



IMMERSIFY

Project Introduction

Mauricio Alvarez-Mesa (Spin Digital) & Project partners

Immersify

Audiovisual Technologies for Next Generation Immersive Media

- Duration: 30 months: Oct 2017 – March 2020
- Funding: European Commission, Horizon 2020, Innovation Action
- Budget: 2.5 million €

Immersive Media

immersive

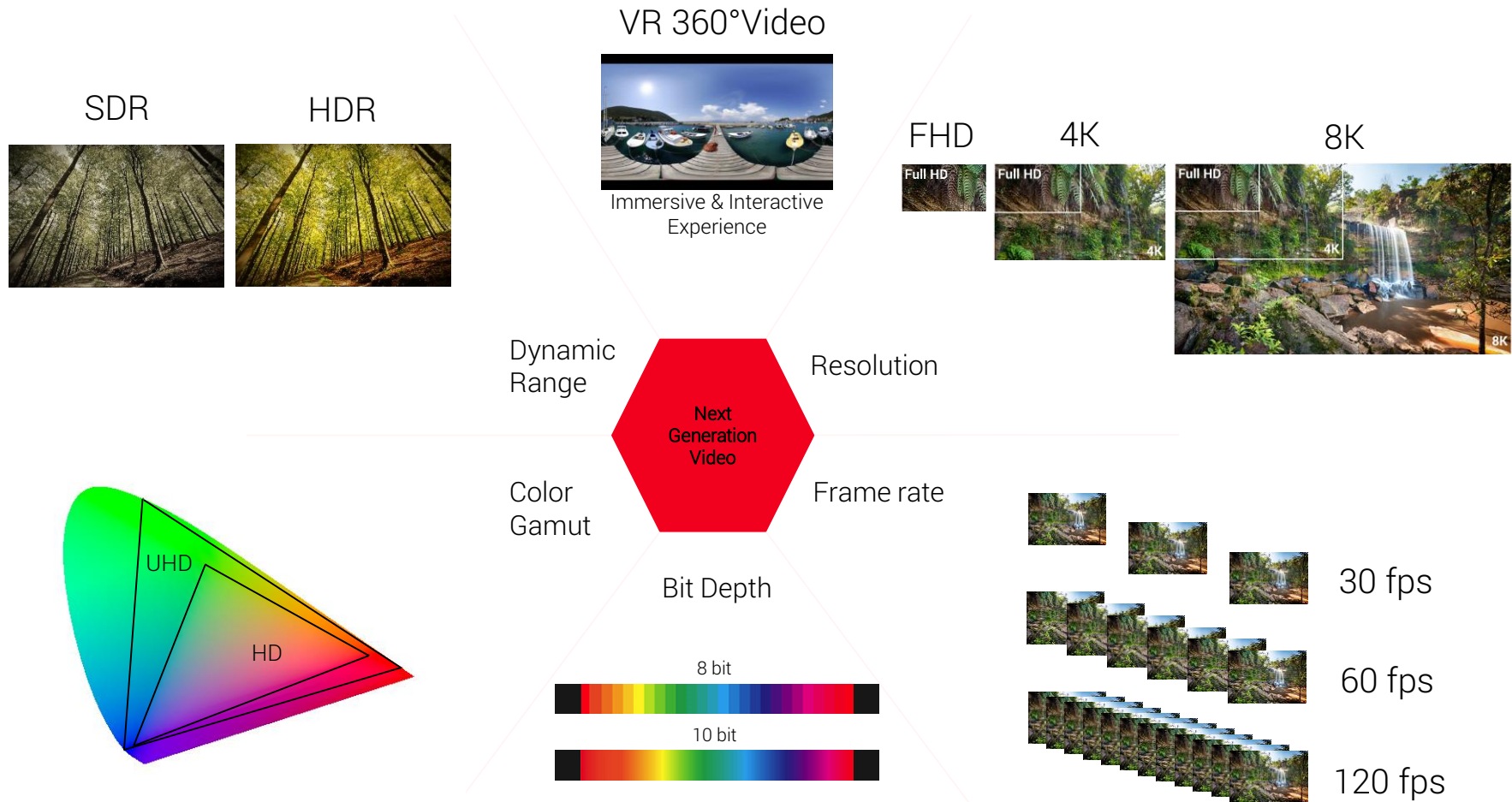
adjective • /ɪ'mɜːsɪv/ /ɪ'mɜːsɪv/

- ★ **seeming to surround the audience, player, etc. so that they feel completely involved in something:**

an immersive theatrical experience

The new game is more immersive.

Next Generation Video



VR & 360° Video

- Virtual Reality: immersive and interactive experience
- Total 360° video requires 3X-4X the resolution of the Field of View
- Stereoscopic 360 ° video requires 2X the data rate



Quality Requirements for Next Gen VR



16K and 240 fps are needed for “true VR”

Raja Koduri, head of GPU at AMD

8K per eye is the ideal resolution for full immersive virtual reality

Palmer Lucky, co-founder of Oculus Rift

	4K	8K	12K	16K
Per eye resolution	1Kx1K	2Kx2K	3Kx3K	4Kx4K
360° total resolution	4Kx2K	8Kx4K	12Kx6K	16Kx8K
360° 3D total resol.	4Kx4K	8Kx8K	12Kx12K	16Kx16K

Data Requirements: Uncompressed Video

Format	HD	UHD-4K	UHD-8K	16K ("True VR")
Resolution	1920x1080	3840x2160	7680x4320	15360x15360
Framerate	30	60	120	240
Video type	Planar 2D	Planar 2D	Planar 2D	Spherical + 3D
Color format	4:2:0	4:2:0	4:2:0	4:2:0
Bit depth	8-bit	10-bit	10-bit	10-bit
HDR	No	Yes	Yes	Yes
Raw bitrate	0.747 Gbps	7.5 Gbps	59.7 Gbps	849 Gbps
Content / 1 TB	2.97 h	17.8 min	2.2 min	9.4 sec

Immersify Partners



spin digital



PSNC

- Poznan Supercomputing and Networking Center
- Poznan, Poland
- 8K media lab
- Immersive cave



Spin Digital

- Berlin, Germany
- SME
- Video Codecs for 8K and beyond



Ars Electronica

- › Linz, Austria
- › Deep Space 8K
- › FutureLab R&D Center
- › Ars Electronica Festival



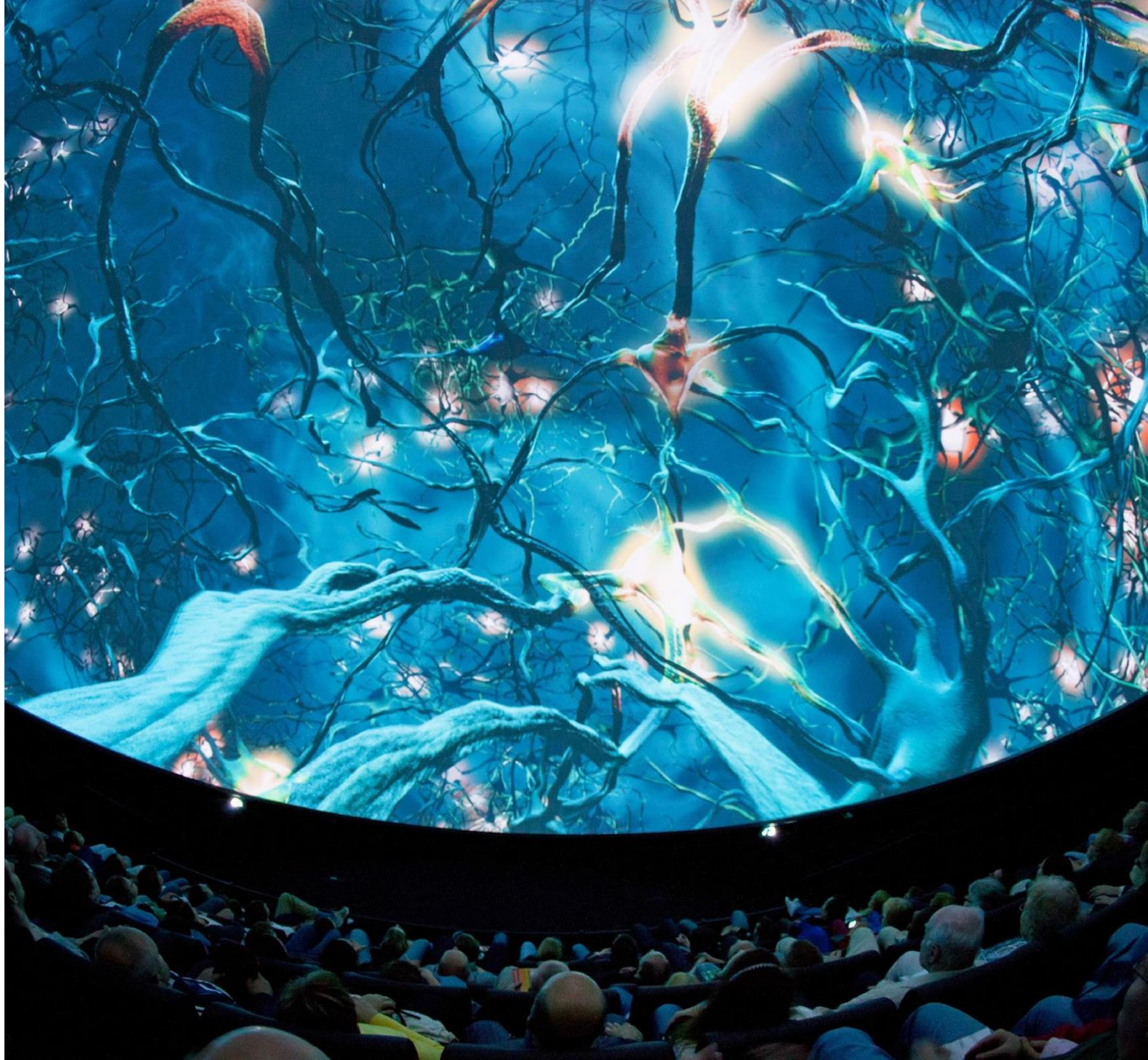
Marché du Film

- Cannes/Paris, France
- NEXT: innovation hub at the Marché du Film
- VR Content and Immersive Cinemas



Norrköping Visualization Center

- Norrköping, Sweden
- Research & Science Center
- 8K Dome



General Objectives

1. To improve the quality of immersive media using advanced compression technology
2. To enable immersive media for multiple display devices and environments
3. To support new ways in interactive experiences by providing the required tools for personalized and interactive non-linear storytelling
4. To promote immersive media content and tools in the creative & media industries in Europe and worldwide

Video Codecs

- To improve the quality of immersive media using advanced compression technology
 - High quality HEVC/H.265 codec
 - Optimizations for VR & 360° video



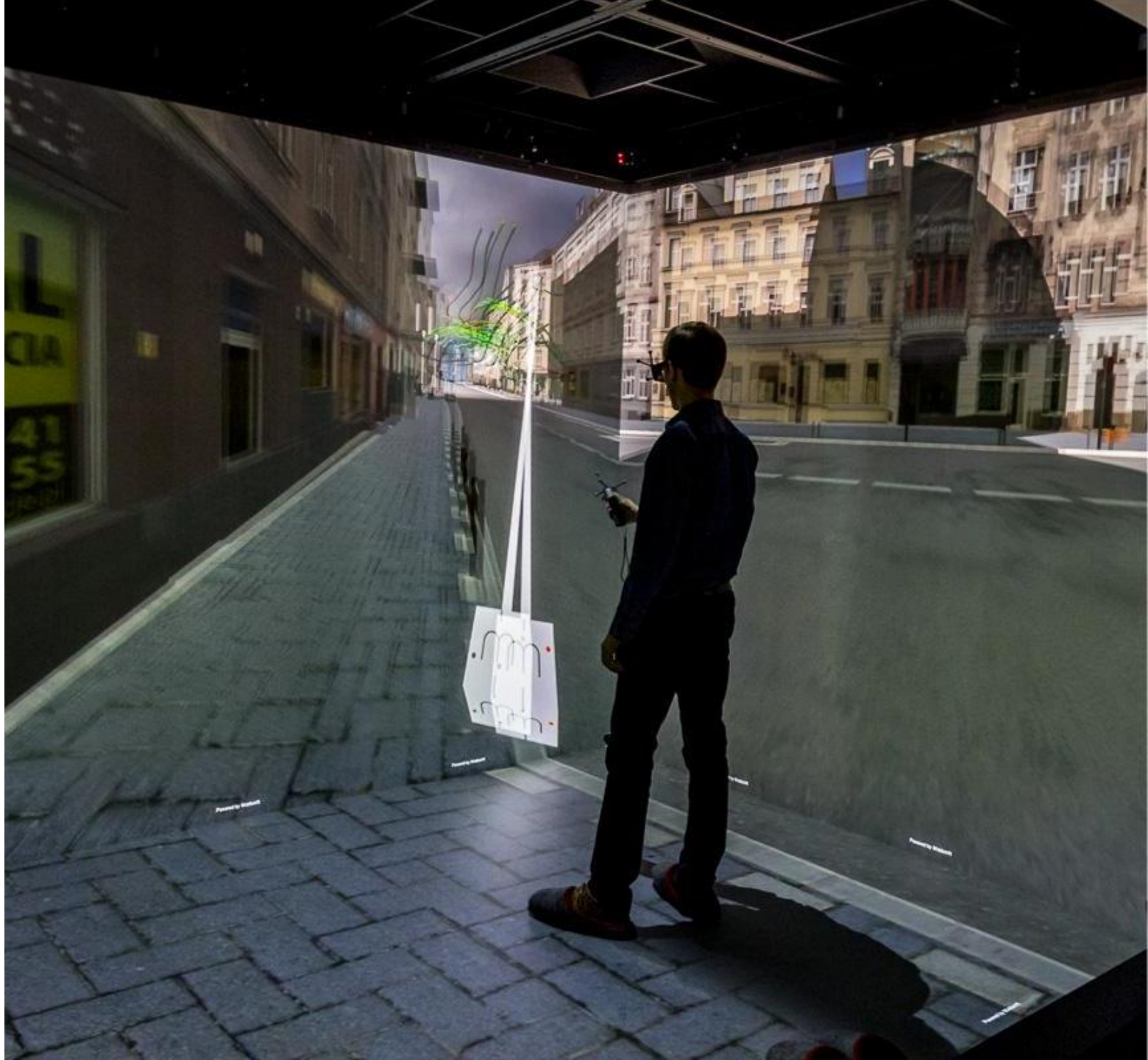
Immersive Display

- To enable immersive media for multiple display devices and environments
- Ultra-high-res: 8K & 16K
- Player for multi-projection systems
- Player for Deep Space & Dome



Interactive & non-linear

- Provide the required tools for personalized and interactive non-linear storytelling
- 6 Degrees of freedom VR video
- Ultra-HD (4K & 8K) video textures in interactive applications



Immersive Streaming

- Real-Time Media Server and Streaming
- 8K VR live events



Content & Tools

- To promote immersive media content and tools in the creative & media industries in Europe and worldwide



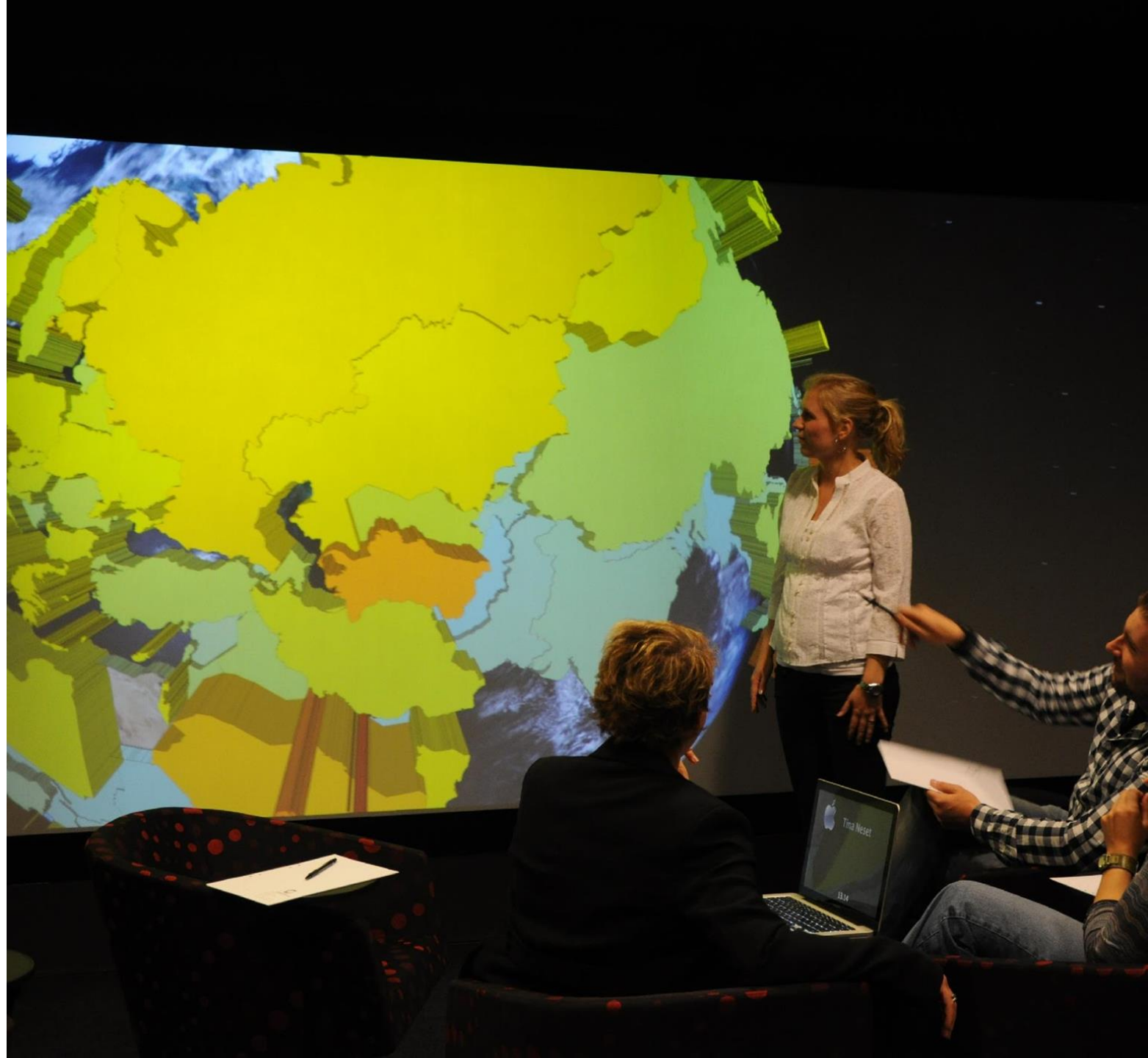
Creators and Tools developers

- Create immersive content using new tools
 - Time-lapse photography
 - 3D laser scanning
 - CGI and animation
 - Panoramic video
 - Real-life 8K footage
 - Interactive VR



Document

- Document best practice guidelines for media production workflows



Showcases

- NEXT at Festival de Cannes
- Ars Electronica Festival
- IBC, NAB and InterBEE



Advisory Board

- Participate in project meetings: 2018, 2019, 2020
- Give Feedback
 - Technical developments: objectives, milestones, and risks
 - Validate the dissemination and exploitation plan
- Current members
 - Kenji Sugawara. NHK Media Technology. Japan
 - Akihide Nagara. Technology Joint Corporation. Japan

Immersive content showcases

- › Innovative VR content will be produced
 - › Project partners
 - › External content creators
- › The content will be presented at major international events
 - › Festival de Cannes - NEXT
 - › Ars Electronica Festival
- › Content will be used reference for
 - › Codec development and assessment
 - › Best practice show cases and guidelines
- › Open for collaboration with content creators
 - › Small sub-contracting possible
 - › Other instruments (STARTS initiative) available

WP3: Immersive Displays

- Optimizations for next generation formats and platforms
 - Up to 16K and higher fps (120 fps)
 - New generation Intel Xeon CPUs (Skylake-X/W/SP based platforms)
 - Multiple GPU setups
- Optimizations of HEVC decoder and video render
 - **Efficient Pixel Formats:** compaction and compression
 - **SIMD instructions:** Intel Advanced Vector Extensions AVX 512 for Skylake CPUs
 - **Multi-GPU rendering:** scaling video rendering with multiple GPUs
 - **NUMA Optimizations:** highest performance in new multi-socket platforms

World First 16Kp60 Video Player

> 16Kp60 HEVC video player

- > Resolution: 16K (15360 x 8640 px)
- > Frame rate: 60 fps
- > Pixel format: HEVC 4:2:0 – 10-bit
- > Codec: HEVC at 400 Mbps

> Platform

- > CPU: 2x Intel Xeon Scalable Platinum 8168 (2×24 cores)
- > GPU: 4x Nvidia Quadro M4000
- > OS: Windows 10
- > Display: 16x 4K Monitor – DisplayPort 1.2

16K Video Player Demonstrations



NAB 2018 – Las Vegas – April 2018

8K/16K Video Powered by Intel Xeon Scalable Processor
Joint demo with Intel Corporation



ISE 2018 – Amsterdam – January 2018

16K 60P Playback
Joint demo with Azlab

Thanks for your attention!

Questions?



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PSNC
Poznan Supercomputing and
Networking Center



Spin Digital Video
Technologies GmbH



Ars Electronica
Futurelab



MARCHÉ DU FILM
FESTIVAL DE CANNES

Marché du Film –
Festival de Cannes



NORRKÖPING
VISUALIZATION CENTER

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