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Research Priorities in Media & Entertainment

Position Paper

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Executive Summary

This paper is a report of a Workshop that has been organised on the 15th May by the SNS CO-OP project together with the NEM Initiative (https://nem-initiative.org/) , the 5G Media Action Group (https://www.5g-mag.com/).

The objective was to update our vision regarding the requirements that have the Media & Entertainment sector with regards to the connectivity. These requirements will also feed the WP 2026 and the WP 2027.

During this workshop, the opportunity was given to present side initiatives that will also contribute to define the long-term vision of the Media & Entertainment sector. The Virtual World Partnership is being defined to be implemented in the next FP10 program, they also have a number of requirements on connectivity.

At the end of October 2025, the NEM initiative and SNS CO OP project are organising a special session on Networked Media in order to make a presentation of the results and SNS JU projects in the context of Media & Entertainment but also to collect additional requirements that could also feed the SNS WP2027.

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1. INTRODUCTION

The SNS JU 2 is in the process of preparing the SNS Work Programme 2026/27, which is mainly addressing Phase 2 of the following phases of the Joint Undertaking:

- Phase 1: Evolutionary 5G, 6G exploration, concepts and definitions;
- Phase 2: 5G detailed design, system optimisation;
- Phase 3: Pre-commercial 6G systems.

As in 2024, 6G-IA organised in 2025 a series of workshops with stakeholders in different technology domains such as AI for SNS, Automotive, FEM (Front-end Module), Industry, Media & Entertainment, NTN, Photonics, Public safety, Security and Wireless.

This report focuses on the outcome of the Media & Entertainment follow-up Workshop for the SNS JU Work Programme 2026 preparation on May 15, 2025.

The main objective of the Workshop was to update the list of relevant technology areas and to propose a prioritisation of these topics as input to the preparation for the SNS JU work Programmes 2026 and 2027.

After opening statements from DG Connect E1, 6G-IA and SNS Office, a presentation from Bernard Barani on 6G vision, followed by the NEM SRIA presentation by Silvia Boi, followed by a presentation of the new Virtual World PPP initiative followed by the 5G MAG vision, a brainstorming session took place in order to collect M&E requirements that could be part of the next SNS JU WP2026.

2. MOTIVATION & BACKGROUND

In 2025, experiential entertainment moves into spotlight, AI goes mainstream, streaming profitability accelerates and M&E executives recalibrate portfolios as linear fades.

- Investments continue in location-based entertainment as consumers demand access to experiences.
- The use of artificial intelligence (AI) and generative AI (GenAI) will gain momentum, but media and entertainment (M&E) executives want to see the ROI.
- All eyes are on direct-to-consumer (DTC) models for sustainable profitability.
- Linear TV has arrived at a strategic crossroads: harvest or divest.

5G offers a range of key technologies to enable and support these cases. The main ones are **higher bandwidth**, both downlink (mainly) but also uplink; **edge computing** that enables latency reduction in some uses; support for increased **user density** – to reduce congestion both for production and consumption; **slicing and orchestrated virtualised services** using 5G Core to enable QoS "guarantees" for paying customers in stand-alone (SA) networks; **NPN networks** and NPN-PN roaming and collaboration models; and **broadcast/multicast** support.
Looking to foreseen network development, AI, MEC and NTN should find a place in the M&E technical chain but from the end user point of view, the Network is not the main weakness today, end devices have also a big role in the E2E user experience

3. MEDIA&ENTERTAINMENT LANDSCAPE

The Media and Entertainment industry has multiple segments that combine into one vertical:

1. Movies/Cinema,
2. Television,
3. Music,
4. Publishing,

[2] SNS JU: https://smart-networks.europa.eu/

5. Radio,
6. Internet,
7. Advertising,
8. Gaming

All these segments have the usage of connectivity, but not always the same technical capacities

On the hand 6G will offer a number of innovations that can contribute to the Media & Entertainment sector to provide new use cases and applications

- Precise positioning
- Environment understanding
- Environment control
- Real time data capture
- AI impact on communicating entities
- Non-public networks
- Exposure of network capabilities and performance data in real time

4. MEDIA&ENTERTAINMENT REQUIREMENTS

During the workshop and after the presentation of the parties, a survey was conducted in order to capture the key requirements of the Media & Entertainment sector with regard to connectivity.

2 questions were addressed to the participants:

1. Which M&E services require advanced connectivity?
2. What 6G will bring to M&E services?

4.1. WHICH M&E SERVICES REQUIRE ADVANCED CONNECTIVITY?

The following topics have been collected:

1. Smooth steaming of entire virtual worlds / 3D scenes
2. Immersive Content Virtual World Immersive services
3. live streaming of 3D assets in virtual worlds
4. XR based mobile services
5. Immersive education
6. Real-time interaction between 3d avatars / humans in virtual worlds, without latency
7. Low latency access to virtual world applications
8. Live streaming of 3D objects and humans/avatars

4.2. WHAT 6G WILL BRING TO M&E SERVICES?

The following topics have been collected:

1. AI powered video technology leveraging the high-speed capabilities of 6G networks.
2. Reliability, accessibility and guaranteed low-latency
3. Guaranteed low latency for critical high-bandwidth streams and interaction
4. Live interaction without latency

5. ACTION PLAN

Following this workshop, 4 actions are planned

1. Identification of M&E requirements with regards to 6G to feed the SNS JU WP2026 (see section 4 above)
2. Development of White paper with the SNS JU projects
3. Organisation of a session at the next NEM Summit (21/22 October in Berlin)
4. Contribution to the new Virtual Worlds PPP SRIA on the Infrastructure networks and compute chapter

5.1. DEVELOPMENT OF A WHITE PAPER

In order to capture useful information from SNS JU projects that are developing Media & Entertainment use cases and applications, a white paper with the following content is being developed with the objective of making a presentation at the next NEM Summit.

40 contributors representing 16 SNS projects are actively contributing to the paper.

The content will be the following

1. Introduction
1.1 Background information on 6G technology
1.2 Importance of the 6G in the Media and Entertainment
1.3 Objective of the white paper
2 Section 1: Understanding 6G technology
2.1 Definition and overview of 6G
2.2 Key features of 6G
3 Section 2: The impact of 6G on Media and Entertainment
3.1 Enhanced user experience
3.2 Content creation and distribution
3.3 M&E services and applications
4 Section 3: Use cases and applications
4.1 Virtual and augmented reality
4.2 Live streaming and broadcasting
4.3 Smart advertising
5 Section 4: Challenges and considerations
5.1 Technical challenges
5.2 Regulatory and ethical considerations
6 Section 5: Future outlook

5.2. ORGANISATION OF A SESSION AT THE NEM SUMMIT 2025

The SNS JU and NEM have signed a MoU a few years ago, one of the objectives is to facilitate exchanges between the 2 communities.

For NEM members, they could capture innovations coming from the network projects, for SNS members, they could identify requirements that could feed the SNS roadmap.

The objective of the session is to give the opportunities to NEM Cluster 4 projects and SNS JU projects to make presentations of their results and to organise a discussion between projects.

SNS JU vertical tracker shows that 20 projects have developed Media/entertainment use cases, we need to identify 4 to 5 of them that could be part of the session

NEM Cluster 4 projects (Horizon Europe/CL4/Human)?

Round table with a moderator

Provisional agenda:

Presentations and moderated panel with questions and discussions

1/ Intro (Pierre-Yves Danet | 6G-IA)

2/ Presentation of the white paper “6G for Media&Entertainment” (Pierre-Yves Danet | 6G-IA)

3/ Presentation of the 5GMAG activities (Dr Jordi J Giménez | 5GMAG)

4/ Presentation of 6G-BRICKS, 6G-XR and SUNRISE-6G (Mario Montagud | I2Cat)

5/ Presentation of PRESENCE XR (Sergi Fernandez Langa | I2Cat)

6/ Panel discussion (Presenters)

1. Which M&E services are requiring advanced connectivity?
2. What 6G will bring to M&E services?

7/ Closing:

Take Home – One concept, one idea, or one word.

5.3. CONTRIBUTION TO THE VIRTUAL WORLD PPP

Virtual Worlds SRIA – Infrastructure, Networks and Compute chapter

11 June 2025

Intelligent connectivity is key for the implementation and deployment of edge intelligent immersive technologies combining augmented reality (AR), virtual reality (VR), mixed reality (MR), and extended

reality (XR) with concepts like metaverses, omniverse, multiverses, next-generation spatial web, Web 4.0 as part of future virtual worlds.

Future Virtual Worlds applications will place entirely new demands on the network in terms of uplink, downlink, latency, and jitter requirements depending on the deployment scenario. For example, while near-term 5G conversational AR applications may require somewhere up to 20 Mbps downlink, 10 Mbps uplink and 10 milliseconds latency (including RAN and Core), it is expected that future massive multi-sensory XR could require anything up to 1 Gbps downlink, 100 Mbps uplink and 5 milliseconds latency – with a need for high edge cloud compute offload. Some extremely demanding holographic communication use cases featuring very high fidelity could even place demands of up to 10 Gbps downlink, 5 Gbps uplink and as low as one millisecond latency on the network.

AI-native architecture, API-enabled network platforms, and new compute fabrics such as energy-efficient neuromorphic computing, will also carry significant weight in terms of service enablement and acceleration, and must also be addressed in the coming years.

The interplay between multimodal sensing, ubiquitous connectivity, and 6G positioning technologies, together with digital twin and cloud-based spatial mapping technologies, will form a cornerstone of future programmable Virtual Worlds providing a new playing field for truly immersive communication.

High-quality Virtual World experiences will also be dependent on the advancement of video compression technologies. For instance, Versatile Video Coding (VVC) will free up networks to not only handle traffic from cutting edge technologies like mixed reality – AR and VR applications that have the potential to transform everything from city planning, to education, to gaming – but also to deal with the increased amount of video conferencing and remote collaborative tools.

6G will revolutionise XR by addressing current limitations (latency, bandwidth, mobility) and providing communication and computing integrated network in order to enable new use cases:

1. Ultra-Low Latency for Real-Time Interaction

- To cover all Virtual Worlds use cases, the optimal latency should be around 10 ms. For motion to photon latency 10ms is expected (most VR headsets render at 90fps, meaning 11ms). Latency is highly depending on the what kind of computation is done remotely: visual rendering (around 10ms), haptics feedback computation (around 20ms), relocalization (no strong needs for high latency)
- Holographic Communication: 6G's sub-millisecond latency will support real-time holograms for telepresence, remote collaboration, and social XR.
- Tactile Internet: Enables haptic feedback in VR/AR, crucial for remote surgery, industrial training, and gaming.
- Immersive triplets and digital twin

2. Massive Bandwidth for High-Fidelity XR

- 8K/16K 360° Streaming: 6G's terabit-level speeds will support ultra-high-resolution XR content without compression artifacts.
- Multi-Sensory XR: Supports smell, touch, and taste simulations in virtual environments.

3. **AI-Integrated Edge Computing**

- Distributed AI Processing: 6G networks will use AI-driven edge computing to offload XR rendering tasks, reducing device dependency.
- Context-Aware XR: AI in 6G will enable adaptive XR experiences based on user behaviour, environment, and network conditions.

4. Ubiquitous Connectivity with Terahertz (THz) and Satellite Integration

- THz Frequencies (100 GHz – 10 THz): Enable ultra-high-speed short-range XR data transfers (e.g., wireless AR glasses).

- Non-Terrestrial Networks (NTN): 6G will integrate satellites and drones for global XR coverage, enabling outdoor AR navigation and disaster response.

5. 6G for wearable XR devices

- 6G's energy-efficient protocols will extend battery life for lightweight AR glasses and VR headsets.
- An opportunity for European Industry to take the lead on XR devices (Smart glasses, Head Mounted Displays, Interaction controllers, haptic devices, holographic display, …).
- The border between network and devices is getting ever fuzzier, some of those should become part of the future networks. (A specific section in the Virtual World SRIA is dealing with devices)

6. Centimetre (cm) accurate positioning systems

- Integration of new radio and computer-vision-based localization positioning systems will enable large-scale AR experiences, indoor and outdoor

The Smart Network and Services Join Undertaking (SNS JU), the New European Media Initiative (NEM), and the Alliance for AI, IoT and Edge Continuum Innovation (AIOTI) are addressing research in several activities and projects supported by the European Commission that can contribute to the Virtual Worlds partnership on this specific domain.

Network infrastructures, including edge computing, IoT and devices, are key enablers contributing to the adoption of Virtual Worlds in various verticals such as manufacturing, transport and logistics, healthcare, media/Entertainment, cultural heritage, automotive, education, public safety and disaster response (PPDR), smart cities, and others. Several SNS JU projects are already addressing such use cases that could contribute to the definition of the Virtual Worlds partnership.

ANNEX 1. SNS PROJECTS THAT ARE ADDRESSING M&E USE CASES

46 use cases developed by 22 SNS JU projects are addressing different aspects of the Media/Entertainment sector:

1. IMAGIN-B5G
2. 6G-XR
3. 6G-SANDBOX
4. SUNRISE-6G
5. EXIGENCE
6. 6G-INTENSE
7. SAFE-6G
8. TeraGreen
9. Fidal
10. TrialsNet
11. FirstTo6G
12. DESIRE6G
13. 6G-BRICKS
14. 6G-SHINE
15. 6G-NTN
16. 6G-XR
17. NANCY
18. HEXA-X II
19. 5G-STARDUST
20. 6G Tandem
21. ADROIT 6G
22. SEASON

ANNEX 2. LIST OF PARTICIPANTS TO THE VIRTUAL WORKSHOP ON MAY 15, 2025

	Name	Company / Institute / University
Halid	Hrasnica	Eurescom (NEM Secretary)
Raffaele	De Peppe	TIM (Vertical Task force chair)
Bernard	Barani	6G-IA
Mike	Matton	VRT (NEM Co-Chair)
Silvia	Boi	Sistemi Alder (NEM Co-Chair)
Pavlos	Fournogerakis	SNS JU Office
Miguel	Gonzalez Sancho Bodero	DG Connect/E1
Colin	Willcock	Nokia (6G-IA Chair person)
Anne	Bajart	DG Connect/G2
Jordi	J. Gimenez	5GMAG

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