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| **Abstract:** | This TD contains the Lead SG report of ITU-T SG21 since its establishment by WTSA-24 |

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# 1 The first SG21 meeting (Geneva, 13-24 January 2025)

ITU-T SG21 (Technologies for multimedia, content delivery and cable television) met in Geneva in January 2025, chaired by Mr Noah Luo (Huawei Technologies, China) who was assisted by his vice-chair Mr Shin-Gak Kang (ETRI, Rep. of Korea) and Mr Stefano Polidori (ITU/TSB Counsellor). SG21 was attended by 499 participants from 39 countries. This was the inaugural meeting of SG21, which followed up to the WTSA-24 consolidation of SG9 and SG21.

Several activities were collocated with the first Study Group 21 meeting:

* [ITU-T Study Group 21](https://www.itu.int/go/tsg21) (Geneva, 13-24 January 2025)
* [JVET](https://www.itu.int/en/ITU-T/studygroups/2022-2024/16/video/Pages/jvet.aspx) (Geneva, 14-22 January 2025)
* [MPEG](https://www.mpeg.org/meetings/mpeg-149/) of ISO/IEC JTC1/SC 29 (Geneva, 20-24 January 2025)
* **Joint** **workshop** between SG21 and ISO/IEC JTC 1 SC 29 on [“Future video coding – advanced signal processing, AI and standards”](https://www.itu.int/en/ITU-T/Workshops-and-Seminars/2025/0117/Pages/default.aspx) (Geneva, 17 January 2025)
* ITU-T [JCA-AHF](https://www.itu.int/en/ITU-T/jca/ahf) (Accessibility and Human Factors) on 22 January 2025
* ITU [IRG-AVA](https://www.itu.int/en/irg/ava/Pages/default.aspx) (Audiovisual Media Accessibility) on 21 January 2025
* [ITU-T Study Group 20](https://www.itu.int/go/tsg20) (Geneva, 15-24 January 2025)   
  *NOTE: a joint session among SG21 and SG20 on metaverse was organized*

ITU-T SG21 Working Party structure and leadership was approved as contained in [SG21-TD4R1/PLEN](https://www.itu.int/md/T25-SG21-250113-TD-PLEN-0004/en). During the SG21 meeting, the proposal of the management team was endorsed with only one update to the title of WP3, which now includes the word "authenticity".

* **WP1** **“Integrated broadband and cable television systems”** (Q14, 15, 16, 17, 18, 19, 20, 21, 22).
* **WP2** **“Multimedia digital services and human aspects”** (Q1, 2, 3, 4),
* **WP3** **“Media authenticity, processing and AI-enabled applications”** (Q5, 6, 7),
* **WP4** **“Infrastructure for multimedia systems, services and applications, including metaverse”** (Q8, 9, 10, 11, 12, 13)

SG21 is the result of the consolidation of SG9 and SG16, which has been a one-year process that started by TSAG in January 2024, was approved by WTSA-24 and concluded with its final implementation at the 1st SG21 meeting in January 2025. It involved major coordination efforts from stakeholders in both SGs, including various virtual meetings led by TSB and each chair of SG9 and SG16. A concatenation approach was used to initially integrate the two communities and preserve their work.

Also, a new ad hoc group on **future questions structure** (AHG-FQS) was established. It aims to support and complement the consolidation process of SG9 and SG16 as follow up to WTSA-24. The main purpose of the ad hoc group is to discuss and coordinate proposals for the refinement of Questions text and/or structure within ITU-T SG21 with the goal to provide a possible improved structure within two years timeframe. This process will also support the following preparation of SG21 towards WTSA-28. The AHG-FQS will report the AHG activities to SG21 Plenary. Mr Noah Luo will act as AHG-FQS Chair. The AHG-FQS terms of reference are found online [here](https://www.itu.int/en/ITU-T/studygroups/2025-2028/21/Documents/AHGs/2025-01_TOR-AHG-FQS.pdf). (Ref. Annex to [SG21-TD39R1/PLEN](https://www.itu.int/md/T25-SG21-250113-TD-PLEN-0039/en)).

In the meanwhile, SG21 agreed to revise the Question text for **Question 6/21** to clarify the scope of **coded multimedia authenticity** (see separate liaison statement [TSAG-TD58](https://www.itu.int/md/T25-TSAG-250526-TD-GEN-0058/en)), and for **Question 9/21** to clarify the scope of **metaverse interoperability** (see separate liaison statement [TSAG-TD57](https://www.itu.int/md/T25-TSAG-250526-TD-GEN-0057/en)). The two steps approval process foresees for SG21 to send a liaison statement to TSAG to request comments, if any. The texts of the revised terms of reference for Q6/21 is found in [SG21-TD105R1/PLEN](https://www.itu.int/md/T25-SG21-250113-TD-PLEN-0105/en), while the revised terms of reference for Q9/21 is found in [SG21-TD106/PLEN](https://www.itu.int/md/T25-SG21-250113-TD-PLEN-0106/en). Both revised texts were submitted to TSAG for their comments/approval.

**SG21 data:**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **2025-01 Geneva** | **2025-10 Geneva** | **2026-07** | **2027-07** | **2028-04** |
| **Participants** | **499** |  |  |  |  |
| **Countries** | **39** |  |  |  |  |
| **Contributions** | **232** |  |  |  |  |
| **Deliverables** | **50** |  |  |  |  |
| *Consent* | *43* |  |  |  |  |
| *Determined* | *2* |  |  |  |  |
| *Approved* | *2* |  |  |  |  |
| *Agreed* | *3* |  |  |  |  |
| **New work items** | **67** |  |  |  |  |
| *Draft Recs* | *61* |  |  |  |  |
| *Informative* | *6* |  |  |  |  |
| **Outgoing liaison statements** | **79** |  |  |  |  |
| ***Interim RGM*** | **31** |  |  |  |  |
| ***Interim WP meetings*** | **2** |  |  |  |  |
| **TDs (total)** | **514** |  |  |  |  |
| *TD GEN* | *127* |  |  |  |  |
| *TD PLEN* | *107* |  |  |  |  |
| *TD WP1* | *45* |  |  |  |  |
| *TD WP2* | *71* |  |  |  |  |
| *TD WP3* | *73* |  |  |  |  |
| *TD WP4* | *91* |  |  |  |  |

# 2 SG21 Lead SG Report

The coordination function expected under the lead SG responsibilities of SG21 is supported by the agreed list of SG21 liaison officers and representatives for the Study Period 2025-2028 as found in [SG21-TD6R1/PLEN](https://www.itu.int/md/T25-SG21-250113-TD-PLEN-0006/en).

## 2.1 Multimedia technologies, applications, systems and services

ITU-T SG21 has established a new ad hoc group on **coded multimedia authenticity** (AHG-MMA), which will coordinate discussion around standards development work on the authenticity of coded multimedia within ITU-T SG21 until the next meeting of SG21 in October 2025. The objective of this AHG is to finalize the scope, study items, and tasks needed for establishing a new Question on the authenticity of coded multimedia. This will involve studying existing and emerging technologies. Thomas Wiegand (Fraunhofer HHI, Germany) will act as AHG-MMA Chair, assisted by two vice chairs: Xin Kang (Huawei Technologies Co., Ltd., China) and Iraj Sodagar (Dolby Laboratories, US). The AHG-MMA terms of reference are found online [here](https://www.itu.int/en/ITU-T/studygroups/2025-2028/21/Documents/AHGs/2025-01_TOR-AHG-MMA.pdf) (Ref. [SG21-TD49/PLEN](https://www.itu.int/md/T25-SG21-250113-TD-PLEN-0049/en))

## 2.2 Integrated broadband cable networks

The work previously under SG9 has been mainly grouped under the new Working Party 1 of SG21. N activity that served in the past to boost momentum and promote coordination is the organization of the future of TV workshop series, the latest of which was dedicated to the Europe region and took place in November 2024 under the umbrella of ITU-R SG6 meeting. WP1 discussed the organization of the next event which may be dedicated to the Asia and Pacific region and may take place towards the end of 2025.

## 2.3 Audiovisual content processing and delivery over multimedia distribution systems, including cable networks, IP-based television services and digital signage

SG21 was collocated with ISO/IEC JTC 1/SC 29 *"Coding of audio, picture, multimedia and hypermedia information"* and its [MPEG-related WGs](https://www.mpeg.org/meetings/mpeg-149/).

**A joint workshop between** **SG21 and ISO/IEC JTC 1/SC 29** [on **“Future video coding – advanced signal processing, AI and standards”**](https://www.itu.int/en/ITU-T/Workshops-and-Seminars/2025/0117/Pages/default.aspx) was organised in co-location in Geneva, Switzerland on 17 January 2025. The workshop focused on **advanced signal processing, AI, and standards**. The workshop had over **500 participants** and featured three sessions:

1. **Requirements and Use Cases** – Industry and user perspectives.
2. **Towards H.267/MPEG-Next** – Current status and future timeline.
3. **Practicalities** – Hardware capabilities and software implementations.

The workshop also hosted a demonstration by Tencent and Alibaba. Find the full [workshop programme](https://www.itu.int/en/ITU-T/Workshops-and-Seminars/2025/0117/Pages/programme.aspx) for more info and the related [photo album](https://www.flickr.com/photos/itupictures/albums/72177720323231461/).

As follow up to the joint workshop on video coding, a joint session with JVET and ISO/IEC JTC 1/SC 29/WG 2 reviewed and refined draft requirements for a next-generation video coding standard beyond VVC, incorporating input on market needs. Also, a joint Ad Hoc Group was established with WG2 to further study these requirements until the next meetings. The AHG will:

* Summarize workshop input.
* Refine draft requirements.
* Review specific WG2 and JVET documents.
* Collect additional contributions.

At this meeting, the development of the JPEG AI core coding system for AI learning-based image coding, **T.840.1** (T.JPEG-AI, ISO/IEC 6048-1), was completed and the text was forwarded for consent as common text. Work on other parts of JPEG AI continued.

For the JPEG 2000 family of standards that has been a longstanding subject of joint standardization, **T.815 v3** (ISO/IEC 15444-16 v3) was completed. A new work item was added for updating of T.808 | ISO/IEC 15444-9.

The video coding work conducted collaboratively by SG21 WP3/Q6 with ISO/IEC JTC 1 SC29/WG5 as the **Joint Video Experts Team (JVET)** has been very active, attracting about 400 participants (including about 200 in-person and another 200 remotely) and approximately 200 technical contributions (not counting reports and crosschecks) for the recent and current meetings. A meeting of JVET was held along with the current ITU-T SG21 meeting at ITU facilities in Geneva, Switzerland. The activities in JVET are managed on the ITU-T side by Q6/21. JVET is tasked with the development, maintenance and extension of the jointly developed video coding standards in the domain of SG21 and SC29, and with exploration work on potential additional such future standards development projects relating to video coding. It also maintains the specification of Versatile Supplemental Enhancement Information (VSEI, Rec. ITU-T H.274, twin text with ISO/IEC 23002-7) and Coding-Independent Code Points for Video Signal Type Identification (CICP, Rec. ITU-T H.273, twin text with ISO/IEC 23091-2) and develops reports on non-normative topics relating to video coding (including H.Sup15, H.Sup18, H.Sup19, HSTP-VID-WPOM, H.Sup-FGST, and H.Sup-MACVC, which are twin texts with ISO/IEC technical reports) and reference software and conformance testing specifications relating to the jointly developed video coding specifications.

At this meeting, the development of the supplement H.Sup-FGST providing information about film grain synthesis technology for video coding applications was completed and the text was forwarded for agreement by SG21. Since further work on this subject is ongoing, a future V2 edition of this supplement was added to the work programme.

Also, the joint **AHG on event-based vision standardization** has been established between Q7/21 and JTC1 SC 29/WG1 (JPEG).

## 2.4 Human factors and ICT accessibility for digital inclusion

ITU-T Study Group 21 is parent of the Intersector Rapporteur Groups on Audiovisual Accessibility (IRG-AVA) and is actively participating in the [Joint Coordination Activity on Accessibility and Human factors](http://www.itu.int/ITU-T/jca/ahf/index.html) (JCA-AHF).

SG21 approved the revised terms of reference for [IRG-AVA](https://itu.int/en/irg/ava), as submitted in [TD118/GEN](https://www.itu.int/md/T25-SG21-250113-TD-GEN-0118/en). **Masahito Kawamori** (Tokyo University, Japan) was appointed as the IRG-AVA co-chair from SG21.  Collaborative work on **audiovisual accessibility** with ITU-R SG6 continues using this IRG-AVA mechanism.

## 2.5 Multimedia aspects of automotive-related intelligent services

Coordination with the Collaboration on Intelligent Transport Systems communication standards ([CITS](https://www.itu.int/en/ITU-T/extcoop/cits/Pages/default.aspx)) continues and a detailed report on activities has been submitted by the SG21 liaison officer to CITS, Mr Hideki Yamamoto (see for details [SG21-TD30/PLEN](https://www.itu.int/md/T25-SG21-250113-TD-PLEN-0030/en)).

Collaboration with the [CITS Expert Group on Communications Technology for Automated Driving](https://www.itu.int/en/ITU-T/extcoop/cits/egcomad/Pages/default.aspx) has been strengthened by appointing a liaison officer, Mr Hongki Cha (ETRI, Korea), who proactively contributed to their latest meeting (7 March 2025) with a presentation (see: [Doc 37](https://mycloud.itu.int/s/mWnwxyTyAjTZFNE)).

## 2.6 Multimedia aspects of digital health

Q2/21 continued its collaboration with WHO at this meeting and created a new work item on “safe-viewing systems and devices”, in a similar manner how H.870 “guideline on safe-listening devices/systems” was developed. It also updated the draft Recommendation H.SL-AD “Accurate dosimetry for safe-listening transducers”, also in the safe-listening series.

Q2/21 is also initiating discussion with another UN agency, the ILO, to explore digital health standardization in the field of occupational health and safety.

## 2.7 Digital culture

Standardization work continues under the leadership of Question 3/21, which finalized and proposed for consent the draft Recommendation F.740.10 (ex F.CDA-RP) “Requirements and procedure for cultural data annotation”. Additionally, four ongoing work items were progressed, two were discontinued, and four new work items were agreed to be initiated (see for details [Q3/21 work programme](https://www.itu.int/ITU-T/workprog/wp_search.aspx?isn_sp=9677&isn_sg=9681&isn_qu=10739&isn_status=-1,8,1,3,7&details=0&field=acdefghijo)). No coordination issues were raised at last meeting.

## 2.8 Multimedia aspects of distributed ledger technology (DLT) and its applications

Standardization work continues under the leadership of Question 12/21, which finalized and proposed for consent five Recommendations:

* ITU-T F.751.24 (ex H.DLT-AGFAS) *"Application guideline for authorization services based on distributed ledger technology”*
* ITU-T F.751.26 (H.DLT-ESSS *“Framework of distributed ledger technology-based energy storage sharing systems”*
* ITU-T F.751.25 (H.DLT-SGDRF *“Framework of distributed ledger technology-based smart grid demand response”*
* ITU-T F.751.23 (ex H.DLT-TFI) *“Technical Framework for distributed ledger technology (DLT) Interoperability”*
* F.751.27 (ex H.DLT-DAS) *“Technical framework for distributed ledger technology-based multimedia data asset services”*

Additionally, ten ongoing work items were progressed, and four new work items were agreed to be initiated (see for details [Q12/21 work programme](https://www.itu.int/ITU-T/workprog/wp_search.aspx?isn_sp=9677&isn_sg=9681&isn_qu=10738&isn_status=-1,8,1,3,7&details=0&field=acdefghijo)). No coordination issues were raised at last meeting.

## 2.9 Immersive multimedia technologies, including metaverse

ITU-T SG21 agreed to extend the terms of reference of the ad hoc group on **metaverse** (AHG-MV), inherited by SG16. The main objective of the renewed SG21 AHG-MV is to monitor the progress of metaverse related work in SG21 and carefully analyse advantages and disadvantages of establishing a new Question, along with analysing the workload of existing Q9/21. The results of the AHG-MV will be reviewed in October 2025. Mr Shin Gak Kang will act as AHG-MV Chair. The AHG-MV updated terms of reference are found online [here](https://www.itu.int/en/ITU-T/studygroups/2025-2028/21/Documents/AHGs/2025-01_TOR-AHG-MV.pdf). (Ref. [SG21-TD69/PLEN Annex E](https://www.itu.int/md/T25-SG21-250113-TD-PLEN-0069/en)).

In the meanwhile, ITU-T SG21 has reviewed and took actions on a number of metaverse-related deliverables developed by FG-MV and expressed its readiness to carry out further standardization work on this topic in coordination with involved Study Groups. For example, Q9/21 started four work items based on FG-VM deliverables: H.MV-MAMA “Multimedia aspect of metaverse architecture”, H.MV-PIOP “Service scenarios and high-level requirements for metaverse cross-platform interoperability”, H.MV-HIA “High-level interoperability architecture for cross-platform metaverse”, and H.MV-FRAVI “Functional requirements and architecture for avatar interoperability in cross-platform metaverse”.

For a complete report on metaverse activities in SG21, see the separate liaison statement submitted by SG21 to TSAG ([TSAG-TD64](https://www.itu.int/md/T25-TSAG-250526-TD-GEN-0064/en)).

During the January 2025 SG21 meeting, a joint session with SG20 discussed the current status and future activities to coordinate metaverse-related standardization. A joint proposal to establish under TSAG a joint coordination activity on metaverse (JCA-MV) was discussed and submitted to TSAG for its consideration (see separate liaison statement [TSAG-TD51](https://www.itu.int/md/T25-TSAG-250526-TD-GEN-0051/en)).

# 3 Future meetings

Two Working Parties meetings (WP2/21 and WP4/21) are planned in Geneva, 4 July 2025, preceded by a number of interim rapporteur groups meetings to start the approval process for texts that become mature, as well as to assess the status of the metaverse work. See [collective letter 2/21](https://www.itu.int/md/T25-SG21-COL-0002/en) for more details. All the co-located meetings in Geneva are:

* WP2/21 (4 July 2025)
* WP4/21 (4 July 2025)
* Q10/21 (30 June – 2 July 2025)
* AHG-MV (30 June, and 2 July 2025)
* Q2/21 (3 July 2025)

*NOTE: Q2/21 will join the ITU-WHO stakeholders' consultation on the Make Listening Safe initiative (Geneva, Switzerland, 1-3 July 2025), see* [*TSB Circular 42*](https://www.itu.int/md/T25-TSB-CIR-0042/en) *and the* [*event webpage*](https://www.itu.int/en/ITU-T/Workshops-and-Seminars/2025/0701/Pages/default.aspx)*.*

The second (and next) meeting of the Study Group 21 is planned in Geneva, 06-17 October 2025. It will be co-located with ISO/IEC JTC1/SC29 (MPEG & JPEG) and the joint video experts team (JVET).

In view of the advance planning needed for the collocated meetings with ISO/IEC JTC1/SC29 and the JVET, the 3rd SG21 meeting is also already planned in Geneva, 06-17 July 2026.

Rapporteur meeting activities are listed at <https://itu.int/go/rgm/tsg21>.

**Annex: 1**

***–*** [***ANNEX***](#_ANNEX_Background:_SG21) ***Background: SG21 Mandate and Lead roles***

# ANNEX Background: SG21 Mandate and Lead roles

## 1.1 SG21 Mandate

ITU-T SG21 is responsible for studies relating to multimedia technologies, capabilities, systems, applications and services for existing and future networks, including Internet Protocol (IP)-based and cable-based networks.

This encompasses studies relating to:

* ICTs for multimedia systems, applications, services, terminals and delivery platforms; accessibility for digital inclusion; ICTs for active assisted living; human interfaces; multimedia aspects of distributed ledger technologies (DLTs); media and signal coding and systems; digital multimedia services to support various verticals (e.g. digital health, digital culture and mobility); and multimedia aspects of metaverse-related issues;
* use of telecommunication systems for: a) contribution, primary distribution and secondary distribution of audiovisual content (including television programmes and related data services, and advanced capabilities, e.g. ultra-high definition, high-dynamic range); and b) multimedia applications providing immersive experiences, virtual reality, augmented reality and multiview, including 3D (stereoscopy type and holographic type);
* use of telecommunication networks, e.g. coaxial cable, optical fibre, hybrid fibre-coaxial cable and IP networks, to also provide integrated broadband services including interconnection with other types of networks such as fixed wireless access networks (e.g. radio local access network, private International Mobile Telecommunications-2020 (IMT-2020) network and beyond);

NOTE 1 – Private IMT-2020 network is intended to refer to private wireless networks specifically designed for supplementing a cable television access network;

NOTE 2 – The cable network, primarily designed for audiovisual content delivery to the home, also carries time critical services, such as voice, gaming, video-on-demand, interactive and multiscreen services, to customer premises equipment in the home or enterprise;​

* use of cloud computing, artificial intelligence (AI) and other advanced technologies to enhance multimedia applications and services and integrated broadband services over telecommunication networks.

NOTE 3 – When ITU‑T Study Group 16 was created in 1996, one of its mandates was to continue ITU‑T Study Group 1's studies on multimedia services. Accordingly, references to "services" in the context of ITU‑T Study Group 21's mandate are to be understood as "multimedia services".

## 1.2 SG21 Lead SG roles

ITU-T Study Group 21 performs on the following lead SG roles (WTSA-24 Res.2):

– multimedia technologies, applications, systems and services

– integrated broadband cable networks

– audiovisual content processing and delivery over multimedia distribution systems, including cable networks, IP-based television services and digital signage

– human factors and ICT accessibility for digital inclusion

– multimedia aspects of automotive-related intelligent services

– multimedia aspects of digital health

– digital culture

– multimedia aspects of distributed ledger technology (DLT) and its applications

– immersive multimedia technologies, including metaverse

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