6G, building upon Research and Innovation in Europe.

ETSI tools for accelerating research results into 6G standards & beyond.

Presented by: David Boswarthick
ETSI Director of Strategy and Innovation

18/09/2025

Continual Research and Innovation in Standards

Standards are driven by technology innovation and research

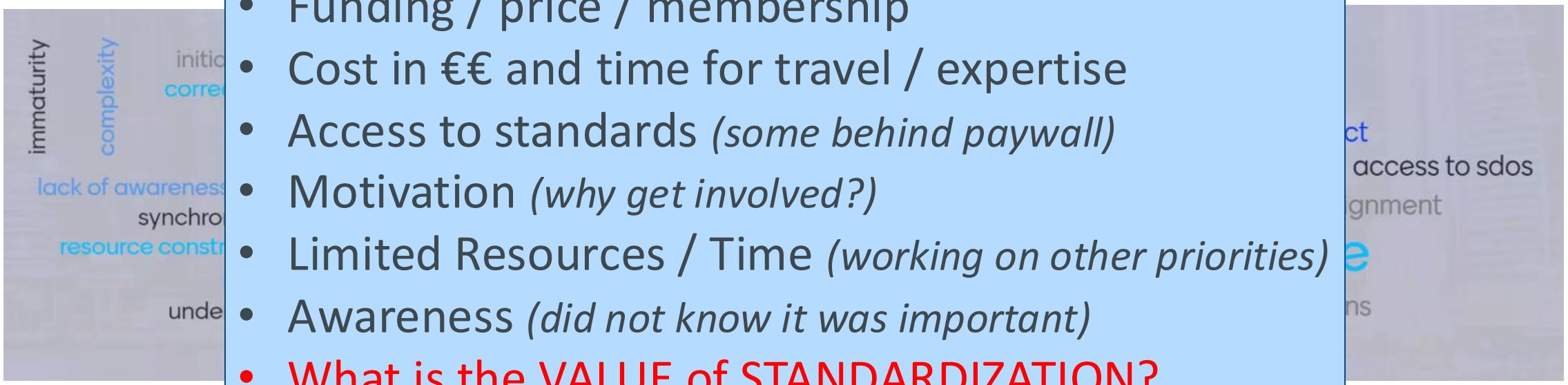
Many standards contributors started as researchers in Universities, helped by collaborative EC funded research programs

We seek to enable a competitive European industry *(large, medium and small enterprises)* – ultimately generating wealth and wellbeing for European citizens / institutes.

Standardisation is a major competitive advantage, for individuals, companies, and for European Industry.

Enterprises / EC funded projects / academia ***should be encouraged,*** guided and helped to ***engage in standardization*** at the appropriate moment.

There are Barriers for Researchers in Standards



- Funding / price / membership
- Cost in €€ and time for travel / expertise
- Access to standards *(some behind paywall)*
- Motivation *(why get involved?)*
- Limited Resources / Time *(working on other priorities)*
- Awareness *(did not know it was important)*
- What is the VALUE of STANDARDIZATION?
- Incentives / where is the recognition / the RoI?
- Knowledge & Education about Standards missing
- Complex process – heavy investment
- Synch. research & standards life/project cycles
- Lack of information - guidance
- Contact point / where / who?

ETSI Tools to enable Researchers in Standards

ETSI Support to Projects and Researchers

General Advice on Standardization

Letter of Support to Projects

ETSI presence on Advisory Committee

Education about Standardization

Specific Technical Groups for pre-standards and for Code

Contact research@etsi.org

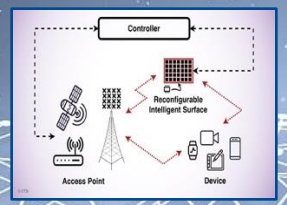
ETSI, Linking Research to Standards

EU Research

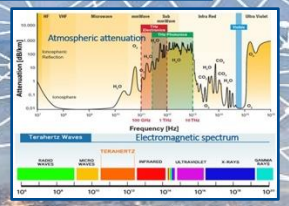
ETSI pre-standards

HEXA-X-II

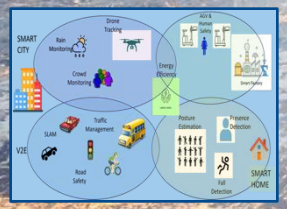
ISG RIS (Sept. 2021)



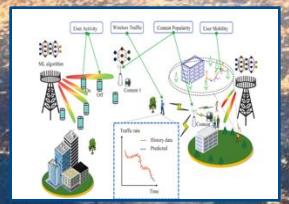
ISG THz (Sept. 2022)



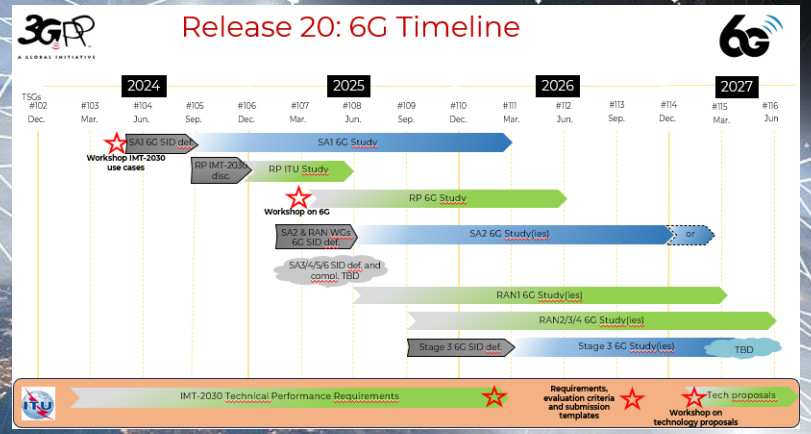
ISG ISAC (Oct. 2023)



ISG MAT (Dec. 2024)



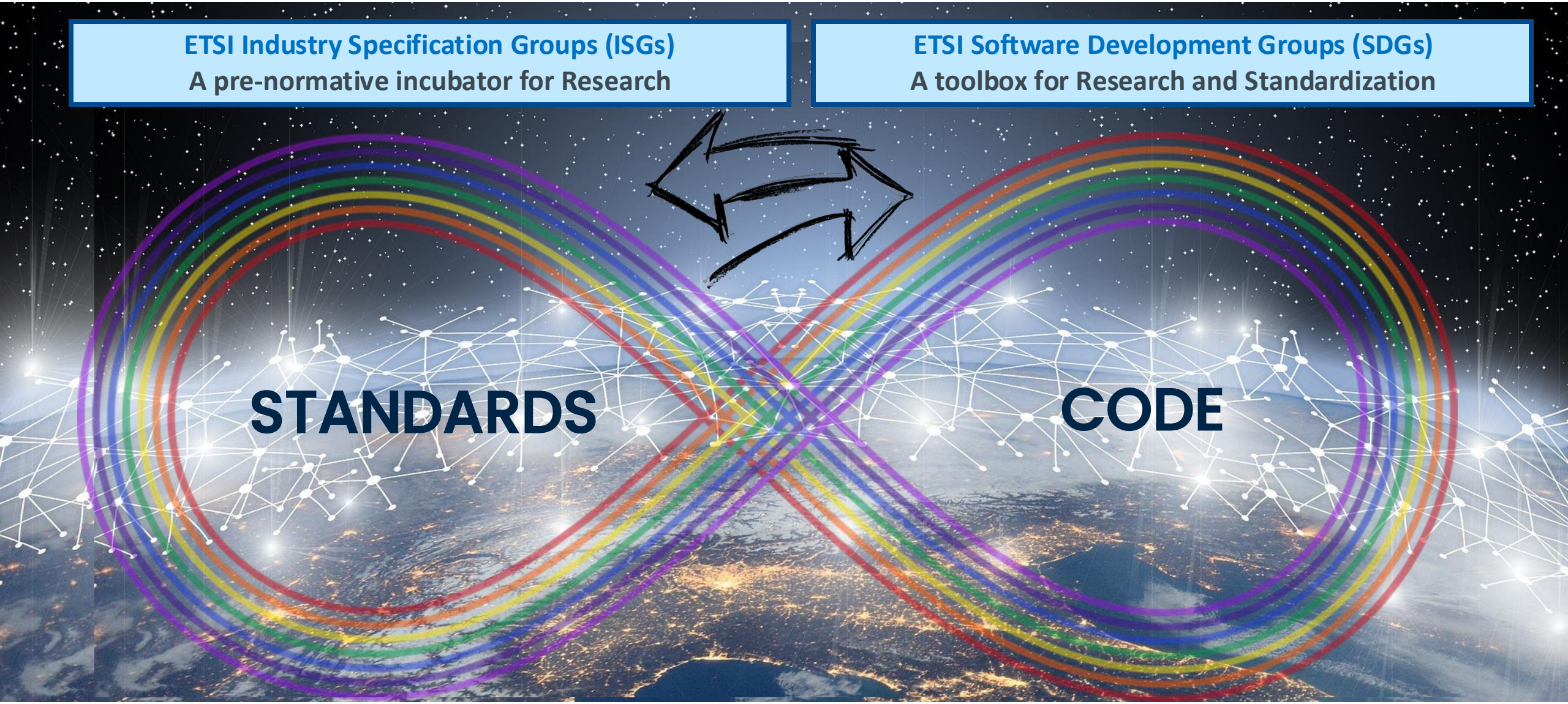
3GPP Global Standards



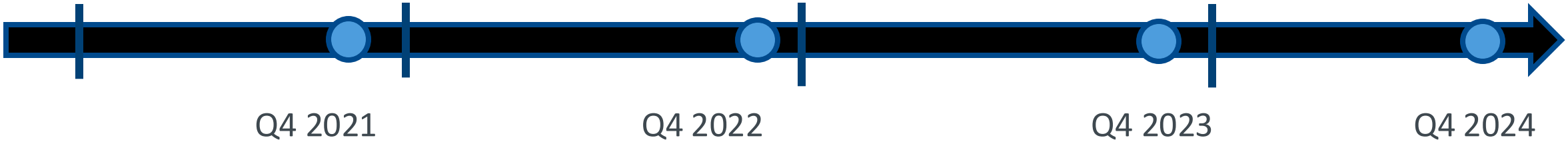
Pre-Standards in ISGs and Code in SDGs

ETSI Industry Specification Groups (ISGs)
A pre-normative incubator for Research

ETSI Software Development Groups (SDGs)
A toolbox for Research and Standardization

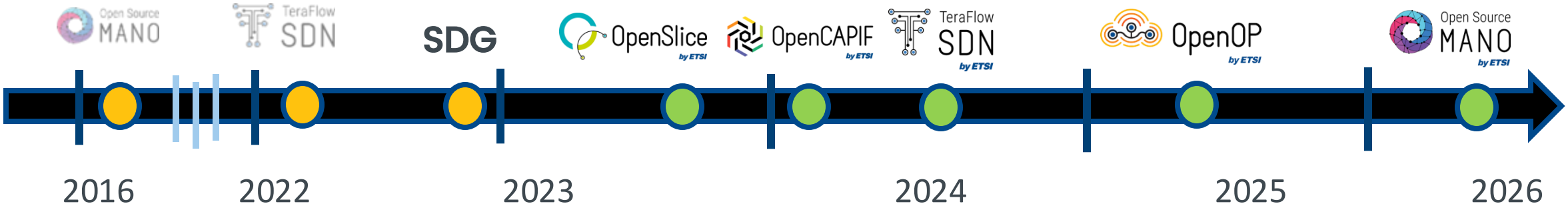


ETSI 5G/6G Industry Specification Groups (ISGs)



ISG RIS (Sept. 2021)	ISG THz (Sept. 2022)	ISG ISAC (Oct. 2023)	ISG MAT (Dec. 2024)
ETSI ISG RIS Mission: Provide an opportunity for ETSI members to collect their pre-standards research efforts on **RIS** technology across various EU/UK collaborative projects, extended with relevant global initiatives, towards paving the way for future standardization of RIS technologies,	**ETSI ISG THz Mission:** Establish technical foundations for **sub-THz** (100 GHz -> 10 THz). Place for ETSI members *(and non-members)* to progress their pre-standardization activities resulting from EU/National research efforts in the domain of **sub / full THz** technologies.	**ETSI ISG ISAC Mission:** Provide an opportunity for ETSI members to coordinate their pre-standards 6G research efforts on **integrated sensing and communication** technology across various European/National funded collaborative projects, extended with relevant global initiatives.	**ETSI ISG MAT Mission:** Study downlink multi-user (MU) **multiple access techniques** for the physical layer of the 3GPP radio interface that enhance the transmission efficiency (e.g., spectrum efficiency, power consumption, latency, user fairness, etc.) of specified approaches.
44 members, **4** participants **3** deliverables published **5** deliverables being drafted	**45** members, **2** participants **4** deliverables published **1** deliverables being drafted	**90+** members, 3 participants **1** deliverables published **3** deliverables being drafted	**32** member organizations, **2** participant organizations **1** deliverables being drafted

ETSI Software Development Groups (SDGs)



Open Source MANO by ETSI

OSG OSM - Open Source MANO provides Management and Orchestration for Network Services across cloud platforms

TeraFlow SDN by ETSI

SDG TFS - TeraFlowSDN develops an open source cloud native SDN Controller enabling smart connectivity services, automation and security for future networks

OpenSlice by ETSI

SDG OSL - OpenSlice develops an open source OSS to deliver Network as a Service (NaaS)

OpenCAPIF by ETSI

SDG OCF - OpenCAPIF is developing an open source Common API Framework allowing to expose and invoke APIs in a secure and consistent way

OpenOP by ETSI

SDG OOP – OpenOP will develop an Open Operator Platform allowing for operator networks and testbed federation along with capability exposure

6G has now begun in 3GPP, but technology research continues

Key Technology Evolutions that bridge 5G and 6G

- **Terahertz Communication:** Utilizing the THz frequency band for significantly higher bandwidth and data rates.
- **Artificial Intelligence:** Integrating AI for intelligent network management, resource optimization, and security.
- **Reconfigurable Intelligent Surfaces (RIS):** Using intelligent surfaces to control radio waves and optimize signal propagation.
- **Network Slicing and Edge Computing:** Enabling the creation of dedicated virtual networks for specific applications and leveraging edge computing for reduced latency and improved performance.
- **Secure and Privacy-Preserving Communication:** Addressing security and privacy concerns related to data transmission and user information.
- **Beyond Connectivity:** Enabling new applications in areas like **sensing (ISAC)**, imaging, and holographic communication.

Overall 3GPP 6G Workplan

2024

WG SA1

Stage-1 workshop on IMT2030 use cases

Rotterdam, Netherland, May 8 – 10, 2024

SP-241391: SA1 6G study item on use cases and service requirements (FS_6G_REQ) **approved** at TSG SA#105.

TSGs#107

First 3GPP TSG-wide 6G Workshop

Incheon, S. Korea, March 10 – 11, 2025

To discuss vision & priorities for next generation RAN, system architecture,
CN and protocols.

Studies for 6G from Release 20

RP-251881: The 6G RAN + RAN WGs Studies on 6G Radio was approved at TSG RAN#108

See next slide for the 6G studies timelines

Normative work for 6G 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 and is expected to be delivered with a single drop (i.e., a single code freeze).

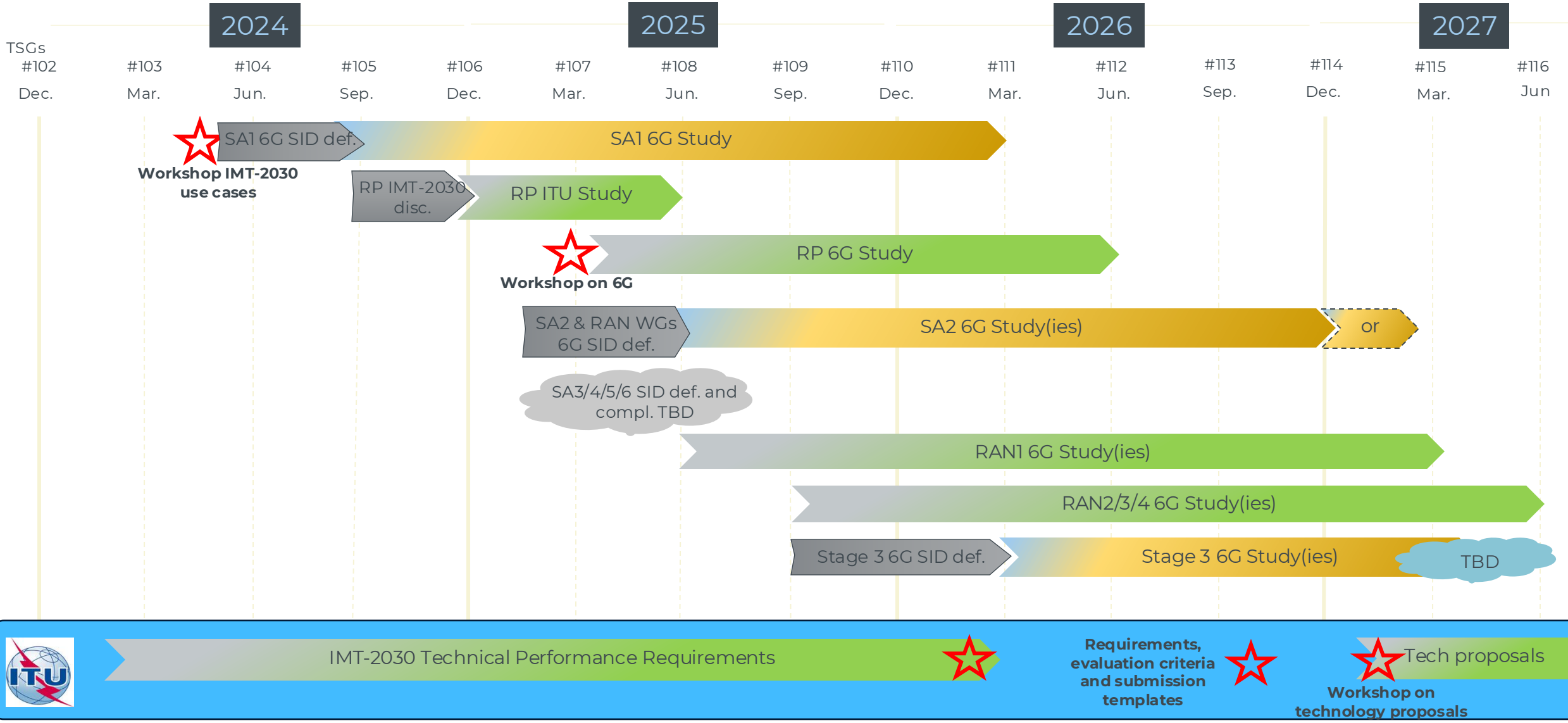
Rel-21 timeline is to be decided no later than June 2026

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

2030

Source: 3ORW-250002, 3GPP – ORAN ALLIANCE Joint Workshop on 6G, Sophia Antipolis, France, 24 -25 April 2025

Release 20: 6G Timeline



Source: 3ORW-250002, 3GPP – ORAN ALLIANCE Joint Workshop on 6G, Sophia Antipolis, France, 24 -25 April 2025

ETSI's focus is now on technology enablers for "mid-point" 6G, based on new / ongoing research projects

- 6G is a Generation of mobile networks that will be with us for at least 20+ years (2030 -> 2050++)
- The 6G we see on "day 1" (2030) will evolve to include more services over that time
- The research we are seeing in Europe (and globally) today will feed the 6G products and services we see in 2035++
- ETSI continues to work with EU-funded projects and our industrial members to develop pre-standards, open-source code and formal standards that will enable future releases of 6G to be developed in 3GPP
- ETSI is proud to be an enabling partner organization of 3GPP

Key Takeaways:

1. 6G begins now in 3GPP (R20)
2. Research in new technologies continues
3. ETSI links to ongoing research projects
4. Pre-Standards in ISG & SDGs
5. The 6G of 2030 is just the beginning

Disclaimer: Image created by Generative AI

Thank you for your attention

David Boswarthick

https://www.etsi.org

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