

IEEE Broadcast Technology Society

Who is BTS

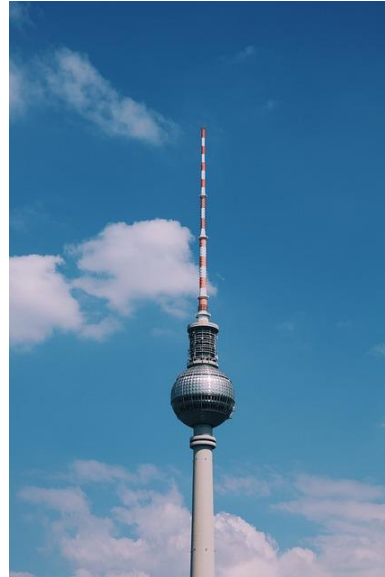
- The IEEE (Institute of Electrical and Electronics Engineers) BTS (Broadcast Technology Society) is an International membership organization open to everyone in the broadcast technology industry and allied fields.

What is our Mission

- The BTS mission is to serve the **needs of its members**; to enhance their professional **knowledge** by keeping them informed of the **latest research** results and **industry trends** and provide enriching **educational** and **networking** opportunities.

Technologies related to:

Production: technologies for efficient processes



Transmission:

Distribution: driving global standards for end user reception



Reception: enabling solutions

BTS Industry Involvement

Commitment in assisting the **advancement** of the **Broadcast Technology** industry throughout the world:

- Event sponsorships, exhibitions, live demos and tutorial sessions
- Distinguished lecturers' program
- BTS seminars and educational courses
- Support of industry and university programs



Charting the Evolution: Exploring Digital Video Broadcasting Standards from Past to Future

A Play in 3 Acts

Dr. Peter Siebert

20 October 2024

Disclaimer

The views and opinions expressed in this presentation are **solely those of the presenter** and **do not necessarily represent** the views, opinions, or official positions of **IEEE** (Institute of Electrical and Electronics Engineers) or **DVB** (Digital Video Broadcasting). Any statements made by the presenter are their personal opinions and should not be construed as official statements or endorsements by IEEE or DVB.

Prelude



Schönburg at the Rhine



By Traveler100 - Own work, CC BY-SA 3.0,
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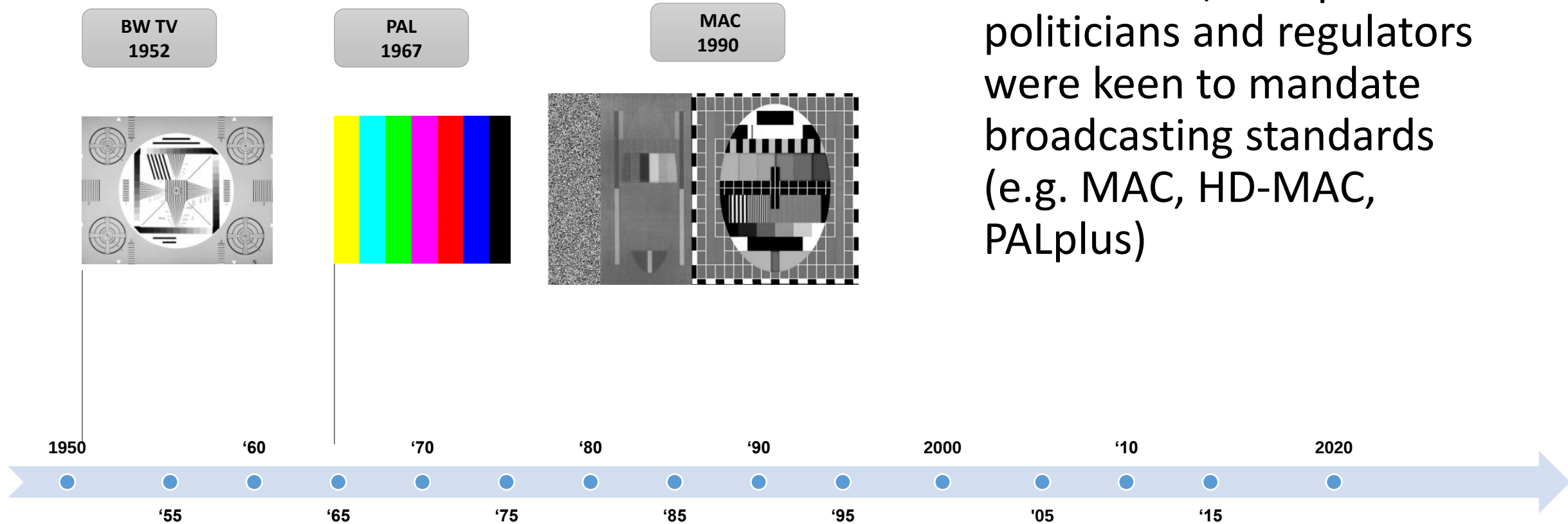
How DVB begun: Secret meeting on the Schöenburg in 1991 (source U. Reimers)

21 years ago, six friends from six European organizations started to look for a „**Great TV-Vision**“

- We spent the weekend **3/4 May 1991** in a **secret** meeting on the Schöenburg overlooking the Rhine river. The six of us had noticed that Europe was running into a **dead-end street** called „D2-MAC and HD-MAC“. We tried to find a way out.
- The result of our discussions was the completely „academic“ idea: „We will have to develop **Digital TV**“.
- In my capacity as President of the Technical Commission of ARD/ZDF/ORF/SRG I was asked to start making the academic idea a reality
- By the way: The six friends were:
 - Erich **Geiger** (Thomson)
 - Hans-Georg **Junginger** (Grundig)
 - Theo **Peek** (Philips)
 - Ulrich **Reimers** (ARD/NDR)
 - Charles **Schepers** (Intermetall)
 - Albrecht **Ziemer** (ZDF)



European Broadcast Standards 1990



- Before DVB, European politicians and regulators were keen to mandate broadcasting standards (e.g. MAC, HD-MAC, PALplus)

Moore's Law: The driver of CE Innovation



Cramming more components onto integrated circuits
By Gordon E. Moore
1965

New standard, new specialist



- Early 90' ISO MPEG and ITU published MPEG-2 System, Video and Audio specifications, the foundation for digital TV broadcast



First Act



DVB's first-generation standards

MPEG-2
1993

SD

DVB AVC[®]

DVB SI[®]

DVB CS[®]

DVB S[®]

DVB C[®]

DVB T[®]

- How to use MPEG 2 Audio Video and Systems in broadcast
- Service Information for DVB Systems
- Common Scrambling and Conditional Access Signaling
- Delivery Systems for Satellite, Cable, Terrestrial

1990

'95

2000

2010

'15

2020

2025

'93

'98

'03

'13

'18

'23

DVB's greatest successes

- DVB's first-generation transmission standards have enabled analogue switch-off in many countries and created the foundation for a successful Pay TV industry
- Another success has been to stop “politicians picking winners” by bringing together all stakeholders and let them decide on technology

Reasons for DVB's success

- The right moment in time and a “green field” standardization scenario
- Bringing all stakeholders together
- Commitment of stakeholders to create a common solution for digital broadcast
- DVB activities taking place in 4 Modules
 - Commercial Module (CM)
 - Technical Module (TM)
 - Intellectually Property Rights Modul (IPRM)
 - Promotion and Communications Module (PCM)

End of act 1



Second act



New Coding specifications, new TVs



1990

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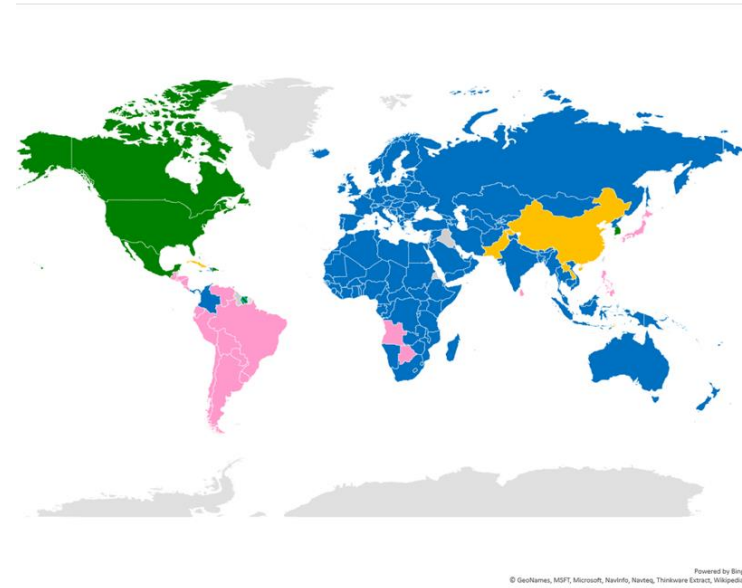
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DVB's second-generation specifications



H.264
2003

HEVC
2013

HD

UHD

Advanced Feature Set

DVB S2[®]

DVB S2X[®]

DVB T2[®]

DVB C2[®]

DVB IPTV[®]

Colour

4k

HFR

HDR

Audio

1990

'95

2000

'05

2010

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Highlights of second-generation specifications

- DVBs 2 second-generation S2 and T2 were even more widely adopted:
 - S2 is **the** standard for GEO satellites
 - T2 is used as upgrade to first generation digital or for “leapfrogging” from analogue terrestrial to second generation standards
- TV sets in Europe follow Advanced Feature Set specifications (4k, color, HDR), however broadcast content still only in HD

Lowlights of 2 generation

- C2 could not compete with DOCSIS
- No technology for 3rd generation physical layer specifications in sight
 - Confirmed by ATSC3.0 performance
- No interest in technologies beyond 2D
 - no 3DTV
 - no Virtual Reality

 DVB decided to limit activities on physical layer technologies to maintenance

Third Act



What does the audience want?

- Any content
- Any time
- Any where



 IP based delivery

BBC DG Tim Davie shares his thoughts on a future internet-only BBC

Article in the Guardian about an interview with BBC DG (7 Dec 2022)

“Imagine a world that is **internet-only**, where **broadcast TV** and radio are being **switched off** and **choice is infinite**,”

BBC preparing to go online-only over next decade, says director general

Tim Davie outlines vision for a world of ‘infinite choice’ where broadcast TV and radio are being switched off



The BBC director general, Tim Davie. Photograph: Christopher Furlong/Getty Images

DVB's IP specifications



DVB DASH® • DVB Profile of MPEG DASH for AV Delivery

DVB MABR® • DVB Multicast Delivery

DVB I® • Signaling of IP Services

DVB NIP® • IP Based Transport

1990

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DVB and IP: High- or lowlight?

- DVB-DASH is the transport protocol used by HbbTV and in wide use in Europe for interactive broadcast services.
- In 2019 the DVB-I specification was published. There has been a lot of interest in the industry resulting in various field trials. However, we are still waiting for full operational services to start.

View of the DVB Chairman Peter MacAvock in 2022



1. IP, web online service technology specification is a crowded space
2. Web innovation is controlled by two companies but browsers represents 10% of video consumption
3. Hybrid replaced pure broadcast some time ago!
4. To compete implies being vertically integrated
5. Can DVB really make a difference?



Epilogue



DVB Today

- DVB played an essential role in the transition from analogue to digital Television.
- Today Television is hybrid and may be broadband only one day.
- The focus is going from broadcast to telecom networks in which DVB is only one player among many others
- Handheld devices ecosystems are controlled by Google and Apple
- DVB still plays in important role in the TV ecosystem and overall AV delivery

DVB's future role ?

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SEPTEMBER 2019
ISSUE 54



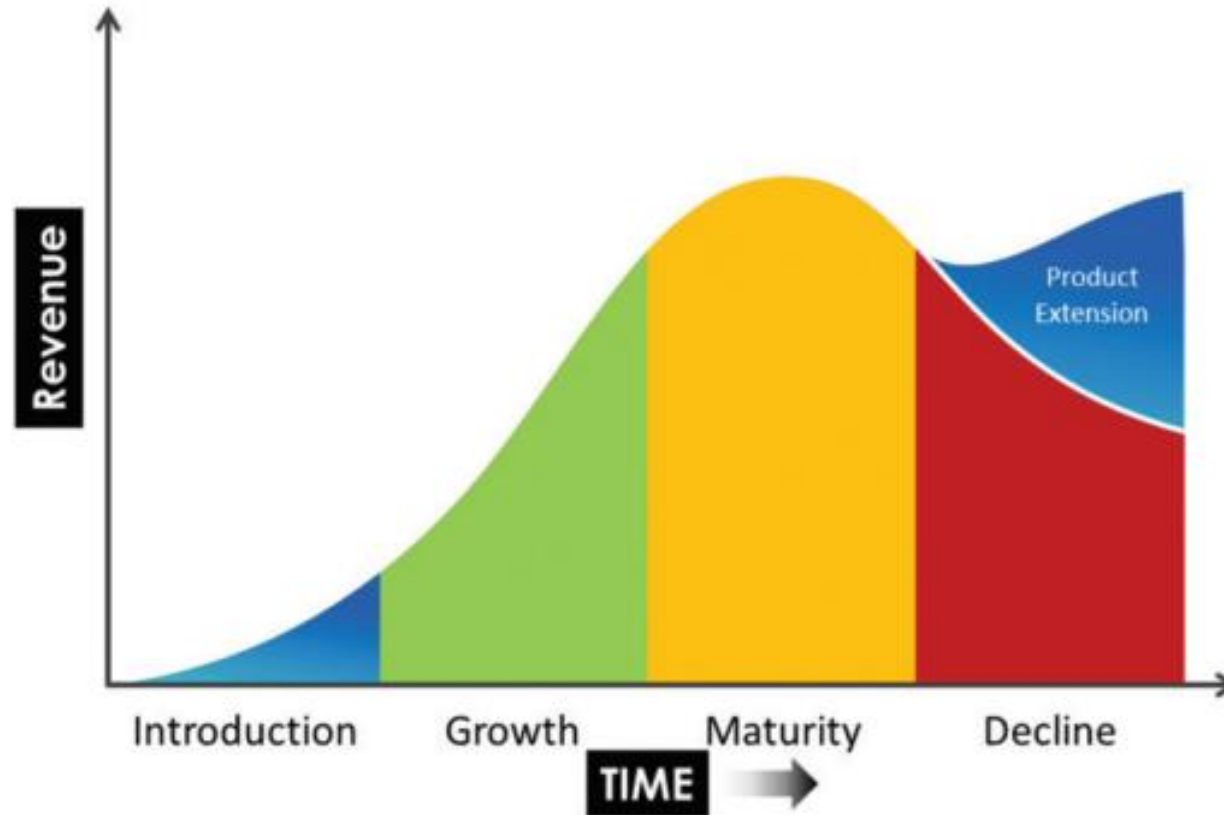
STANDARDS FOR OTT:
Bringing order to chaos



DVB relevant topics:

- Signaling for IP based services
- Audio and Video formats:
 - Codecs, Advanced features, ...
- Transport protocols
- Subtitles
- Hybrid delivery (interworking with S/C/T)

Broadcast TV product life cycle





Thank You

*Become a BTS Member
today!*

bts.ieee.org

DVB has developed many specifications

DVB3DTV[®]

DVB-CSA[®]

DVB-HLN[®]

DVB-PCF[®]

DVB-RCL[®]

DVB-SI[®]

DVB-ATM[®]

DVB-DATA[®]

DVB-IPDC[®]

DVB-PDH[®]

DVB-RCP[®]

DVB-SIM[®]

DVB-C[®]

DVB-DSNG[®]

DVB-IPTV[®]

DVB-PI[®]

DVB-RCS[®]

DVB-SRM[®]

DVB-C2[®]

DVB-FF[®]

DVB-IRDI[®]

DVB-RCC[®]

DVB-RCT[®]

DVB-SSU[®]

DVB-CI[®]

DVB-GEM[®]

DVB-M[®]

DVB-RCCS[®]

DVB-S[®]

DVB-SUB[®]

DVB-CMT[®]

DVB-GSE[®]

DVB-MDS[®]

DVB-RCD[®]

DVB-S2[®]

DVB-T[®]

DVB-CPCM[®]

DVB-H[®]

DVB-MPEG[®]

DVB-RCG[®]

DVB-SDH[®]

DVB-T2[®]

DVB-CS[®]

DVB-HAN[®]

DVB-NIP[®]

DVB-RCGPRS[®]

DVB-SH[®]

DVB-TVA[®]

High- and Lowlights

MPEG-2
1993

SD



- Delivery and Presentation of Interactive Content
- Return Channel Solutions for S/C/T
- Terrestrial for Handheld

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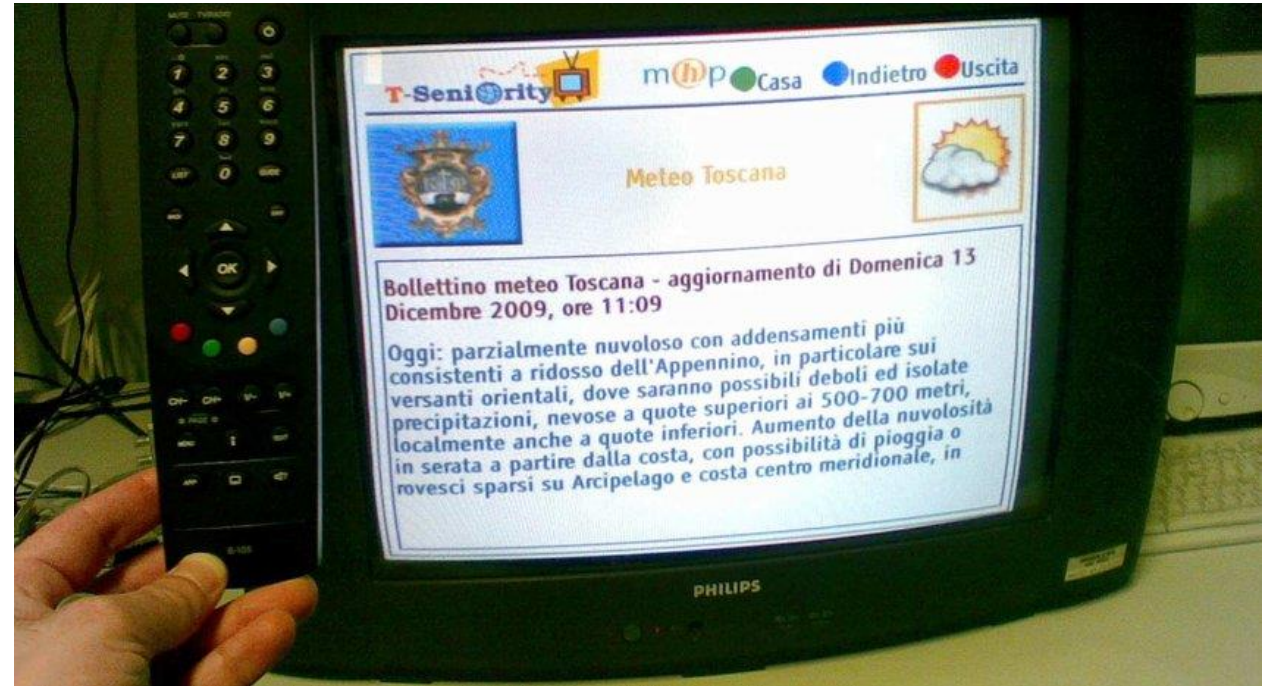
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What went wrong with MHP

- Technology was too early
 - Limited return channel availability
 - Not sufficient processor and memory capacity in TV sets
- Later on, European industry moved to HbbTV



Challenges of broadcast TV to handhelds

- DVB-H
- MediaFLO
- DVB-SH (Satellite)
- ATSC M/H
- ISDB-tmm
- CMMB
- DVB-T2
- *ATSC3.0 (to be seen)*
- *5G Broadcast (to be seen)*

