Enjoy!

NTN – Non-Terrestrial Networks

Mastering Tech Standardization with ETSI

Introducing our new Director-General

August 2024

ETSI

The Standards People

Our executive interview on Page 16 highlights the ambitions of ETSI's new Director-General.

ETSI has made significant strides in 5G technology, focusing on enhancing network performance and expanding capabilities. Recent developments include the approval of new specifications that aim to improve 5G network efficiency and support for emerging applications. These advancements are crucial as industries increasingly rely on robust 5G networks for various applications, from autonomous vehicles to smart cities. With the proliferation of IoT devices, ETSI has updated its IoT security standards to tackle new vulnerabilities and ensure comprehensive protection. The new guidelines focus on device authentication, data integrity, and secure communication protocols. These updates are vital for maintaining the security of interconnected devices in both consumer and industrial applications.

Enjoy reading!

Jan Ellsberger
Director-General ETSI

Advancements in 5G and Beyond

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Focus on Quantum-Safe Cryptography

In response to the growing threat of quantum computing to current cryptographic methods, ETSI has intensified efforts in quantum-safe cryptography. A series of new standards have been introduced to safeguard data against future quantum attacks. These standards are essential for industries that handle sensitive information, ensuring long-term data security.

Artificial Intelligence and Securing AI

ETSI continues to lead in setting standards for artificial intelligence (AI) technologies, with a particular emphasis on the security aspects. The recent release of guidelines and standards aims to address the ethical and security challenges posed by AI. These efforts are designed to foster trust and promote the responsible development and deployment of AI systems across various sectors.

Enhancements in Internet of Things (IoT) Security

With the proliferation of IoT devices, ETSI has updated its IoT security standards to tackle new vulnerabilities and ensure comprehensive protection. The new guidelines focus on device authentication, data integrity, and secure communication protocols. These updates are vital for maintaining the security of interconnected devices in both consumer and industrial applications.

Education and Standardization

ETSI is also addressing the growing need for education in standardization. The organization has launched new educational initiatives aimed at training the next generation of ICT standardization experts. These initiatives include updated teaching materials and collaboration with academic institutions to integrate standardization into their curricula. This move is crucial for sustaining the growth and competitiveness of the ICT sector. See pp.24-25 for details.

Cybersecurity Frameworks

Cybersecurity remains a top priority for ETSI, with the introduction of updated frameworks to protect critical infrastructure. The new standards focus on enhancing resilience against cyber threats and ensuring robust security measures for network infrastructures. These efforts are particularly important for sectors such as finance, healthcare, and transportation, which rely heavily on secure and reliable network operations.

Master Tech Standardization
with ETSI

> **Energy efficiency is becoming a big design consideration for satellite systems.**

Above and Beyond **Nicolas Chuberre**

Vice Chair of ETSI's Technical Committee on Satellite Earth Stations Systems and Solution Line Manager at Thales Alenia Space

Non-Terrestrial Networks (NTN) provide wireless communications using satellites in geostationary or low earth orbit (LEO), or High Altitude Platforms (HAPS). This network component has been added to 5G since 3GPP Release 17, and is considered an intrinsic part of the 6G system. NTN are intended to offer seamless global coverage and support a wide range of communication applications demanding high availability.

Nicolas Chuberre, Vice Chair of ETSI's Technical Committee on Satellite Earth Stations and Systems and Solution Line Manager at Thales Alenia Space, explains how satellite network technology can complement terrestrial mobile networks for the benefit of end users as well as network operators.

Let's start with some definitions. When we talk about 'satellite communications', what does this mean from a market perspective?

Here we are referring to any communication via satellite, which can be geostationary or non-geostationary. The latter includes both low and medium earth orbiting satellites.

> **" The objective now is being able to address mass market smartphones.**

There are three broad market segments for satellite communications. The first addresses direct connectivity to handheld devices. These typically operate at frequencies below 3 GHz, requiring quite specialized handsets that are costly by regular smartphone standards. The objective now is being able to address mass market smartphones.

The second segment is broadcast TV services, delivered to hundreds of millions of homes around the world by satellites in geostationary orbit to terminals connected to a familiar rooftop dish or parabolic antenna.

The third segment addresses broadband Internet connectivity to terminals with a directive antenna, typically with speeds of a few tens of megabits per second on the downlink and a few megabits per second on the uplink. While most of these systems employ geostationary satellites, there have also been initiatives to create LEO-based broadband systems such as Starlink that have been enabled by phased array antenna technology at the terminal side.

What is the commercial rationale behind closer integration of satellite networks into the mobile ecosystem?

Users are calling for standardized access because they don't want to be tied to a specific service provider. In addition, they see a benefit in being able to connect anywhere. Given that the service area of a mobile system may be limited in certain countries, satellite allows global coverage to be achieved, provided that it's integrated with mobile systems.

Lastly if we want to drive down the cost to end-users, then clearly we want to move away from having so many different proprietary satellite communication systems that aren't interoperable, as is currently the case. So there's a rationale in replacing these legacy satellite access technologies that are proprietary to different vendors with a single 3GPP-defined technology.

What's the goal with NTN?

The idea behind NTN is to achieve technological commonalities between all satellite market segments and mobile systems. This will allow a reduction in costs through a bigger market and consequent economies of scale. 5G is already a great basis for this, with its flexible radio interface that's adaptable to any band from 1 GHz to tens of GHz. Hence in 3GPP we started the standardization process to primarily address the mobile satellite market, spanning connectivity to handsets as well as to IoT devices. And now we've just completed the specifications for broadband satellite networks operating in the Ka band. The definition of the Ku band has just started.

And why is satellite a big part of the conversation about 6G?

There's increasing recognition of the benefits of closer integration between satellite and mobile services. Improving the resiliency of the network is at stake. Adding redundancy communication paths in the network will certainly reinforce its robustness to node failures.

Seamless service continuity is another challenge. Take for instance the maritime industry, where you have different terminal devices, all connecting to different satellite systems. Then when you're approaching the coastline you need to be able to roam to terrestrial networks. From a user's perspective, it's obviously better if they don't have to keep switching between networks while using their handset.

Take another example from the aeronautical industry, where aircraft need to carry different antennas, different modems and so on to switch between one satellite system to another. That's a lot of extra weight for the plane at the expense of passenger seating. And each time you need to install new terminal equipment, that aircraft is grounded for some time at considerable cost. So all these industries are calling out for standards and for interoperability.

What's the distinction between the way NTN is implemented in 5G and 6G?

Ubiquitous coverage is one of the key IMT-2030 (6G) requirements, whereas service extension was just a 'nice to have' feature in 5G. It has taken some time for the mobile industry to fully appreciate that satellite is not a competitor, but an important complement.

> **With 6G, in contrast, integrated operation of both NTN and TN could enable optimized resource usage.**

Right from the start in 3GPP, there's been an opportunity to design the radio interface and the system architecture to take into account the requirements and constraints associated with NTN and related use cases. NTN has been added on top of the existing 5G system, whereas it could be a native network component of 6G. In 5G, terrestrial and non-terrestrial network components operate independently, but supporting mobility between the two components. With 6G, in contrast, integrated operation of both NTN and TN (terrestrial networks) could enable optimized resource usage.

> **6G should be seen as an evolution of 5G rather than a disruptive technology.**

Putting it another way, NTN in 5G is really about service and terminal level integration, with the same user device supporting NTN and TN capabilities. 6G takes this a stage further: it's about deep operational integration between NTN and TN at the network infrastructure level. However it's important to note that 6G should be seen as an evolution of 5G rather than a disruptive technology.

Sustainability is a central part of the 6G story. What contribution can NTN make?

Energy efficiency is becoming a big design consideration for satellite systems, as it is for 6G and indeed for all industries. There's a lot of investigation going on in this area, and we believe that satellite may also contribute to a certain extent optimizing energy consumption with 6G in specific cases.

There are two different aspects of sustainability. There's the energy required to transport a bitstream of information. Then a further consideration is minimizing the energy needed to provide service in a certain coverage area when there's little or no traffic. In the first case, smart routing techniques may be developed taking into account energy cost associated to the transport of bits. And secondly one may consider turning off cells at the expense of others, considering the energy/coverage ratio.

> **For the past seven years my role has been to define new satellite network solutions.**

What is your own company's involvement in NTN?

Thales Alenia Space is a global space manufacturer, delivering solutions for telecommunications, navigation, Earth Observation, environmental management, exploration, science and orbital infrastructures. For the past seven years my role has been to define new satellite network solutions.

We've been instrumental in creating this standard because we want to open up new market opportunities for the integration of satellite with terrestrial networks. We also believe that this can help defragment broadband and mobile satellite market niches.

Furthermore, we see more intelligence coming on board the satellite, and that's where standards are beneficial. If you're designing equipment for on-board processing that's compatible with a standard, then you can drive down the cost of that satellite.

How is ETSI currently involved in standardization for NTN?

ETSI's Technical Committee on Satellite Earth Stations and Systems has recently approved a new Work Item looking at standards for free space optical (FSO) inter-satellite links.

A second priority is the development of harmonized standards for terminals operating with NTN, where we're working jointly with the responsible sub-group within ETSI TC MSG (Mobile Standards Group). And thirdly, ETSI may explore techniques that are not within 3GPP scope, for example routing within multi-orbit constellations.

Nicolas CHUBERRE graduated in 1988 from the Ecole Supérieure d'Ingénieur en Electronique et Electrotechnique in Paris. After working at Nokia and Alcatel to design signal processing algorithms, Medium Access Control protocols and test tools for 2G cellular handsets and systems assembly, he joined Thales Alenia Space to manage the development of satellite payload equipment and the design of advanced Satellite Communication Systems.

He has successfully led several European collaborative research projects in FP6, FP7, H2020 as well as ESA ARTES context.

He has chaired the SatCom Working Group of Networld2020 technology platforms for nine years, and was a member of the partnership board of the 5G Infrastructure Association. Nicolas has published several papers on innovative Satellite System concepts. Currently he is defining and developing Satellite Solutions for 5G and 6G systems. In addition, he is the lead representative of Thales in 3GPP TSG RAN, where he is the rapporteur on standardization for the integration of satellite in 5G. He also chairs ETSI's Satellite Communication and Navigation Working Group. He is technical manager of the Horizon Europe research project 6G-NTN.

Welcome to our New Members

Arma di Carabinieri

🇮🇹 **Italy**

The Carabinieri fulfil the dual function of defending the Italian state and protecting public order and safety. Considered the first Corps of the Land Army since its origins, the Carabinieri have permanently maintained this singular privilege even within the Army of the Kingdom of Italy. Over time, the double essence of the Institution, a military body with a special order, has been consolidated, which as early as 1922 was defined as an 'armed force in permanent service of public security'.

Central European Initiative (CIE)

🇮🇹 **Italy**

The Central European Initiative (CEI) is a regional intergovernmental forum established in 1989, following the fall of the Berlin wall. CIE aims at overcoming the division in blocks by re-establishing cooperation links among countries of different political orientations and economic structures. Headquartered in Italy, CIE is the largest and oldest forum of regional cooperation in Central and Eastern Europe and brings together 17 member states to promote regional cooperation for EU integration and sustainable development.

Chazah Group Ltd

🇺🇬 **Uganda**

Technology-driven Chazah Group Ltd f is focused on investments in the global digital economy via the design, development, deployment, and operations of its own technology-based products and services delivered in four anchor formats that are each standalone. Expansion Protocols were designed and developed in conjunction with the Internet Engineering Task Force (IETF) to reduce the overall Cost of Data (COD) via the ISO/OSI Model. Using existing infrastructure and internet-enabled devices -especially low-end devices-, additional revenues, and digital economic benefits as indirect investment anchors enables the design, development, deployment and operation of new and better technologies, infrastructure and internet enabled devices, particularly in the Third World.

CROSSCALL

🇫🇷 **France**

Creator of the outdoor mobile technology market, Crosscall offers waterproof, durable, and highly autonomous mobiles and smartphones. The brand designs models perfectly adapted to the hostile and unpredictable environments encountered by athletes and professionals in the field (water, rain, humidity, dust, shocks…), as well as a range of high-performance accessories. The French company is currently pursuing its international development with a presence in 16 countries around the world.

Digitaal Vlaanderen

🇧🇪 **Belgium**

Digitaal Vlaanderen is an agency of the Flemish government. It realizes and supervises digital transformation projects for Flemish and local authorities to pave the way to building tomorrow's government today. Created at the beginning of 2021 by the merger of Informatie Vlaanderen with the ICT department of the Facilities and Services Department, the agency now has a total of around 740 employees.

EA Consult Services Ltd

🇬🇧 **United Kingdom**

EA Consult Services Ltd provides specialized standardization strategy advice to both 'for-profit' and 'not-for-profit' clients. The primary area of focus is currently the evolution of 5G mobile systems towards 6G. In addition, the company provide specialist software consultancy for mission critical applications, particularly for clients in the Fintech domain. EA Consult Services Ltd has offices in the UK and France. Adrian Scrase (former ETSI CTO) is a Director of EA Consult Services Ltd and takes care of standardization related clients.

Holistic Innovation SLU

🇪🇸 **Spain**

Holistic Innovation is a Spanish SME specializing in services related to innovation management for research and technology development. Their vision encompasses a holistic and strategic approach to businesses associated with various fields, including: Audiovisual, networked media, future internet, satellite communications, mobile communications, 5G and beyond 5G, Smart Cities, eHealth, and maritime communications. The team of professionals and researchers has extensive experience in research

activities at national, international, and European levels. Holistic Innovation focuses on spectrum management, standardization, policy development, and strategic initiatives.

HZN - Croatian Standards Institute

🇭🇷 Croatia

The Croatian Standards Institute is an autonomous non-profit public institution established as the national standards body of the Republic of Croatia with a view to accomplishing the following goals of standardization: increasing the safety level of products and processes, protecting human health and lives and environmental protection, promoting the quality of products, processes and services, ensuring the appropriate use of work, materials and energy, improving production efficiency, controlling variety, ensuring compatibility and interchangeability, and removing technical barriers to international trade. The Institute is a member of ISO, IEC, CEN-CENELEC and ETSI, and it acts as the enquiry point for the World Trade Organization Agreement on Technical Barriers to Trade.

IMDEA Networks

🇪🇸 Spain

IMDEA Networks Institute is a research organization on data networks whose multinational team is engaged in cutting-edge fundamental science and technology. As an English-speaking institute located in Madrid, Spain, IMDEA Networks offers a unique opportunity for pioneering scientists to develop their research vision. IMDEA Networks has established itself internationally at the forefront in the development of future network

principles and technologies. Our team of highly-reputed researchers is designing and creating today the networks of tomorrow.

Kythera Space Solutions

🇺🇸 USA

Kythera Space Solutions is the leading provider of dynamic management systems for next generation satellite payloads and SATCOM networks. Kythera's software solutions manage and optimize your satellite resources along with your ground-based assets, providing fully autonomous, real-time space network provisioning and operations that take full advantage of today's flexible, high-throughput satellites. The company's mission is to transform satellite communications into a real-time, integrated, responsive, and resilient service.

Last Mile Semiconductor GmbH

🇩🇪 Germany

Based in Dresden, Germany — the heart of Silicon Saxony — Last Mile Semiconductor GmbH is a semiconductor startup for the breakthrough development of a new non-cellular 5G wireless chipset that enables secure massive IoT use cases. Driven by a vision of a future where technology is seamlessly integrated into our daily lives, encompassing homes, industries, public spaces, and healthcare, the company strives to optimize resource and energy consumption while establishing global digital sovereignty. To realize this vision, it is actively developing a low-cost and ultra-low-power 5G wireless chipset based on the revolutionary NR+ non cellular private 5G standard.

Leibniz Universität Hannover

🇩🇪 Germany

Leibniz University Hannover is a public research university located in Germany. It is a member of TU9, an association of the nine leading Institutes of Technology in Germany, as well as the Conference of European Schools for Advanced Engineering Education and Research, a non-profit association of leading engineering universities in Europe. Leibniz University sponsors the German National Library of Science and Technology, the largest science and technology library in the world. The university holds a leading international position in six established key research areas: Biomedical Research and Technology, Energy Research, Interdisciplinary Studies of Science, Optical Technologies, Production Engineering, and Quantum Optics and Gravitational Physics.

Merqury Cybersecurity Ltd

🇲🇹 Malta

Merqury works with the quantum technologies research group at the University of Malta. It builds on expertise grown over the course of the preceding decade, including through participation in large-scale research initiatives funded by the European Commission, NATO, and local funding mechanisms.

Merqury is not your typical quantum communication startup. The company brings together expertise in quantum technologies with computer science to develop tools and technologies that are useful to people in the real world.

MZ Denmark GmbH
Germany

Mozilla's mission is to promote openness, innovation, and opportunity on the Web. Its flagship product is Firefox, which is an openly developed and open source web browser. Firefox is used by hundreds of millions of people worldwide to discover, experience, and connect to the Web. Mozilla is also a non-profit foundation that educates and empowers Internet users to be the Web's makers, not just its consumers

To accomplish this, Mozilla functions as a global community of technologists, thinkers, and builders who work together to ensure the Internet is a global public resource, open and accessible to all.

National and Kapodistrian University of Athens
Greece

Founded in 1837, the National and Kapodistrian University of Athens, usually referred to simply as the University of Athens (UoA), is the first university not only of Greece but both the Balkan peninsula and the Eastern Mediterranean region. With over 69000 registered students it is today one of the largest universities by enrolment in Europe.

The University of Athens consists of academic, administrative, financial, and technical units and offers a broad spectrum of services to the community that include educational, research and cultural activities.

Politecnico di Milano
Italy

Politecnico di Milano is a public scientific-technological university which trains engineers, architects, and industrial designers. The University focuses on the quality and innovation of its teaching and research, developing a fruitful relationship with business and productive world by means of experimental research and technological transfer. Politecnico takes part in several research, sites and training projects collaborating with the most qualified European universities. It's contribution is increasingly being extended to other countries: from North America to Southeast Asia, to Eastern Europe.

Regula
Latvia

In 1992 Regula started as a team of passionate engineers who loved a challenge. Today it has grown into a robust end-to-end ecosystem of science-backed solutions powered by 400 innovators. Regula's mission is to bring a scientific approach to safety and comfort. With 30 years in forensics, Regula helps organizations make document authentication and identity verification seem easy. Regula's solutions help over 1000 clients and have been deployed in 170 countries to date, including equipping 80 national borders.

Sensoriis
USA

Sensoriis Inc. was formed in Seattle in 2016 to commercialize innovative sensors for biomedical applications. The core competence of Sensoriis include documented expertise and experience in developing innovative biomedical sensors, especially non-contact and wearable sensors, and a mobile data management system with integrated machine learning algorithms.

Smart Internet Lab, University of Bristol
United Kingdom

The Smart Internet Lab at the University of Bristol is one of the UK's most renowned Information and Communications Technology (ICT) research centres which addresses grand societal and industrial challenges. 200 experts on 5G radio/wireless, optical communications and networks challenge the complexity of tomorrow's world by fusing research expertise and innovation in a range of research areas such as: IoT, 5G and Beyond, Future Transport Networks, Smart Cities, Autonomous Networks, Machine Learning, Artificial Intelligence, Network, Convergence, Mobile Edge Computing and Network Softwarization. The unique offering across optical, wireless, IoT and cloud technologies enables the research centre to bring together end-to-end network design and optimization and impact regional, national, and global ICT innovations.

Ubiik
France

Ubiik is a leading AMI solution provider that develops technologies related to innovative IoT (Internet of Things) products. The company build tools and infrastructure aimed at creating a smarter and more sustainable world. It focuses on research, development, and deployment of low power wide area

network (LPWAN) communication systems. Ubiik provides complete vertical solutions for utilities, smart energy, smart factory, and smart city applications. The company supports 3GPP standard technologies like NB-IoT and LTE-M, providing the foundational protocols, end devices, base stations and cloud services needed for implementing IoT networks.

University of York
🇬🇧 United Kingdom

Founded on principles of excellence, equality and opportunity for all, the University of York opened in 1963 with just 230 students. Nowadays it has positioned itself as one of the world's leading universities, carving out a reputation as an academic powerhouse where a clear focus on excellence has secured national and international recognition alongside longer established institutions. Today York University counts more than 20,000 students and 5,000 staff. Its diverse community fosters a sense of belonging and operates at the highest academic and ethical standards.

SDI Squared
🇺🇸 USA

Focus on securing outcomes that further global development and well-being, SDI Squared's mission is to accelerate favourable outcomes in and via international fora. In collaboration with partners, the company provides a wide range of services including tools for research and research services, integrated standards strategy services, integrated planning services & fora procedural guidance, and navigating standards development fora to obtain favourable outcomes.

Shenglu Telecommunication
🇨🇳 China

Part of the Shenglu Group, Shenglu Telecommunications Tech. Co., Ltd. located in China's Guangdong Province, has built a whole set of research, development, manufacture, and sales system, specializing in antennas and RF products. The company exports its products to more than 60 countries and regions, including Europe, the United States, Australia, and India.

SJU Sejong University
🇰🇷 Korea

A global prestigious university leading the era of creative convergence, Sejong University ranked 397th in the annual listing of the world's best global universities in 2023 and was named the seventh-best global university in South Korea, and the 79th-best global university in Asia that same year. The university's world ranking climbed up sharply from No. 506 the previous year. In particular, Sejong University topped the ranking among Korean universities in the category of international research collaboration.

Tron Future Tech Inc.
🇹🇼 Taiwan, Province of China

Tron Future Tech Inc. delivers the innovative applications based on advanced phased array systems for a wide range of markets and in a wide range of disciplines - from semiconductor IC to user experiences – including antenna, packaging, cooling, DSP, array architecture, computer architecture, language compiler, information architecture, production methods, etc. Tron Future Tech literally

means "to create future technology" in Mandarin Chinese. The long term focus of Tron Future Tech Inc. is to create never-existed technologies for the well-being of humankind based on fundamental research, and not limited by disciplinary boundaries.

XEYE Clear Vision Ltd
🇮🇱 Israel

Xeye uses innovative and effective electromagnetic imaging and AI to keep people and places safe. The revolutionary near field threat detection (NFTD) system scans people in real-time — without hindering the flow of foot traffic — to enhance overall public safety and security. eye's patented technology helps realize the full potential of AI-based NFTD by enhancing the responsiveness of standoff detection measures. Deploying Xeye to address security challenges in high-traffic public areas, businesses, venues, and government entities Xeye alleviates key bottlenecks and pain points in current security operations, while providing more support for security directors to keep venues safe without limiting personal freedom.

Excluded are GROUP members for this section of enjoy:

- ZTE Italia – EEA- GROUP
- MediaTek Finland- GROUP
- MediaTek Germany GmbH- GROUP
- MediaTek Sweden AB- GROUP
- Reflection B.V.- GROUP
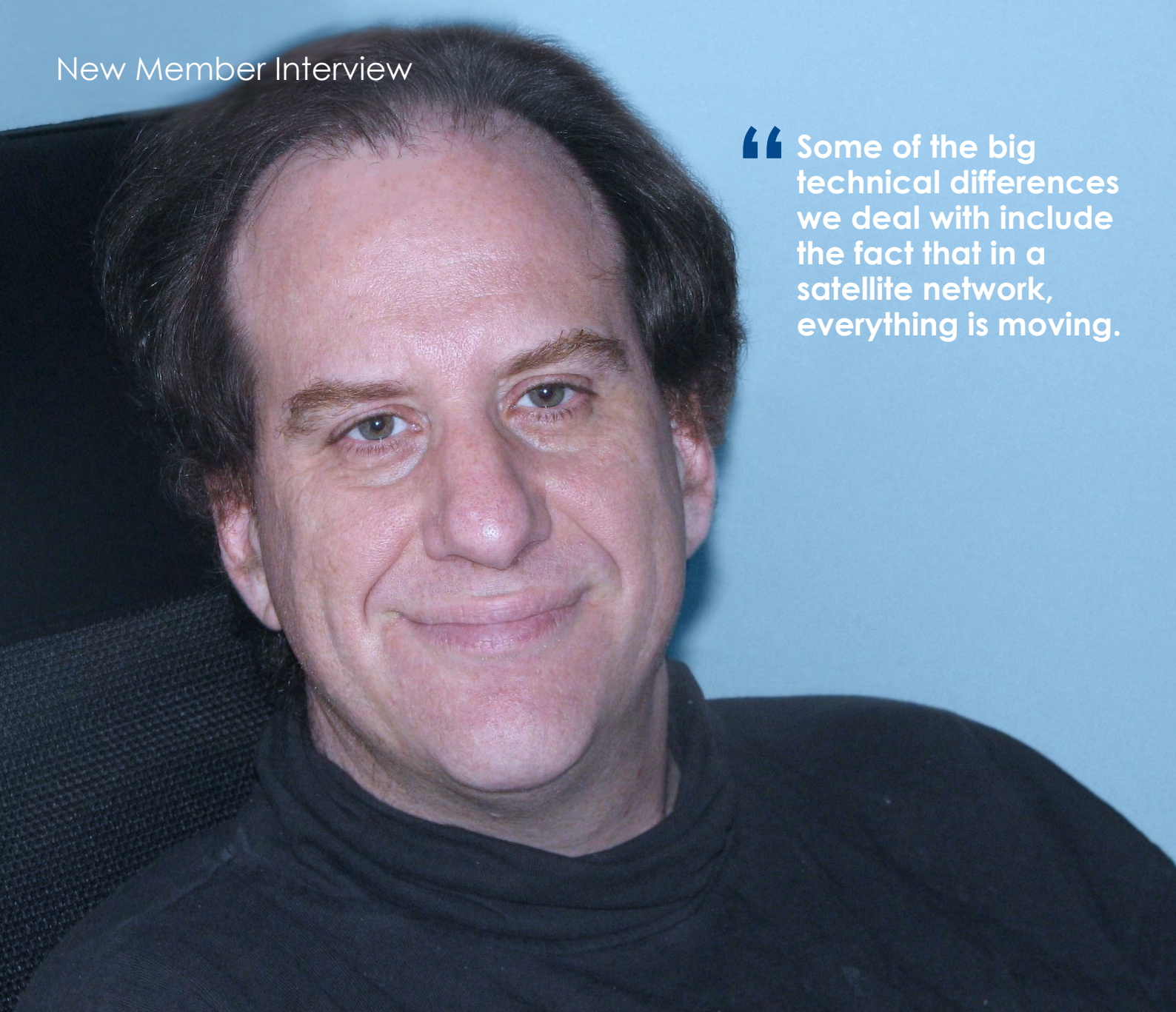
> " Some of the big technical differences we deal with include the fact that in a satellite network, everything is moving.

Dr. Jeffrey Freedman, PhD

Kythera Space Solutions, focusing on Non-Terrestrial Networks and 6G

With more than 35 years of telecommunication engineering and software development experience, Jeff is both CEO of Kythera Space Solutions and CTO of RKF Engineering, Kythera's sister company. Jeff is the visionary and technical genius behind Kythera's business. Jeff holds over 70 patents in satellite payload design, satellite resource management software, and telecommunication architectures and is highly regarded as a subject matter expert in satellite performance, antenna design, payload design, and dynamic satellite control systems. Jeff is also an accomplished science fiction writer and has led the development of award-winning, groundbreaking software products in both communications systems modeling and 3D animation. Jeff holds a BSEE from North Carolina State University, an MSEE from Cornell University, and a Ph.D. in EE from the University of Maryland.

How does Kythera Space Solutions empower space networks?

Kythera is a pioneer in developing software systems to manage and optimize dynamic, autonomous satellite communication (SATCOM) networks. Modern SATCOM networks take advantage of emerging communication satellite designs that incorporate advanced beamforming and channelization hardware, all controlled by software that enables reconfiguration on-the-fly. The Kythera Operating System – KOS – enables satellite operators to exploit these next-generation, software-defined satellites to dynamically and autonomously deliver satellite capacity exactly where and when it's needed.

How are space networks different from terrestrial ones?

Space networks are far less mature than terrestrial ones. Historically, if you wanted service from a satellite network, you might have had to wait days or weeks to get that service provisioned. That's all changing very rapidly at this point, and Kythera's business focus is enabling that shift of SATCOM into a service that operates much more dynamically and autonomously – more like today's terrestrial networks.

Some of the big technical differences we deal with include the fact that in a satellite network, everything is moving. The satellites are moving, and in many cases, they're moving relative to the users they're serving, who may also be moving. Additionally, satellites are notoriously power, spectrum, and bandwidth limited, so optimizing capacity and service becomes a constant battle against hard constraints. If you don't properly optimize against those constraints, you could easily waste 50% of your power efficiency and/or capacity. The result is a far more expensive satellite to operate and a higher cost for service. The key to a successful satellite service is getting the cost per bit down, so wasted power and capacity is a killer.

And, of course, it's impossible to get technicians out to a satellite on short notice, so resiliency is critical.

What does the future of space networks look like?

Five years ago, Kythera received a lot of skepticism for its vision of SATCOM as a real-time, integrated, responsive, and resilient service. Today, it is widely accepted that satellite communications will increasingly become:

- Globally integrated and interoperable across satellite operators, and between government and commercial satellites;
- Multi-orbit across satellites in different orbital planes, including Low Earth Orbit (LEO) (like Space X's Starlink network), medium Earth Orbit (MEO) (like SES Networks' O3b mPOWER network), and Geosynchronous Earth Orbit (GEO) (like most traditional communication satellites);
- A unified pool of satellite capacity made up of heterogenous satellites from different manufacturers;
- Dynamic, with the ability to rapidly respond to changing service needs and adapting to changing operating and interference conditions;
- Autonomous, with instant decision making, speeding operations with fewer humans needed in the loop;
- Resilient, with built-in redundancy and service routes.

Kythera is at the forefront of this transformation, with software that supports all of these tenets of a next-generation dynamic, autonomous SATCOM service.

Where does ETSI fit in for Kythera Space Solutions?

Historically, SATCOM networks were single function and purpose-built with no dynamic properties. Standards weren't even a glimmer in anyone's eye. But, as we look towards a future filled with interoperable multi-orbit, heterogenous SATCOM networks, strong standards for interoperability, interfacing, and management become a necessity. As a leader in defining the future of dynamic SATCOM, we're keenly interested in defining and furthering these standards to establish that future.

Does 5G/6G have a place in space?

Yes. 5G took the first steps to deliver on the promise of satellite-based ubiquitous high-speed connectivity. 6G offers the fulfillment of the initial promise to deliver a rich set of services across satellite. However, providing 5G or 6G services is more than turning on a base station in space and expecting it to "just work". Deploying any 3GPP technology in a SATCOM network requires a sophisticated management solution that enables operators to maximize their capacity and revenue while minimizing operational expense, taking into all the unique constraints that characterize a satellite network. Any such solution must also enable users to enjoy high-quality, high-speed connectivity in a variety of challenging operating environments. At Kythera, we're offering 5G/6G solutions that promise to increase power and spectrum efficiency by up to 10x above what a standard 5G/6G architecture can offer.

ETSI SDG OpenSlice and OpenCAPIF:
Transforming the Telecom Standardization Landscape

Within ETSI, renowned for developing standards that drive technological innovation, the Software Development Group (SDG) is a new type of group tailored for collaborative software development. Two significant initiatives under this group are OpenSlice and OpenCAPIF, which are set to revolutionize the telecom industry by enhancing interoperability, flexibility, and scalability in network services.

OpenSlice:
Network Slice as a Service

OpenSlice is an open-source Operations Support System (OSS) prototype within the ETSI NFV (Network Functions Virtualization) architectural framework. OpenSlice offers Network-as-a-Service (NaaS) following ETSI NFV, TM Forum, 3GPP, and ETSI Zero-touch Network and Service Management (ZSM) principles. OpenSlice exposes TM Forum OpenAPIs, and interacts seamlessly with NFV orchestrators through ETSI NFV APIs and data models, ensuring interoperability with platforms such as Open Source MANO (OSM).

Network slices in OpenSlice are described according to the GSMA Generic Slice Template (GST), characterized to expose the TM Forum NaaS API suite. This approach enables service providers to offer customized network slices efficiently, meeting diverse customer requirements.

OpenSlice's architecture supports a range of functions, including service order and orchestration, NFV catalog management, and service inventory management. The platform offers two main portals: the Services portal for accessing and designing services, and the NFV portal for managing NFV artifacts. OpenSlice allows third-party applications to interact via TM Forum APIs, enhancing flexibility and integration capabilities.

OpenSlice's cloud-native design supports deployment in Kubernetes, ensuring scalability and resilience. By automating the lifecycle management of network slices, OpenSlice significantly reduces the time and effort required to deploy new services, thus accelerating time-to-market.
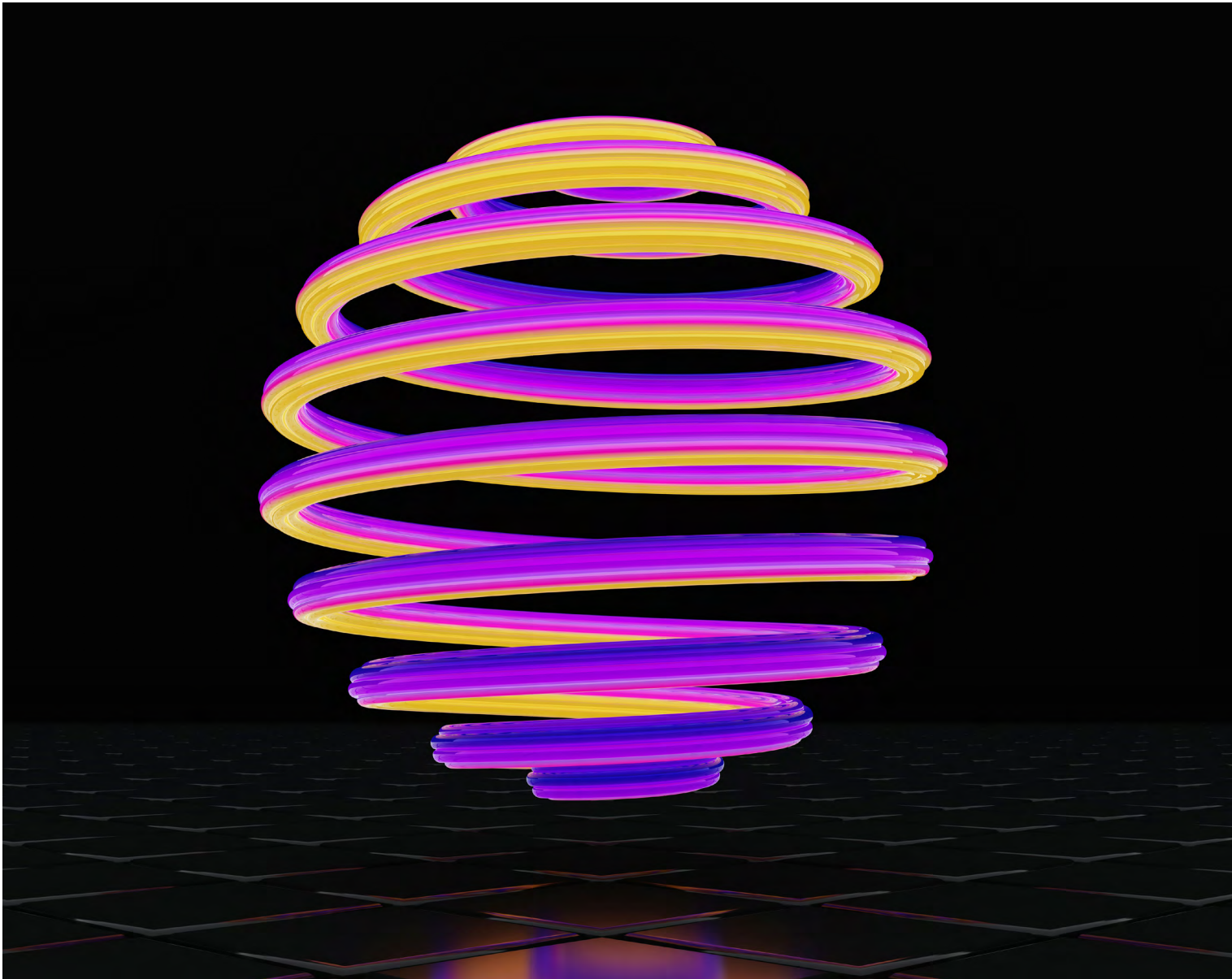
OpenCAPIF:
Common APIs Framework for Interoperability

OpenCAPIF (Open Common API Framework) is another groundbreaking initiative under the ETSI SDG program. It aims to develop an open-source framework for the CAPIF concept introduced in 3GPP Release 15. OpenCAPIF provides an open-source implementation of the core function, enabling secure and consistent API exposure and invocation.

The core objective of OpenCAPIF is to create a unified API framework that ensures seamless interaction between diverse systems and services. This standards-based framework facilitates the integration of new technologies and services, making it easier for operators to adopt and deploy innovative solutions. OpenCAPIF is designed expose network and service APIs from different domains, ensuring a harmonized API consumption approach by Network Applications.

OpenCAPIF supports mutual TLS authentication for secure communication between API invokers and providers. It employs a Certificate Authority to manage certificates and offers three security mechanisms for API consumption: pre-shared keys, certificates, and OAuth 2.0 tokens. OpenCAPIF's components are deployed in a Kubernetes environment.

Transforming the Telecom Standardization Landscape

Both OpenSlice and OpenCAPIF are instrumental in driving the transformation of the telecom standardization. By promoting interoperability, and component re-use these initiatives enable operators to create more flexible, sustainable and scalable networks.

The collaborative nature of these software projects fosters innovation and accelerates the development of new technologies. By providing open-source code and tools in support of standardization, ETSI provides a platform for industry players and research initiatives to experiment, iterate, and deploy new solutions more rapidly while enabling an unvaluable source of early feedback to standardization groups. This accelerated innovation cycle is vital to enable network standardization keeping pace with the fast-evolving telecom landscape.

OpenSlice and OpenCAPIF are the 2 latest additions to the ETSI portfolio of open source tools and projects, where we could already find Open Source MANO and TeraFlowSDN. To learn more about them, and their role in bridging innovation into standardization, don't miss the upcoming "Software and Standards for Smart Networks and Services" event at ETSI.

> **My immediate priority is to take a proactive stance in strengthening ETSI's role as an ESO.**

Introducing our new Director-General

Jan Ellsberger was elected as ETSI's new Director-General at our 83rd General Assembly in April 2024. Taking effect on 1st July, his term of office lasts for five years which can be extended by a further three years at the discretion of ETSI's membership. He succeeds Luis Jorge Romero who served as Director-General for thirteen years.

Jan is no stranger to ETSI. From 1995 to 1998 he worked as a permanent expert with responsibility for our relations with the ITU-T secretariat, SG.10 and SG.11 related to formal methodologies for standards development. He was closely involved in the development of INAP/CAMEL, TETRA and ISDN standards, and methodologies for standards conformance test suites.

With a career spanning over three decades in technical standardization, Jan led Ericsson's global standardization operations for twelve years in his capacity as Vice President Industry and Technology. More recently, he has worked as an advisor to clients and partners on industry trends in the automotive and ICT sectors. Until 2023 he was Vice President Industry Development and Standardization Officer Automotive at Huawei.

As incoming Director-General of a world-class standardization organization with some 950 members, what's your starting point?

The origins of ETSI date back to a proposal in the shape of the Green Paper that was issued by the European Commission in 1987. The following year ETSI was set up by CEPT with a somewhat different structure from its ESO (European Standards Organization) peers CEN and CENELEC, as a vehicle enabling the rapid development of standards to meet the needs of European policymakers and industry.

ETSI became very successful right from the first years of its operation, with early results including the globalization of GSM, the Smart Card Platform, and the creation of 3GPP, as well as other initiatives like DECT and TETRA. Of course a lot has happened since, both in terms of technology development and within the European and global political and socioeconomic landscape. What's important now is for ETSI to consolidate on that early success in a world where change is the only constant.

While preparing for my candidacy over the last year I've already been in several discussions with the European Commission in my role representing one of ETSI's member companies. We have already established a good foundation for collaboration, and together we've identified a number of areas of improvement. It's my priority to address these right from the outset of my office.

I'm a European citizen who's worked for most of my career in European companies. Working most recently in a Chinese company of course gives valuable insights into the working practices and priorities of other non-European organizations. I believe this experience will serve ETSI very well in a landscape that is influenced by and where ETSI works with entities from outside of Europe.

What initiatives can we expect to see marking your first months as Director-General?

My immediate priority is to take a proactive stance in strengthening ETSI's role as an ESO and re-establishing its relevance within the European standardization system. That means working closely with the Commission as well as other policy stakeholders – the scope of ETSI is of course wider than just the 27 EU member states. So in the near term I am keen to strengthen ETSI's interfaces with the Commission and other policymakers. We need to work more systematically, and from a perspective of the ETSI Secretariat we will focus our use of resources in engaging positively with the Commission and other stakeholders, and to further strengthen ETSI's role as a global platform for technology innovation.

The fundamental way that ETSI creates standards through global collaboration is already very strong, and I don't see any need to change this process dramatically in the short term. However we will continue to look closely at our own working methods, just as 3GPP, ISO and IEC have been doing in recent years. It's certainly time to take a new look at this and see what ideas we can adopt.

Hand in hand with this, another area I want to look at with fresh eyes is ETSI's high-level strategy, with a clear understanding of our strengths and actionable items for the Secretariat to execute. I'm very much looking forward to discussing with the Board and executives from our member companies and administrations to explore what can be achieved in this area.

Jan, let's talk about technology. You've said that you are keen to broaden the scope of technologies that ETSI addresses in its standardization activities.

While ETSI is tremendously proud of its heritage – and rightly so – it cannot always stay rooted in its radio and wireless past. ETSI's work already touches on a vast spectrum of industries and vertical markets. There are also a number of horizontal technology areas, like AI, data and cybersecurity, that form an integral part of the digitalization of many industries.

> ❝ ETSI's work already touches on a vast spectrum of industries and vertical markets.

One example of this is building an architecture for data sharing and data monetization across industries. It's a hot topic that's a central part of the new European data strategy, and a lot of work on policy development is ongoing in this area. Looking at ETSI's membership, all the relevant stakeholders are already here. It's definitely an area where we can play a big role in driving necessary standardization work in support of this strategy. It's also an area that's very interesting from the perspective of our non-European members, where exactly the same discussions are happening in other parts of the world. It's a very good fit for ETSI to strengthen its work on data.

Then of course we have the very broad topic of sustainability – not least from the perspective of 3GPP that's reflected in its current work on 5G and now 6G. In the last five years there's been a lot of effort expended on developing regulatory and policy strategy relating to sustainability, energy efficiency and circularity. Now we're entering a phase where we need to develop standards and implement them. ETSI is very well suited to do this, not only from a traditional telecoms perspective but also looking at a commonality of needs with other industries.

Where else do you intend to focus your energies?

Standardization is the ultimate output of a process that stretches right back to grass-roots technological work that's often conducted in universities and the research labs of member companies. I'm a strong advocate of the efforts that ETSI is already making to forge dialogue with R&D and academic communities – especially in emerging technology areas beside wireless, like data, AI and sustainability. Here I'm keen to create new relationships and strengthen ETSI's position as a platform to disseminate the results of research being conducted in Europe and similar activity in other regions.

ETSI's success is not measured in the number of our members, but rather in the impact we have on industry as an organization. ETSI is rightly viewed as a leading platform for developing world-class standards. Of course we need to ensure that ETSI remains relevant, and one aspect of that is continuing to grow and broaden our membership, especially in new industry sectors.

> ❝ Of course we need to ensure that ETSI remains relevant.

It's also my ambition to reach out into world regions where ETSI is not so present today. We've been very active to date in forging relationships with regions such as China and India. There's a lot of exciting technology innovation happening in the Middle East and Africa, for example.
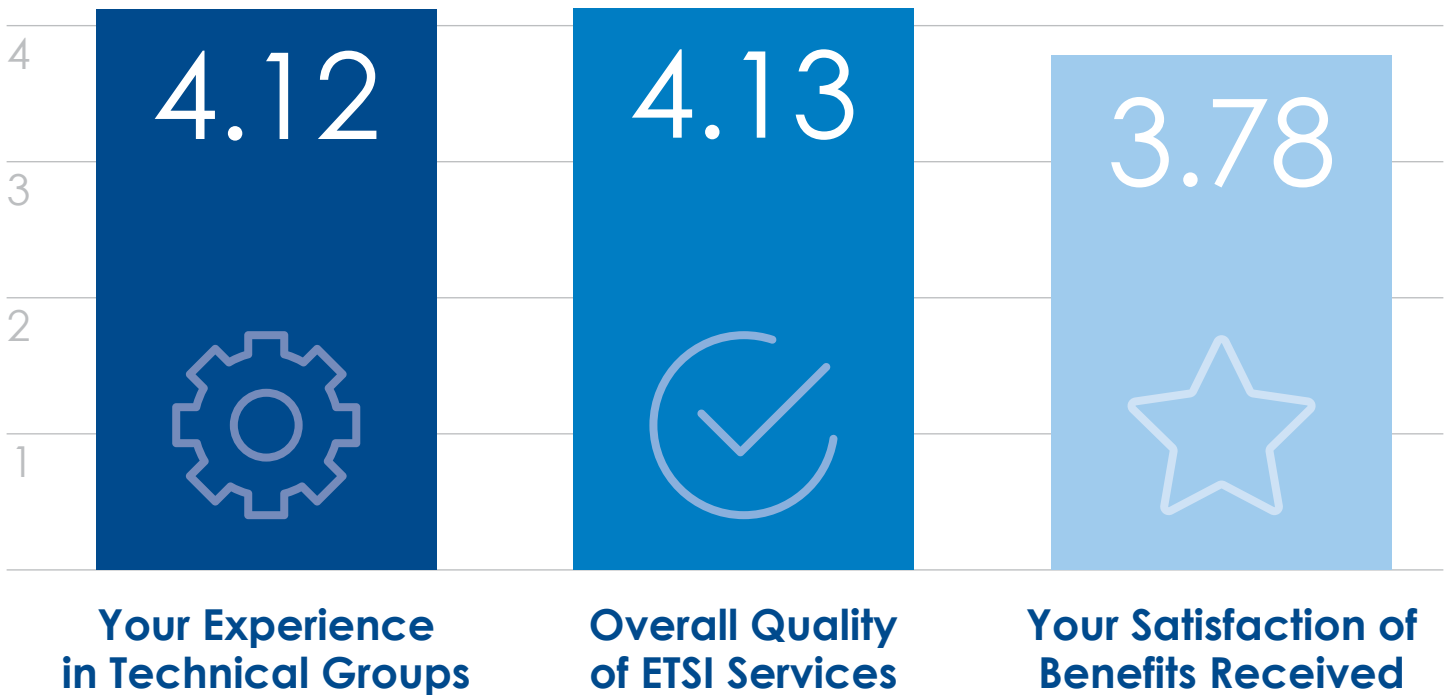
From a personal point of view, what can ETSI members and colleagues look forward to during your tenure as Director-General?

I'm Scandinavian, and my management style is typical of that! We focus on team efforts where everyone contributes to their best ability, based on their own competencies and background. 'Freedom under responsibility' is a personal motto for me. I encourage my staff to take initiatives, and I'll always support them as much as I can.
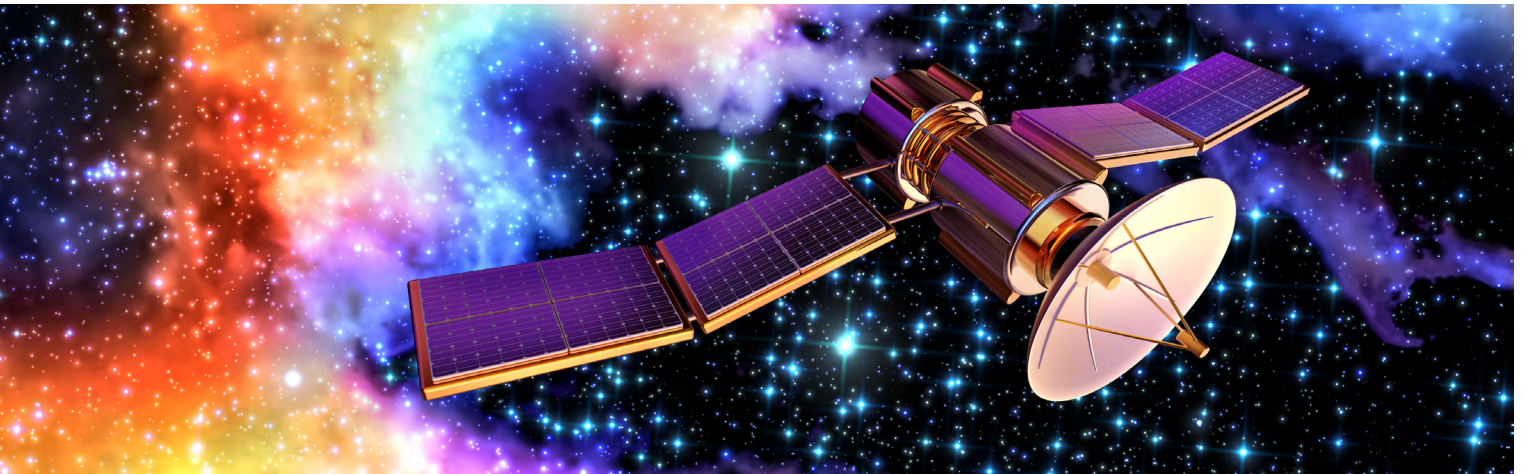
> ❝ We focus on team efforts where everyone contributes to their best ability, based on their own competencies and background.

Results of ETSI Membership Survey 2024

	4.12	**4.13**	**3.78**
Your Experience in Technical Groups	**Overall Quality of ETSI Services**	**Your Satisfaction of Benefits Received**	

Shaping the Future:
Europe's Pioneering Role in 6G with Integrated Non-Terrestrial Networks

The advent of 6G technology is poised to revolutionize the telecommunications landscape, with non-terrestrial networks (NTNs) playing a pivotal role in this transformation. The definition of the 6G standard is underway, but NTNs are consistently recognized as essential to future fully integrated systems. Their disruptive potential to transform connectivity, support diverse applications, and bridge the digital divide underscores the profound impact NTNs will have on the future of telecommunications.

For Europe, this presents an unparalleled opportunity to lead in the next frontier of telecommunications. The Smart Networks and Services Joint Undertaking (SNS JU) vision for 6G is inherently multilayered, involving a symbiotic relationship between terrestrial, airborne, and space nodes. This approach envisions a 3D heterogeneous architecture in which terrestrial infrastructures, satellites, unmanned aerial vehicles (UAVs), and high-altitude platforms (HAPS) will converge to enable innovative mobile services.

The integration of NTNs into 6G systems is not without its challenges. Each layer of the architecture: terrestrial, airborne, and space presents unique research hurdles that need to be solved and for which standardization will be fundamental. At the same time, the potential benefits are substantial. NTNs promise of providing cost-effective and ubiquitous wireless coverage is compelling. This will be crucial in extending mobile services to areas that are currently underserved. Importantly, the integration of NTNs in 6G systems could help to finally close the digital divide, offering affordable and accessible internet services to billions of people worldwide who are currently unconnected.

Another primary value propositions of NTNs lies in their ability to support a diverse range of applications. These include real-time Internet of Things (IoT) services, emergency response services, high-speed mobility, and high-throughput hybrid multiplay services. LEO satellite backhaul solutions, in particular, can enhance network resilience and availability, providing a secure and reliable connectivity option.

Moreover, this convergence of terrestrial and non-terrestrial networks (TN-NTN) is expected to drive innovation in network management and orchestration. Advanced techniques for managing interference, optimizing handovers between TN and NTN, and efficiently allocating spectral resources will be essential to guarantee full-service reliability.

The integration of non-terrestrial networks (NTNs) within the framework of 6G is being significantly propelled

by several research projects funded by the European Commission through the SNS program. Here's an overview of several key projects that aim to explore and develop critical aspects of NTN integration into future 6G systems:

- **5G Stardust:** focuses on Satellite and Terrestrial Access for Distributed, Ubiquitous, and Smart Telecommunications. By leveraging both satellite and terrestrial infrastructures, 5G Stardust aims to create a seamless communication network that provides ubiquitous coverage and high-capacity connectivity.

- **6G-NTN:** is dedicated to designing and validating the key enablers for the integration of terrestrial and non-terrestrial components into 6G. 6G-NTN's research is critical in understanding how best to merge these two distinct network types into a cohesive system. The project is expected to develop innovative techniques for managing interference, opt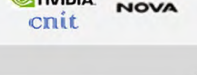imizing handovers, and efficiently allocating spectral resources, which are crucial for the reliable performance of 6G networks.

- **Ether:** The Self-evolving Terrestrial/Non-Terrestrial Hybrid Networks project aims to develop networks that can adapt and evolve autonomously. Ether's focus on creating self-optimizing networks that can dynamically respond to changing conditions and demands will be pivotal for the operational efficiency and resilience of 6G systems. This project underscores the importance of adaptive network management in achieving the robust performance required for next-generation connectivity.

- **6G Sandbox:** This project provides a comprehensive and modular facility for the European experimentation ecosystem, including access to the European Space Agency's 5G/6G Hubs. The 6G Sandbox will be instrumental in testing and validating new technologies and concepts in a controlled environment before deployment. It serves as a critical resource for researchers and industry stakeholders to experiment with integrated TN and NTN solutions, fostering innovation and collaboration across the continent.

- **Adroit 6G:** Focused on the convergence of communications, computation, and control, Adroit 6G aims to enable highly reliable IoT services. This project addresses the integration of IT and network technologies to create a seamless and reliable IoT ecosystem. By ensuring that IoT devices can reliably communicate across both terrestrial and non-terrestrial networks, Adroit 6G is set to enhance the scope and reliability of IoT applications, which are integral to the future of smart cities and autonomous systems.

In conclusion, the integration of NTNs into future 6G systems represents a significant leap forward in the telecommunications industry. Now Europe must seize this opportunity to be at the forefront of this technological evolution.

SNS Projects	Members	Areas of Focus
5G stardust	11 — Deutsches Zentrum DLR, ThalesAlenia Space, hispasat, Fraunhofer, orange	• Satellite and Terrestrial Access for **Distributed, Ubiquitous, and Smart Telecommunications**	• Fully **integrated 5G-NTN** autonomous system • Flexible **multi-constellation/multi-orbit** architect. • Self-adapting to diverse **vertical requirements**.
6GNTN	15 — SES, TECHCOM, ThalesAlenia Space, Qualcomm, orange, Deutsches Zentrum DLR, ERICSSON, Greener wave.	• Design and validate key **enablers for the integration of TN /NTN components** into 6G	• Multidimensional network infrastructure, multi-constraint RANs, and multi-user terminals. • Sustainable and resilient **3D multi-layered** (GSO, NGSO, HAPS, drones) network architecture
ETHER	13 — net Ai, SATELIOT, orange, Collins Aerospace, i2cat	• Self-evolving **terrestrial/non-Terrestrial Hybrid Networks**	• Unified Radio Access Network (RAN) and energy-efficient, **AI-enabled (zero-touch) resource management** across TN/NTN domains.
SANDBOX	18 — KEYSIGHT TECHNOLOGIES, Telefónica, NOKIA, COSMOTE, Lenovo, Fraunhofer	• Complete and modular **facility for the European experimentation** ecosystem	• Fully configurable, manageable and controlled **end-to-end trial networks** • MoU with **European Space Agency 5G/6G Hubs**
ADROIT6G	13 — SIEMENS, NVIDIA, cnit, orange, NOVA	• Distributed **AI-Driven Open & Programmable Architecture** for 6G Networks	• Combined communications, computation and control **enabling IT-Network convergence** for highly reliable IoT services

3GPP Workshop on IMT2030 Use Cases

A standards stage 1 workshop, exploring the Use Cases that can be expected to drive the next generation of mobile systems took place May 8-10, 2024 in Rotterdam. Although 6G is several years away, the prospects for further growth beyond conventional cellular markets, with features for new sectors and new geographies, helped to make the workshop a popular event with over 200 participants attending in person and a further 350 following live online.

The opening sessions heard from two 3GPP partners representing the operators (GSMA and NGMN), as well as several of the Market Representation Partners in 3GPP – looking at the key 6G use cases for the vertical industries – with Automotive (5GAA), Industry automation (5G-ACIA), Media delivery (5G-MAG), Satellite & NTNs (GSOA), Public Safety (TCCA) and the Wireless Broadband Alliance all represented.

The second day of the '3GPP Stage 1 workshop on IMT2030 use cases' concentrated on the various national and regional research alliances working on a 'Global 6G View'. Many synergies exist in the evolving research

on 6G, with Robotics, Awareness, Digital twins, Immersive [personalized] experiences, XR, Multi-dimensional [massive] sensing, AI/ML, Ubiquitous Connectivity... all joining Sustainability, Security and Trustworthiness amongst the main priorities.

3GPP's new 6G logo. Approved for use in time for the Rotterdam workshop.

Attendees also heard from the ITU, on the final day, learning that the usage scenarios for 6G are extended from the IMT-2020 set (remember the 5G triangle) to six overarching IMT-2023 scenarios (The hexagon within a 'wheel') to deliver communications that are:

- Immersive
- Massive
- Hyper Reliable & Low-Latency
- Ubiquitous
- AI ready
- Integrated Sensing capable

Throughout the workshop, there were several recurrent themes for inclusion in the 6G discussion. Puneet Jain, the

3GPP TSG SA Chair noted that "Smart" everything was still a buzz word, with Voice over 6G, Fixed wireless access, LPWA & massive IoT, Industrial IoT, Open network Northbound APIs, Healthcare, Autonomous Driving, and Enhanced positioning all set to fuel discussions about 6G features and projects.

Next Steps in 3GPP

Initial 6G use case study item aspects are now under discussion to assemble the areas identified into a manageable load for the standards groups – with the start of work on WG SA1 6G Studies (SIDs) targeted for the September 2024 plenary (TSG SA#105).

During the 3GPP plenaries, TSGs#107 in Korea - March 2025, workshops will be convened to kickstart further Release 20 studies from the 6G radio interface (TSG RAN) and 6G core network architecture (TSG SA) Working Groups.

The workshop presentations and summary are at www.3gpp.org/Stage1_IMT2030_UC_WS

Kevin Flynn
3GPP Marketing and Communications

5G Timeline & 6G Study phase

Data source: SP-230382
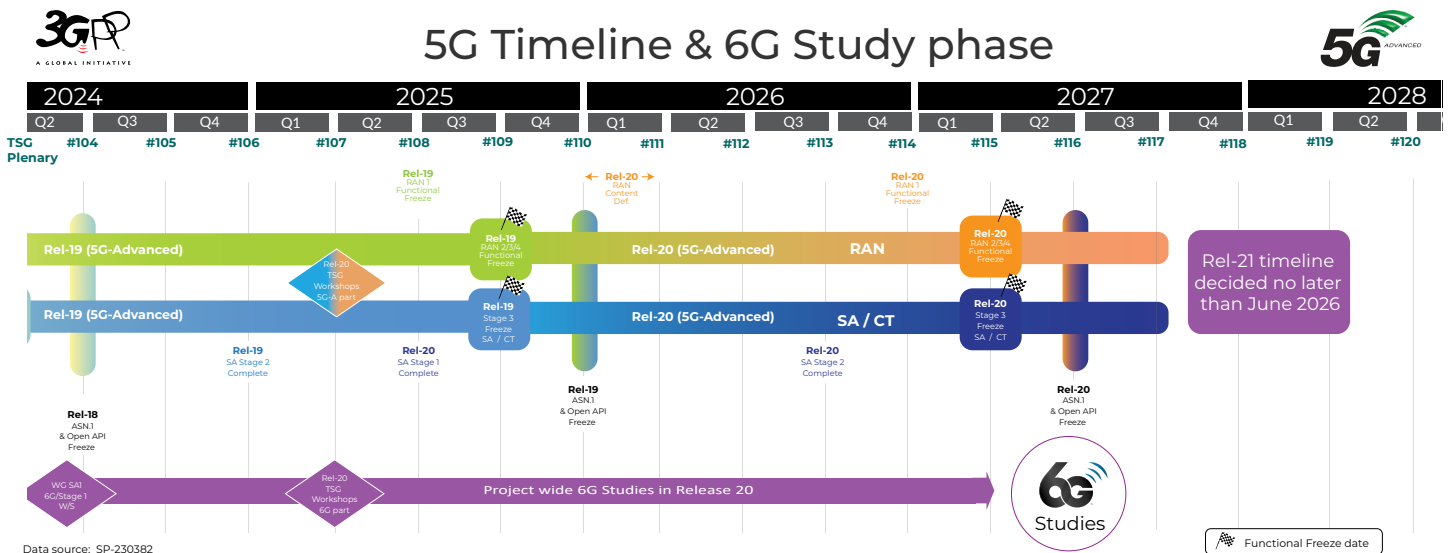
Combining Cellular and Satellite Connectivity Intelligently

Beyond technical challenges, businesses need to balance coverage and cost considerations.

Demand is growing for global asset tracking and IoT sensing to monitor critical infrastructure in remote locations. As the IoT market matures and new use cases evolve, satellite becomes a consideration in mixed connectivity situations. However, businesses need to balance global coverage and connectivity costs, which requires intelligence in the solution approach.

Two Approaches for Cellular-Satellite Connectivity

3GPP-compatible, dual-mode wireless modules are a factor in the rise of hybrid satellite-cellular solutions. These are network-oriented approaches. They rely on roaming partnerships between cellular and satellite connectivity providers. This is a promising early approach and currently more suited to low power, narrowband scenarios.

There is a different approach for medium and broadband use cases which focuses more on API integration. It allows solution providers to manage endpoint IoT hardware and connectivity through a management system without touching the network.

oneM2M's Advantages for Multi-access Connectivity

Hybrid satellite-cellular systems can use existing management systems. There is no need for a full-blown IoT platform. An organization might build its IoT solution by beginning with an established device management (DM) solution and then customizing it. However, that involves carrying the full capabilities of the DM solution although that might be an overstretch for the requirements of any given case. A lightweight system with good integration capabilities could be much more fit for purpose. It can provide precisely the (potentially) small set of functionalities required by combined satellite-cellular use cases.

To avoid recreating new solutions from scratch, Deutsche Telekom decided to build off a oneM2M foundation. This means product managers and architects can call on just the right subset of connectivity, device- and data-management capabilities for each proposition. oneM2M also contains enough flexibility to represent exactly the data required to manage and configure connectivity intelligently.

Enabling Interoperability and Overcoming Proprietary Data Formats

Interoperability is another important goal. oneM2M standardizes the collection and sharing of real-time network data among different applications ranging from the business support systems of different partners to the client applications of their customers.

Satellite partners can supply real-time, connectivity performance data. oneM2M's interworking proxy entity (IPE) capability harmonizes that data for ease of sharing via oneM2M FlexContainers. These are customizable containers for data instances which are configured to record connection rate, jitter, and latency metrics. Through the oneM2M API, developers and end-users access real time data from the FlexContainer.

For Deutsche Telekom's IoT business, oneM2M's flexibility to represent different kinds of data from different sources provides not only technical advantages but also enables new business propositions. Moreover, standardization makes it easier to add other partners in the future without incurring new systems integration costs.

Andre Dutra,
Enterprise Architect, Deutsche Telekom IoT

Mastering Tech Standardization
with ETSI

The importance of tech standardization and the standardization processes is continuously growing, and both education and training are beneficial. Standardization is a profession which requires specific knowledge, skills, and insights. These include not only technical but also institutional, legal, cultural and social dimensions.

ETSI, as the ICT standards body in Europe with global outreach, is conscious that most universities and other educational organizations have yet to develop and offer relevant modules and courses in ICT standardization.

To bridge this gap, ETSI established an 'Education about Standardization' (EaS) programme. Aimed not only at lecturers and students but also administrations, NSOs and companies, our comprehensive teaching material comprises a substantial slide set and an accompanying textbook. This material is soon to be complemented with eLearning modules and specific teaching sets.

Recent activity has seen lectures being given at the University of Luxemburg in the framework of their Master MTECH course (led by ILNAS in collaboration with the University of Luxembourg and the Chamber of Employees): www.uni.lu/fstm-en/study-programs/master-in-technopreneurship

ETSI collaborated with the Utrecht University Summer School on 'Global Power and Technology' covering 'Competition, Innovation & Technological Advancement through Standardization in the EU' in mid-July in the Netherlands.

> **We had a fantastic lecture from Alex – very engaging, the students really liked it and learned a lot! Alex talked about many fascinating things, but perhaps a message that explicitly stood out is that standards should first and foremost benefit the society, and that there is no such thing as legal certainty in cybersecurity standardization. He also outlined the shortcomings of EU regulations when it comes to cybersecurity, and how the legal instruments sometimes do not interact.**
>
> – Dr. Olia Kanevskaia –

This is the feedback from the Course Director, Dr Olia Kanevskaia (pictured on the far right) on yesterday's lecture by Alex Leadbeater (pictured in the centre), ETSI's Chair of the Technical Committee on Cybersecurity.

He gave his guest lecture to an international audience (pictured) enrolled in the week-long course on 'Global Power and Technology' provided by the University Utrecht: https://lnkd.in/dnHwrtDj. This hands-on dissemination of standardization knowledge is just one aspect of our collaboration with this high-level educational institution — whilst clearly a highlight.

Other activities include being involved in the EC High-Level Forum (HLF) on European Standardization: Workstream 1 – Horizontal Workstream Education and Skills (HWES), there will be a series of workshops to progress

Master Tech Standardization with ETSI

New Collaboration with University Utrecht

the work in Delft (NL) in June. ETSI also participates in EDU4Standards: a research project funded by the European Union (ETSI is a member of the External Advisory Group).

Strongly committed to supporting young -and indeed all- professionals in mastering tech standardization, the ETSI General Assembly has created a Training in Standardization project that will run over several years and aims to extend and enhance the currently available material with the help of an external consultant.

ETSI is convinced that conveying the value of standardization in the market economy not only raises awareness and interest in the field but expands horizons and may open exciting and rewarding career avenues. Our education material has also been successfully used in company in-house trainings.

New White Papers

All-Optical Network Facilitates the Carbon Shift

The onset of the Covid-19 pandemic has led to an inevitable surge in the use of digital technologies and placed broadband networks as a key enabler for various digital applications in homes and businesses, including teleconferencing, online education, 4K / 8K ultra-high-definition video, VR / AR gaming, cloud computing, etc. Meanwhile, Industry 4.0, which focuses on digitizing manufacturing to improve operations, is generating vast amounts of data for decision-making and other operations such as predictive maintenance.

Deploying cutting-edge fibre optic technologies can help to achieve both the objectives of satisfying the changing needs of consumers and the need for telecom operators to reduce their carbon footprint by using technologies that consume less energy and last longer.

According to IDATE, by December 2023 there will be 887 million FTTH/B subscribers worldwide and 1 200 million FTTH/B homes connected. FTTH promises connection speeds of up to 1000 Mb/s, 20 to 100 times faster than a conventional cable modem or DSL connection.

The ETSI White Paper provides an overview of an all-optical network and the recent development of optical technologies. It also explains how innovations can help operators to support the sustainable development.

To know more, download the White Paper at the following link:

www.etsi.org/images/files/ETSIWhitePapers/ETSI-WP-60-All_Optical_Network_facilitates_the_Carbon_Shift.pdf

Tracking Future Technology Evolutions

In ETSI we create strong links between Researchers, Innovators & Standards Makers by examining emerging technology trends in combination with initiatives such as:

- The ETSI Technology Radar (ETR), tracking the evolving technology trends
- Building enablers to encourage Research and Innovation to engage in Standards
- Creation of new technical groups [Technical Bodies (TBs) / Industry Specification Groups (ISGs) / Software Development Groups (SDGs) / others] in ETSI
- Publication of technology White Papers
- Organizing ETSI conferences and presenting technology standards updates at relevant external Events

The ETSI Technology Radar (ETR) provides a high-level description of the main technology trends emerging in ICT and their potential relevant for ETSI's present and future work.

To know more, download the White Paper at the following link:

www.etsi.org/images/files/ETSIWhitePapers/ETSI-WP-61-ETSI-Technology-Radar.pdf

Welcome to our New Staff Members

Cécile VASSEUR
CFO

After graduating with a Master's degree from a business school in France and Australia, Cécile lived for 15 years in New Caledonia, where she worked for 8 years at the PwC audit firm, and then joined the leading press and communication group of New Caledonia as CFO for seven years. After spending several years more than 20 000 km away from her origins and family, in the middle of the Pacific, with her husband and their son, she decided to return to the region she grew up in. Cécile loves the sea, diving, and sharing moments with her friends and family.

Muhammad TAYYEB
Technical Officer

After completing his engineering studies in Pakistan, Muhammad joined Pakistan Mobile Com-munication Ltd. (Mobilink), where he led a regional QoS team, focusing on KPI monitoring, performance management, and benchmarking to improve customer experience and regulatory compliance. At Saudi Telecom Company he supported international roaming operations and pro-vided technical support to over 600 operators worldwide. At Pakistan Telecommunication Author-ity (PTA) he contributed to type approvals and the implementation of the Device Identification, Registration, and Blocking System (DIRBS), ensuring only type-approved and legal mobile devices are operational over mobile networks in the country. In his leisure time, Muhammad enjoys swimming and travelling.

Royer YANGALI CACERES
Technical Expert STS/SNS

Originally from Lima, Peru, Royer pursued his passion for technology by studying Telecommunications Engineering at the Pontificia Universidad Católica del Perú (PUCP). His journey started with a role as a teaching assistant at PUCP. He then pursued his professional career at Huawei Peru, working on the delivery of 4G RAN solutions. Royer's career took a significant turn when he joined Whitestack, a company specialized in the deployment of private clouds for telecommunication companies across various Latin American countries. At ETSI, he works in the Software and Standards division supporting Software Development Group TeraFlowSDN and Open Source Group OSM, as well as their virtual infrastructure. Royer is an avid football player and enjoys reading science fiction books.

Katerina GIANNAKARA
Microsoft 365 Developer

Originally from Thessaloniki, Greece, Katerina moved to France in 2022, just before completing her master's degree in Electrical and Computer Engineering. Her first role as a data-focused developer at Amadeus sparked her interest in the business applications of data. This experience led her to a position as a data analyst, where she developed her skills in extracting insights and visualizing data. Katerina's enthusiasm for exploring new technologies made the role of Microsoft 365 Developer at ETSI an ideal fit. At ETSI, she works extensively with Microsoft products, particularly the Power Platform. Outside of work, Katerina enjoys dancing lindy hop, learning new languages and traveling.

Petr KAYANKIN
IT Support Technician

Originally from Russia, after graduation Petr joined the multimedia department of the university. As Head of Multimedia he covered technical support for international conferences, webinars, concerts, and streaming. In other roles he worked as a multimedia engineer with LED-screen, supporting events, and creating videos. In 2023, he moved to the South of France. An interesting fact is that during his studies, Petr participated in major international hip-hop dance competitions in Europe and the USA. In his free time, he enjoys mountain skiing, swimming, video editing, and design.

Congratulations to ETSI Fellows 2024!

Established in 2015, the ETSI Fellowship Programme rewards and honours those individuals who have made an outstanding personal contribution to ETSI, helping to build ETSI's work, or raising its reputation in specific standardization sectors. Following the call for Nominations for the ETSI Fellowship Awards, we are pleased to introduce our Fellows for 2024. *More information:* **www.etsi.org/membership/fellows**

Dr. Howard Benn
Retired, former VP, Samsung Electronics, United Kingdom

Over the past 32 years, Howard Benn has been a major contributor to ETSI and 3GPP. He started in SMG2, where he worked on Phase 2 GSM radio standards, developing the RF scenario concept that reduced radio requirements while maintaining high performance levels. This work paved the way for single-chip solutions that acted as catalysts in the mobile industry.

In 1998, he helped to create the radio group in 3GPP, becoming convenor and then Chair, remaining in this position until 2007. He then moved on to the SA1, SA plenary and CT plenary groups, which he attended until 2023 as a contributor. Outside of meetings, he has supported academia with standards education. As part of his efforts to develop ETSI's strategy and support ETSI's operations, he joined the Board in 2008, a role that he continued until his retirement in 2023.

Philippe Magneron
Connected Product Standardization Manager, Hager group, France

Philippe Magneron has been a key member of the Short Range Devices standards community since 2004, when he joined ETSI ERM/TG28, where he contributed to developing standards for SRDs used by millions of citizens in their daily routines. He has spent over 30 years of his career working in Private Mobile Radio, Short Range Devices communications, and is now expanding into Cyber Security for connected devices. He has been a passionate promoter of the SRD industry in both his direct contributions to ETSI's work and in his championing of ETSI on a broader level: particularly in CEPT ECC, CENELEC, and CEN in Europe; and in IEC on the international scene.

As rapporteur of the EN 300 220 standard series, Philippe has made an ETSI leading global standard for SRD / licence-exempt technologies, being cited across five continents.

Dr. Matthias Schneider
HF Standardization Expert, IP and Licensing Schneider, Germany

Matthias Schneider has been an active figure in R&D for human factors, accessibility, usability, and user interface design since his graduation from the University of Stuttgart in 1986. He joined ETSI's Human Factors Committee in 1995. Since 2010, he has been the Chair of TC HF and from 2011 to 2022 he was also the Chair of the ETSI/CEN-CENELEC Joint Working Group on eAccessibility. During his tenure as TC HF Chair, the committee was responsible for developing the most important European Norm and standards supporting European Accessibility legislation. He has been the initiator of the development of the ETSI Accessibility Policy and has been instrumental in overseeing its adoption by ETSI. His current roles focus on the implementation of ETSI's accessibility strategy to ensure that ETSI will become a fully inclusive and accessible standardization organization.

Isabelle Valet-Harper
Retired, former Standards Expert, CommLedge, France

Isabelle Valet-Harper, was a senior Standards Adviser at Microsoft, then a Standards Expert at CommLedge. She has more than 30 years of experience in Standardization in a number of French, European and International organizations including AFNOR, ETSI, ISO/IEC JTC1, IETF, W3C, 3GPP, Ecma International, OMA, the Multi Stakeholders Platform, etc. Within these organizations, Isabelle had various roles and responsibilities by occupying a number of positions, including Delegate, Editor, Chair, President, Board Member, and Liaison Officer. She has been a regular participant at ETSI GAs (and/or TAs), attending all of them since 1989, and has also been a member of the ETSI Board since 2011.

During this time, she has been a member of several Review Groups and has taken on the roles of Board Champion or Ad-hoc Group Chair on multiple occasions, and she also chaired the Board Process Group. Isabelle has been especially involved in matters of governance, making sure that ETSI Directives, including the Technical Working Procedures, are fit for the rapidly evolving purpose of serving a highly dynamic standard-setting organization, and for its liaisons with the standards sector.

Dirk Weiler
Retired, former Head of Standards Policy, Nokia, Germany

Dirk Weiler is a firm believer in the power of standardization. He has been involved in standardization throughout his successful career in Siemens and Nokia. This spanned from contributing to technical work for GSM in ETSI in 1988 and leading Siemens Communication Standardization activities during the 1990s and up to 2006, including the creation of 3GPP, to guiding and leading standardization organizations and related industry bodies, enabling mobile communications and supporting the world's most successful standardized eco-system. Within ETSI, Dirk has chaired the IPR Special Committee (2008–2018), the General Assembly (2010–2014), and the Board (2014–2023).

He was also a member of the CEN-CENELEC-ETSI Joint Presidents' Group and the 3GPP PCG/OP delegation, and representative for the European Commission ICT Standardization MSP. Dirk is a renowned advocate for global, open, and consensus-based standardization with FRAND IPR policies, allowing for the incorporation of the most appropriate technologies.

Join us at Upcoming ETSI Events

ETSI Events (September to December 2024)

ETSI WEBINAR: ETSI STF 642 - ACEMCOM Project - Accessibility and Interoperability of Emergency Communications and for Answering of Emergency Communications

◉ Online

🗓 5 September 2024

The ETSI STF 642 (ACEMCOM Project, co-funded by the EC and the EFTA) expert team will present and speak about the EC-requested standards TS 103 919 and EN/HS 303 919, titled Accessibility and interoperability of emergency communications and for answering emergency communications by the PSAPs (including to the single European Emergency number 112).

ETSI / CEN Workshop on EU Digital Identity Framework Standards

◉ ETSI, Sophia Antipolis, France, & Online (Hybrid)

🗓 10-12 September 2024

The Workshop is conducted by ETSI ESI Technical Committee and CEN/TC 224. ETSI and CEN are working together to develop several standards to support the new European Digital Identity regulatory framework, building on the latest globally recognized standards for website authentication, open identities and mobile based wallets. The workshop will present the latest status of these standards and aims to include demonstrations from large scale pilots applying the EU Digital Identity Wallet.

4th C-V2X Plugtests

◉ Malaga, Spain

🗓 10-13 September 2024

Organized by ETSI in partnership with the 5G Automotive Association (5GAA) and co-funded by the European Commission (EC) and the European Free Trade Association (EFTA), this 4th edition of the ETSI C-V2X Plugtests event will be hosted by DEKRA. This event will focus on testing direct communication between devices using ETSI TC ITS Release 2 standards, including Collective Perception Services (CPS) and Vulnerable Road Users (VRU).

6th NG112 Emergency Communications with NG eCall Plugtests

◉ Malaga, Spain and remote

🗓 30 September - 4 October 2024

Organized by ETSI in cooperation with the European Emergency Number Association (EENA), this 6th edition of the ETSI NG112 Emergency Communications Plugtests event will be hosted by the University of Malaga. Remote participation is possible. The tests will be based on the Next Generation 112 Long Term Definition document (NG112 LTD), 3GPP, ETSI and IETF standards. During the event, the interoperability between NG112 and NG eCall solutions will be tested, based on ETSI TS 103 683 and ETSI TS 103 795-2. NG112 interoperability of end-to-end emergency services communications will be tested based on the draft of ETSI TS 103 480 to verify the requirements defined in ETSI TS 103 479.

ETSI Security Conference

◉ ETSI, Sophia Antipolis, France

🗓 14-18 October 2024

This exclusive annual face-to-face event offers a unique opportunity for the security community to convene, exchange insights with experts, network with peers, and discuss the most pressing topics in cybersecurity standardization. This year's event will address AI, Impacts of Regulation on Zero Trust and Consumer devices, Societal Impact of Technology-Fraud, Security and Standards Convergence, 5G to 6G, Privacy and Considerations of Employing Encryption Technologies, Transport, Public safety and Critical Communications, and Consumer verticals.

Software & Standards for Smart Networks & Services Conference and Hackfests

◉ ETSI, Sophia Antipolis, France

🗓 12-14 November 2024

The ETSI SNS4SNS event will bring together experts from the fields of software, standards, and smart networks. It will feature engaging talks, panel discussions and hackfests focused on the integration of open source and standardized solutions in modern communication technologies. This event serves as a platform for industry leaders, decision makers, technologists, researchers, and developers to collaborate and innovate for building sustainable, resilient, and interoperable communication networks and services.

SAVE THE DATE

ITU-T - ETSI
Sustainability Symposium

⊙ **Geneva, Switzerland**
▥ **11-12 December 2024**

Events endorsed by ETSI

ETSI is pleased to endorse the following events, featuring ETSI speakers:

IET India Future Tech Congress 2024

⊙ Bengaluru, India
▥ 2 September 2024

Open Telco Cloud Summit 2024

⊙ Mexico, Hybrid
▥ 3 September 2024

FutureNet Asia

⊙ Singapore
▥ 17-18 September 2024

TelecomTV Cloud Native Telco Summit

⊙ Online
▥ 17-19 September 2024

TelecomTV AI Native Telco Summit

⊙ Online
▥ 15-16 October 2024

Network X Event

⊙ Paris, France
▥ 8-10 October 2024

The Great Telco Debate

⊙ London, UK
▥ 5 December 2024

For more details, please visit etsi.org/events

ETSI Snapshot

ETSI Member Stats:
946 member organizations from
64 countries, including
23% SME/micro-enterprises and
15% universities / researchers

Standards published to date:
58 550

Standards downloads in 2023:
19 975 000

Plugtests interoperability events:
8

Technical groups:
100+

Publications issued in 2023:
1 812

Partnerships:
108

ETSI Secretariat:
127 people
25 nationalities

About ETSI

ETSI provides members with an open and inclusive environment to support the development, ratification and testing of globally applicable standards for ICT systems and services across all sectors of industry and society. We are a not-for-profit body with about 900 member organizations worldwide, drawn from over 60 countries and five continents. Members comprise a diversified pool of large and small private companies, research entities, academia, government and public organizations. ETSI is officially recognized by the EU as a European Standards Organization (ESO).

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