

Tomorrow's Challenge #1: You're Kidding! – UHD TV 4K and 8K

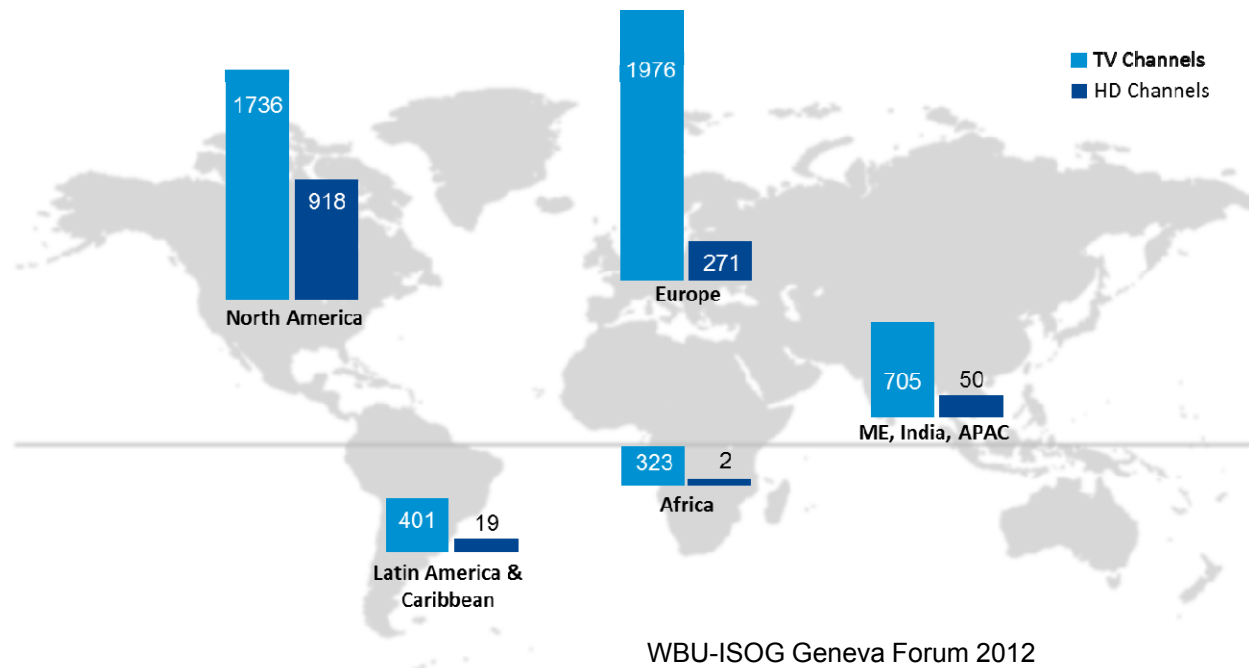
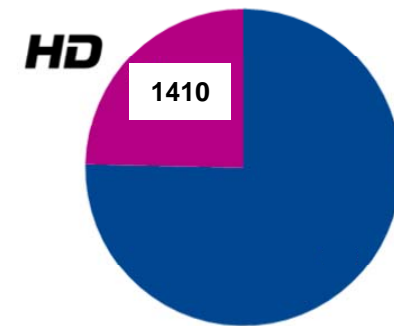
# UHD TV: The Satellite DTH Perspective



Thomas Wrede - Geneva, 28 November 2012

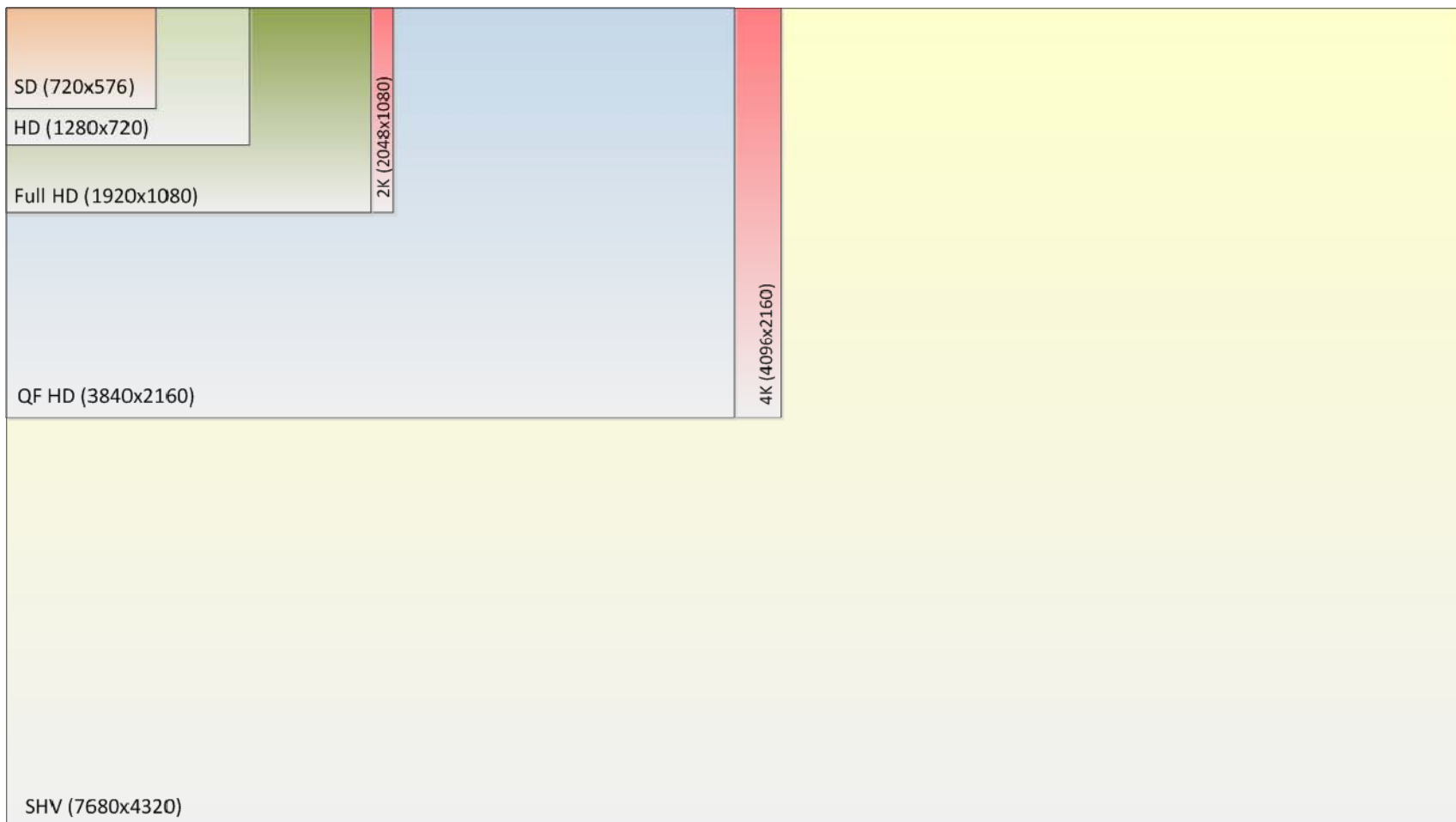
# Commercial relevance of HDTV

- ▲ Out of the 5237 TV channels carried on SES satellites more than 1400 are in HD
- ▲ Further increase in HDTV channels expected
- ▲ An HD only future is now foreseeable
- ▲ “Beyond HD” preparations have started



# What is the next best system?

## ▲ Resolution in Digital Television and Cinema



# Our focus: a 4K broadcast format

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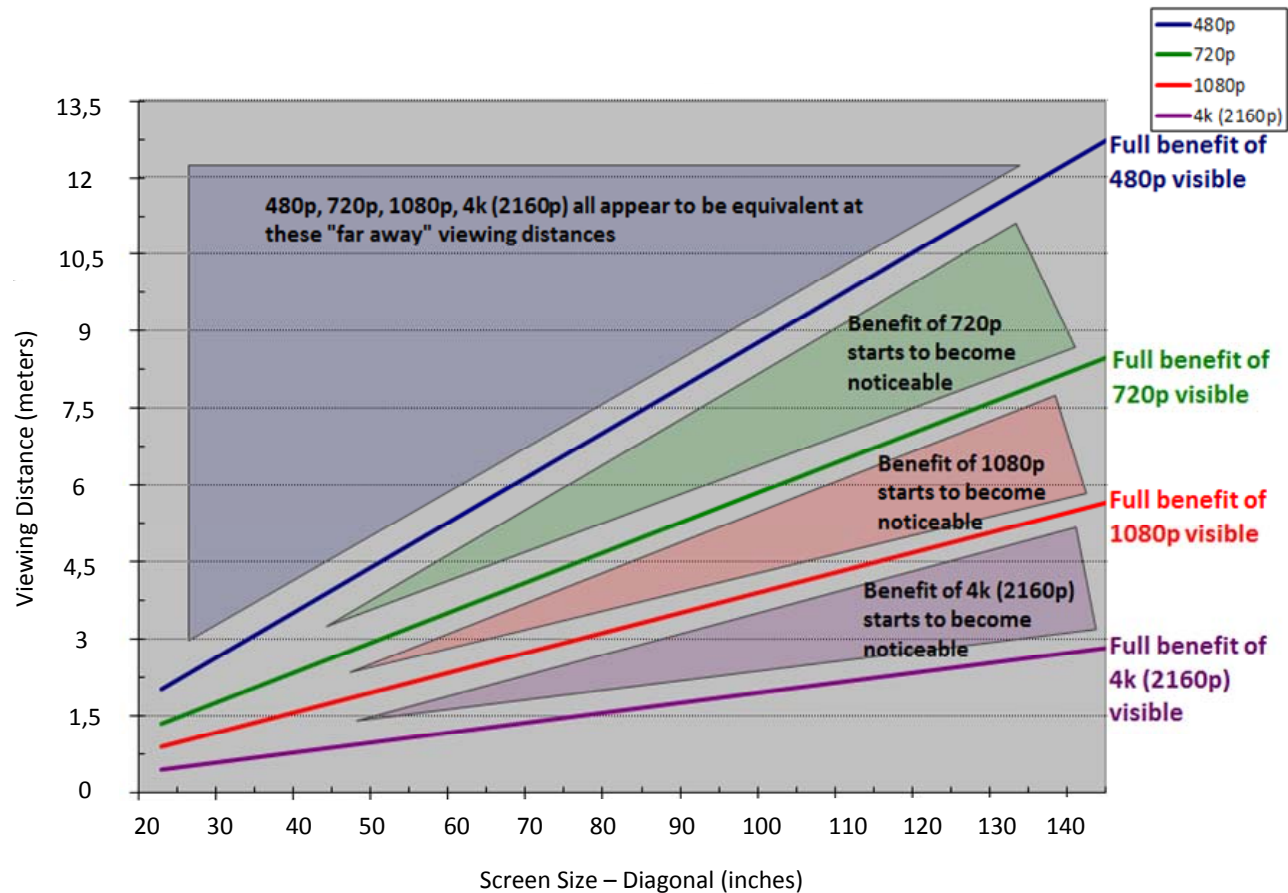
- ▲ For satellite television the near term HD successor format is:

**3840 x 2160**



- ▲ Referred to by ITU as UHD-1
- ▲ 8.3M pixels
- ▲ Exactly 4 x HD (allows for better scaling)
- ▲ Frame rate: **50 Hz**

# Screen size vs viewing distance



# UHD-1 market introduction

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- ▲ Balance between quality improvements versus timeline and cost
- ▲ HEVC and DVB-S2x: required for a pragmatic UHD-1 market introduction
  - Over 20% additional net bandwidth cannot be ignored
- ▲ Extended color gamut (and eventually 10 bits/color)
- ▲ Frame rates:
  - Distinguish between broadcast and locally up-scaled frame rates
  - 100/120 fps prohibitive in terms of bandwidth and complexity hence **preference for 50/60 fps**
    - Over 20 Mbit/s (in HVEC and with DVB-S2x) for a 100/120 fps channel is too much
- ▲ Audio: **5.1 and/or 7.1 are sufficient** (and require enough wiring in the home.....)

# Broadcasting UHD-1 via Satellite

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- ▲ Nearly 4 times the capacity of HD: prohibitive.....
- ▲ Need **HEVC** (and **DVB-S2x**) for a realistic market introduction:
  - (HEVC roadmap: Draft International Standard in July 2012 , FDIS in January 2013)
  - (DVB-S2x: technical specification available in Q4/2013)
- ▲ 2-3 programmes per DTH transponder

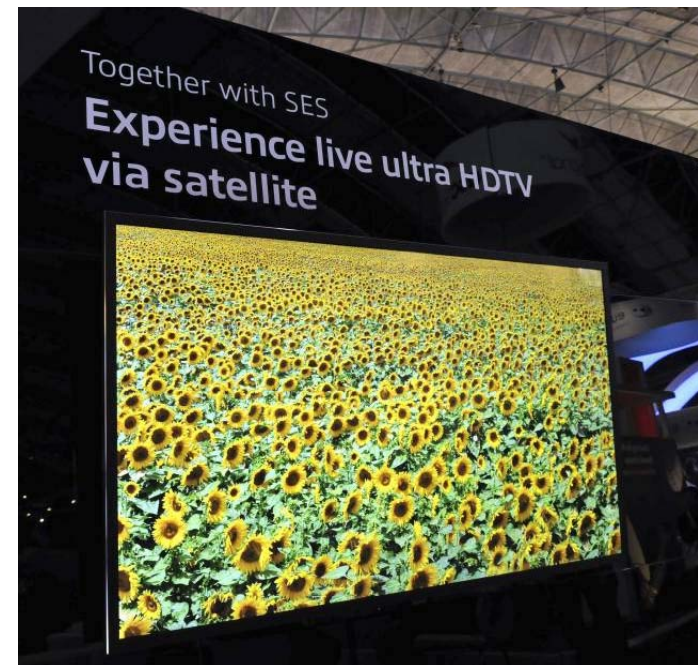
Mbit/s	1080i50 (H.264)	UHD-1 (H.264)	UHD-1 (HEVC)
Pessimistic	12	44 – 48	22 - 24 Mbit/s
Most Probable	10	36 – 40	18 - 20 Mbit/s
Optimistic	8	28 – 32	14 - 16 Mbit/s

**About 25% less data rate required with DVB-S2x on a typical DTH transponder**

# UHD-1: What is SES doing?

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- ▲ Strong co-operation with industry, operators and trade
- ▲ Follow-up of technology developments and standardization
- ▲ Preparing customers and professionals
  - Demonstrations at trade events and customer events
  - Very high interest and positive feedback
- ▲ What's next?
  - Set up an end-to-end HEVC chain
  - Follow-up with display industry & chip manufacturers
  - Market studies
  - Launch of a 24/7 demo channel
  - Marketing campaign





## “To Do’s” for the industry

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- ▲ A 4K specification and profile is required for broadcasting (DVB 101 154 update)
- ▲ Real-Time 4K HEVC Encoders need to become available
  - Processing power about 10x compared to H.264
- ▲ STB/TV backend chipsets (SoCs) incl. HDMI 2.0 need to become available
  - Tape-out hardly before mid 2014 – mass production in 2015
- ▲ New set top boxes need to be designed around these chipsets
- ▲ Consumer flat screens at affordable price points and in different sizes
- ▲ .....
- ▲ Much more UHDTV content is needed

An operator launch of UHDTV in 2015/2016 is realistic

# Conclusions

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- ▲ UHD-1 will be the next “Ultra-HD” broadcast format on satellite
- ▲ There is still need for
  - **standardization** (scan format, fps, colorimetric, coding format, audio,..)
  - a new video **codec**: HEVC
  - **interfaces** to carry UHD-1 to the display at 50/60 Hz: HDMI 2.0
  - **chipsets** and **STBs** to decode UHD-1 signals
  - and more **affordable displays**
- ▲ Hence a careful timing of the market introduction is important
- ▲ UHD-1 temporary test transmissions are on air since spring 2012 (still H.264 encoded)
- ▲ A 24/7 demo channel will be launched when suitable STBs and displays are available



**Thank you!**



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