I recommend that you read Chernov’s full account of the siege¹. For any of us who work in the media, it is a sobering reminder that the services we provide can and do make a life-or-death difference. (The essential role of the media when the COVID-19 pandemic began to sweep the world in early 2020 was another example that remains fresh in the mind.)

SUPPORTING DEMOCRACY

Ensuring the contribution and distribution of information remains active, even when key infrastructure is destroyed, is a fundamental requirement for any democratic society. A modern distribution network should be regarded as critical national infrastructure. It is a strategic resource allowing access to multiple and trusted sources of education and information, supporting public safety and democratic life.

As the war in Ukraine intensified, broadcast and broadband resources were



progressively disrupted or taken over. The EBU coordinated several actions to support the public broadcaster UA:PBC, using terrestrial and satellite-based resources.

Beyond these immediate and urgent actions, we must now reflect on how we can improve the resilience of information infrastructure in every country. As per a new EBU Recommendation (see page 5), the answer lies in the use of multiple technologies in complementary ways. This collaborative infrastructure should include both broadband and broadcast networks. It must implement high reliability, resilience, and security features, providing services to 100% of the population and across 100% of the territory, leveraging the respective strengths of different technologies and networks. And it must not be thought of as infrastructure to be used only in

emergencies: these networks should be the same that are used day in, day out to inform and entertain the population, while also being ready to alert them to crisis situations.

The irreplaceable role of broadcasting as a means of reaching the entire population of a country has come into sharp focus in the Ukrainian crisis. There, we have seen the use of almost all the broadcasting technologies of the last 100 years, including MW and SW radio, and extensive use of satellite technologies, helping to reach populations independent of local infrastructures.

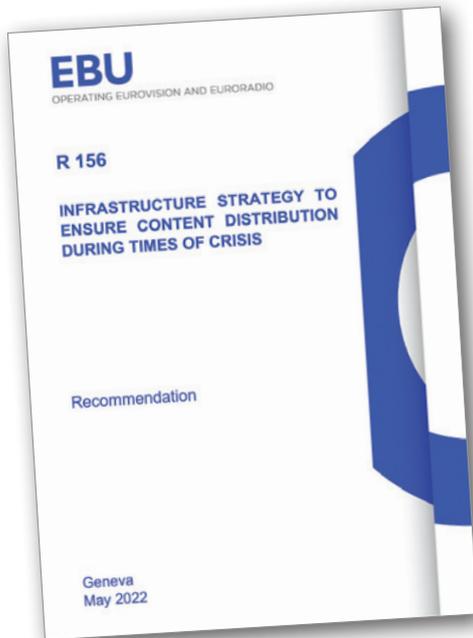
SPECTRUM IS A MUST

All of this strengthens my conviction that we urgently need to design, develop and deploy these resilient information networks. One core element of this is the availability of radiofrequency spectrum for essential public services. The broadcast networks that inform and educate on a 24/7 basis, with coverage of the entire territory of a country, can help prevent crises and alert the population when emergencies occur.

Regulators and policy makers should create favourable regulatory and market conditions to support the development and implementation of advanced collaborative network solutions, providing stability and long-term certainty. That includes access to sufficient spectrum resources for the continuous development of broadcasting technologies and networks.

This need is felt more intensely as we watch events unfolding in Ukraine, but it is not limited only to times of crisis. We must act now to protect our common future.

¹ <https://tinyurl.com/chernov-report>



A new recommendation from the EBU calls on national regulators and public service media to run resilient distribution infrastructure involving multiple technologies in order to ensure service continuity and maximized reach in times of crisis.

Recommendation R 156 stresses that resilience is a

Recommending resilient distribution infrastructure for times of crisis

benefit of the coexistence of multiple distribution platforms – including all forms of terrestrial broadcast, fixed broadband, mobile and satellite – and that these technologies should be considered for their ability both to work independently from one another and to maximize coverage of a given population.

Robustness and resilience come at some cost, but the likelihood and cost of unexpected events and their consequences is frequently underestimated. It often takes a crisis to show us how vulnerable we are. There is plenty of evidence for this in the past two years alone: from a global pandemic, to natural disasters such as flooding, hacking attacks on critical infrastructure, and war.

It is critically important for public institutions to be able to disseminate trusted information

and warnings – and the loss of such an ability can escalate a crisis and hamper an effective response. A key clause in R 156 states that the distribution infrastructure must be used “not only in time of crisis but also every day during normal times for the purposes of public service broadcasting, aiming to inform, educate and entertain the whole population, as well as alerting them to critical events.”

See: tech.ebu.ch/r156



Explore new Horizons

Following the trend merging broadcast and broadband distribution into a single seamless user experience, EBU T&I is launching a new event. Horizons, from 15 to 17 November 2022, will cover many topics. The opening day will focus on platforms, covering personalization and the various aggregator platforms for video and audio services. On Wednesday, the focus will be on distribution topics like 5G, hybrid networks and sustainability, as well as the traditional broadcast and broadband distribution technologies. Finally, Thursday's sessions will deal with spectrum issues, with the watershed WRC-23 conference looming. An initial programme will be available soon, with an innovative new format for the event and sponsorship possibilities. See: tech.ebu.ch/horizons2022

Putting 5G Broadcast to the test during the Eurovision Song Contest

The Eurovision Song Contest 2022 provided an ideal opportunity to showcase how live content could be efficiently distributed to mass audiences over 5G. Host broadcaster Rai, in Turin, joined ORS/ORF in Vienna, France Télévisions in Paris, and SWR/ARD in Stuttgart, all using 5G Broadcast to deliver live content from the contest.

“5G Broadcast offers big opportunities to the whole media value chain and there’s no better way to showcase this technology than at the EBU’s flagship event, the Eurovision Song Contest,” said Antonio Arcidiacono, EBU Director of Technology & Innovation. “With its flexibility, free-to-air reception, compatibility with existing broadcast networks and seamless integration with 5G devices, it represents an

important step in building truly hybrid networks for the benefit and safety of global media consumers.”

Running throughout the week of events, the 5G Broadcast test transmissions consisted of live content produced by Rai in Turin, encoded by Ateame at EBU HQ in Geneva and distributed to SWR, France Télévisions and ORS. At each city, transmitters from Rohde & Schwarz brought the signal over-the-air to test smartphones supplied by Qualcomm Technologies, Inc.

The 5G Broadcast solution tested was built on the 3GPP Rel-16 feature-set, operating in a receive-only mode, free-to-air, and without the need for a SIM card. The 5G Broadcast dedicated mode was demonstrated with a stand-alone broadcast infrastructure operating within the UHF band.

Innovation matchmaking opportunity for PSM

The STADIEM project, which kicked off in October 2020, offers a competitive acceleration and co-creation programme that brings together start-ups, scale-ups, investors and media organizations. The aim is to foster the development of next generation media solutions. As part of the STADIEM consortium, the EBU is helping to ensure that public service media (PSM)

organizations across Europe are an integral part of this dynamic, innovation-focused community.

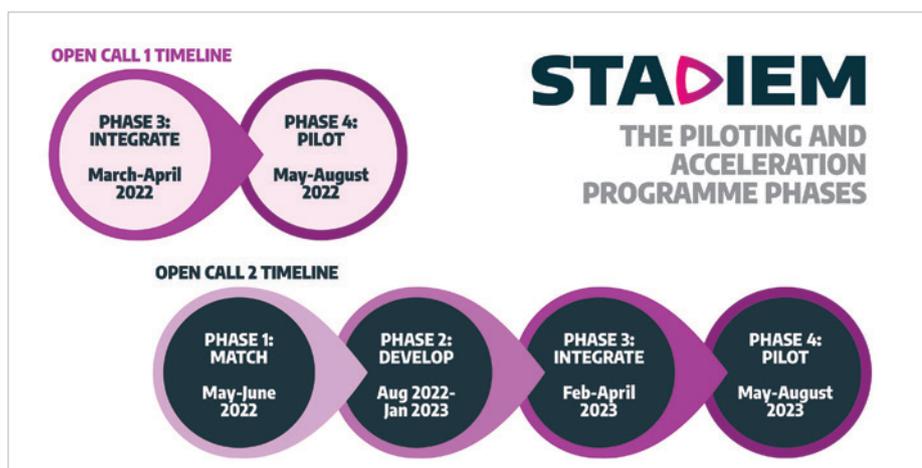
The project has completed two open calls for media innovators. The second call is now in the MATCH phase of the programme, where the aim is to identify corporate partners for the selected start-ups. Forty companies were chosen, with focus areas ranging from content

creation and distribution to archiving, data and content verification against disinformation. The list of start-ups is available now at stadiem.eu – any EBU Member interested in exploring a possible collaboration with one of these start-ups should contact the project team (info@stadiem.eu).

The scale-ups that successfully came through STADIEM's first open call have now entered the INTEGRATE phase of the programme. This means that, along with their corporate partners, they have begun technical integration and testing, or pre-pilot activities for public pilots.

Those that are working directly with EBU Members include On-Hertz (with RTBF), Tinkerlist.tv (with VRT), Web64 (with VRT), Datavillage (with RTBF and VRT) and Trension (with SWR).

Find more information at: stadiem.eu



Inspiring the next generation of media technologists

On Saturday 30 April, EBU Technology & Innovation welcomed a group of young schoolgirls from the local Geneva community to spend a fun and interactive afternoon at EBU headquarters to mark Girls in ICT Day, an initiative of the International Telecommunication Union.

The young students learned how to use software tools to record, edit and mix speech and music for publishing via EBU Euroradio's Storyboard tool, which facilitates the distribution of audio on social platforms. It was also a great opportunity for them to see the world of media technology in action, with visits to the Eurovision master control room and the EBU's production studio.

We hope the visit will have helped to inspire these girls to pursue studies and a career in areas that they wouldn't have otherwise considered, and that it creates a ripple effect in



changing mindsets of peers also. The International Girls in ICT Day aims to encourage girls and young women to actively pursue studies and careers in STEM

disciplines (science, technology, engineering and mathematics). EBU T&I has been involved for the past five years.

Taking a position on UHF spectrum

Across Europe, coalitions are coming together around the urgent need to defend the current status of sub-700 MHz UHF spectrum ahead of the next World Radiocommunication Conference.

GERMANY

Jochen Mezger, *Competence Center International Frequency Management, ARD and Deutschlandradio*



Broadcasting is fundamental to freedom of expression, and a vibrant culture is indispensable for a democratic society. Hence, the German *Alliance for Broadcasting and Cultural Frequencies* is campaigning, especially with political decision-makers, to preserve the UHF frequencies. At a high-profile conference in December 2021, representatives from federal and state politics, broadcasting, culture, and equipment manufacturers confirmed this requirement. A big success was the inclusion in the new government's coalition agreement of a statement that UHF spectrum must be secured for culture and broadcasting permanently.

Moreover, the alliance drafted a paper titled "Terrestrial Broadcasting in the digital society 2030+". Based on that, the German Federal Broadcasting Commission took a decision that the UHF frequencies are fully needed for broadcasting and culture after 2030.

Currently, we are preparing the declaration "Call to Europe!", encouraging like-minded European stakeholders to add their logos in the upcoming weeks with the aim of addressing relevant politicians.

SPAIN

Angel Garcia Castillejo, *Director of Audiovisual Policies, Public and International Service, RTVE*



RTVE is a member of *Televisión Abierta* - or *Open Television* - an initiative that brings together the main digital terrestrial television (DTT) players in Spain, where DTT is the main consumption platform. It accounts for almost 80% of linear television viewing time and 93% of the total audience of the television market.

Since its creation, *Televisión Abierta* has reached a common position among its members regarding the future of DTT and has successfully defended this position vis-à-vis the Spanish administration, making it the national position.

As far as WRC-23 preparations are concerned, *Televisión Abierta* will continue to defend its position not only with the Spanish administration, but also the Spanish Government, the EU, CEPT and ITU-R. We also have the support of the EBU and BNE (Broadcast Networks Europe), organizations with which we share a common position on the future of the UHF band.

SWITZERLAND

Roberto Moro, *Strategic Broadcast Services Manager, SRG SSR*



Major stakeholders from public service and commercial media, broadcast service providers and cultural organizations using frequencies for programme making and special events (PMSE) agreed to join forces on a national level by forming a Swiss alliance.

It was crucial to establish a common voice on the spectrum needs of broadcasting and PMSE audio, joining forces between stakeholders on a national level, among both EBU and APWPT (Association of Professional Wireless Production Technologies) members. Special care was taken to keep in close contact with the Swiss regulator, OFCOM.

A report published in February 2022 communicated Swiss PMSE audio spectrum needs in a precise and convincing manner. We now hope to reach consensus on a national level and coordination on a European level. The evaluation of alternatives for PMSE audio will take more time beyond WRC-23; concepts are yet to be proven and the spectrum needs for 5G Broadcast must be defined. I hope our excellent collaboration within EBU working groups will live on.

ITALY

Bianca Papini, *Technical Commission Coordinator, CRTV*



Confindustria Radio Televisioni (CRTV) is the association of Italian radio and television broadcasters, representing both public and private operators. It has prepared an official document asking the Italian administration to avoid co-primary allocation of mobile and broadcasting services in the sub-700 MHz band, the only one still available for terrestrial television broadcasting in Europe. Its disposal would imply the loss of the only platform that is able to provide universal, free-of-charge service to end users without any profiling. It is the only platform subject to prescriptive statutory regulation at both national and EU level; and it is much less CO₂ intensive than other distribution means. Linear transmission via IP cannot replace all these principles and values, even with significant investment.

To better represent the Italian broadcasting industry at WRC-23, CRTV became an Associate Member of the ITU in January 2022. CRTV and its members will attend CEPT and ITU-R meetings that are drafting text concerning the review of the 470-960 MHz band ahead of WRC-23. Particular attention will be given to the EU-level process to reach a common position.

Pushing the set-top box to the edge

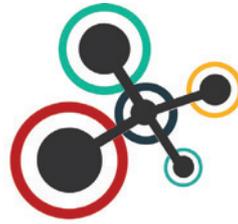
The EBU is leading a new partnership project aiming to converge satellite communication (SATCOM) services with broadband media delivery mechanisms. **Bram Tullemans** introduces 5G-EMERGE.

It all starts with question of how to optimize distribution networks to meet the demand of audiences who en masse use internet-enabled devices to consume media. The 5G-EMERGE project addresses this challenge by developing a satellite-enhanced ecosystem with distributed edges within, or close to, the last mile to effectively cache and manipulate content, applying 5G as a convergence technology. The satellite set-top box will no longer sit next to the TV set – it will instead connect, for example, to a router in an in-home network or to a 5G base station. The project is part of the **European Space Agency (ESA)** programme of Advanced Research in Telecommunications Systems (ARTES).

EDGES, FAR & NEAR

The integration of edge computing in media streaming is a core component of the overall 5G system being developed by 3GPP. It is leveraged in this project by orchestration of virtualized network functions between distributed ‘far edges’ and those near to the core of the content delivery network (CDN). For example, transcoding for multi-device playout can take place at the far edge, while the near edge prepares a high-quality version only for uplinking. Different satellite constellations using a common ‘native IP’ format, as standardized in DVB, will be used to enhance the data connection between the edges. Integration of this network slice in 5G base-stations (direct-to-the-edge) is only one of the targeted use cases. This ecosystem is also useful for direct-to-home and direct-to-vehicle scenarios.

The integration of SATCOM solutions in an orchestrated network with distributed edges has many advantages. Cost of delivery can be lower, even compared to fibre-connected



5G-EMERGE

areas. In such cases the terrestrial IP connection would be used for return channel traffic and long-tail content. If for some reason a terrestrial IP network became unavailable or congested, all traffic would be delivered over satellite, ensuring a fully resilient system. Besides efficiency and resilience there is also great potential for new business, as the multi-vendor edge approach also allows other (software) applications to be deployed.

The ecosystem itself is agnostic to the satellite networks used. In the initial phase different satellite distributions are integrated into functional demonstrators to test the operation of the specified ecosystem. Within the 5G-EMERGE architecture, geostationary satellites can be used to distribute popular content over a large region (Europe and larger), while spot beams covering a few hundred kilometres will allow a higher efficiency through a higher cache-hit-ratio (the number of times a video will be played out from a cache). If available, the cheapest bidirectional network can be used for the return channel to reduce costs. These are only a few examples of configuration options.

OPEN SPECIFICATION

Phase one of the project aims to use existing solutions to develop

and test an open technical specification of the envisaged ecosystem. The specification will define several functional components. At one end there are the connected content-provisioning environments of multiple content providers or aggregators of these services, mostly CDNs. There is an uplink ‘near edge’ that selects and prepares the content for satellite distribution.

Satellite networks will be used for two-way traffic. Besides using existing antennas, the project will also deploy more experimental phased-array solutions optimized for reception on moving vehicles. The actual distributed ‘far edge’ or micro-edge device will run the containerized media applications, like caching, content protection, etc. It will also connect to the (access) network, with optimizations to functionally integrate with 5G setups, to expose the content transparently to connected devices running content providers’ end-user-facing media applications. Running a CDN via satellite in combination with smart edge clients brings advantages both in terms of resilience and cost efficiency.

The EBU has established a consortium of more than 20 companies from six ESA member countries, working together to develop this 5G-EMERGE ecosystem. With partners specialized in satellite solutions and online delivery, the consortium members intend to deploy their respective solutions in this new value chain. The willingness of such a large group of leading companies to work on this ‘multi-tenant’ vision is seen as one of the indicators that the market is ready for 5G-EMERGE.

5G-EMERGE CONSORTIUM Arctic Space Technologies, Arthur D. Little, Athonet, Celestia Technologies Group, EBU, Fondazione LINKS, FTA Communication Technologies, G-Core Labs, MBI, Nagravision Sàrl, Nagravision AS, Rai, RomARS, SES Techcom, SixSq, Telenor ASA, Telenor Satellite, Telenor Maritime, TNO, Varnish Software, and ViaSat Antenna Systems.

Putting content – and archives – at the heart of a modern production platform

For Cyprus Broadcasting Corporation, an urgent need to preserve its archives became a key driver for building a new unified platform that adds value throughout the organization, writes

Yioula Kyriacou, Head of Strategic Planning & Digital Transformation

When our archives were assessed for ‘vinegar syndrome’ – the commonly used term for the degradation that can affect acetate film – the recommendation was given for their urgent restoration and transfer to a new archives building. A question came to us: was restoring and moving our legacy archives to the new building adequate? Apart from preserving our legacy, was placing them on new shelves going to add value to our organization, our production teams, and the public?

At the same time, we needed to break the cycle of producing and transmitting content, then putting it on a shelf and not being able to use it in the future due to changes in technology. We needed a new ecosystem that would place our content at the centre of all that we do, supporting our production teams and having the possibility to grow with the volume of our media assets.

UNIFIED PLATFORM

The entire world is shifting to platforms; so, we designed our own multifaceted unified platform, on which value can be created by all stakeholders. Production teams can now use a single interface to access end-to-end workflows, orchestrated by the media asset management (MAM) system, including a comprehensive rundown editor and a flexible metadata scheme.

Audio, video, images and other media, imported from different locations, are automatically converted into the set house formats and associated H.264 proxies are created on the proxy storage. Metadata is automatically indexed for efficient search. During ingest,

confidence monitoring is performed as well as automatic and manual QC.

Based on agreed rights, users browse, search, and retrieve content, they build rundowns, create and modify scripts, select shots, perform timeline editing with multiple audio tracks, add graphics directly on the timeline, and record and render voiceovers at the desktop. Non-linear editing (NLE) systems are integrated via API, while built-in editing tools can be used for rough cuts and simple effects, replacing the NLEs in the workflows. Metadata enrichment is supported throughout the media lifecycle.

Media and metadata are exported to our websites and TV playout system. The hierarchical storage management (HSM) system manages the transfer of the media to the robotic LTO (Linear Tape-Open) library. Retrieving consists of copying the media from the LTOs back to the HSM system and copying and unwrapping it on the production storage. Retrieving from the archive is done whenever the media needs to undergo production processes like editing, transmission, or export to various destinations.

DESIGN DILEMMAS

When designing the platform, we faced many dilemmas. Should our platform be more open or more closed? What login system should production teams use and what rights should they have? Who else should use platform and what rights should *they* have? Delete, repurpose, archivists’ rights? What content shall we make available to the public and who decides?

Faced with these dilemmas, the goals of the project were set. We needed a reliable system

built on robust, end-to-end and efficient workflows. We needed to create value and put our content at the centre by making it instantly accessible to our production teams and the public. We needed to be story-centric and provide all the tools to the production teams to make them autonomous in telling their stories.

During implementation we were faced with another crisis. Our 22-year-old newsroom system was dying. However, having this old technology actually helped with user acceptance of the new system since, basically, they did not have any legacy system to which they could hold on. Thanks to the successful implementation of the production and archives platform, we had users advocating for the new way of producing. Also, the content that was already on the platform added value, with more users wanting to access it by logging into the platform.

Funding was another big challenge. Our strongest argument for ensuring EU funding was that the archives would be made available to the public.

It took us two years from researching the market, writing the specification, and going through the European public procurement procedure, to installing, testing, and putting the system into operation.

CHANGE MANAGEMENT

During technological change, involvement, participation, and open communication help to avoid any ambiguity about roles and assist in building a positive perception of the introduced technologies and the impact these will have on the



Top left: The new archives building at CyBC; Bottom left: The new building houses a museum that includes these puppets from CyBC's first children's show; Left: The new production platform runs in an on-premises data centre; Above: Archived films were restored in France and Belgium and delivered to CyBC on LTO tapes together with the restored original reels, pictured here.

organization's performance.

Technologies should be reliable, to create a climate of trust when colleagues use them to carry out their daily work. Managerial support for new technologies is vital and helps to create a positive attitude towards new technologies, resulting in more effort in assimilating them.

Specifications should be set with great attention, specifying the technical parts, the required technology and the standards, but also the functionality required from the new systems. In this way vendors understand what you require, and this creates a climate of trust and fairness. It is important to always keep the big picture in mind and think platform-wise, breaking the silos and looking for end-to-end workflows. Once the holistic picture has been captured, then dive into the details, see where bottlenecks could develop and address them. A vision is needed, a vision to be communicated effectively.

At CyBC we openly communicated the technological change and how this would impact the way we do things, keeping the users in focus. In our efforts to streamline the workflows, break the silos and communicate with all involved,

we ran many workshops. This led to the detailed solution design agreed among all. After the system's configuration, the next obvious step was training, as this facilitates the assimilation of new technologies and enhances skills and capabilities; it improves employee self-efficacy and satisfaction during the change; and it reduces role ambiguity and uncertainties, leading to more effort in using the technology. A lack of training hinders the understanding of the system's capabilities, leading to workarounds, misuse of the systems or even complete avoidance of using the technologies.

RECOGNIZED SUCCESS

Making CyBC's archives available to the public, by reusing them in our television and radio programmes and by publishing them on our archives website (digital-herodotus.eu), managed to positively change public opinions of CyBC. The project has won prestigious awards such as the Cyprus Digital Marketing 2019 award in the category of best website transformation and the Cyprus Employers and Industrialists' Federation's 2021 award for social innovation. The project was also chosen as

an emblematic act by the EU regional development fund and as such it was published on the European Commission website.

CyBC's archives are used for educational purposes and in academic research. Many individuals access the digital collections driven by their interest in the history and culture of Cyprus and in their efforts to connect with the past. The Radio and Television Museum is also housed in CyBC's archives building, where visitors to the museum can explore dozens of museum exhibits.

GROWTH AND DISASTER RECOVERY

We continue to support the platform and our colleagues in the production teams daily, building trust in technologies. We also continue to grow our platform organically as our content grows and as per our colleagues' needs. In the meantime, we are working towards a disaster recovery plan, considering moving our content backup to the cloud.

We have a winning business case for ensuring further funding to restore and digitize the entire volume of our legacy archive collections. We have managed to break the cycle!

260 episodes of the soap opera *Un si grand soleil* are produced annually at Vendargues; inset: office spaces within the facility



A director's dream, a producer's paradise: France TV's studios in Vendargues

The France Télévisions production hub in Vendargues is a one-stop shop for producing films and series, with studios, sets – real and virtual – and post-production facilities all available on-site.

Olivier Roelens and **Alexandre Glenat** are our guides.

As part of its creation plan, France Télévisions installed an impressive production facility for fiction in Vendargues, close to the city of Montpellier, in 2017. The 16,000 m² building, which was previously a logistics warehouse, has been transformed into a production hub.

The first phase of the work was designed to accommodate the filming of the daily series *Un si grand soleil* as of early 2018. The second phase, which is currently nearing completion, will make it possible to host the production of other audiovisual works for France Télévisions, but also to open up to external projects (cinema and television). This is the group's main production site and is managed by La Fabrique France Télévisions, the internal production resources department. A producer or director can find

in our facilities everything necessary for the production of a film or series:

- three 1,133 m² film studios and one 600 m² studio
- a stock of lighting equipment including several hundred light sources, most of them LED
- a space dedicated to post-production (600 m²) including 13 video editing rooms, two colour-grading rooms, two 5.1 audio mixing suites, five sound-editing rooms, and two VFX open spaces
- a carpentry workshop for sets (600 m²)
- a paint shop (250 m²)
- a large stock of accessories, furniture, sets and costumes
- dressing rooms and production offices
- a restaurant (600 m²)
- fibre-optic equipment for sending film rushes

- more than 20 existing studio sets (police station, prison cell, lawyer's office, hospital, flats, offices, etc.) and the possibility of accessing a wide variety of sites for exterior locations
- on-site teams providing financial, technical, logistical and artistic expertise for projects.

VIRTUAL SETS

Innovation is at the heart of this production site: it hosts Les Tontons Truqueurs (LTT), a subsidiary of france.tv studio, the production company that is itself a subsidiary of France Télévisions. This team is specialized in visual effects that are displayed in real time on the set, visible directly on camera, and not added in post-production as is traditionally the case.

In concrete terms, LTT is able to design a virtual set, which will be

inlaid in real time on the green screen of the set, and visualized live by the film crews. Thus, the sequence shot can be seen immediately as it will be seen in the end, after post-production.

This makes it possible to obtain very realistic and augmented sets (set extensions) on sequences shot in the studio, and therefore greater freedom of direction and creativity; it also considerably facilitates and accelerates post-production.

Since April 2018, this audiovisual production hub has hosted the production of the series *Un si grand soleil*. This is a daily 22-minute soap opera with 260 episodes each year, broadcast on the France 2 channel. 230 employees work daily on its production, divided into four shooting teams. The ambition of this series is to have a high level of aesthetic rendering, equivalent to a prime-time series. This level is achieved through a mixture of sequences shot in natural settings and sequences shot on studio sets 'enhanced' by the use of the system developed by LTT. *Un si grand soleil* is a great success, with almost 4 million viewers every day in France and numerous sales abroad.

DESIGN AND BUILD

Also available are a 600 m² carpentry workshop and a 200 m² paint booth. This is the central set-design workshop of the France Télévisions group, capable of handling the construction of fiction sets as well as sets for studio-based programmes, newscasts or technical apparatus.

In the construction part, we find all the traditional tools of a joinery: band saw, panel saw and format saw, router, planer, and a digitally controlled machine that allows the manufacture of large volumes of various elements of sets or furniture. A wood dust extraction unit is connected to all these machines, allowing sawdust and shavings to be recovered for processing and recycling. A welding area has been set up to allow for



Vendargues includes three 1,133 m² film studios and one 600 m² studio; below: graphics can be inlaid in real time on the on-set green screen



metalwork.

In the painting area, a large suction system ensures that the air is clean so that the painters can work in complete safety. A specially adapted room is used for the storage of dangerous products and a fume cupboard facilitates the mixing of paint and the cleaning of equipment, and helps to recover paint residues.

There is a team dedicated to the management of the sets, furniture and accessories. Indeed, the set stock of the entire France Télévisions group is located in Vendargues. Tens of thousands of pieces of furniture and accessories are stored on pallets, waiting to be selected by a head set decorator for a future film. A database is being set up to facilitate the work of the teams and optimize the reuse of set elements. Handling is facilitated

by the use of motorized trolleys that can access the studios or truck loading areas.

This production site has been designed to minimize the environmental impact of productions: stone walls, highly insulated studios and premises, latest generation heat pumps, double-flow ventilation, centralized and computerized management of the building, electric vehicle recharging stations, LED lighting, waste minimization and sorting, bio-waste recovery, tree and herb planting.

The Vendargues production site will be fully operational by summer 2022. In addition to the shooting of the daily series, it will host the production of series, mini-series and one-offs and will be open to external production companies.

Is Starlink ready for prime time?

Starlink is a high-bandwidth, low-latency, low-orbit meshed satellite network and service from SpaceX. What does it mean for broadcasters and can it be used for live contribution of audio and video signals? **Jonathan De Bolster** reports on VRT's tests.

One of the most important advantages of a satellite connection is the ability to use it everywhere within the satellite's footprint with a clear view of the sky, even where there's no traditional connectivity available. Initially, Starlink terminals were registered to a specific location and one could use them only within a radius of several kilometres, which made it a good 'fixed wireless access' solution but not so well suited for events and ad hoc situations. The address could be changed via the portal, but it did not always work, and it was a hassle.

Recently Starlink activated the "roaming" feature, which allows for portability. This was necessary for broadcasters to seriously consider it as a valuable connectivity solution.

SECURITY & CONFIDENTIALITY

Starlink offers a gateway to the public internet – a broadcaster's traffic might be routed through several countries. Using it in combination with an encrypted layer 2 or layer 3 VPN tunnel solves this potential problem.. Latency and bandwidth are very good, so there's almost no noticeable overhead.

Another advantage of using a VPN is that this offers a workaround for carrier-grade NAT, or CGN. This is a system that an operator implements to reuse public IP addresses and allows multiple terminals to share the same public IP address. This can be problematic for specific devices or services, such as audio codecs.

Other potential problem areas when using Starlink include the risk of saturation, where many terminals are used simultaneously, and a lack of the kind of service level agreement required by a broadcaster. Equally, there are uncertainties

The test team with a Starlink terminal: (clockwise from left) Jonathan De Bolster (System Expert ENG & Transmission), Tom Grenson (System Expert Telecom), Geert Cantens (System Engineer Radio Lab Audio Technology), Koen De Leener (Team lead ENG & Transmission).



about the future evolution of data plans and prices. It is also worth noting that the service is focused on download, where broadcasters would mainly use upload.

What about sustainability? Starlink requires ground stations, user terminals and thousands of satellites that need to be brought in orbit. Depending on the type of terminal, its firmware and the location (which influences the frequencies and the output power), the power consumption will vary. Some users have seen a consumption of 60–80 W, whereas we noticed values closer to 100 W.

VRT's tests of Starlink will continue, for events or newsgathering (in emergency situations) and to test the roaming capabilities. We will also keep an eye on competing solutions that are becoming available.

INTERIM CONCLUSIONS

Is Starlink a replacement for traditional satellite connectivity? For live audio/video contribution as a stand-alone solution: probably not, at least not yet. We consider it the equivalent of a 'stable 4G connection on steroids' and recommend treating it as

one: use it in combination with a bonding router or bonding video encoder to reduce the risk of packet loss, thus increasing the overall quality.

For surfing and data transfers (e.g. compressed video files), it's perfectly usable stand-alone, for non-critical use cases.

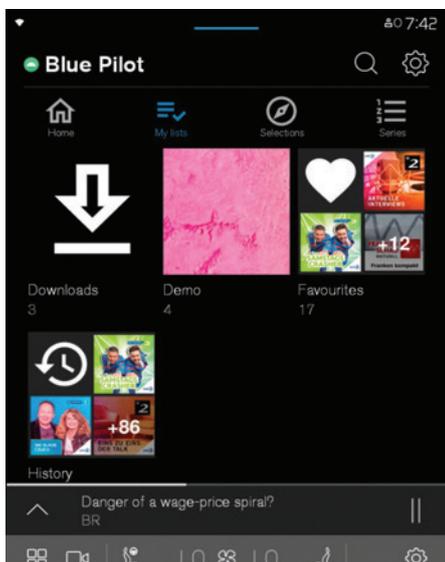
It's important to keep an eye on the rapidly changing market. Even if it's not a perfect fit, it can be used to a broadcaster's advantage. The trick is to use the right solution for the job. Starlink is quite new and unconventional, but sometimes an elephant in the room also helps the competition to innovate; and constantly questioning whether the room needs redecoration is a healthy attitude as well!

Starlink is currently a nice-to-have solution with loads of potential that has created a mind shift for broadcasters, as well as for traditional satellite providers.

Jonathan De Bolster spoke about Starlink at the EBU Production Technology Seminar 2022. EBU Members can access the presentations here: tech.ebu.ch/pts2022

Doing more with PSM podcasts

Could the technology stack that underpinned last year's launch of two news-related products, now widely used by EBU Members, be applied to the world of podcasts? **Sébastien Noir** (EBU T&I) outlines three potential use cases.



2021 saw the EBU collaborating with its Members, through the News Pilot, to launch two new products that allow content to be more easily shared in innovative ways. The Eurovision News Monitoring tool provides editors and journalists with access to stories – text, audio and video – from 20 EBU Members, in close to real time, in a unified web application. And the European Perspective box, integrated by 11 Members, provides visitors to news websites with a diversity of views on the most important stories. In both cases, the shared content is automatically translated into the language of the end user.

EuroVOX and PEACH, both co-developments of the EBU and its Members, are core elements of the technology stack for the above products. The transcription and translation capabilities of EuroVOX help to overcome language barriers; and PEACH provides powerful recommendation algorithms that make it easier to find relevant content.

Building on the success of the News Pilot, we're now exploring how the same technology stack can be applied in other areas. One promising focus is the increasingly popular world of podcasts. With a

working title of the EBU Blue Pilot, we're currently building prototypes to evaluate the relevance of three potential, and non-exclusive, directions for collaboration. We have successfully integrated the content of three broadcasters: BR (Germany), UR (Sweden) and ORF (Austria). An Android mobile app and Android Automotive OS app showcase the content and the services ported from the News Pilot.

1. HUB OF SERVICES

While most broadcasters create podcasts, they often don't have the resources to maximize the value of what is created. Using EuroVOX, the EBU Blue Pilot could provide the transcription of content, enabling better search capabilities, improved accessibility, and enhanced understanding for those who have not mastered the source language. With PEACH algorithms, content recommendations could help create links to existing content for the listener, uncover hidden gems in the archives and offer a richer experience. Segmentation would allow content repurposing, creating shorter stand-alone clips that could be shared on social networks. Automatic extraction of topics (places, organizations and people) would help the user understand the subject at a glance and find other relevant content. These features could be delivered through APIs or available natively in a smart, easily integrated player.

In this scenario, the Blue Pilot acts as a hub of services, potentially multiplying the untapped value of content with a minimal integration effort.

2. CONTENT CROSS-LINKING

As for stories within the News Pilot products, the Blue Pilot could provide EBU Members with an

innovative and straightforward way to cross-promote their podcasts on their websites and apps. The listener benefits from a rich horizon of trusted content. Depending on the nature of the content, semi-automatic translation could provide increased reach both abroad and in-country for minority languages. Even where the content isn't suited to translation, it can be shared with countries that use the same language, creating local content alliances.

3. COMMON APP

Most broadcasters rely on third parties like iTunes, Spotify and Google to distribute their podcasts. In exchange for a potentially wider audience, they can lose the direct link with their listeners as well as the data associated with the usage. Alongside the risk of misattribution, even more importantly, they face the risk of not being seen: their content is lost in an ocean where algorithms driven by commercial considerations favour controversy and extremism to capture the attention and loyalty of listeners. Losing prominence, they are at the mercy of the gatekeepers.

A third possible scenario would thus see Members joining forces to create a European user-facing application for PSM podcasts, targeting mobile phones and the automotive industry. Listeners would have a safe place to search for quality content, curated by journalists and personalized by responsible algorithms. The magnitude of the app would ensure its visibility in stores and bring the needed leverage to secure prominence in discussions with car manufacturers and gatekeepers.

If you'd like to know more or get involved, please contact me via email: noir@ebu.ch

Bringing clarity to the implementation of Live IP standards

Despite the existence of agreed standards, interoperability between implementations in Live IP production is not always assured, particularly in the early stages of deployment. The EBU is helping to bridge the gap with a highly practical checklist. **Pavlo Kondratenko** introduces PICS.

The shift to Live IP production is now well under way, with most broadcasters opting for IP-based systems when moving to new facilities, aiming to benefit from greatly increased flexibility and scalability. This shift is underpinned and enabled by several industry standards, including SMPTE ST 2110 – for sending digital media over IP networks – and AES67 for audio. However, implementing Live IP can be challenging: standards are complex, non-straightforward texts that can be difficult to interpret. There is often a lack of clarity regarding the decisions taken by equipment manufacturers in areas where the standards themselves do not give strict guidance.

To address this challenge, the EBU has been developing a detailed checklist called PICS, standing for *protocol implementation conformance statement*. Aimed at both broadcasters (i.e., the future end-users) and vendors looking to implement Live IP, the PICS checklist is a structured document that asserts how specific requirements are met by a given implementation of a protocol standard.

With this document in hand, implementers can verify their

compliance to the ST 2110 standard and ensure interoperability between two implementations. They can also receive additional clarifications about the standard, guidance on how to comply with it, and clarity in terms of decision-making during the compliance process. This document might also be used for tender procedures and as a basis for standards conformance testing.

The PICS document starts by identifying the implementation being assessed, and then breaks down the relevant parts SMPTE ST 2110 into a checklist of easily manageable statements and precise options, all in tabular form (see below). Each statement is numbered and colour-coded according to its level of requirement imperative. A notes column provides additional clarification and guidance. The last column is where the implementer can tick whether the statement is supported, by replying with a simple yes or no. In some cases, statements will only apply to a subset of implementations, in which case PICS incorporates additional questions, some of them multi-level, to make clear whether the statement is applicable to this specific implementation or not.

JT-NM TESTED

PICS builds on certification efforts from JT-NM, the Joint Task Force on Networked Media – a consortium in which the EBU is a partner alongside AMWA, SMPTE and the VSF – and its JT-NM Tested programme, the goal of which is to promote and support interoperability of IP production equipment. Self-testing certification was introduced in 2020, in part as a response to the pandemic-related cancellation of a planned physical validation gathering. This year the EBU will be coordinating another on-site JT-NM Tested event. It will be the first such event where the test plan for one of the standards will be based on the corresponding PICS document. The idea is that, for subsequent events, all other test plans will also be based on PICS – and submitting the completed PICS proforma will be the first step for vendors in submitting their product for testing.

Currently, PICS is at a draft stage and requires input from future users. Please get in touch if you would like to provide feedback and comments on how the document is taking shape, to make it fit for your needs. Contact kondratenko@ebu.ch.

Statement Number	Feature	Requirement Level	Notes	Supported
6.3-1	The Standard UDP size limit shall be 1460 octets. The UDP Size is reflected in the UDP header, and includes the length of the UDP header (8 octets) and also the RTP headers and data. Senders shall not generate IP datagrams containing UDP packet sizes larger than this limit unless operating conformant to the optional extended UDP size limit specified in section 6.4.		Does the device contain one or more senders?	Yes <input type="checkbox"/> No <input type="checkbox"/>
			Does the sender operate conformant to the extended UDP size limit of 8960 octets?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/>
		1	Mark as supported if the sender doesn't generate IP datagrams containing UDP packet larger than 1460 octets.	Yes <input type="checkbox"/> No <input type="checkbox"/>

An extract from a typical PICS document, showing how the checklist provides clarity on the capabilities of the implementation under consideration.

Telling sustainability stories goes hand in hand with taking action

With many highlighting the need to 'build back better' as we emerge from the pandemic, the EBU Sustainability Summit 2022, held the day before Earth Day, provided a timely look at what the media industry is doing to address climate change, writes **Simon Tuff** (BBC).

In a full day, and across four sessions, the second EBU Sustainability Summit explored a wide range of topics, from COP26 and the content pledge, to generator sets and cloud-based workflows. In simple terms, however, it seems that the challenge of sustainability falls, for us as broadcasters, into two main areas: our content and our operations. In other words, the stories we tell and the way we make and distribute our programmes.

Emma Stewart of Netflix talked about the power of environmental themes across their content (and if you haven't watched *Don't Look Up* then I recommend you do), but she also talked about their aim to support those stories with improvements in their business operations. Gaby Hornsby of the BBC used audience data to show how the broadcaster's attempts to tell the story of October's UN Climate Change Summit in Glasgow – COP26 – connected with the UK audience. She said that, although the climate issues may have been overshadowed by other world events in recent times, the environment is still something audiences care about greatly.

CREDIBLE STORYTELLERS

We learnt that positive messages, information that people can use to take action, and sustainable behaviours that can be applied to everyday life, are three critical elements for successful content. What is more, our audiences want us to go further in our efforts to help arrest climate change. Part of this is the media's role in holding to account those creating carbon footprints, making climate pledges and promising



Emma Stewart, Sustainability Manager at Netflix, was the keynote speaker at the EBU Sustainability Summit 2022

support or action. As the storytelling panel made clear, the carbon footprint created by making and distributing our content can be outweighed many times over by the resulting positive changes to behaviours and values among the audience. Nevertheless, we must maintain our credibility to tell those stories by being as sustainable as possible ourselves.

Which brings us to the subject of our own operations. Here we find that, as more broadcasters calculate and report their carbon

footprint, it is becoming clear that the vast majority, over 95% in fact, is generated not within our buildings but in our supply chains. That is, in the things we buy, the services we use and the platforms we rely on. Fear not, however, because there are now a whole range of tools, service providers and technologies that can help us understand the challenge more clearly as we start to decarbonize our world.

The carbon calculators from albert and EcoProd are well known but the DPP offers an assessment tool to help with the supply chain challenge (including certification) and Workflowers has a tool to help you record and analyse your operations in more detail. At RTÉ, they have used the international ISO 50001 standard to manage (down) their energy consumption and at The Economist they are using the European taxonomy for sustainable activities and non-governmental reporting frameworks to great effect. All of these approaches demonstrate the importance of good quality data, as without it you won't be able to sustain improvement and achieve deep decarbonization. Still, none of these tools is a magic wand.

The challenge of saving the planet is a nontrivial one but with committed leadership, that empowers us to do our best work, we have started to make a difference. As Tim Davie, BBC's Director General, said in his opening address to the summit, "the big challenge is how we keep up that momentum... even as other global crises demand our attention".

Find the presentations here:
tech.ebu.ch/sustainability2022

Delivering big changes with small teams at NRK

Ahead of a move into new headquarters, Norway's NRK has already started transforming its technology, with an emphasis on small internal teams rather than large, consultant-led projects, writes **Heidrun Reisæter**, Director of Technology.

NRK is facing great technology change in the coming years. We are about to build a new head office and at the same time we need to modernize our production platform, with a transition to IP, and modernize our playout and distribution solutions. These are changes we would make anyway, but our relocation plans have forced us to accelerate – we don't want to delay the organization's journey towards this long-awaited new building, where well-functioning and flexible production technology is a must.

Modernizing NRK's production infrastructure is a complex and demanding task, both technologically and for the organization. The risk is great, as we're changing core technology that is crucial to fulfilling our remit. Instead of installing the new production platform for the first time in our new head office, we can reduce the risk and reap the benefits earlier by starting the technological transition now, in our existing premises. This will mean that everything is well tried and tested, with known workflows, before we move.

THE WAY WE WORK

Alongside this renewal of NRK's technology, we are renewing the way we work. Three years ago, we gathered all product development, technology, and production into one division. To deliver the best results as a unified organization, we have made efforts to develop how our work is organized and carried out. All choices and priorities must be linked to NRK's remit and audience strategy. For product and technology, we reduce vulnerability by establishing teams as the smallest unit of delivery,



strengthening our DevOps capabilities, reducing the use of projects, and striving for more interdisciplinary collaboration.

Based on this, we are now organizing our modernization initiative as a 'hybrid project'. This means that, even though we operate with a project structure on top, as much as possible is solved within teams in the line organization. The project's main responsibility is to ensure a comprehensive plan, solution design and financing, while the actual work of developing infrastructure and technical installations will be carried out by the same teams that will own and operate the solution in the future. This way we secure ownership in the team while putting our own organization in a better position to operate and further develop the solutions after the transition.

INVESTING IN OUR OWN TEAMS

This model is demanding to set up in the start-up phase. We would probably have made quicker early progress by establishing a large project organization staffed by more consultants, under the assumption that our own employees could take over at a

later stage. However, while our chosen approach means we currently face capacity challenges in our teams, I am convinced that having these initial obstacles to overcome is preferable to facing greater risk at a later stage. I have seen too many large projects drive change at their own pace without taking enough care to ensure that the organization would be ready to take over. When the project is over, the organization receives solutions that they themselves have not defined and is thus poorly positioned for future development. There is also a risk of the project being unable to adjust to continuously changing needs because the team is too distanced from the line organization and thus does not deliver what is actually required for the future.

The more we pursue the iterative, team-based development of our technology portfolio, the less we will need large, expensive and risky projects in the future. That is why we are investing in ensuring that our own employees can define and develop NRK's future production platform, with a way of working that we believe is best for the long term.



From 5G to 6G: developing globally competitive satellite solutions

Satellites will play a critical role in fuelling the lucrative 5G and 6G media sector economy. The European Space Agency is working alongside the EBU on key technology developments, writes **Maria Guta**.

We have entered an era of digitalization and connectivity, between everything and everyone, changing the fundamentals of human existence: the way we interact, produce, live and work. Driven primarily by technological forces that support new connectivity, computing and consumption paradigms, as promised by the advent of 5G technology, this fast-approaching socioeconomic transformation also causes massive disruption to business models and service delivery chains.

Satellite contributions to 5G deployments are being consolidated to maximize the benefits of integrating satellite in the overall 5G network. A first specification for the integration of satellite networks in 5G becomes available with the finalization of 5G Advanced Release 17.¹ Satellite networks bring global connectivity, straightforward and cost-efficient/sustainable deployments, serving users within the edge with low latency and increased reliability. Furthermore, the COVID-19 pandemic emphasized the importance of secure and reliable satellite connectivity solutions and services supporting societal needs and the economy globally. This evolution represents a huge opportunity for the satellite industry to seamlessly integrate satellite communications in the global mainstream telecommunications ecosystem to address new markets and serve many additional use cases.

The key objective of the Strategic Programme Line 5G/6G (SPL 5G/6G) of the European Space Agency is focused on the development of globally competitive satellite solutions



Maria Guta is Senior Telecommunication Systems Engineer at the European Space Agency

as complements to terrestrial ones, providing sustainable and green 5G, beyond-5G and 6G connectivity and services to address the needs of market stakeholders and citizens. To fully realize this potential, SPL 5G/6G engages with the satellite community for the timely delivery of suitable concepts and visions and, above all, credible technology developments.

MEDIA OPPORTUNITIES

Due to the increased digital connectivity needs, especially within the media industry, and the high rate of early adoption of 5G networks in the sector, the overall satellite telecommunication environment has seen a big increase in potential new development directions and innovation of the related business value chains.

Satellite is part of content creation and distribution chains. To maintain its primary role, it is highly important to be able to provide services comparable with terrestrial networks. Of

utmost importance are to: (a) update existing technologies to transport the latest content data traffic classes, such as IP-based on demand; (b) enhance performance and service offerings for conventional direct-to-home delivery; and (c) address emerging use cases such as direct-to-the-edge or direct-to-mobile scenarios, benefiting from shifting the focus of 5G deployments from wide area network operators towards local networks as well as towards nomadic and moving networks, so as to be able to better address the needs of other vertical markets, including transportation, PPDR and smart city/smart regions.

SPL 5G/6G is engaging with the 5G-EMERGE partnership (see page 7), led by the EBU, to develop and validate an integrated satellite-terrestrial system to efficiently deliver high-quality content distribution services, developing technology and service delivery features and other necessary enhancements compliant to international standards. Such developments aim to enhance interoperability and reduce costs, adopting continuous development and integration principles. 5G-EMERGE also aims to investigate the use of future technologies for low end-to-end local and global delay, for example with the adoption of satellite-enabled micro-edges and multi-orbit communications.

The 5G-EMERGE system needs to be considered and understood in the broader underlying context as it aims to prepare Europe for gaining a leading role in media content delivery and maintaining its sovereignty in the face of extensive global convergence.

¹ tinyurl.com/5ga-rel17

The precarious financial position of public service media

Several reports published recently by the EBU together paint a bleak picture for the funding of public service media, writes **Florence Hartmann**, Manager of the EBU Media Intelligence Service.

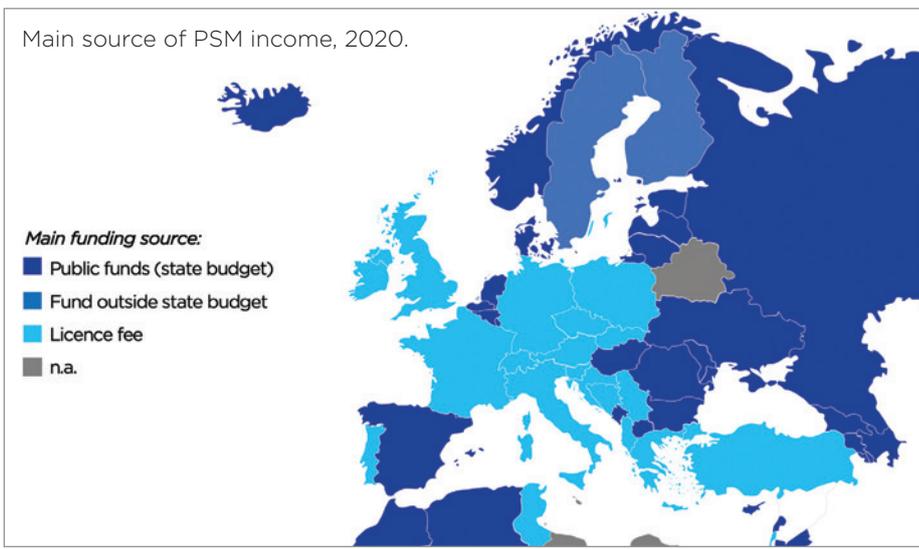
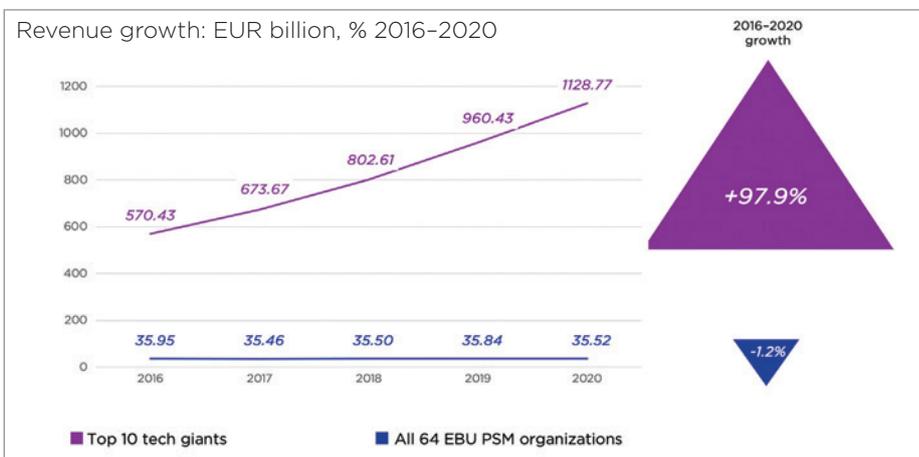
Public service media (PSM) remain major players in the audiovisual landscapes of their respective markets, with a cumulated operating revenue of EUR 35.52 billion in 2020. Yet, PSM are operating in a changing competitive context that surpasses the traditional boundaries of the European audiovisual sector. The market has been shifting to pay-based online services, which are increasingly controlled by groups based outside Europe, and specifically to US-based interests.

The gap between European PSM and these behemoths keeps widening: while PSM revenues contracted by 1.2% from 2016 to 2020, revenues of top 10 tech giants doubled over the same period (+98%). What's more, the 1.2% contraction in PSM revenues turns into a sharp 6.9% drop in financial capacity when expressed in real terms, i.e. taking inflation into account.

In accordance with their public service remit and mission, PSM remain mostly publicly funded: in 2020, 79.4% of all PSM funding in the EBU area was public while commercial sources accounted for only 17.4%. Commercial sources represent a steadily decreasing proportion of the funding mix.

While many different mechanisms of public funding for PSM coexist across the EBU area, three models can be identified:

- Funding PSM directly via state grants is the most widespread model in the area, with 31 EBU markets relying on the general state budget, representing 16.2% of total PSM funding in 2020.
- The licence fee remains the main funding model in 20 EBU countries and represented 59.5% of total PSM funding in 2020. This large proportion of total funding is mostly explained by the fact that, in four of the



'Big Five' countries (France, Germany, Italy and the UK), PSM are still funded by a fee. It hence remains the cornerstone of PSM funding, despite the growing number of countries replacing the fee with more direct public funds in recent years. In 2022, the future of the licence fee is under examination in several countries, including France, Switzerland and the UK. When possible, the EBU is calling for adjustment and modernization of the fee, rather than scrapping it. Recent cases indeed show that replacing the fee with direct transfers from state budget generally has not guaranteed stable, independent and adequate funding.

- A third model, less widespread but as beneficial as the licence

fee in terms of sustainability of PSM funding, relies on specific funds outside state budgets. This model is currently implemented in Finland and Sweden. Efforts to guarantee sustainable and adequate funding of PSM across the EBU area for years to come can benefit greatly from having access to accurate intelligence on these European funding trends, national models and recent reforms.

The above insights are drawn from the recently published EBU reports "Funding of Public Service Media" and "PSM Competitive Environment". Complementary information is available in the reports "Licence Fee and Household Charges" and "Advertising and Public Service Media".

(Source: EBU based on Members' data - 64 Members in 47 markets - and companies' financial statements)

(Source: EBU based on Members' data)

Conference videos on demand

A selection of recent additions to our rich library of videos from EBU Technology & Innovation events, available to Members from: tech.ebu.ch/presentations



GREENING THE MEDIA SUPPLY CHAIN

ABDUL HAKIM (DPP)

How to take the lead, from script to screen



AN INTRODUCTION TO ISO 50001

JAMES MCCONNOLOGUE (RTÉ)

Adopting the international energy management standard



EBU BLUE PILOT: PODCASTS ON STEROIDS

SÉBASTIEN NOIR (EBU)

Applying the News Pilot tech stack to podcasts



WHAT DOES BEING 'DIGITAL FIRST' MEAN?

TIM WATKIN (RADIO NEW ZEALAND)

Your strategy can take you to unexpected places



AN INTRODUCTION TO WIKIDATA FOR MEDIA

KIM VILJANEN (YLE),
ALEXANDRE ROUXEL (EBU)

Opening presentation of the EBU Wikidata Workshop 2022



DEVELOPING EUROPEAN MEDIA DATASPACES

LUCILLE VERBAERE (EBU)

Boosting innovation while safeguarding data privacy and sovereignty

IN THE SPOTLIGHT

Susanne Rath

SENIOR ENGINEER, COMPETENCE CENTER
INTERNATIONAL FREQUENCY MANAGEMENT, ARD/BR



Susanne Rath is chair of the EBU Project Group on Programme Making and Special Events (PMSE)

WHAT ARE YOUR CURRENT RESPONSIBILITIES?

I work for ARD/BR in the area of frequency management. At the moment, the frequencies for terrestrial TV and wireless production equipment (PMSE) are the most urgent issues (see page 6), but we also deal with 5G Broadcast as well as DAB.

WHAT DO YOU CONSIDER AS YOUR FINEST ACHIEVEMENT SO FAR IN YOUR CAREER?

I have been so fortunate to work for IRT [the renowned *Institut für Rundfunktechnik* research centre that closed in 2020] for 30 years. Here I was able to accompany many great developments for broadcasting, such as MPEG audio, DAB and HbbTV. It was a great honour to have been part of the teams involved.

WHAT ARE YOUR PREDICTIONS FOR MEDIA TECHNOLOGY IN THE FUTURE?

Well, predictions are difficult – especially when they concern the future... We now have media on all kinds of devices, and this development will continue. We have to make sure that these media are prepared appropriately depending on the usage situation and the end device. And, while

acknowledging our love of technology, we must not forget: content is king!

WHAT, FOR YOU, ARE THE BIGGEST CHALLENGES FOR EBU MEMBERS (OR PUBLIC BROADCASTERS IN GENERAL) TODAY?

In our – at the moment, often really terrible – times it is one of the main tasks of public broadcasting services to provide a reliable, high-quality media offer and, especially, reliable information. It is a challenge, but also a great opportunity for public broadcasters to stay relevant next to all the fake news and hate speech. For everyone, across all age groups.

TELL US ABOUT SOME OF YOUR INTERESTS AWAY FROM THE WORKPLACE.

I find respite from all the paperwork in nature. That's why I often go hiking in the mountains or skiing in winter, or ride my bike. But I also love being part of a team, which is why I am very attached to rowing, both as an active rower and as a coach.

Join us and the industry's leading experts for technology updates, strategic insights and real-world use cases, plus demonstrations and networking.

NETW(O)RK TECHNOLOGY SEMINAR

AN EBU EVENT

YOUR NETWORKED MEDIA & IT RENDEZVOUS

**14-15 June
2022**



tech.ebu.ch/events/nts2022

MEDIA CYBERSECURITY SEMINAR

AN EBU EVENT

SHAPING A MORE SECURE MEDIA INDUSTRY

**18-19 October
2022**



tech.ebu.ch/events/mcs2022

H(O)RIZONS

AN EBU EVENT

THE MEDIA DISTRIBUTION AND PLATFORM TECHNOLOGY CONFERENCE

**15-17 November
2022**



tech.ebu.ch/events/horizons2022