

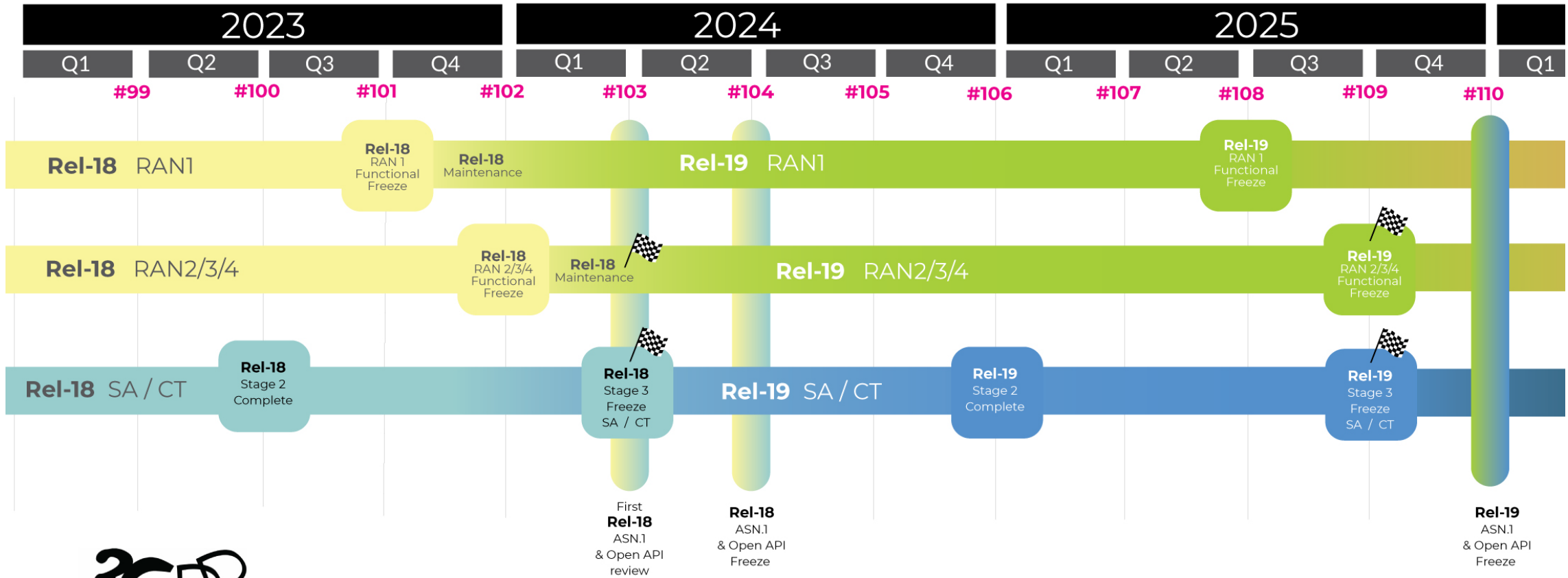
3GPP SA 6G Planning and Progress update

Puneet Jain

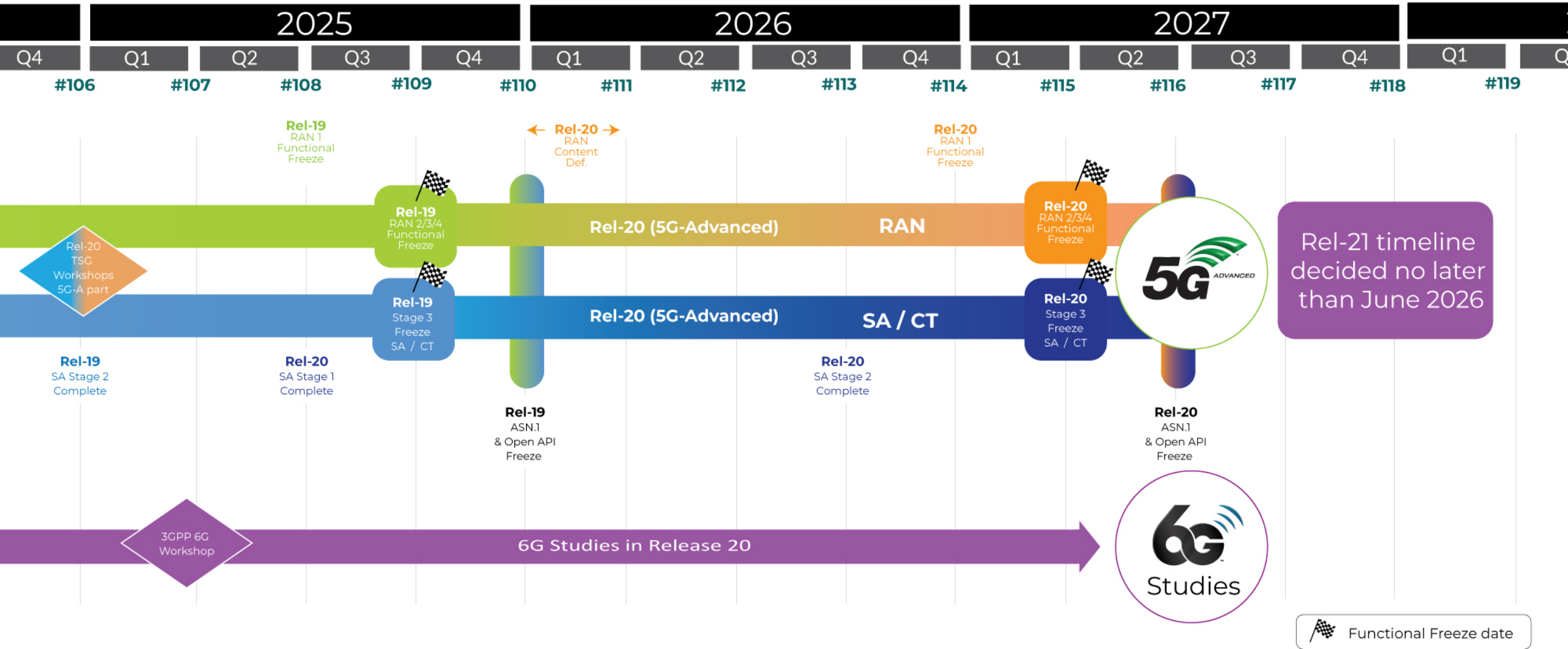
3GPP TSG SA Chair (Intel)



3GPP Rel-18 and Rel-19 timeline



3GPP Rel-20 timeline



6G Workplan & Timeline – Summary

2024



Stage-1 workshop on IMT2030 use cases

May 8th – 10th, 2024

Workshop Summary: [SWS-240025](#)

Workshop Presentations: [Link](#)



TSGs#107

First 3GPP TSG-wide 6G Workshop

March 10th – 11th (Monday – Tuesday), 2025

WS Format:

- **Separate Parallel TSG RAN and TSG SA sessions**
 - Monday: 1400 – 1800; Tuesday: 0900 – 1530
- **Joint RAN/SA/CT session**
 - Monday: 0900 – 1230; Tuesday: 1600 – 1800 (**summary of the workshop**)

Details: [SP-240952](#)



Studies for 6G

from **Release 20**



Normative work for 6G

from **Release 21**

3GPP Stage 1 workshop on IMT 2030 use cases

May 8th to 10th in Rotterdam, NL

Workshop Presentations: [Link](#)

- ❧ To bring 3GPP closer to the ongoing initiatives of various global/regional research organizations and MRPs related to the 6G use cases, as WG SA1 undertakes the task of defining the requirements and use cases for 6G starting from Rel-20.
- ❧ More than 200 people attended the F2F meeting.
- ❧ Opportunity for different communities to present their views on 6G/IMT2030 Use Cases (Incl. Operators; Verticals; Regional Alliances and ITU).
- ❧ Workshop Summary (slides 5 to 10) based on the analytical review of all the presentations, identifying the common themes across presentations. **NB: It is not a prioritization process or final ranking of the 6G use cases.**



Some Potential Drivers for 6G (1/4)

As commonly heard at the workshop

(Source: [SWS-240025](#))

- **Security** - Used in different contexts, both about network security and user data confidentiality:
 - 🌀 Maintaining continuity of service and robust security, especially crucial in times of crisis
 - 🌀 Identify all relevant new threat-factors for 6G, and develop mitigation solution (e.g. detection and protection against electromagnetic threats)
 - 🌀 quantum-safe security mechanisms

- **Support of Artificial Intelligence** - for:
 - 🌀 Network-design/performance:
 - ❖ network optimization and automation (Intelligent Network management, Network Performance)
 - ❖ Energy efficiency/saving/ sustainability
 - ❖ AI-assisted air interface/ Radio Performance;
 - ❖ AI for improving positioning
 - 🌀 Enabling AI at the application level:
 - ❖ AI data management, model distribution for all AI-assisted “smart” areas (cities, industries, surgeries, robot control, manufacturing plant, rescue missions etc.
 - ❖ AI as a Service (AlaaS)
 - ❖ To implement a range of media’s personalization and customization (sport TV program, etc)

Some Potential Drivers for 6G (2/4)

As commonly heard at the workshop

(Source: [SWS-240025](#))

■ Immersive Communications

- 🌀 Extended reality
- 🌀 Holographic, telepresence
- 🌀 Multi-sensorial communication
- 🌀 Digital twin; (Hyper-realistic) metaverse; virtual worlds
- 🌀 for leisure (gaming, entertainment), professionals (industrial training), education (remote lecture)

■ Sustainability

- 🌀 It mainly refers to energy efficiency/reduction of energy consumption
 - ❖ Exact metrics vary between presenters
- 🌀 In specific contexts, It might also refer to:
 - ❖ Reducing environmental impacts
 - ❖ More efficient processes and more utilization of resources in different industrial domains to support a circular economy
 - ❖ Reuse of 5G hardware/no forced hardware refresh; Software-based upgrades

Some Potential Drivers for 6G (3/4)

As commonly heard at the workshop

(Source: [SWS-240025](#))

■ Ubiquitous and resilient coverage

- ⊹ Non-Terrestrial Network (Satellite) coverage
- ⊹ Remote and underserved areas; Seamless rural coverage for smart agriculture, education, etc
- ⊹ Needed for Automotive (also for autonomous driving), Aerial & Maritime communications
- ⊹ Network resiliency: minimise network outage, resiliency to the unexpected (natural disaster, etc.)

■ Sensing

- ⊹ Human Activity Recognition; Localization and Tracking; Environmental Object Reconstruction; Monitoring Tasks
- ⊹ Use the communication infrastructure as a sensor
- ⊹ Intelligent sensing and communication coexistence
- ⊹ For different use cases, e.g. autonomous driving

Some Potential Drivers for 6G (4/4)

As commonly heard at the workshop

(Source: [SWS-240025](#))

- **“Smart” everything:**
 - ⌘ “Smart” refers to a remotely operable/controllable/configurable system, generally AI-assisted
 - ⌘ Smart Cities/home/factory
 - ⌘ For Factory: Smart Industry/logistic/manufacturing/productivity; this includes the Control of Robot/Cobots/Sobots
 - ⌘ Smart Infrastructure; Smart Grid
 - ⌘ Smart Agriculture/education
 - ⌘ Smart Health & Wellness

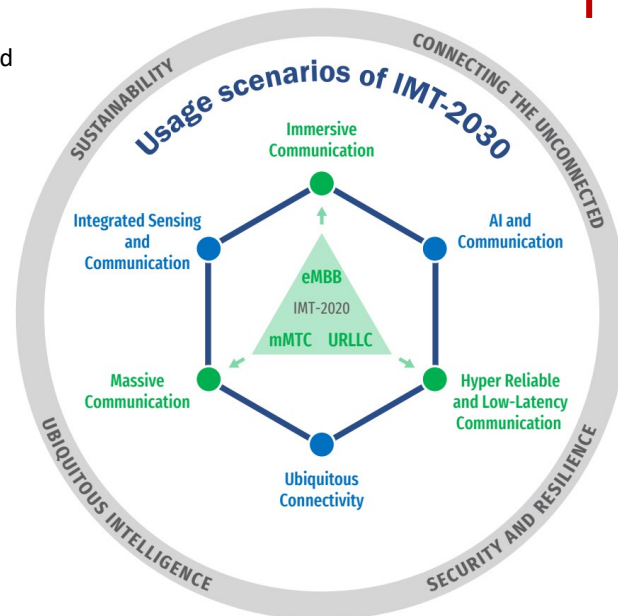
- **Voice over 6G (Vo6G), including roaming, lawful interception and emergency communications**
- **Fixed Wireless Access (FWA)**
- **Low Power Wide Area Network (LPWA) and massive IoT/sensors**
- **Open network Northbound APIs**
- **Healthcare: monitoring; telesurgery**
- **Autonomous driving; Connected Vehicles (see also “ubiquitous coverage”)**
- **Enhanced positioning**
- **Backward compatibility**

ITU's "wheel" and "palette" for IMT-2030

(Source: [SWS-240025](#))

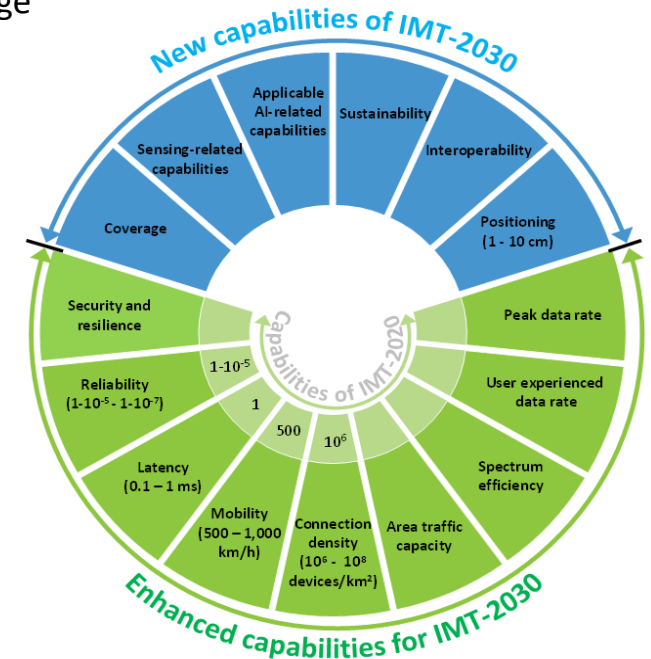
■ The "wheel diagram": the six Usage Scenarios of IMT-2030 (6G)

- ☞ Three Usage Scenarios are extensions from IMT-2020 (5G):
 - ❖ Immersive Communication (from "eMBB")
 - ❖ Massive Communication (from "mMTC")
 - ❖ HRLLC (Hyper Reliable & Low-Latency Communication) (from "URLLC")
- ☞ Three Usage Scenarios are new:
 - ❖ Ubiquitous Connectivity
 - ❖ AI & Communication
 - ❖ Integrated Sensing & Communication
- ☞ In addition, the four "Overarching Aspects" (i.e. design principles applicable to all usage scenarios) are:
 - ❖ Sustainability
 - ❖ Connecting the unconnected
 - ❖ Ubiquitous intelligence
 - ❖ Security/resilience



■ The "palette diagram": the 15 Capabilities of the IMT-2030

- ☞ Fifteen capabilities for IMT-2030, including nine derived from IMT-2020
- ☞ When given, the range of values are estimated targets for research and investigation
- ☞ For each usage scenario, a single or multiple values within the range would be developed in future in other ITU-R Recommendations/Reports
- ☞ IMT-2030 is also expected to help address the need for increased environmental, social and economic sustainability, and also support the goals of the Paris Agreement of the United Nations Framework Convention on Climate Change



3GPP 6G Workshop Plan

March 10 – 11, 2025 (Monday – Tuesday)

- **3GPP 6G Workshops collocated with TSG#107 meetings.**

Workshop timings:

- ☰ Parallel RAN/SA sessions starting from Monday afternoon to Tuesday early afternoon
 - ❖ Monday: 1400 – 1800
 - ❖ Tuesday: 0900 – 1530
- ☰ Joint RAN/SA/CT session
 - ❖ Monday morning: 0900 - 1230
 - ❖ Tuesday 1600 – 1800: summary of the workshop



- **Draft preliminary Agenda for TSG 6G SA Workshop:**

1. Opening of the workshop (Monday 0900 local time)
2. Contributions from 3GPP members
 - ❖ Contributions on 6G technologies focusing on System/CN aspects, 6G Stage-2 study organization, etc. [Details TBD]
 - ❖ Up to one contribution per company
 - ❖ 6G use cases related papers may be submitted for information but will not get handled.
3. Chairman's summary and open discussion
4. Closing of the workshop (Tuesday 1800 local time)

6G Study Item(s) – TSG SA

- **6G SI Approval**
 - SA1 SI approval: TSG#105 (Sept 2024)
 - SA2 SI approval: TSG#108 (Jun 2025)
 - Other SA WG (SA3, SA4, SA5, SA6) SI approval: TBD at future TSG meeting
 - SA1/SA2 6G SI may continue beyond Stage-1/Stage-2 freeze dates for 5G-Advanced
- **6G SI completion (this may use time from Rel-21)**
 - SA1 6G SI completion: Mar 2026
 - SA2 6G SI completion: Dec 2026 or Mar 2027 (To be confirmed at future TSG meeting)

TSG RAN Plenary Study for 6G

- **RAN plenary work is split into an ITU-focused SI and General RAN SI**
 - IMT-2030 discussion is expected in RAN from 09/24 to 12/24
 - RP SI Rel-20 focusing on ITU– IMT-2030: approval 12/24 until 06/25
 - RP SI Rel-20 focusing on 6G General: approval 03/25 (after WS), until 06/26

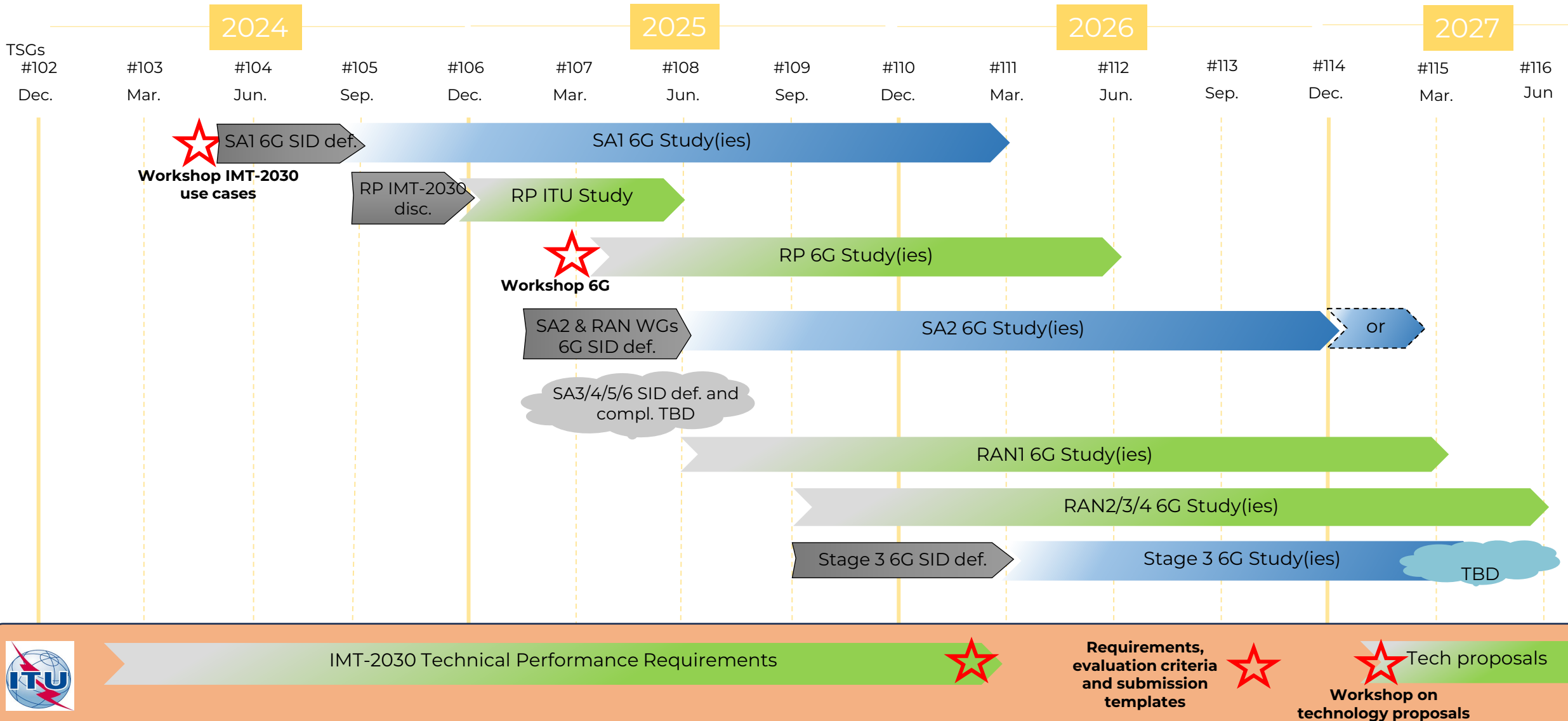
6G Study Item(s) - RAN

- **RAN WGs: 21 months**
 - RAN1 starts in 06/25 until 03/27
 - RAN2/3/4 start in 09/25 until 06/27

3GPP Study Item(s) – TSG CT

- **CT WGs: at least 9 months**
 - CT WG 6G SI will start 9 months after approval of SA2 SI.

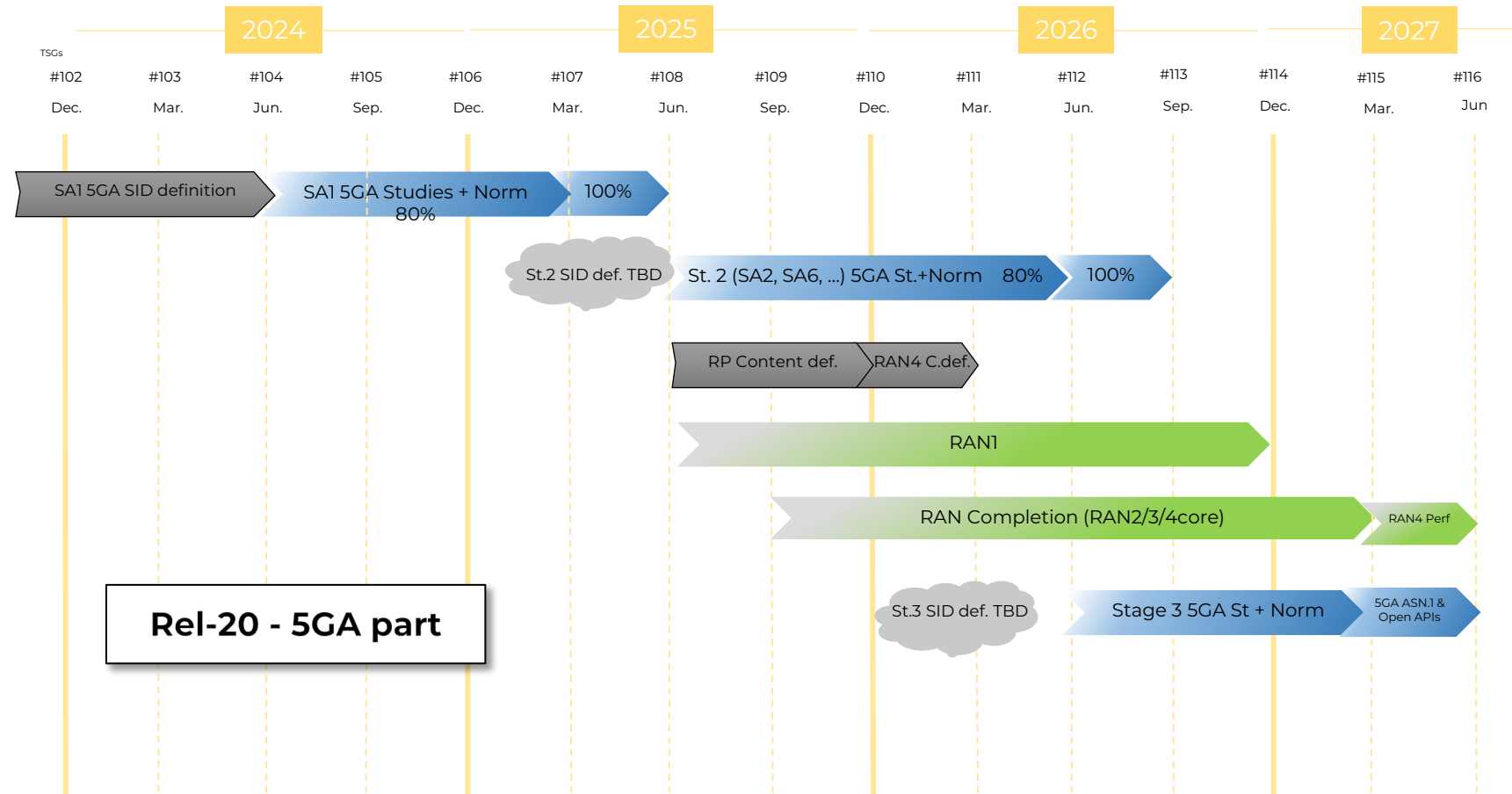
Illustration of Release 20: 6G Study Item (SI) timeline



Release 20: 5G-Advanced timeline

Rel-20 (5G-Advanced)

- **For 5G-Advanced: 18-month. Assuming no delay of Rel-19**
- Stage-1 freeze : Jun 2025
- Stage-2 freeze : Jun 2026 (>=80%); Sep 2026 (100%)
- Stage-3 freeze : Mar 2027
- ASN.1/OpenAPI freeze: June 2027



Release 21: 6G Normative work timeline



6G Normative work

IMT-2030 submission and normative work for 6G in 3GPP are expected to start from Release 21

- Release 21 is expected to produce the 1st set of 3GPP 6G technical specifications, and will be the release for IMT-2030 submission before 2030
- Release 21 is expected to be delivered with a single drop (i.e., a single code freeze)



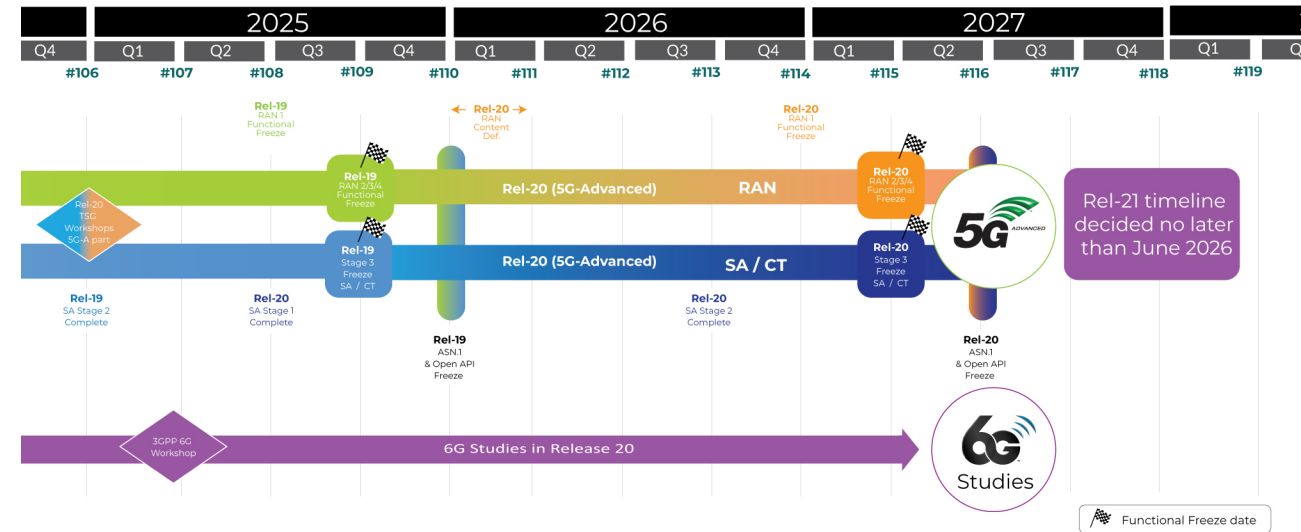
Release 21 timeline

Rel-21 timeline is to be decided no later than June 2026

- However, ASN.1/OpenAPI freeze date is no earlier than March 2029

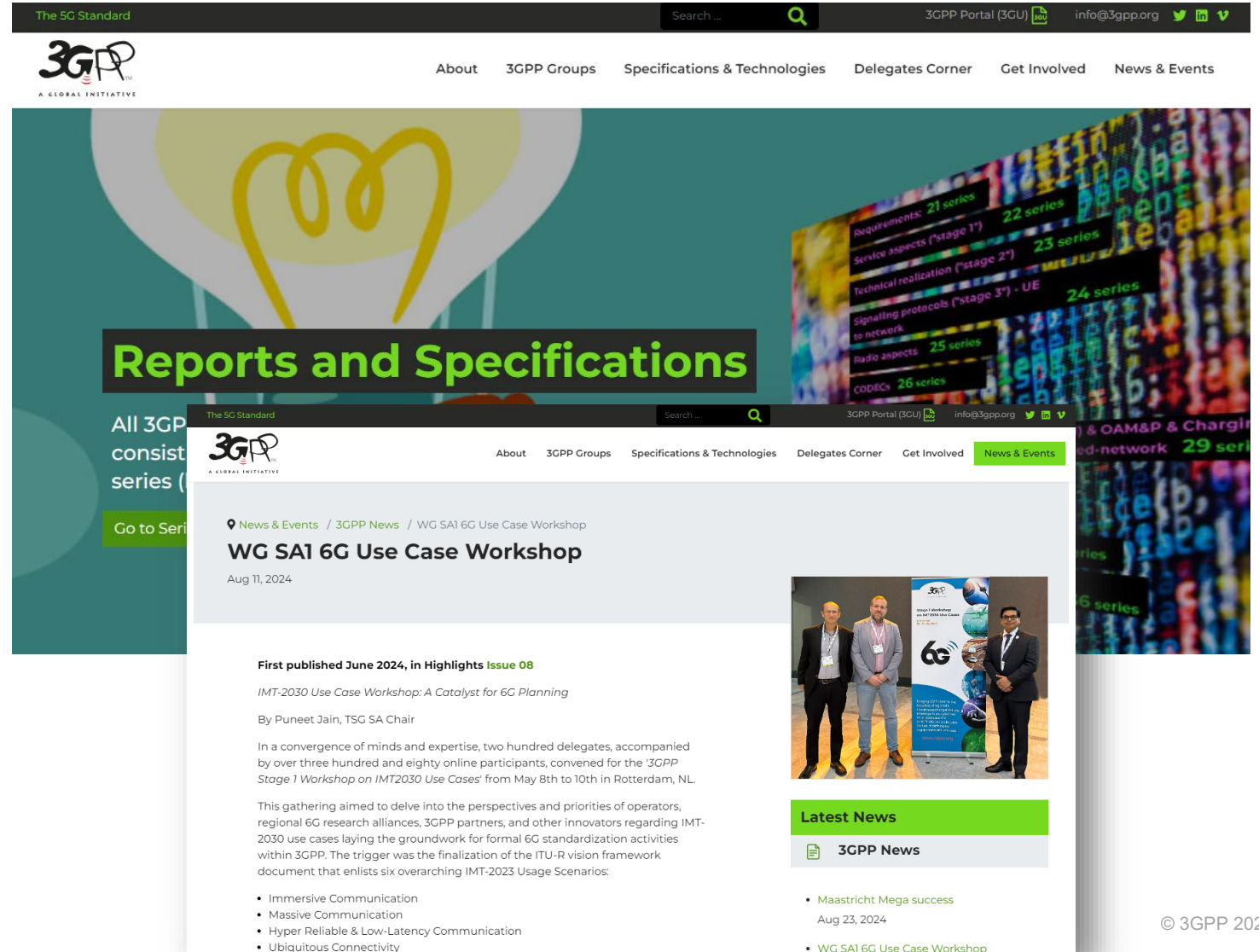
Summary of Next steps towards 6G

- SA1#106 (27-31 May 2024 - Korea, Jeju) discussed inputs from 3GPP Members on their views on 6G Use Cases and the SI organizational aspects: one or several studies on 6G?
- 6G SA1 SID on use cases and service requirements was agreed in [S1-242545](#). 6G Study TR skeleton was agreed in [S1-242544](#).
- TSG SA#105 (Sep 2024) will approve the stage-1 6G study on use cases and service requirements.
- TSG-wide 6G Workshop is planned for Mar 10 – 11, 2025.
- Technical studies on the 6G radio interface and 6G core network architecture within the RAN and SA Working Group to start in June 2025.



Thank you!

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The screenshot shows the 3GPP website interface. At the top, there is a navigation bar with the 3GPP logo and the text 'The 5G Standard'. Below this is a search bar and social media links. The main navigation menu includes 'About', '3GPP Groups', 'Specifications & Technologies', 'Delegates Corner', 'Get Involved', and 'News & Events'. The page features a large banner for 'Reports and Specifications' with a list of series: Requirements (21 series), Service aspects (22 series), Technical realization (23 series), Signaling protocols (24 series), Radio aspects (25 series), and CODECs (26 series). The main content area displays a news article titled 'WG SA1 6G Use Case Workshop' dated August 11, 2024. The article is categorized under 'News & Events / 3GPP News / WG SA1 6G Use Case Workshop'. It includes a sub-headline 'First published June 2024, in Highlights Issue 08' and a byline 'By Puneet Jain, TSG SA Chair'. The article text describes a workshop on IMT-2030 Use Cases held in Rotterdam, NL, aimed at delving into the perspectives and priorities of operators and innovators. A list of six overarching IMT-2023 Usage Scenarios is provided: Immersive Communication, Massive Communication, Hyper Reliable & Low-Latency Communication, and Ubiquitous Connectivity. To the right of the article is a photo of three men standing in front of a 3GPP banner. Below the article is a 'Latest News' section with a link to '3GPP News' and a list of recent news items, including 'Maastricht Mega success' and 'WG SA1 6G Use Case Workshop'.