

# Research, and Innovation, Driving the Future of Standards

**Presented by:** David Boswarthick,  
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**For:** **ITU-T Industry Engagement Workshop 2026**  
*Making industry successful through standardization*

Sophia Antipolis, France. 27 March 2026

## INTERCONNECTED TRENDS ARE TRANSFORMING THE ESTABLISHED ORDER

CHANGE DOMAIN	KEY DEVELOPMENTS	IMPLICATIONS
Climate	Rising temperatures, extreme weather, population shifts	Higher adaptation costs, increased global risks, essential resources rare.
Geopolitical	Power fragmentation, regional tensions, Emerging superpowers	Uncertain alliances, regulatory divergence, emergence of tri-blocks.
Technology	AI and Robotics, Quantum Technologies, Space Comms.	Need for oversight, policy modernization, separate the facts from the noise.

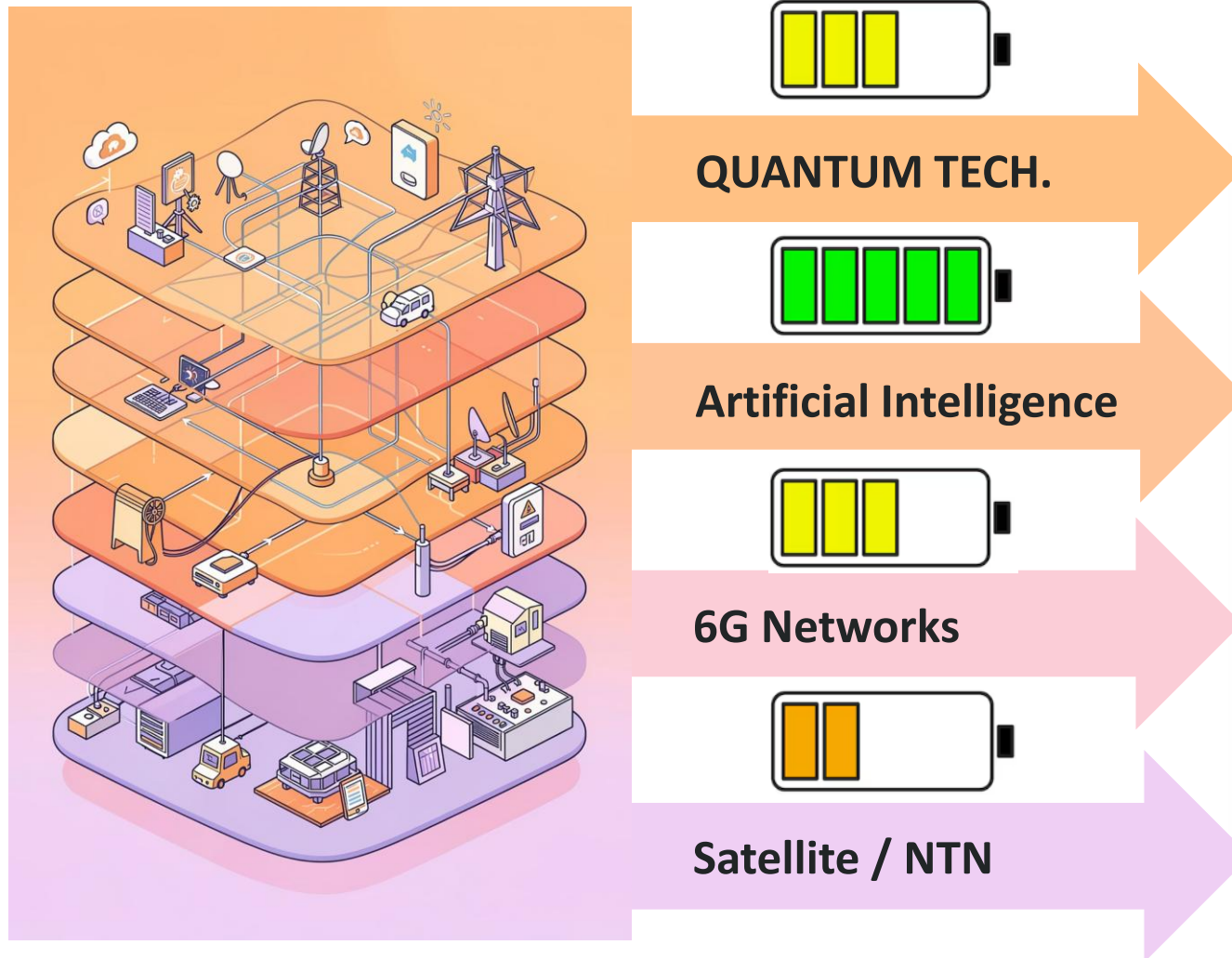
## THE WORLD IS EXPERIENCING AN ERA OF ACCELERATED CHANGE

*Change management requires reliable information / foresight & the ability to adapt to rapid political, societal & technological shifts.*

# Audience Interactive Question



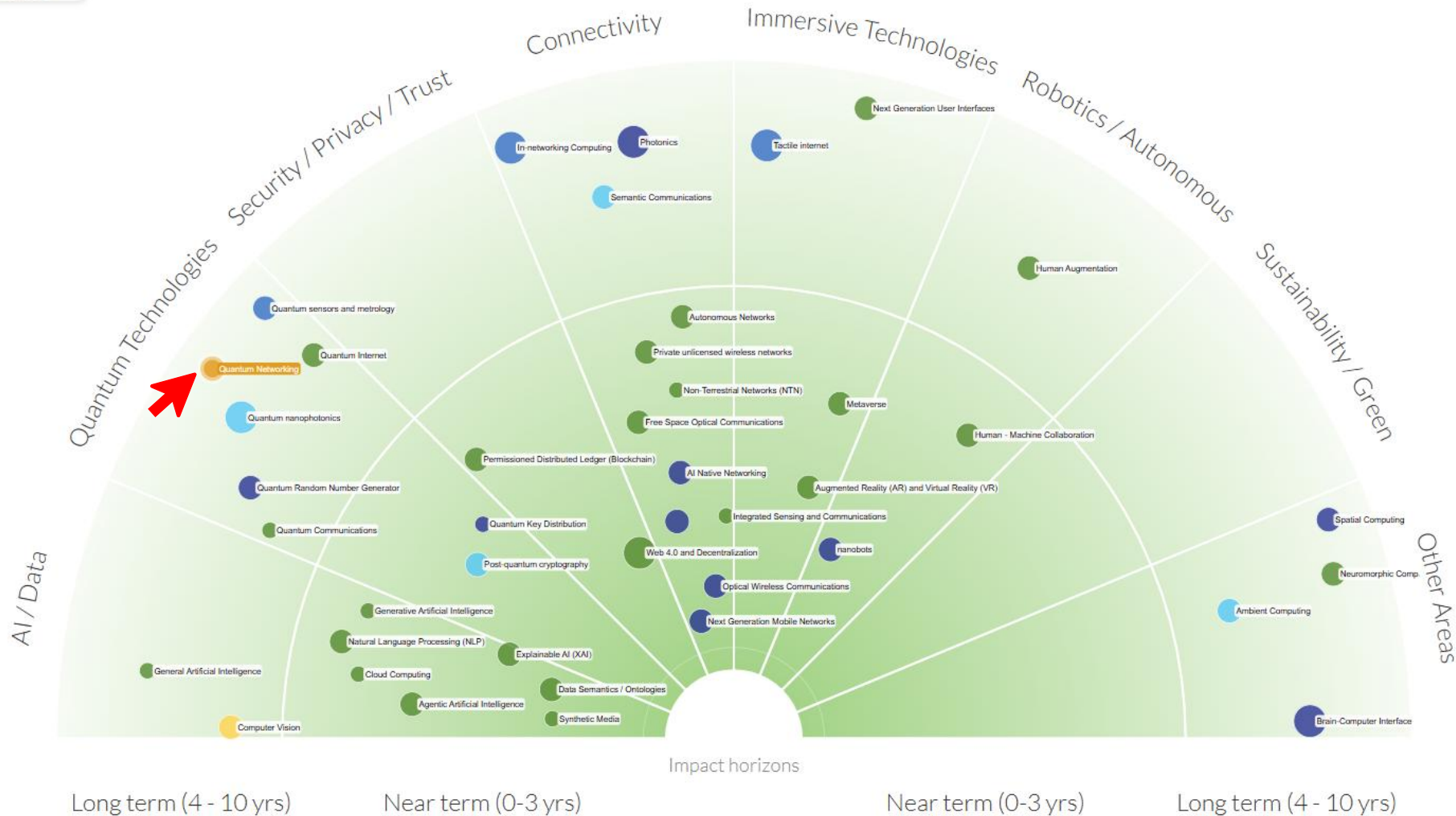
**Q:** What is the most important technology of the coming decade?



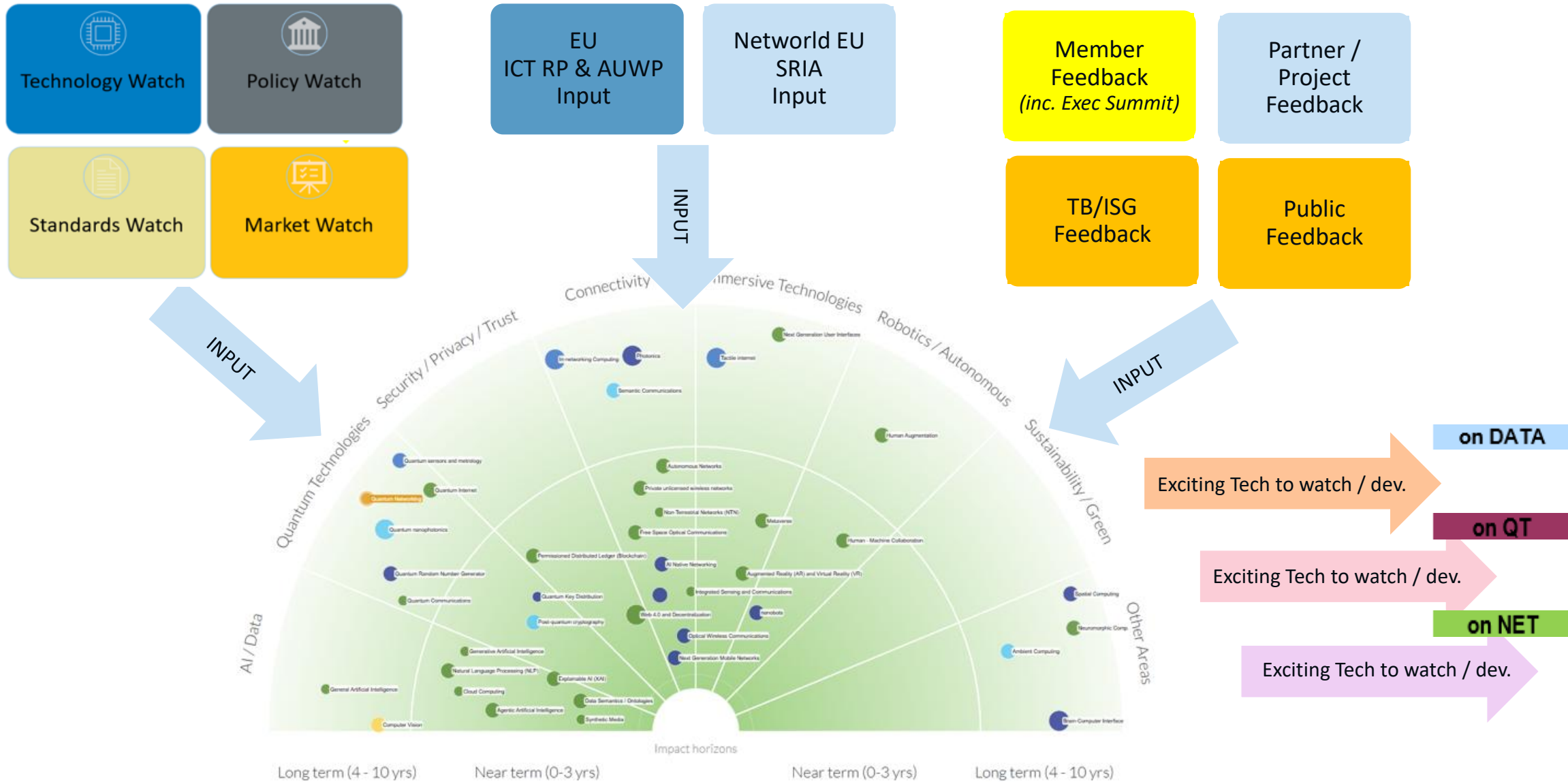
**NOTE:** Generative AI (Copilot) was used to produce this image

# Technology Foresight in ETSI (using the FIBRES platform)

## Eight (8) Main Segments sub-divide the main Radar



# How do we build ETR and what sources of info used?



# ETR drives technology deep dives & enables new groups

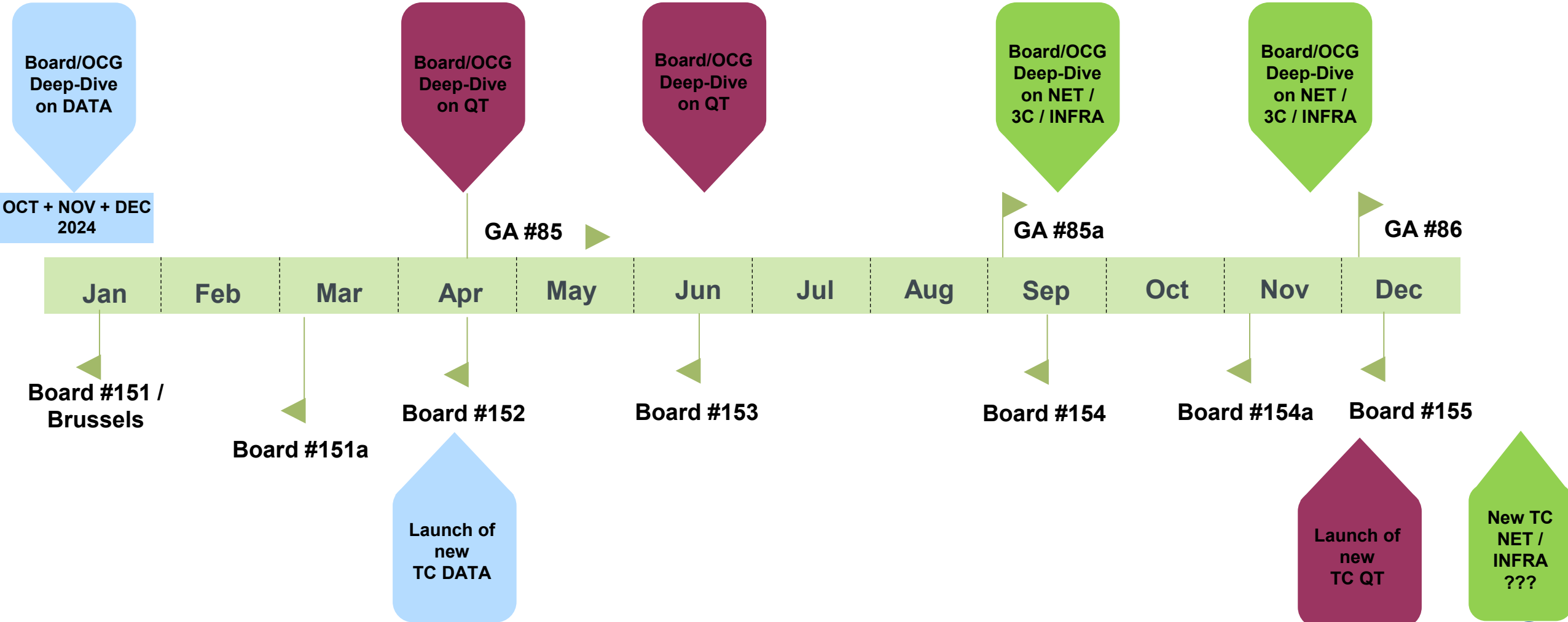


Example: 2025

on DATA

on QT

on NET



# ETSI Support to Research Projects and Researchers



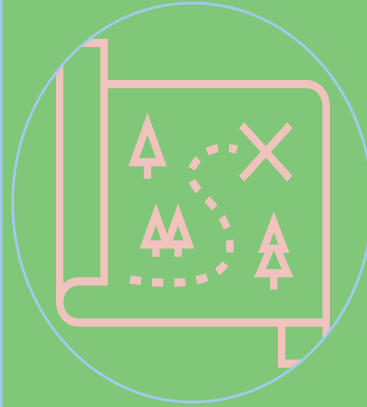
General Advice  
on  
Standardization



Letter of  
Support (LoS)  
to Funded  
Projects



ETSI in Funded  
Project  
Advisory  
Committees



Education  
about  
Standardization

*Master Tech Standardization*  
with ETSI



Specific  
Technical  
Groups for pre-  
standards and  
for Code  
(ISG + SDGs)



Research &  
Innovation  
Awards

Contact [research@etsi.org](mailto:research@etsi.org) AND <https://www.etsi.org/education/teaching-material>

# ETSI Research and Innovation Awards

2026 marks the first Edition of ETSI Research and Innovation Awards to recognise the outstanding contributions of the research community to ETSI's standardisation work.

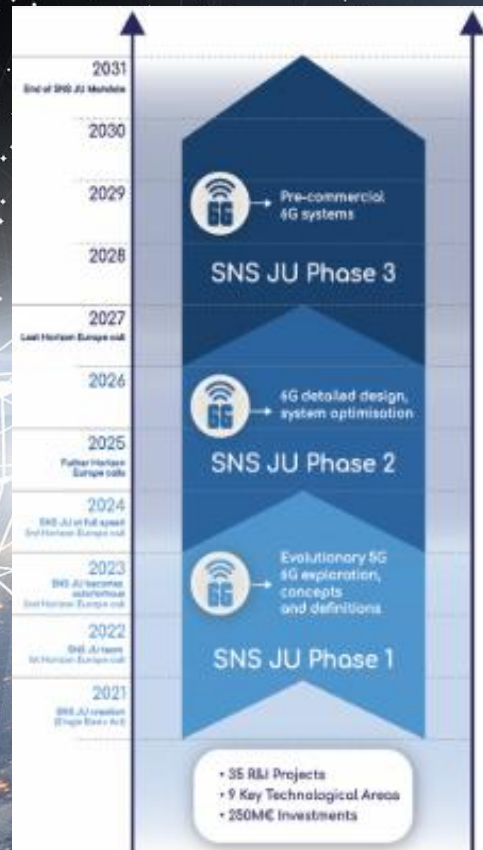
- ✔ Three award categories
  - ✔ Publicly Funded Collaborative Project
  - ✔ Individual Researcher/Innovator
  - ✔ Under 30 Individual Researcher/Innovator
- ✔ The nominator: an individual representing an ETSI member organisation
- ✔ The nominee: a delegate of an ETSI member organisation or a delegate of an ISG or SDG participant organisation who has demonstrated a significant and valuable contribution to ETSI standardisation activities
- ✔ Presented at the EuCNC (European Conference on Networks and Communications) & 6G Summit, held in June 2026 in Malaga
- ✔ More information and online nominations on ETSI research webpage
  - ✔ [ETSI - Research & Innovation for ICT standardisation work](#)



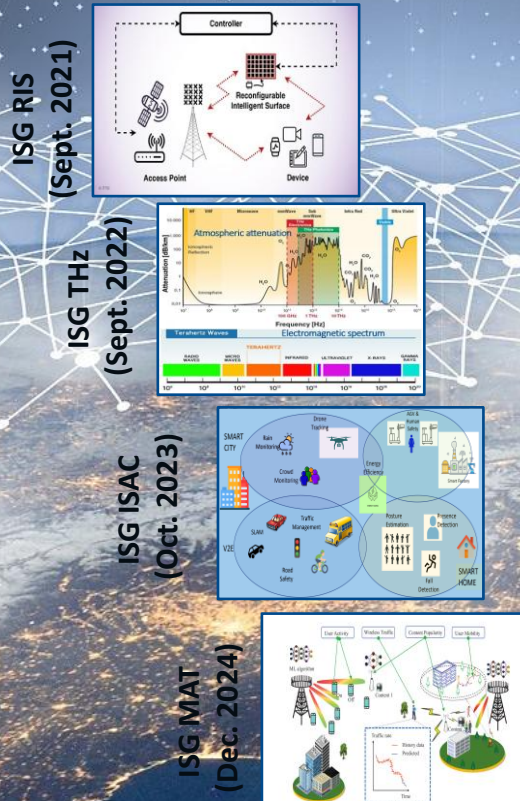
# ETSI, Linking Research to Standards (example)



## EU Research

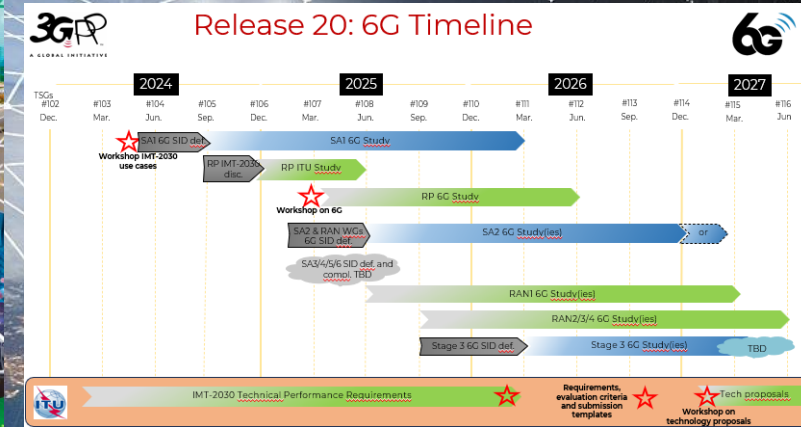


## ETSI pre-standards



## 3GPP Global Standards

3GPP A GLOBAL INITIATIVE  
Hosted by: TTA  
**6G Workshop**  
March 10-11, 2025  
Incheon, South Korea

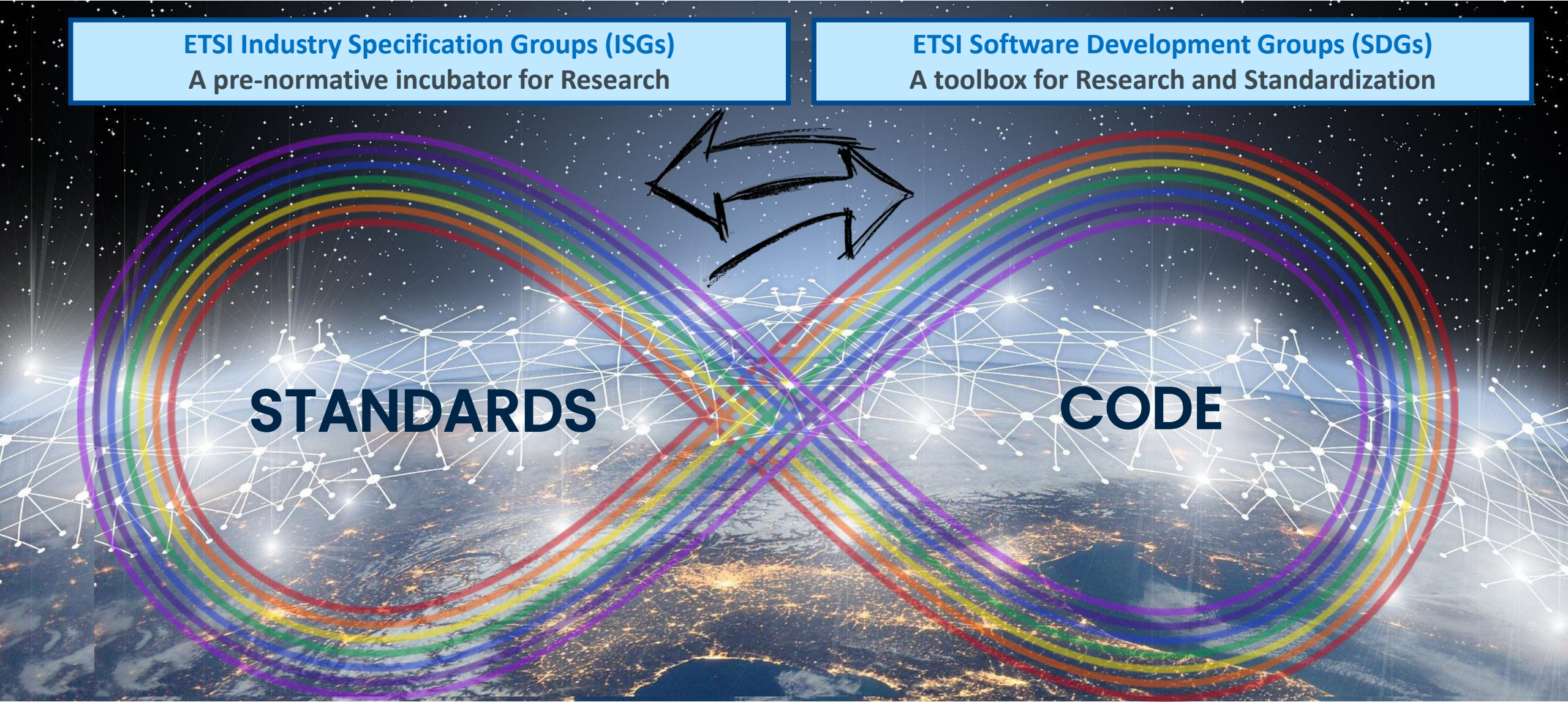


# Pre-Standards in ISGs and Code in SDGs



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

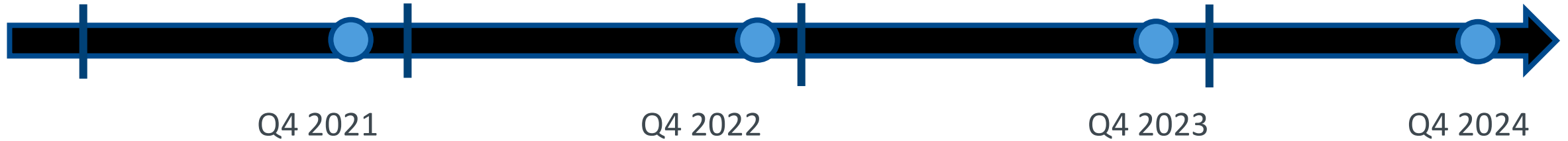
**ETSI Software Development Groups (SDGs)**  
A toolbox for Research and Standardization



**STANDARDS**

**CODE**

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



## ISG RIS (Sept. 2021)

### 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,

**44** members, **4** participants  
**6** deliverables published  
**2** deliverables being drafted

## ISG THz (Sept. 2022)

### 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.

**45** members, **2** participants  
**4** deliverables published  
**1** deliverable being drafted

## ISG ISAC (Oct. 2023)

### 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.

**90+** members, **3** participants  
**2** deliverable published  
**3** deliverables being drafted

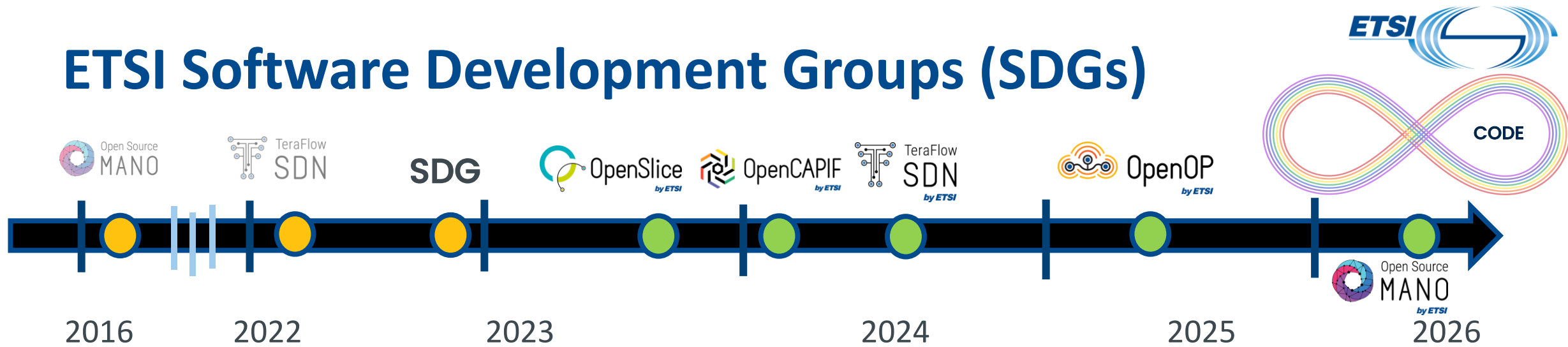
## ISG MAT (Dec. 2024)

### 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.

**32** member organizations,  
**2** participant organizations  
**1** deliverables being drafted

# ETSI Software Development Groups (SDGs)



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



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



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



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



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



# 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

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



## Key Technology Evolutions for 6G

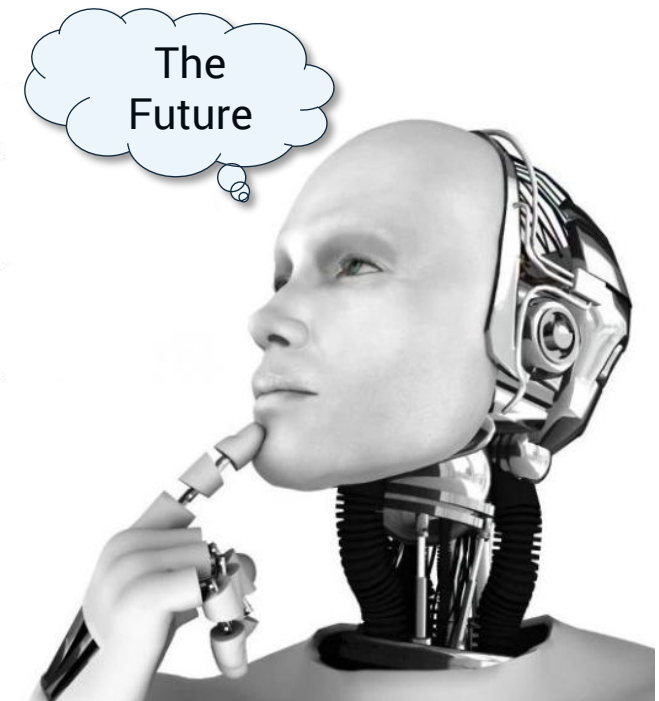
- ✔ **Artificial Intelligence:** Integrating (native) AI for intelligent network management, resource optimization, and security.
- ✔ **Integrated Sensing and Communications:** communications networks also act as a “radar” sensor, using its own radio signals to sense and comprehend the physical world in which it operates.
- ✔ **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.
- ✔ **Terahertz Communications:** Utilizing the THz frequency band for significantly higher bandwidth and data rates.
- ✔ and many more technologies that may arrive in time for 6G, 6G advanced (mid-point), beyond 6G or indeed never.

# 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 features and services
- ✔ 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 may be considered for future releases of 6G that are developed in 3GPP
- ✔ ETSI is proud to be a founding partner organization of 3GPP!

# Conclusions

1. Mega Trends require keen Foresight
2. 6G begins in 3GPP, research continues
3. ETSI links EU / other research projects
4. Enablers for pre-Standards in ISG & SDGs
5. ETSI makes the standards Industry needs



# Thank you for your attention

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