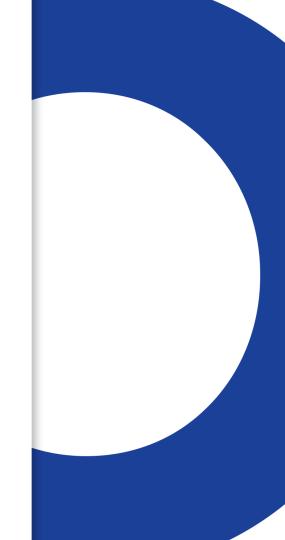# EBU

OPERATING EUROVISION AND EURORADIO

FOREWARD TO THE PAST

CAN WE PREDICT THE FUTURE?

DR DAVID WOOD - EBU TECHNOLOGY & INNOVATION.

ITU 90TH ANNIVERSARY

NHK STRL PREDICTIONS

- **Correct predictions and development of HDTV** ☑

- **Correct predictions of integrated media environment** ☑

- **Correct predictions and development of UHDTV1** ☑

- **Correct predictions of the limitations of stereoscopic television** ☑

- **Predictions and development of UHDTV2** ?

- **Predictions and development of voice activated TV** ?

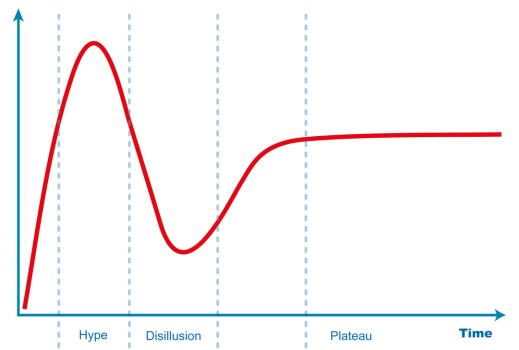- **Predictions and development of Integral TV** ?

THE GARTNER CURVE

Expectations / Time diagram showing the Gartner curve with phases: Hype, Disillusion, Plateau

2017 IS THE 50TH ANNIVERSARY OF "OUR WORLD" THE MOST COMPLEX TV PROGRAMME OF THE AGE.

The international broadcast of Summer 1967

Viewers in 24 Countries including Japan

1 million miles of cable and multiple satellites

400 million viewers saw (almost) the live birth of the first son of the family Kamakura from Sapporo.
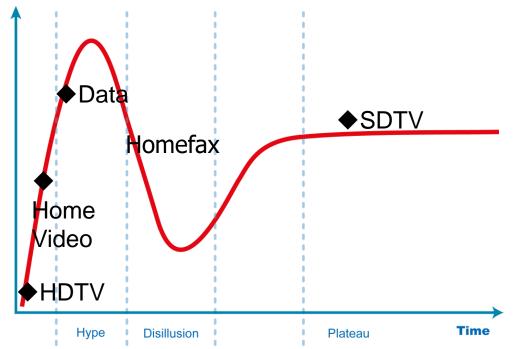
WHERE WAS BROADCAST TECHNOLOGY IN/ABOUT 1967?

- SDTV Colour TV (PAL, SECAM, NTSC) already well developed
- HDTV idea already there (Dr Takashi Fujio, in1964)
- RCA Homefax
- 3D HMDs
- Data broadcasting nearly there - in early 1970s (Teletext, Captain, Antiope)
- Data services by telephone lines nearly there – in early 1970s (Viewdata, Videotext)
- Home video recording not far away

Picture: EBU

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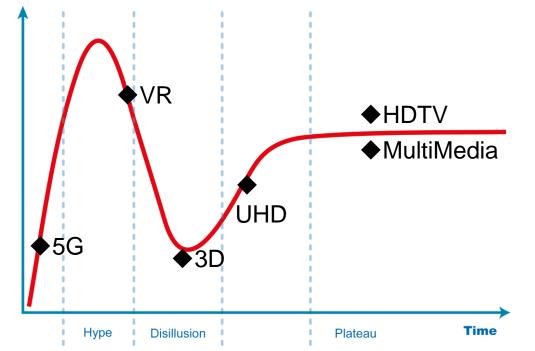
WHAT IS BROADCAST TECHNOLOGY IN 2017?

- HDTV relatively well developed
- UHDTV services started
- Broadcast multimedia delivery widely available
- Internet multimedia delivery widely available
- Early Virtual Reality services

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WHAT HAS HAPPENED OVER THE 50 YEARS?

- Changing infrastructure takes time but..

- There was a pattern to progress!

- The original systems and technology trends continued

- The systems were the same idea but expanded

- It was essentially "more of the same"

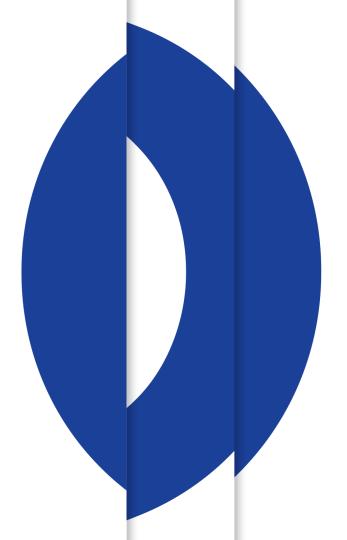- A "continuation of trends" theory?   For example, TV screens continue to become thinner and thinner

CAN WE LOOK FORWARD TO 2067 AND PREDICT THE MEDIA TRAJECTORY?

HISTORY SHOWS THAT TRENDS AND TENDENCIES DO NOT STOP ABRUPTLY

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WHAT DOES THE EBU TECHNOLOGY AND INNOVATION BELIEVE ARE THE CHALLENGES FOR BROADCASTERS TODAY?

UHDTV (including HDR issue)

VR, AR, MR

NGA

Big Data (AI, ML, DL)

Companion Screens

OTT and Hybrid TV

Better Internet delivery

Smart Radio

IP Programme Production
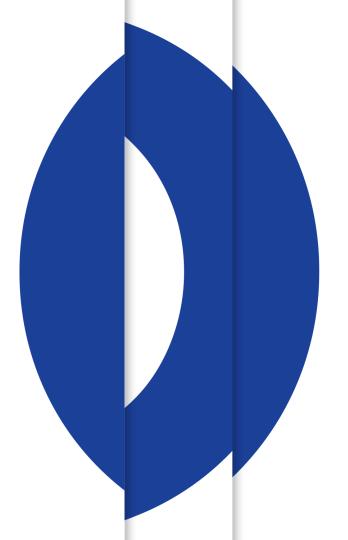
The Cloud

Security

5G Delivery

Voice activation

Will a progression theory apply to some or all of them?

CAN WE EXAMINE THE TECHNOLOGY CHALLENGES OF TODAY - AT LEAST FOR SOME ISSUES - AND PREDICT WHERE WE WILL BE IN FUTURE YEARS?

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LET'S LOOK FIRST AT IMAGE RESOLUTION

What does "more of the same mean" here?

System	H. res	V. res	Pixels per frame	Compressed Bit rate H264	HEVC	Next Gen. Comp.
1080p	1920	1080	2,073,600	10	?	??
4K	3840	2160	8,294,400	30	?	??
8K	7680	4320	33,177,600	90	?	??
16K	15360	8640	132,710,400			
32K	30720	17280	1,194,393,600			
64K	61440	34560	2,123,366,400			
128K	122880	69120	8,493,465,600			

GREATER IMAGE RESOLUTION – AN INEVITABLE TREND?

- Why more detail?

- "Simple acuity (60c/d)" is not all there is. "Hyper acuity (120c/d)" for feature localisation may also be important.

- Depth perception is improved by better texture gradient.

- There is degradation between the camera and the TV screen and domestic TV sets vary in quality.

- Cinema wide screen aspect ratios can be attractive.

- Bigger numbers always appeal to the public.
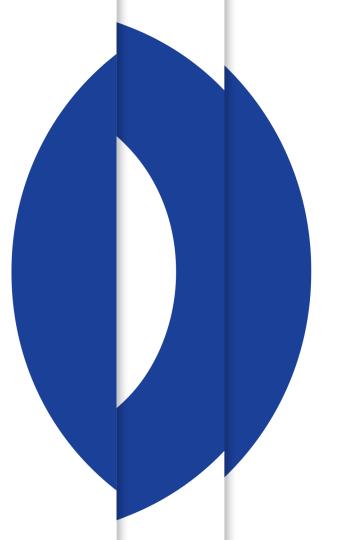
- Compression technology continues to improve.

IMAGE RESOLUTION CONTINUES TO INCREASE IN STEPS.
BY 2067 WILL NORMAL TV LIKELY BE 32K OR 64K?

...along with adaptive improvements in dynamic range, frame rate and, possibly, colorimetry.

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VIRTUAL REALITY – A COMBINATION OF STRENGTH AND WEAKNESS – NOT SO CLEAR!
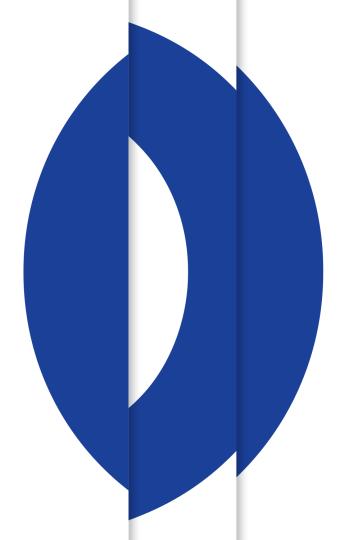
- **VR has the potential to provide an exciting immersive experience**
- **VR may be able to make use of the 'beyond 8K' bandwidths**
- **But saturating the eye with detail for 360 degree stereoscopic images needs <u>extremely</u> high bandwidths, that will be unavailable for many years**
- **Wearing a headset can be uncomfortable**
- **Wearing a headset prevents multitasking**
- **Viewers usually will only watch short form VR content – with a maximum length of about 20 minutes**
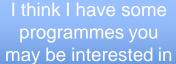
WHAT DOES VR LOOK LIKE IN 2067?

VR MAY BE A NICHE MARKET. VR WILL NOT SUPERSEDE UHDTV.

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LET'S LOOK AT PERSONALISATION AND VOICE ACTIVATION – THE PLUS AND THE MINUS

- Voice activation will become more and more important for everything, including television and media.

- But we will need more sophisticated 'agents' in the TV set – a friendly face that recognises you, listens to you, and talks to you.

- Are we over-estimating the importance of 'Personalisation' in general?   A major attraction of the media is that it provides a shared or common experience. What's more, the population growth area is old - not young - people, and they just want to sit back and be entertained, not to constantly make choices.

- How to avoid people being driven into a personalised dead-end (more of the same, only similar interests, no surprises, no overview)? Could too much personalisation lead to a less connected/social world?
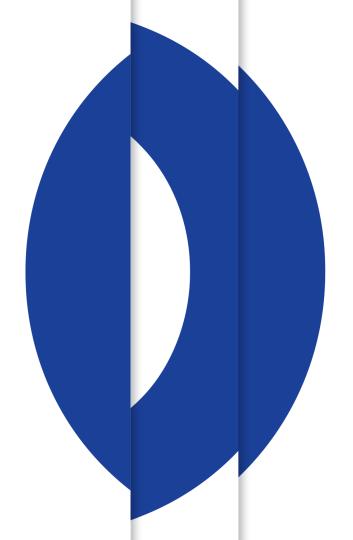
VOICE ACTIVATION WILL BE UNIVERSAL AND USE A HUMAN "AGENT"?

BUT PERSONALISATION WILL NEVER REPLACE THE SHARED EXPERIENCE?

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LET'S LOOK AT HYBRID BROADCAST/BROADBAND - THE PLUS AND THE MINUS

- Hybrid broadcasting will continue to be successful, but maybe less than we imagined some years ago.

- Initial HbbTV services have not been successful in all European countries. There may be issues of covering costs and public awareness to solve.

- Using Hybrid for 'Companion Screens' – information on a Tablet that adds to the enjoyment of the TV show - in general has been less successful than we thought.

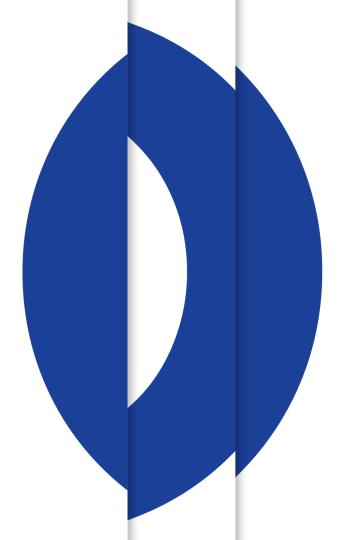- Hybrid systems will be used for VoD services, but other multimedia services may be taken over by Apps.

HYBRID BROADCAST BROADBAND

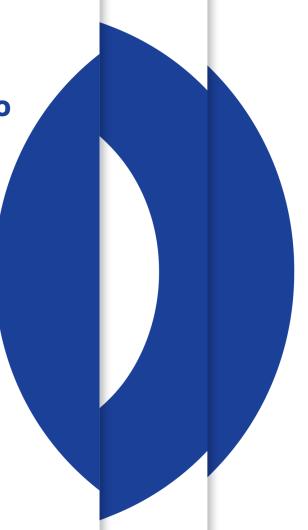# THE MAJOR STRENGTH OF HYBRID BROADCAST/ BROADBAND SERVICES WILL BE VOD?
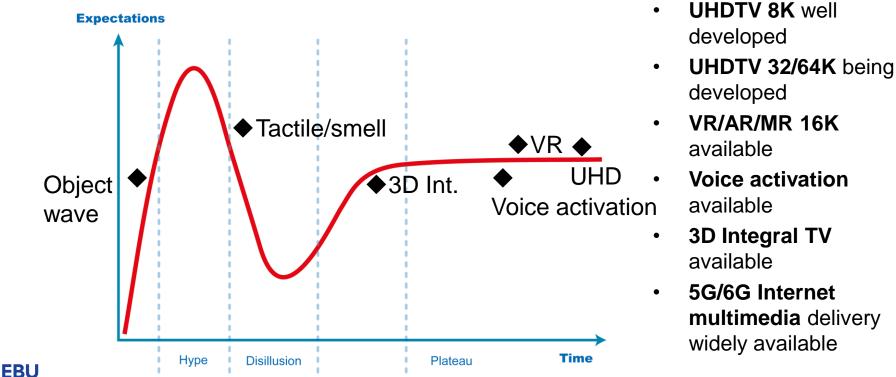
APPS WILL COVER MULTIMEDIA NEEDS?

BUT SOME THINGS WILL NEVER CHANGE....

- **THE MEDIA EXISTS, FIRST AND FOREMOST, TO "TELL STORIES"**
- **ITS ROLE IS TO MAKE US LAUGH, CRY, BE HAPPY AND BE INVOLVED**
- **ITS ROLE IS TO HELP US TO UNDERSTAND OUR ENVIRONMENT**
- **THE ROLE OF MEDIA TECHNOLOGY IS TO ADD VALUE TO THE CONTENT – TO MAKE IT MORE INVOLVING AND EASIER TO FIND**
- **IF WE DO THIS, WE WILL ALWAYS BE SUCCESSFUL**

WHAT WILL BROADCAST TECHNOLOGY BE IN 2067?

- **UHDTV 8K** well developed
- **UHDTV 32/64K** being developed
- **VR/AR/MR 16K** available
- **Voice activation** available
- **3D Integral TV** available
- **5G/6G Internet multimedia** delivery widely available
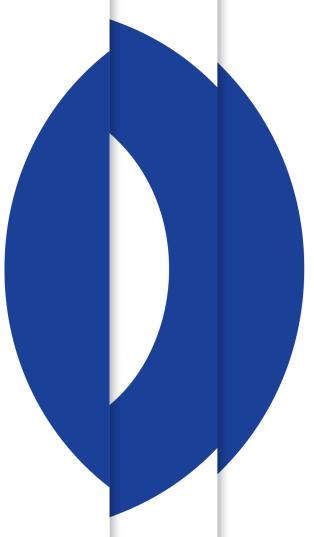
CONCLUSIONS ON PROGRESSION

THE YEARS TO 2067 WILL BRING:

- HIGHER IMAGE RESOLUTION (PLUS HFR AND HDR)
- VR SERVICES AS AN IMPORTANT ADJUNCT TO BROADCASTING BUT NOT A SUBSTITUTE
- PERSONALISATION AVAILABLE BUT THE VALUE OF SHARED CONTENT WILL REMAIN
- VOICE ACTIVATION VIA HUMAN-LIKE AGENTS
- HYBRID BROADCAST BROADBAND MOSTLY IN THE SERVICE OF VOD
- EXTENSIVE USE OF APPS

WHAT DO YOU THINK?

THANK YOU FOR LISTENING!

DR DAVID WOOD

WOOD@EBU.CH