

WEDNESDAY 23 NOVEMBER 2016

Chairman of the day

David Hemingway (BBC) is Senior Spectrum Manager for the BBC in London. Since joining the BBC in 1988, he worked in the Transmission Projects department before transferring to the Spectrum Planning Group in 2001. Since then, he has worked on the UK's TV digital switchover project, planning a transmitter network to cover the whole UK and introducing the world's first DVB-T2 High Definition transmission network, while at the same time delivering a digital dividend suitable for mobile broadband services. As well as being part of the BBC's spectrum planning team working with the UK Government, Ofcom and other stakeholders on plans for switchover to digital radio and investigating options for further UHF spectrum release, since June last year, he has been Chairman of the EBU's Spectrum Management and Regulation group.



SESSION 1: KEYNOTE

09:30 – 09:40



Simon Fell (EBU) is Director of Technology & Innovation for the EBU, a position he took up in September 2013. He has more than 35 years' experience in senior broadcasting technology roles, including at British broadcaster ITV, where he was Director of Future Technologies (2008-2009) and Controller of Emerging Technologies (2004-2006). From 1991 to 2004 Mr Fell worked for Carlton Television, the ITV franchise holder for the London region, where he held several executive roles linked to operations and emerging technologies. Mr Fell, prior to

joining the EBU, was Chairman of the Technical Council at the Digital Television Group, the industry association for digital television in the UK. He also represented UK broadcasters on the EBU Technical Committee between 2006 and 2009

And **David Hemingway** (BBC)

Welcome to FORECAST 2016

09:40 – 10:05



Gunilla Ohls - yle (b. 1956), Director of Strategy

Education: Master of Science in Economics, Department of Economics, Hanken School of Economics

Main position: Director of Strategy, 2011–present Member of the Management Group since 2011.

Key work experience: Director of programmes, Swedish Yle at Yle in 2006–2010; Director of Programming, Yle FST in 2002–2005; Operational Controller, SVT Nyheter och Sport

at Sveriges Television in 2000–2002; Editor-in-chief, Finnish editors, in 1997–2000 Key positions of trust: Yle Pension Fund, deputy member of the Board of Directors, 2013–present; mentor in Diamanten network of women leaders 2016–2017

Pace and flexibility in the digital transformation - Yle strategy for meeting changing media habits

Yle has a tradition of being in the forefront of technological changes in media. Now The Finnish Public Service Media company is about to take the next big leap to live up to the audience's changing media habits and and technological developments. Yle launched its new Strategy2020 earlier this year, and now Yle is speeding up a big digital transformation program for the coming years. Yle is ready to go towards a more internet based television, at the same time traditional broadcasting will remain strong. Yle wants to increase the tv-services on the internet player, the Yle Areena and at the same time it will go down from 4 tv broadcasting channels to 3. This will happen in spring 2017. Next year Yle also starts planning a renewal of the FM-radio.

10:05 – 10:30



Dr. Roberto Suárez Candel is the Head of the Media Intelligence Service (MIS), the research unit of the European Broadcasting Union (EBU). He manages a team of international researchers responsible for data collection processes, the implementation of research and analysis projects and the publication of market reports. MIS' main goal is supporting European Public Service Media across Europe in their daily operations, advocacy activities and strategic planning. Previously, Roberto Suárez worked as an

academic researcher in Germany (Hans-Bredow-Institut für Medienforschung), Sweden (Stockholm University) and Spain (Pompeu Fabra University). His work was focused on communication public policy, public service media and ecology of the media sector. Roberto Suárez has contributed to a wide range of international conferences and academic journals, and his research has been awarded several prizes. He is passionate about project designing, visual thinking and how public service media can contribute to build a better society. Media Intelligence Services (EBU)

How are TV consumption patterns evolving?

Based on the most recent market data collected by MIS and information provided by EBU Members, Roberto Suárez will provide an overview of the current TV consumption trends, including the evolution of total media consumption, development of viewing time, reach and market share. He will also deliver insights of what and how people watch TV as well as the growing role of video in social networks.

Related reports produced by MIS:

- Audience Trends – Media Consumption 2016: <https://goo.gl/FUxCdM>
- Audience Trends – Television 2016: <https://goo.gl/kDtJVH>

Infographic: Europeans & Television <https://goo.gl/GH0UJC>

10:30 – 10:55

Jorge Rodríguez López - Hispasat

How is the satellite industry moving forward?

SESSION 2: DEVELOPMENTS IN TERRESTRIAL DISTRIBUTION

11:15 – 11:40



Martin Thorp has worked at BBC Research and Development for over 13 years, joining the department after having worked for both Tandberg Television and Advanced Hardware Architectures (UK) as a development engineer. He graduated from The University of Northumbria with a degree in Communications and Electronic Engineering in 1995. He has worked on many broadcast related hardware projects, primarily focussing on Terrestrial Broadcasting. At the BBC he has worked on the development of a number of prototype contribution and distribution equipment projects. He is also currently representing BBC R&D in DVB's CM-T module, looking to identify commercial

opportunities related to the enhancement of Terrestrial TV Broadcasting.

An opportunity for terrestrial TV? – enhancing in-home network integration

The presentation will draw upon work undertaken by DVB's CM-T group, and the presenter's own observations. This includes looking at conclusions from the "Long Term Vision" report and subsequent follow on work looking at how increased integration with in-home networks could be beneficial for the development of the Terrestrial TV Broadcasting platform.

11:40 – 12:05



Dr. Chawki SAHNINE is the CEO of Télédiffusion d'Algérie, TDA, the Algerian Broadcasting Company. Before that, he held the position of Studies & Development Director within the same company for six years. He chairs the Technical and Training Committee of the African Union of Broadcasting (AUB) since 2015. Before joining TDA, Dr. Sahnine was an R&D engineer at Orange Labs (formerly France Telecom

R&D). Dr. SAHNINE holds an electrical engineering degree, specialized in satellite communication, from Ecole Polytechnique de Montréal, Canada. He holds as well a Master Research degree from Joseph Fourier University of Grenoble and a PhD from Polytechnic Institute of Grenoble, both, in the field of micro-and nanoelectronics for telecommunications.

Case study: DTT in Africa: Algeria

The Digital Terrestrial Television deployment in Algeria started in 2010. The migration process from analogue to digital broadcasting will be explained, knowing that Algeria, like many other African countries, has a strong satellite-broadcasting environment. Furthermore, the opening of the audiovisual landscape in Algeria will deeply affect the future of DTT. We will see through this presentation, how this new ecosystem is going to impact the technological and strategic choice for the future of DTT in Algeria.

12:05 – 12:30



Jarkko Paavola (Turku University) received the Doctoral degree in technology in the field of wireless communications from University of Turku, Finland. He is currently a research team leader and a principal lecturer with Turku University of Applied Sciences, Turku, Finland. His current research interests include 5G technologies, and dynamic spectrum sharing.

Case study: SDL tests in Finland

The future of UHF (FUHF) project is national Finnish project and a part of the Tekes program 5thGear and the 5G Test Network Finland (<http://5gtnf.fi>). During 2015-2016 the FUHF project has researched changing media consumption patterns and business ecosystems, as well as tested the use of LTE supplemental downlink on UHF frequencies. The presentation describes the project activities and a case study for supplemental downlink technology.

12:30 – 12:55



Wouter Gekiere currently works for the European Broadcasting Union (EBU), the European alliance of public service media, as Deputy Head of the Brussels office. He's following up the latest European regulatory and policy trends in the audiovisual field including the Audiovisual Media Services Directive, EU Telecoms rules and radio spectrum. He started his career working on research projects on various European policy issues, followed by a position as an advisor to an MEP in the European Parliament. He holds master's degrees in Law (1998) and in International

Relations (1999) from the University of Leuven and a master's degree in Public and International Law from the University of Melbourne (2004.)

European regulatory developments

In May 2015, the European Commission unveiled its Digital Single Market Strategy, outlining the planned policy initiatives to offer improved access to online goods and services across Europe, create the right environment for digital networks and services, and maximise the growth potential of the European digital economy. These initiatives include reforms of current EU audiovisual media and telecoms rules to make them fit for new challenges (consumer uses and new players in the field). They also cover a proposal for a strategy on the use of 470-790 MHz frequency band in the European Union, which is of key importance for the future of digital terrestrial TV.

In the course of 2016, the European Commission published concrete proposals which are now subject to scrutiny in the European Parliament and the Council. Participants will be briefed about the latest state of play as well as the key features of the various reforms in order to better understand their impact on Europe's media sector.

SESSION 3: PANEL DISCUSSION

14:15 – 14:35

Garazi Goia - BBC

Establishing a new era for the BBC: distribution priorities in an increasingly competitive market

14:35 – 15:45

How should broadcasters adapt to changing consumer behaviors?

Moderator: Cath Westcott

SESSION 4: LOOKING FOR THE FUTURE

16:15 – 16:40



David Wood (EBU) is a consultant to EBU Technology and Innovation. He was formerly a member of staff at the EBU, and earlier with the BBC and IBA in the UK. David Chaired the ITU group that led to the ITU Recommendation for UHDTV, and the DVB Commercial Group that prepared the requirements for the DVB UHD delivery specification, recently agreed.

Going HDR

The presentation is intended as an introduction to the use and value of using the new concept of High Dynamic Range. This will be a feature of future television services intended for the new generation of TV sets that will offer higher peak screen brightness. He presentation will explain the latest developments in the ITU-R and DVB, and suggests what steps need to be taken next.

16:40 – 17:05



Erik Stare (Teracom) received a M.S.E.E. in 1984 from KTH in Stockholm. Since 1992 he is with Teracom focusing on R&D related to various aspects of DTT. He has been deeply involved in the development and standardisation of the broadcast systems DVB-T, DVB-H, DVB-T2, DVB-NGH, DAB+ and ATSC 3.0. He is the inventor of MPE-FEC in DVB-H, Time Frequency Slicing in DVB-T2 & DVB-NGH and the new WiB system concept. He has participated in a number of European R&D projects under the ACTS, IST and CELTIC programmes. His current work focuses on next-generation terrestrial broadcast/telecom systems, in particular

based on the WiB concept (Wideband reuse-1). In September 2016 he received (together with co-authors Jordi Giménez and Peter Klenner) the IBC Best Conference Paper Award for a paper about WiB.

WiB - A new system concept for DTT

A new system concept for DTT, called WiB, is presented, where potentially all frequencies within the UHF band are used on all transmitter (TX) sites (i.e. reuse-1). Interference, especially from neighbouring transmitters operating on the same frequency and transmitting different information, is handled by a combination of a robust transmission mode, directional discrimination of the receiving antenna and interference cancellation methods. With this approach DTT may be transmitted as a single wideband signal, covering potentially the entire UHF band, from a single wideband transmitter per TX site. Thanks to a higher spectrum utilisation the approach allows for a dramatic reduction in fundamental power/cost and about 37-60% capacity increase for the same coverage as with current DTT. High speed mobile reception as well as fine granularity local services would also be supported, without loss of capacity. The presentation also outlines further possible developments of WiB, e.g. doubling the capacity via cross-polar Multiple In Multiple Out (MIMO), backward-compatible with existing receiving antennas, and adding a second Layer Division Multiplexing (LDM) layer within the same spectrum, either as broadcast or as broadband.

17:05 – 17:30



Ludovic Noblet (b-com) graduated from the Ecole Polytechnique de l'Université de Nantes, in 1992 with a specialty in electronics, signal processing and real-time computing systems. Ludovic started his career in 1992 at the Thomson Electronics Research Labs. Until 2004, he worked advancing and delivering technologies for digital TV broadcast, first for the US markets and then European ones. In 2001, he took part into the very first IPTV and mobile TV projects. He joined France Telecom in 2004

as an IPTV architect where he managed the technical aspects for the introduction of high definition into the Orange IPTV service. He went on to be responsible for the Video Compression R&D lab at Orange Labs in 2006. He joined Dolby Laboratories Inc in 2010 as a Senior Director, in charge of technology consistency for new video initiatives under incubation and maturation. In 2012, he was appointed Senior Director, Principal Architect for the Broadcast business group of Dolby Laboratories in charge of delivering AC-4 from Research to the business group. Throughout his career, he has developed a strong experience with world class team management, standardization and intellectual property.

In September 2014, he entered b<>com as Intellectual Property Director, in charge of building the IP & Licensing activities and managing the value for the technological assets developed by the Institute. In December 2015, he was appointed Director of the Hypermedia research department, in charge of leading and scaling the Research activities on virtual, augmented and mixed reality, advanced media formats and codecs, digital trust and identity, uses and acceptability.

The reality of virtual reality

In his presentation, Ludovic will give an overview of where we are today with virtual reality, what should be expected for the next coming years in order to achieve that goal for delivering deeply immersive experiences, what some key challenges will be for broadcasters from an holistic standpoint including content and technological challenges.

THURSDAY 24 NOVEMBER

Chairman of the day



Roland Beutler (SWR) studied Physics at the University of Stuttgart, Germany, and went on to receive a Ph.D. in Mathematical Physics from the Max-Planck-Institute for Metal Physics, also in Stuttgart. Between 1995 and 1996 he worked at the Università degli Studi di Lecce, Italy, under a Fellowship of the European Commission. In 1993 he joined SWR to work in the frequency planning department and is currently responsible for strategy of programme distribution and international frequency management issues.

Dr Beutler has been participating in EBU Technical activities for more than 10 years and has chaired several EBU groups dealing with the future of radio (S/FOR and S/FB2) and sharing and compatibility studies (SMR-SDB). He was chair of the Strategic Programmes on Terrestrial Broadcasting (SP-TB) and Cooperative Terrestrial Networks (SP-CTN). Currently he acts as chairman for the Strategic Programme on Future Distribution

Strategies.

Roland Beutler is also involved in ITU and CEPT work and has been responsible for several of their working groups. He participated in WRC-12, WRC-15 and RRC-06 and was heavily involved in the preparation of the latter conference. Moreover, he has published several articles and four books on frequency and network planning for digital terrestrial broadcasting systems, the Digital Dividend and the evolution of broadcast content distribution.

SESSION 5: EUROPEAN PERSPECTIVE ON BROADBAND

09:00 – 09:30



Achilleas Kemos is Programme Officer within European Commission's Unit dealing with Future Connectivity Systems, with a particular focus on standardisation activities. He has been Commission representative in the key technical bodies related to Internet Protocol (IP)

standards issues and IP address allocation policies (IETF and RIPE respectively) since 2012, bridging policy considerations with technology issues. He is currently co-chairing RIPE's Cooperation Workgroup. In his career with the European Commission he has dealt with issues on Internet Governance, managing the High level Group on Internet Governance, ITU relations, Network and Information Security, and Digital broadcasting, where he was instrumental in the adoption of the "HD-ready" logo and shaping policy through broad consensus in digital broadcasting issues, notably Interactive DTV interoperability, HDTV interoperability and mobile broadcasting. He holds a degree on Electronic Engineering from University College London, and post-graduate degrees in European Business Engineering and Project Management from the French Telecommunications University (ENSTB) and Université Rennes 1 respectively.

5G Action Plan: connectivity as a driver for change

09:30 – 10:00



Eric Fournier - ECC Chair Eric - is currently Director for Spectrum Planning and International Affairs in the Agence Nationale des Fréquences (ANFR), the French public agency in charge of spectrum management (www.anfr.fr).

In this capacity, he is responsible for preparing the revisions of the French national table of spectrum allocation and for coordinating French positions in international meetings on spectrum within ITU, CEPT and EU. He was

deputy head of the French delegation for RRC-06, WRC-07, WRC-12 and WRC-15.

He is the Chairman of the Electronic Communication Committee (CEPT), which develops common policies and regulations for harmonising spectrum in Europe. He has been involved in all discussions on major evolution of spectrum in Europe. He was

Spectrum for 5G

Spectrum for 5G is under discussion at the CEPT/ECC, EU and ITU level and will cover many frequency ranges. The presentation will give a general overview of what is at stake for mobile broadband in such discussions, will provide a picture of what could be 5G spectrum in 5 or 10 years and will aim to identify the links with broadcasting interests

previously Chairman of the CEPT Conference Preparatory Group for the World Radiocommunications Conference 2012 (CPG-12)
Eric is a graduate telecom engineer from SUPELEC (France).

10:00 – 10:30



Frode Sørensen – Nkom - is a Senior Adviser at the Norwegian Communications Authority (Nkom) and he holds a Master of Science degree from the University of Oslo. Frode has been leading the development of the Norwegian net neutrality policy at Nkom since 2007, and he has been an architect behind the Norwegian guidelines for net

neutrality published in 2009. He has been Chair of BEREC Net Neutrality Expert Working Group since it was established in 2010. The Working Group developed BEREC's net neutrality guidelines which were published 30 August 2016. Frode has more than twenty years of experience in telecommunications and has previously worked at Agder University, Telenor and Ericsson and he is the author of several books on Internet technology.

"The latest on European net neutrality" will elaborate how net neutrality has evolved over time in Europe, and then focus on the current state of the European net neutrality Regulation and BEREC's net neutrality guidelines. The presentation will cover commercial practices such as zero rating, traffic management of internet access services and the issue of specialised services. Finally, some long term considerations regarding innovation at the edge and in the core, as well as the rights of Internet users, including content providers, will be presented.

SESSION 6: DISTRIBUTING MEDIA OVER BROADBAND

11:00 – 11:30



Andrew Murphy – BBC has worked at BBC Research and Development for over 16 years, joining the department directly after graduating from Cambridge University with a Masters degree in Engineering and Information Sciences. He has led the development of both hardware and software to support research in a number of fields and has worked within standardisation groups such as Digital Audio Broadcasting, Digital Radio Mondiale and Digital Video Broadcasting. He has written and

edited a number of European Telecommunications Standards Institute standards associated with digital broadcasting. He is currently leading BBC R&D's work into mobile broadcasting and in particular the department's work on eMBMS and 5G. He also chairs the EBU's project group on Mobile Technologies and Standards.

3rd Generation Partnership Project (3GPP) update

The presentation will give a broadcasters' perspective on the 3GPP Work Item on Enhancement for TV service ('EnTV'). It will provide background into the history of the work and the original broadcaster-led requirements that were input into 3GPP. It will also describe current engagement and give an update on progress. Finally, it will touch on future '5G' requirements that are targeting future 3GPP Releases.

11:30 – 12:00

Erik Guttman (3GPP SA Chair) a consultant employed by Samsung Electronics, has been actively involved in standardization in networking and telecommunications for over 20 years. He currently serves as the 3GPP Service and System Aspects Technical Specification Group Chairman. Preceding this, he held the position of chairman of the



3GPP System Architecture working group. He has also chaired and actively contributed to numerous IETF working groups including SVRLOC (Service Location Protocol) and ZEROCONF (Zero Configuration Networking). Erik's background includes leading research and software projects that introduced emerging network application and system functions to operating environments. Erik developed frameworks and tools for distributed

installation and deployment. Erik served Chief Technical Officers as system architect and requirements researcher. Erik obtained a BA in Philosophy and Computer Science from the University of California, Berkeley and a MS in Computer Science from Stanford University.

Media & Broadcast Content distribution, a 3GPP perspective

I will provide a view of the capabilities of the 3GPP system that relate to broadcasting. I will briefly summarize past progress - existing functionality, then focus on current activities and advances in 3GPP for Release 14, foreseen to complete June 2017. I will indicate some coming activities, cautioning that as rapid work on 5G progresses, it is difficult to predict the future.

12:00 – 12:30



Lluís Borrell, Partner at Analysys Mason, has more than 20 years of worldwide experience in the media and telecoms industries. He leads Analysys Mason media work that includes over 150 projects across over 35 countries during last 5 years. Prior to becoming consultant, Lluís worked at Eutelsat. Lluís holds a Master's degree in Spatial and

Aeronautical Telecommunications Systems (ENST, Paris), an M.Sc. in Telecommunications Engineering (UPC, Barcelona), and an MBA from INSEAD. Lluís has worked from and lived in Cambridge, London, Paris, Barcelona and Madrid.

What is the potential for broadband to fulfil PSM's key live TV requirements?

Internet and broadband are significantly transforming the TV and VOD markets including their distribution. From a PSM perspective, universal reach, high quality and free to consumers are key requirements. In this presentation, we explore to what extent fixed broadband distribution can deliver today or in 5 years-time to these PSM requirements across EU28 countries. At the end, we will open up a similar debate for mobile broadband.

SESSION 7: EXPLORING COLLABORATION

14:00 – 14:20

Wladimir Bocquet joined Eutelsat, on August 1, 2016, in the new post of Director of Spectrum Management and Policy.

Wladimir started his career in Japan as a research engineer working on 4G projects, before joining Orange Group in 2005 where he managed a team specialised in the development of fixed and mobile broadband services. In 2008 he returned to France to work as Deputy Director responsible for strategy and spectrum planning at Orange - France Telecom Group. In 2012, he joined the GSMA (world association of mobile operators, 800 operators) where he was appointed Senior Director, Head of Policy, Planning and Regulatory Affairs in the UK.

The possible role of satellite in 5G

While most of the 5G efforts have been focusing purely on wireless and mobile, a combination of terrestrial and satellite technologies is currently under discussion to provide efficient 5G implementation. Satellites, through its inherent structure, can enable ubiquitous coverage, at affordable costs, thereby staking claim in future 5G networks. In addition, multimedia traffic growth, universal connectivity, tower feed, enabling machine to machine communications and critical telecommunication set-up, can augment the satellite element in the 5G service capability.

The proposed presentation examines several potential roles for satellite including coverage extension, content distribution, providing resilience, and suggests areas for future cooperation with a special focus on the distribution of audiovisual media services.

14:20 – 14:35

Simon Fell, EBU

Building cooperation between broadcasters and telecom industry

14:35 – 15:00

Roland Beutler (SWR) and Darko Ratkaj (EBU)

DISCUSSION: Perspectives for PSM in 4G and 5G

SESSION 8: WHAT'S ON THE HORIZON

15:15 – 15:35



Bram Tullema - EBU is the project manager broadband technology and online services of the Technical department of the EBU. In this role he coordinates the EBU Expert Community Platforms & Services (ECP), the strategic programme Broadband Networks (BBN) and Television Platforms (TVP). Besides knowledge exchange between broadcasters and solution providers he works on standardisation issues related to new online broadcast services. At this

moment his centre of interest consists of media services for connected tv's in combination with a second screen approach on personal devices.

With his specialisation in the field of internet, new media and interactivity Bram worked as senior policy advisor research and development at the Dutch public service broadcast organisation NPO. He developed strategies on a conceptual level and their practical

Multi-CDN advantages for online media distribution

implementations on topics like second screens, connected tv, network neutrality, open source, adaptive streaming, p2p, visual radio, device specific video distribution, etc.. Prior to his activities in the broadcast sector he managed a crossmedia department at the international publishing house IDG Communications. His main themes there were video production and online distribution, as well as interactive tv-games.

15:35 – 15:55



Jean-Pierre Evain joined the EBU's Technical Department in 1992 to work on "New Systems and Services" after several years spent in the R&D laboratories of France-Telecom (CCETT) and Deutsche Telekom. He is now looking after "Media Fundamentals and Production Technologies" and coordinates all EBU technical activities concerning metadata and new production architectures. He is the co-author of several EBU metadata specifications. He is actively promoting the use of semantic web technologies in broadcasting. He is the Project Manager of the joint AMWA-EBU FIMS Project on Service Oriented Architecture. He represents EBU in many standard groups and industry forums like AES, ETSI, IPTC, MPEG, SMPTE, UK-DPP, W3C, among several others.

Using big data for broadcasters

15:55 – 16:15

Peter MacAvock (EBU)

DVB's road ahead. HbbTV's growing importance

16:15 – 16:20



Elena Puigrefagut Coarasa, Senior Project Manager at the European Broadcasting Union, coordinates joint technical activities undertaken by EBU Members on frequency planning and spectrum management and regulation and in particular frequency planning studies for terrestrial broadcasting systems. She represents the EBU in a number of international committees as the CEPT, EC and ITU including ITU World Radiocommunications Conferences.

Prior to joining the EBU, Elena worked at Eutelsat, a global satellite operator, as a frequency planning engineer in the Operations Department. During this period, she was responsible for the planning of the satellites that supported the launch of digital TV across Europe in the mid-1990s.

Elena holds a Masters degree in Image and Sound (ENST, Paris) and an M.Sc. in Telecommunications Engineering (Universitat Politècnica de Catalunya, ETSTB Barcelona).

Takeaways from Forecast 2016