ETSI Mag

THE ETSI MAG

A.nticipating I.nnovation

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THE INTERVIEW with François Cuny, Deputy CEO for Innovation of Inria ■ **NEW MEMBER INTERVIEW** with Marc Manzano, General Manager of the Quantum Security Group, SandboxAQ ■ **TECH HIGHLIGHTS**, Large Language Models in AI ■ **ZOOM ON EUROPE**, ETSI Working for Europe, Inclusive and Open ■ **IN THE SPOTLIGHT**, ETSI Technology Radar **TECH HIGHLIGHTS**, Testing AI-based systems for the European Single Market

JANUARY 2024

ETSI
The Standards People

In ETSI, AI is an enabler for our technical work.

As we enter 2024, let me wish you all the very best for this new Year!

Generative AI technology, based on Large Language Models (LLM), has become a tool used around the world, our cover page image being an example of it.

In ETSI, AI is considered an integral enabler for our technical work, with many of our technical bodies integrating AI as a component of the specifications they develop.

In this edition, *our interviews feature François Cuny, Deputy CEO for Innovation at Inria,* who provides insights into the major AI activities at the Institute. *Marc Manzano, General Manager of the Quantum Security Group at the new ETSI member organization SandboxAQ,* explains the close link between AI and quantum.

Our spotlight introduces the ETSI Technology Radar, the ETSI foresight tool that helps us identify and analyse emerging technology trends. It is rewarding to see how ETSI is already active in many of the identified technology trends.

In our Tech Highlights articles, *the ETSI Experiential Networked Intelligence group describes their study of LLM* and other data transformations designed to optimize LLM model using deep learning.

The newly created *Technical Committee on Securing AI* investigates the challenges this technology poses. Meanwhile, our Methods for *Testing committee is testing AI-based systems* for the European Single Market to ensure the quality, reliability, and compliance of artificial intelligence systems. *In our Zoom on Europe,* we take the opportunity to emphasize ETSI's commitment to continued collaboration with the European Commission and EC Policy and Legal Officer Antoine-Alexandre André elaborates on the need for greater stakeholder involvement in the AI Act.

AI is everywhere now; find out how ETSI is involved.

Enjoy reading!

Luis Jorge Romero,
Director-General ETSI

Enjoy! THE ETSI MAG

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New group on sensing, a candidate technology for 6G

ETSI is thrilled to announce its new Industry Specification Group for Integrated Sensing and Communications (ISG ISAC).

This group will establish the technical foundations for ISAC technology development and standardization in 6G. 87 participants from both the industrial sphere and the academic sphere took an active part in the kick-off meeting at ETSI premises on 17 November 2023. Members of the group elected Dr. Alain Mourad from Interdigital as Chair of the group, and Dr. Ayman Naguib from Apple, Dr. Richard Stirling-Gallacher from Huawei, and Prof. Henk Wymeersch from Chalmers University as the Vice Chairs. Sensing refers to the use of radio signals to detect and estimate characteristics of target objects in the environment.

By integrating sensing into the communications network, the network acts as a "radar" sensor, using its own radio signals to sense and comprehend the physical world in which it operates. This allows the network to collect data on the range, velocity, position, orientation, size, shape, image, materials of objects and devices. The sensing data collected and processed by the network can then be leveraged to enhance the network's own operations, augment existing services such as XR and digital twinning, and enable new services, such as gesture and activity recognition, object detection and tracking, along with imaging and environment reconstruction.

Join us for this exciting new initiative!

ETSI Securing AI now a Technical Committee

The ETSI ISG SAI has been transferred to a new ETSI Technical Committee, TC SAI, in order to be able to directly contribute to standardization requests, including the future AI Act, Cybersecurity Resilience Act and NIS2. The primary goal of the group is to develop technical specifications that mitigate threats arising from the deployment of AI whether they originate from other AI systems or conventional sources. In the short term, the Committee will focus on the application of Machine Learning (ML). A fundamental element of the Committee is achieving a common understanding of the duality of attack and defense. The committee's members will create ETSI standards that will serve as a baseline to ensure that AI is secure, safe, societally relevant, and suitable. To address these concerns, they will take into account the perspectives of each stakeholder group, including end users, manufacturers, operators, and governments. In its work on societal aspects, the group will focus on protecting at-risk populations, such as those who may be targeted by AI-generated content

Join us at the ETSI AI conference

Join us at the ***ETSI Artificial Intelligence (AI) Conference - Status, Implementation and Way Forward of AI Standardization*** on 5-7 February 2024 in ETSI, Sophia Antipolis, France. Come to this face-to-face event to exchange with experts, network with peers, visit the demos and posters around the subject of Machine Learning with a specific focus on ICT. More information and registration on our website.

AI is a big topic in Inria's research, but also in our **innovation** and **transfer activities**

François Cuny

Deputy CEO for Innovation, Inria, National Institute for Research in Digital Science and Technology.

François Cuny founded his technology transfer start-up during his PhD studies. With a doctorate in Computer Science and working in the role of Scientific Director, he maintained close links with the Inria and Fraunhofer-Gesellschaft project teams. In 2005, his dual expertise as an entrepreneur and researcher led him to take part to the creation of Systemic, a competitive hub for the Paris region, within which he has worked to accelerate and develop innovative SMEs. In June 2018, he became Manager of Competition and Knowledge in the Grand Est region of France. In October 2018, François become the Deputy CEO for Innovation at Inria. In this role, he works to bolster support for technological development and steer the institute's actions to increase its economic impact, through partnerships with major European industrial groups and the creation of technological start-ups.

How is AI involved in Inria's research and innovation activities?

Artificial intelligence (AI) has a special place here at Inria: Many of our teams are working on the theoretical and algorithmic foundations of AI, with machine learning, semantics, optimization, and advanced signal processing. Others are using AI in their fields of application (medicine and healthcare, climate, sustainable development, cyber security, autonomous vehicles, energy and the environment, education, etc.), or they're interested in the societal issues surrounding AI (frugality, privacy protection, human computer interaction, collaborative robotics, etc.).

AI is a big topic in our research, but also in our innovation and transfer activities: Most of Inria's strategic industrial partnerships are associated with AI challenges.

> **"Most of Inria's strategic industrial partnerships are associated with AI challenges.**

More than a third of the start-ups supported by Inria StartUp Studio are "pure AI", and the training provided by Inria Academy, our continuous education scheme, really highlights AI.

Lastly, in terms of software infrastructure, Inria has led the development of the scikit-learn library, which is known and used worldwide (over 30M downloads/month), and it's the first AI library, other than those specialized in deep neural networks.

What are Inria's AI-related activities within the FRANCE 2030 investment programme?

Since its launch in 2018, Inria has been coordinating the research aspect of the National AI Strategy. Inria communicates with public authorities on behalf of a large number of research institutes and universities, like a spokesperson. Its role involves advising the national coordinator on the scientific pathways to invest in, to create collaborative research programmes with fellow research institutes and universities, and to lead and highlight AI research at national level. Inria is also involved in collective reflection on the optimization of computing capacities to facilitate start-ups and research projects focused on generative AI.

Inria is one of three French institutes managing the PEPR IA (Prior Research Programme) with CEA and CNRS. This programme, with the significant participation of many French research teams from various universities and research institutes, has been granted funding by France 2030 for 5 years. The scientific goals of this PEPR focus on the future of AI, particularly trustworthy AI, frugal AI, embedded AI, and AI's mathematical foundations.

Finally, Inria is managing a major project, largely funded by France 2030, on scikit-learn, aiming to develop, industrialize, maintain, and distribute a comprehensive set of sovereign tools for AI.

eHealth is central to EU citizen well-being: Do you think that AI can play a major role in this?

Yes, definitely. Not only is AI already a major aspect that healthcare players are heavily investing in — here at Inria, over 1/3 of our teams are working in this field — but it will also undoubtedly and radically transform most medical sectors. Whether it's in drug discovery, medical imaging analysis, diagnostic support, pandemic management, or individualized treatment (personalized medicine), AI is playing a role that will only expand in the future.

> **"At Inria, over 1/3 of our teams are working in eHealth.**

This is not without risks and issues surrounding privacy, ethics and fairness in medicine. These are all issues that researchers are tackling within ever larger, multi-disciplinary communities, where social sciences and humanities are playing an increasingly important role. Here, the healthcare sector is also a sort of example for promoting responsible and ethical AI in other areas of human activity.

What impact could research and innovation have on AI standardization activities?

Europe's approach to AI is focusing on creating a reliable framework that guarantees both innovation and the protection of citizens. With the AI Act, the legislator has chosen to only regulate "high-risk" AI systems, despite the risk of the release to market or deployment of these systems potentially jeopardizing not only the security of citizens, but also their fundamental rights, health, and critical infrastructures. Harmonized standards are currently being defined by the relevant standardization bodies. For example, ETSI is organizing work on securing AI and AI testing.

Standardization and regulation in the field of AI require the development of scientifically advanced tools to grant us a better understanding of the possibilities and requirements of this field. For example, Inria's Regalia team implements advanced bias and non-compliance detection tools for AI systems for regulatory authorities.

In the same regard, I believe that we need a wide range of European research partners to join forces, which is something that we are currently working on in Adra-e, (Inria's objective is to steer and lead this support for the European public-private partnership on Data, AI and Robotics), to set up initiatives for testing AI algorithms and assessing auditability and explicability, particularly for those covered by the AI Act regulations.

Welcome to our New Members

AFUSOFT

Germany

Founded in 2002, AFUSOFT Kommunikationtechnik GmbH is a family-owned business based near Karlsruhe, Baden-Württemberg. AFUSOFT is specialized in mobile security/communications, navigation, and data acquisition systems, all developed and manufactured in Germany. The company provides data collection systems that are compatible with devices from any manufacturer systems in the world and that ensure legally binding data transfer. Their customers include international freight companies, highway maintenance departments, security services, fire departments, emergency services, and public transport companies.

CHALMERS

Sweden

Chalmers is a private research and technical university located in Gothenburg, Sweden. Chalmers focuses on engineering and science, but more broadly it also conducts research and offers education in shipping, architecture and management. The institution puts a strong emphasis on competence, knowledge, and collaboration. With a multifaceted approach, Chalmers embraces its roles at the local, national, and global levels, driven by a mission to foster a genuine transformation of society in alignment with its vision; "Chalmers – for a sustainable future". With 2 campuses, 17 departments, 200 research groups and around 11,000 students, Chalmers is a dynamic hub for academic and research pursuits.

CyberSecurity and Technology Consultancy (CSTC)

United Kingdom

CSTC is specialized in advisory services for Board members and executives, offering workshops and training to enhance team knowledge and skills. They conduct assessments and audits to monitor organizational status and team progress, focusing on expertise in CyberSecurity, Information Security Management, Risk Management, Compliance, and emerging technologies like IoT and Digital Twins. Committed to industry collaboration, CSTC actively contributes to ISO and IEC standards development. The company emphasizes confidentiality, integrity, and ethics, prioritizing customer interests and data privacy.

CubeTV

Germany

CubeTV is a leading independent provider offering expert consultancy for optimal business performance, hardware and software development, IT and Hosting Services, and IMAC (Install, Move, Add, and Change) Operations, with Agile services ensuring seamless adaptation to evolving technology needs. Specializing in Aviation, Rail, Transports, Broadcast, Video, and Audio sectors, CubeTV delivers tailored cutting-edge technology solutions for critical industries.

DNS Research Foundation

United Kingdom

DNS Research Foundation is a nonprofit organization, founded in 2021 by Oxford Information Labs. Addressing the lack of comprehensive DNS research, the foundation aims to bridge the gap between technical intricacies and broader understanding. Leveraging Oxford Information Labs' 20 years of experience, the foundation pioneers open-source tools and a DNS Analytics gateway, fostering free and transparent data sharing. The foundation invites DNS key stakeholders from big brands, technology, public safety, and academia to participate as partners and supporters.

ISSDU

Taiwan

Since 2004, ISSDU (Information Security Service Digital United Inc.) has been a pioneer in top-tier professional information security services in Taiwan and owns the first enterprise-level information security monitoring centre (SOC, Security Operation Centre) in the country. After becoming a 100% subsidiary of the FarEasTone Telecommunications group in 2009, ISSDU integrated the information and communication network resources of the entire group. ISSDU has emerged as a leading information security professional and provides customers with a range of IT

security services, including professional IT security monitoring and control services, IT security testing services, IT security management services, and various IT security solutions.

Kyoto University

Japan

Kyoto University (KyotoU) is a national research university. Founded in 1897, it is one of the former Imperial Universities and the second oldest university in Japan. KyotoU is composed of 3 campuses with 10 Faculties, 18 Graduate Schools, 13 Research Institutes, and 22 Research and Educational Centres. The university has about 22,000 students enrolled in its undergraduate and graduate programs. It is considered as one of the most prestigious universities in Japan and is consistently ranked second in the country and in the top ten in Asia. Advocating for international collaboration in education and research, KyotoU has partnerships with various academic institutions outside Japan.

MediaTek UK

United Kingdom

MediaTek Inc. is the world's 5th largest global fabless semiconductor company. MediaTek is the market leader in several key technology areas, including highly power-efficient mobile technologies, with the development of innovative systems-on-chip (SoC) for mobile device, automotive solutions and a broad range of advanced multimedia products such as smartphones, Chromebooks, smart TVs, smart home connectivity, IoT and Voice Assistant Devices (VAD). Mediatek powers more than 2 billion devices a year, that is 20 percent of homes and nearly 1 of every 3 mobile phones globally.

NASK

Poland

NASK is a National Research Institute under the supervision of the Chancellery of the Prime Minister of Poland. Specializing in cybersecurity and user protection, its primary mission is to ensure online security. The Centre for Cybersecurity, a vital component of NASK, oversees responses to network security breaches within Poland. NASK undertakes projects aimed at enhancing the efficiency, reliability, and security of information and telecommunication networks, as well as other intricate network systems. As a telecommunication service provider, NASK offers cutting-edge ICT solutions tailored for the financial, business, administration, and research sectors.

National Taiwan University

Taiwan

National Taiwan University (NTU) is a national comprehensive public research university located in Taipei. Founded in 1928 under the Japanese colonization, it is now considered as the most prestigious university in Taiwan. The university consists of 11 colleges, 56 departments, 133 graduate institutes, about 60 research centres, and a school of professional education.

NTU offers bachelor's degrees, master's degrees, and doctorate degrees in many disciplines.

NTU is affiliated with National Taiwan Normal University and National Taiwan University of Science and Technology as part of the overall NTU System.

Sandbox AQ

United States of America

Sandbox AQ is a SaaS company providing solutions at the intersection of AI and Quantum technology (AQ) to address some of the most challenging issues in the world. Sandbox AQ develops commercial products for financial services, healthcare, telecommunications, public sector, and other compute intensive industries, but also invests in education to advance quantum solutions and computing initiatives. Their approach enables cross-pollination across a diverse range of fields, from physics, computer science, neuroscience, mathematics, cryptography, natural sciences, and more. ***Read the interview of the General Manager of the Quantum Security Group on page 8.***

Sectigo

United States of America

Sectigo is a leading provider of automated Certificate Lifecycle Management (CLM) solutions and digital certificates. It is a global company with offices located in North America, Europe and Asia and supporting customers in over 15 languages across nearly 200 countries. Their cloud based universal CLM platform issues and manages the lifecycles of digital certificates issued by Sectigo and other Certificate Authorities (CAs) to authenticate every user and device identity across the IT ecosystem. With over 20 years of establishing digital trust, Sectigo is one of the longest-serving and largest Certificate Authorities.

Sunet

Sweden

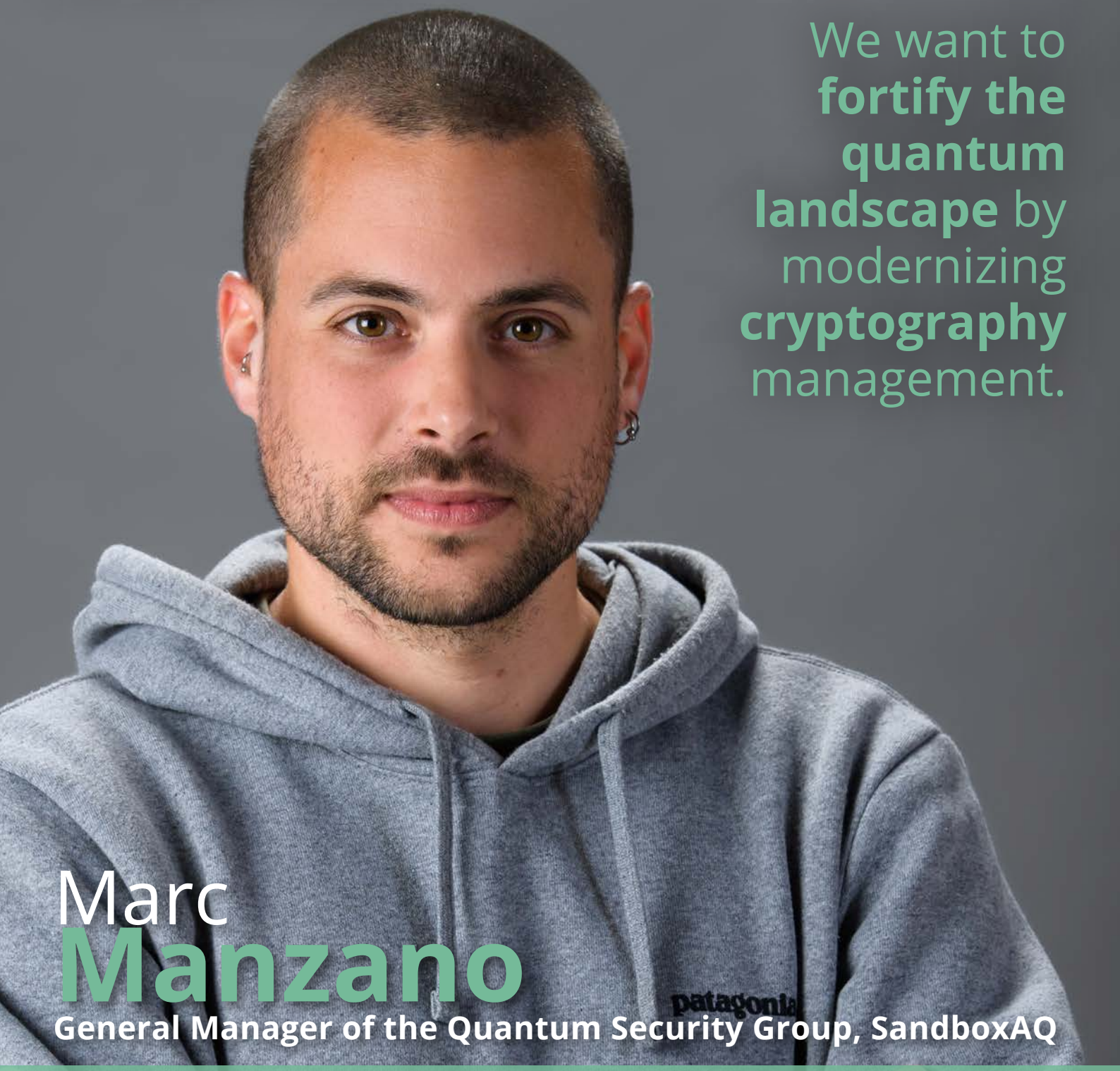
Sunet (Swedish University Computer Network) is the provider of data communication solutions for Swedish universities and affiliated public organizations engaged in research and higher education. Sunet was established in the early 1980s as a pioneering research and development initiative and was a key component of the Internet development in Sweden a decade later. Today, as an integral part of the Swedish Research Council, Sunet ensures seamless connectivity for all universities and colleges. While primarily funded by affiliated organizations, Sunet also receives grants from the Ministry of Education via the Swedish Research Council.

University of Patras

Greece

Established in 1964, the University of Patras (UPATRAS) has played an important role in decentralizing academic education in the country. It expanded further by incorporating the University of West Greece in 2013 and the Technological Educational Institute of Western Greece in 2019. UPATRAS comprises 35 departments but also operates 161 laboratories and 17 clinics.

It is renowned internationally for its pioneering research in areas such as environment, health, biotechnology, mechanics, electronics, informatics, and basic sciences. Several UPATRAS departments and labs have earned the designation of Centres of Excellence through international assessments.



We want to **fortify the quantum landscape** by modernizing **cryptography** management.

Marc Manzano

General Manager of the Quantum Security Group, SandboxAQ

Marc Manzano leads the quantum security group at SandboxAQ, focusing on creating technology for modern cryptography management. His current research interests include post-quantum cryptography and fully-homomorphic encryption. With over 25 articles at international conferences, he has published more than ten journal papers, and collaborated on scientific books on cryptography and computer networks security. In the past decade, Dr. Manzano pioneered the development of secure cryptographic libraries and protocols. Formerly a Senior Staff Software Engineer at Google, he was also the Vice President of the Cryptography Research Centre at the Technology Innovation Institute in the UAE. He also played key roles in implementing cryptographic components for secure communication products, including an electronic voting platform. Dr. Manzano holds a PhD in Computers Network Security, from the University of Girona (Spain) and Kansas State University (United States), an MSc in Computer Science from the University of Girona, and initiated his research career during his BSc in Computer Engineering at Strathclyde University (UK).

In a nutshell, what's the story behind the Quantum Security Group at SandboxAQ?

SandboxAQ has focused on building the software layer of the emerging quantum ecosystem, exploring potential use-cases of AI and quantum technologies (AQ) across industries and the public sector. SandboxAQ emerged as an independent entity in March 2022, raised $500 million, and began executing on our vision. In this context, the Quantum Security Group emerged from the necessity of creating a global leader to enable a quantum-safe communications future.

Over the years, we've built a robust cybersecurity practice that includes some of the world's largest banks, telcos, healthcare organizations, tech companies and U.S. government agencies as customers. Our mission is to lead the charge in fortifying the digital and quantum landscapes by modernizing cryptography management, making it observable, agile, secure, controllable, compliant and quantum-ready.

AI and quantum, threats or opportunities?

The threat of quantum computers breaking today's public key cryptography in the future is very real and should be top of mind for the C-Suite today. However, the information security community believes that the quantum threat has created a unique opportunity to modernize the way that cryptography has been operated in the past decades. That is, it has triggered multiple parallel work streams targeting, for instance, what algorithms are more suitable for a given use case, cryptographic assets management via cryptographic inventories, or agile key management policies. We are confident that the result of this work will definitely improve the cybersecurity posture of organizations at large.

Furthermore, the ability for AQ to transform industries is incredibly profound. AQ is already accelerating breakthroughs in drug discovery and materials science, with the potential to create new chemicals, materials and metals that are stronger, lighter, more durable, sustainable and better for the environment. We believe that simulation – SimAI – will be the next major breakthrough in AI technology.

> **"We believe that simulation – SimAI – will be the next major breakthrough in AI technology.**

In parallel, AQ technology is also driving new applications for advanced medical imaging and geo-magnetic navigation, improved financial modeling and logistics optimization, enhanced machine learning and much more. And we're seeing an incredible uptick in demand from governments and enterprises around the world.

Where do you see the role of standards in your portfolio?

We believe standards are essential for guiding the development of new technologies and aligning technology roadmaps – especially for something as critical as cybersecurity and protecting against quantum threats. At the Quantum Security Group, we've been actively contributing to the NIST Post-Quantum Cryptography standardization efforts. Moreover, we are members at ISO's cybersecurity commission and at ETSI and involved with different groups at the IETF. We believe that a strong collaboration between standardization bodies, academia and industry will definitely accelerate the adoption of PQC.

Education seems to be a high priority for you, as it is for ETSI...

Absolutely. Several years ago, we realized the global demand for skilled professionals in AI and quantum information science would quickly out-pace the ability of academia and the industry to train them. AQ demands a large variety of skilled professionals coming from different backgrounds and fields of expertise. We took matters into our own hands, creating a PhD residency program and partnering with dozens of universities around the world to co-develop AQ curricula; fund new quantum programs, equipment and student and faculty research; sponsor PhD candidates; and host seminars, hackathons and more to increase interest in AQ careers and create a more diverse quantum ecosystem. We also partner with corporations and other organizations to help upskill their existing workforces on AQ, which gives them a competitive advantage.

So what is the next step for SandboxAQ, where do you see the challenges ahead?

In 2024, the Quantum Security Group is going to continue driving awareness and adoption of the Security Suite, our modern cryptography management platform, and the need for organizations and governments to begin the process of building inventories of cryptographic assets present across their IT infrastructure.

In addition, the rest of the SandboxAQ divisions will also continue promoting our molecular simulation technologies, which are being used successfully by biopharma companies to accelerate drug discovery, and by other companies to develop advanced new materials, such as better batteries for EVs and energy storage. Another area we're prioritizing is quantum sensing, which we're currently using to develop advanced medical imaging devices for improved cardiac diagnosis and treatment, and new geomagnetic navigation systems for the aerospace, transportation, and defense industries to supplement GPS, which can be blocked, denied or spoofed. So we have new exciting capabilities coming up in our product roadmap .

Large Language Models in AI

A large language model (LLM) is a statistical model that predicts the next word in a sequence. It is trained on a massive dataset of text, and can be used to generate text, translate languages, write different kinds of creative content, and answer your questions in an informative way. The majority of LLMs are architected as variants of the Transformer architecture. The present article will only consider these types of LLMs.

Large Language Models

LLMs are trained on massive datasets of text, typically in the order of billions of words. This allows them to learn the statistical relationships between words and phrases, and to generate text that is both grammatically correct and semantically meaningful.

All LLMs are generative: they can create new content, such as text, images, or music, by learning the patterns and structures of existing data and then using those patterns to generate new data that is similar to the original data. A language model is "a probability distribution over words or word sequences". This does not refer to grammatical validity.

Case Study: GPT

GPT, or Generative Pre-trained Transformer, is a type of transformer-based neural network that is used for generating human-like text from given inputs. It uses a language model that is pre-trained on large datasets of text to generate realistic outputs based on user prompts. GPT is built using only transformer decoder blocks (no encoder blocks). GPT models use a masked self-attention mechanism that looks at prior tokens. GPT-4 (used today in Google Chrome) has undergone significant improvements, allowing it to perform a wide range of tasks without the need for additional training. However, it is apparent that GPT-4 is a multimodal model, meaning that it can process both images and text. This allows it to describe humour in unusual images, summarise text from screenshots, and even answer exam questions that contain diagrams.

A chatbot is a computer program that simulates human conversation through text or voice interactions. There are two main types of chatbots: rule-based and AI-powered. Rule-based chatbots are programmed with a set of rules that define how they should respond to certain prompts or questions. In contrast, AI-powered chatbots use machine learning to learn from and adapt to their users. This means that they can become more accurate and helpful over time.

What about chatbots?

Chatbots typically use LLMs to generate human-like responses to prompts that is both grammatically correct and semantically meaningful. When a user types in a question or statement, the chatbot shall use the LLM to generate a response that is relevant to the user's input. The chatbot may also use the LLM to translate text from one language to another, or to write different kinds of creative content.

This process repeats with each new user input, allowing for dynamic and interactive conversations. It's important to note that while this process is linear in description, in practice it can be quite complex with multiple factors influencing each step.

Retrieval-Augmented Generation

In-context learning is the ability of an LLM to learn information not through training, but by receiving new information in a carefully formatted prompt. Retrieval Augmented Generation (RAG) is an architecture used to augment the functionality of an LLM by adding an information retrieval system that provides data for the LLM to use. This enables the developer to control the data used by an LLM when it formulates a response. RAG can be fine-tuned and its internal knowledge can be modified in an efficient manner and without needing the entire model to be retrained.

RAG models are typically trained in two stages. First, the LLM is trained on a large corpus (the body) of text and code. Then, the RAG model is trained to retrieve relevant documents from an external knowledge source and to incorporate the information from those documents into the LLM's outputs.

The query vector is then used to search for relevant documents in a pre-computed database of document vectors. As an example, you could embed the word "king", subtract the embedding for "man", add the embedding for "woman", and you would get a vector who's nearest neighbour was the embedding for "queen". This makes RAG adaptive for situations where facts could evolve over time. RAG is very sensitive to semantic nuances.

ETSI ISG ENI is studying the use of these data transformations in an Architecture and the use of LLMs coupled with the combination of learning techniques into a vector comprising Deep Learning. The aim is to develop voluntary specifications on the best use of Data Transformations as part of a AI architecture applied to ICT.

Learn more on the ISG work:
https://www.etsi.org/committee/1423-eni

■ Ray Forbes, ***Chair, ETSI Experiential Networked Intelligence ISG.***

ETSI Working for Europe, Inclusive and Open

In February 2022, the European Commission (EC) published their European Standardization Strategy that led to several high-priority activities in ETSI.

European Standardization Strategy

ETSI decided to prioritise two of the strategy's key elements: To remain legally compliant with the revisions to Regulation (EU) 1025/2012, allowing the national standardization bodies from the European Economic Area (EEA) to decide on the standards and standardization deliverables related to standardization requests based on an EU mandate (the extent of which was later detailed in the amendment of Regulation (EU) No. 1025/2012), and increasing inclusiveness.

Privately and member-driven

Thorough analysis of the European Standardization Strategy requirements revealed the need for changes to ETSI's governance. Being a private, non-profit and member-driven organization, discussions on such changes had to include every ETSI member, and the decisions had to be made unanimously. The members thus met, discussed different proposals, and agreed upon the appropriate changes, taking into account the high value of ETSI's status as a European Standardization Organization.

ETSI's governance in-time amendments

ETSI delved deep into its standards development processes and, based on an existing process for European Standards, made the necessary improvements to accommodate all of the requirements set out in the amendment of the Regulation. With collective contributions from all involved, and through on-going and constructive exchanges with the European Commission, ETSI managed to establish the necessary changes to its Directives in time to comply with Regulation (EU) 2022/2480 when it became effective on 9 July 2023. Since then, we have also incorporated the possibility to provide the opinion of the CEPT-based national standards organizations outside of the EEA into the processes for the development of the deliverables related to Standardization Requests by the EC, in consultation with the European Commission Of course, work on the ETSI Directives is ongoing as we need to continuously adapt and improve. We are maintaining and further enhance our strong cooperation and working relationship with the EC, in our joint aim to make ETSI even better.

Inclusive at heart

The second important element which ETSI has addressed is inclusiveness. ETSI has always been regarded as a model for inclusiveness, as all our standards and deliverables are offered to the whole world free of charge. ETSI offers attractive, lower membership fees to small organizations and is allowing direct contributions — with no middlemen — in peer conditions to all ETSI members across all Technical Groups. However, the ETSI membership took a very important decision with the aim to raise the status of small organizations and to thereby attract even more diverse members, and changed the funding and voting scheme implemented within ETSI. We continue our efforts in addressing inclusiveness matters within the ETSI membership.

Still evolving with the European Standardization Strategy

Although voting is seldom used in ETSI at the technical level, as decision-making is primarily driven by consensus, members have understood the need to change ETSI's model. The change undertaken rebalanced the different voting weights for small and large organizations, and also rebalances the funding contributions from all members to avoid excessive impacts, especially for small organizations. Another point to be highlighted is the creation of corporate and public groups to avoid the accumulation of voting rights.

Corporate groups cover all ETSI member organizations belonging to the same economic entity, which itself is composed of distinct legal entities that are consolidated in the economic entity's financial statements. Public groups bring together ETSI Full and Associate member organizations, in the Administrations and Other Governmental Bodies (OGB) membership categories, from the same country. By creating these entities within ETSI, matters regarding contributions and voting are also handled for the larger organizations, building into the idea of bridging the gaps between smaller and larger organizations.

Today, we are proud to say that we have significantly improved ETSI in terms of its governance, having implemented the changes to answer to Regulation (EU) No. 2022/2480. ETSI is now even more inclusive than pre-February 2022.

We believe that those actions strengthen ETSI in its mission to support the European Commission as a strong and relevant European Standardization Organization. The path to improving ETSI was not always smooth but the way in which ETSI has developed into this new model demonstrates the healthy partnership that it has created with its Counsellors in the EC, by listening, discussing, and working to implement the EC's recommendations whilst also preserving ETSI members' rights to decide on what they consider best for their association.

We look forward to the continuation of the partnership with our Counsellors, the EC, and EFTA for the benefit of all in the years to come.

ETSI Technology Radar:
The ETSI Foresight approach to anticipating Technology evolutions

In this article, David Boswarthick, ETSI's Director of New Technology provides an overview of our latest Technology Radar, the ETSI foresight tool for identifying and analysing emerging technology trends.

Plan for the unexpected

Over recent years, business and society have become increasingly digital, enabled by an ever-increasing number of applications on computers, smartphones, drones, vehicles and other connected devices. The arrival of 5G communications including innovative technologies such as software defined networking and the virtualization of network functions, as well as the increasing demands for decoupled capabilities, such as edge-cloud computing, enable the users of ICT to not only evolve their business areas but also to develop new ones.

Who could have predicted that a global pandemic would bring a massive increase in the demand for communication technologies?

Information and Communications Technology (ICT) is an exciting and dynamic area, that is in a state of constant innovation, through the evolution of existing concepts and technologies but also through the emergence of disruptive technologies and even sometimes unexpected new use cases. Who could have predicted that text-messaging would be the killer-app for GSM networks or that a global pandemic would bring a massive increase in the demand for communication technologies?

By constantly observing the latest activities of numerous innovative research projects as well as studying the developments in the telecoms business sector, it is possible to imagine where the industry may be heading in the coming years and therefore where ICT standards may be required to enable those developments.

One of ETSI´s principle strategic directions as described in the ETSI Strategy is "to be at the heart of Digital", expressing the clear intention for ETSI to be one of the leading organizations providing ICT standards for both present needs and also designing tomorrow's world by addressing the ICT needs for future services and applications.

Over the Horizon Radar, predicting what cannot be seen

Throughout history radars have been used to detect incoming risks and opportunities in multiple industries such as aviation, automotive, meteorology and many others. By constantly scanning the horizon and even beyond, radars allow us to identify obstacles and opportunities by providing insights about possible future evolutions and directions.

Radars allow us to identify obstacles and opportunities by providing insights about possible future evolutions and directions.

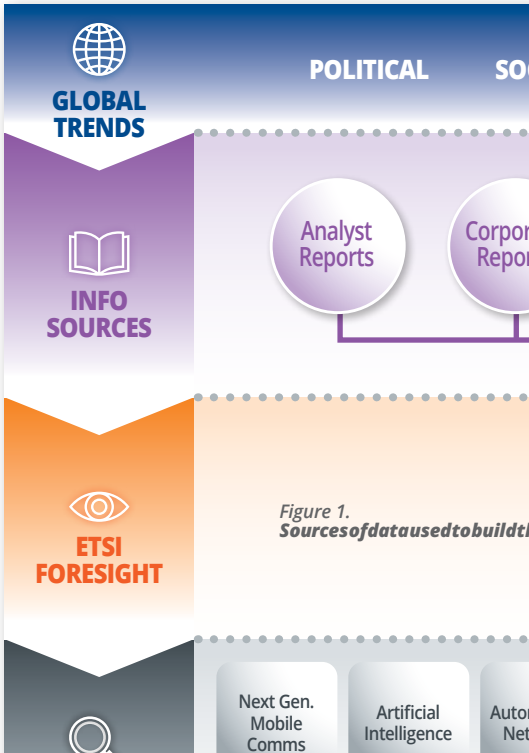


Figure 1.
Sourcesofdatausedtobuildt

The purpose of the ETSI Technology Radar (ETR) is to identify and analyse emerging technology trends for ICT that may influence ETSI's quest to remain at the forefront of ICT standardization. The ETR is also intended to promote the awareness and discussion of such technology trends among ETSI members and enable ETSI to further develop the tools and methodologies ("being versatile") that can leverage the Institute as the preferred collaboration hub for such developments ("an enabler of standards").

ETSI is on the right track

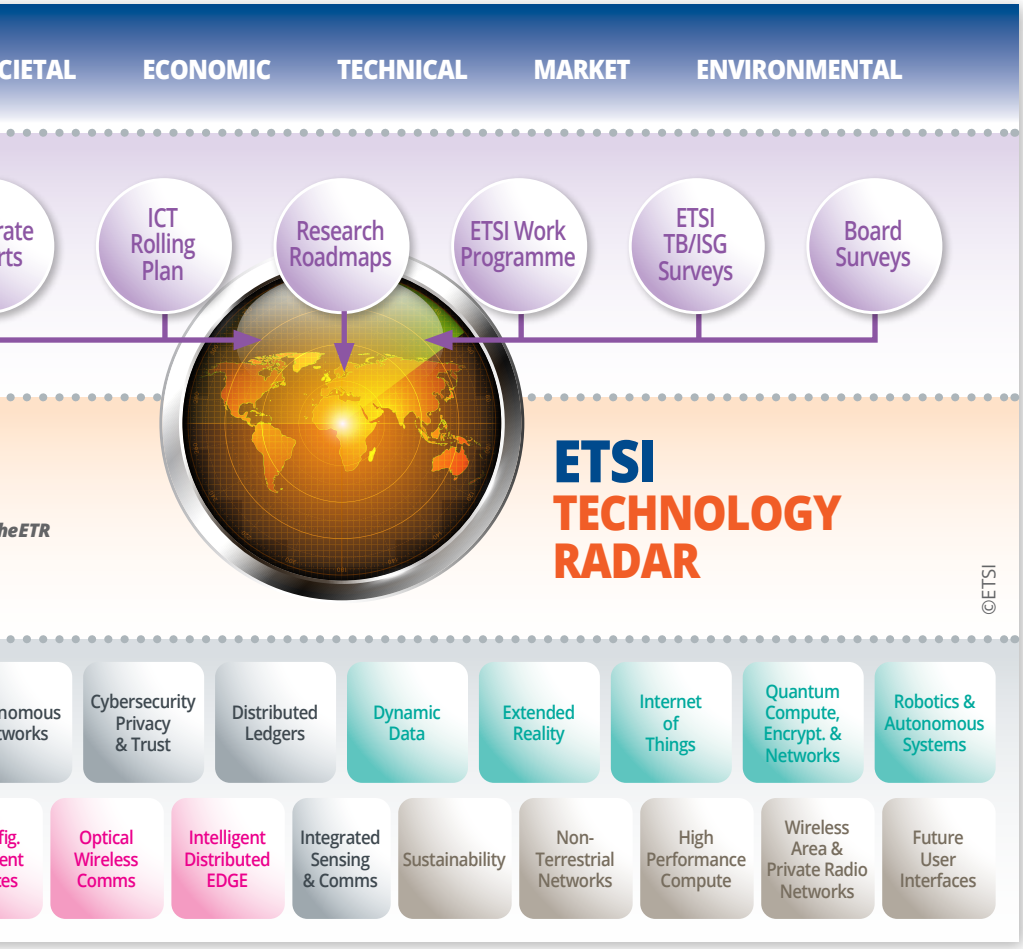
The ETSI Technology Radar has the following objectives:

- To report the findings of a thorough study performed by ETSI members that analysed several publicly available technology reports, questionnaires, roadmaps as well as direct input from ETSI members on their vision for emerging technology trends. The sources of information and identified trends are shown in figure 1.

The ETR demonstrates that ETSI is already active in many of the identified technology areas.

- To identify the emerging technology trends that could be of most concern/ interest for ETSI.
- To contribute, for each selected technology trends, to the identification of eventual gaps with respect to current ETSI activities as documented in ETSI Work Programme and to promote future more detailed analysis on the eventual way forward for ETSI to fill the identified gaps.

Throughout the ETR document it is evident that ETSI is already active in many of the identified technology areas, giving clear assurance that ETSI is already on the right track.



Three of the identified areas of interest within the ETR have resulted in the recent creation of Industry Specification Groups (ISG RIS, ISG THz and ISG ISAC).

However, new trends are constantly emerging, and it is important to promote open discussion about such topics in order to be prepared to be at the forefront of these upcoming technology developments when the time is right for the relevant standards or indeed pre-standards.

ETSI is a fully member driven organization with a major strength being the highly diverse and knowledgeable membership, willing to come together and develop the standards that fulfil needs across all sectors of industry and society that make use of ICT.

The final decision for the take-up of some or all of these identified technology trends will come from members who voluntarily decide to further explore these new and evolving technologies.

However, analysis and preparation is an essential step for success, and the ETSI Technology Radar is designed to help formulate ETSI's readiness to embrace innovation and also to allow our members to have their say in the future work evolution, and in doing so, help ETSI to shape the future.

The Technology Radar illustrates ETSI's readiness to embrace innovation and allow our members to have their say.

To access the latest version of the ETSI Technology Radar white paper and discover more about the identified technologies and their interdependencies you may visit:
https://www.etsi.org/technologies/technology-radar

David Boswarthick,
ETSI Director of New Technology.

Finding the butterfly - the challenge of AI standards

AI is not just software and this is a key issue of both the novelty and the danger of AI. ETSI's work is to rationalise the role of AI in the threat landscape.

Chaos theory

The flap of a single butterfly's wings can set off a storm thousands of kilometres away, or so says chaos theory. A few years ago the role of chaos theory in software development was pushed to the front of the R&D queue and moved beyond its initial home of meteorology and into a set of fields where it was not suited, but rather than accept that, it got made to fit, and the simplicity of the theory got lost in the hype. AI has similar, often outlandish, claims made for it, and the noise around what AI is may lead to the real value of AI getting lost, especially if it follows the cycle of previous computational advances and gets pushed into fields where it is really not suited.

The value of AI

Is AI going to be the magic tool that solves the world's problems? or is it a malicious force out to end mankind? Obviously, neither of these, but striking a balance is going to be difficult. It is what we intend to do in ETSI's TC SAI.

There is more hype, and concern, over AI than probably any other recent software development, and this has been accelerated by the rush to apply AI to anything and everything. AI can be, and often is, dismissed as just software, but it shouldn't be and this is a key issue of both the novelty and the danger of AI. AI, like any form of intelligence, is best used with a degree of caution, or as Pope said ***"a little learning is a dangerous thing"***, so maybe we need to be wary that ***"a little Machine Learning is a dangerous thing"***.

Assessing the problem is key

In order to solve a problem like AI it is essential to assess what the problem really is. Furthermore, if we want to apply technology as part of the solution we need to know what technology is needed. The debate around problems and solutions has to be rational too. At ETSI there has been growing acceptance that standards will play a role in the solution and this has been rapidly reflected across many other SDOs.

For an effective, safe and secure use of AI

Let me now highlight some of ETSI's activities that will contribute to the effective, safe, and secure use of AI as a tool for human endeavour.

When ETSI started its focus on AI as a generic tool, as opposed to a very specific tool for network management and optimisation, it began by identifying a few core problems to be researched and in turn documenting the security problems of AI, an ontology of AI threats, a review of mitigation strategies to AI specific threats, and a study of the supply chain of AI.

A key element of AI, identified in many of the developing legislative instruments, is transparency and explicability (or explainability in more American use of English). This has been addressed now across a number of studies including ETSI GR SAI 007 (Explicability and transparency of AI processing) which takes a simplified view of both static and dynamic aspects by ensuring a developer is able to demonstrate the existence and purpose of AI in a system, and ETSI GR SAI 010 - Traceability of AI Models. The former identifies its target audience as designers and implementers who are making assurances to a lay person such that designers are able to "show their working" (explicability) and to be "open to examination" (transparency). As we transition into TC SAI from ISG SAI the published work of the ISG will be reviewed, and if appropriate updated and republished at ETSI TSs and TRs.

The most recent publications of ETSI's ISG SAI have continued the deep dive into the challenges of AI and specifically address topics of testing, AI based manipulation, and collaborative AI.

In summary, the work of ETSI's ISG SAI has been to rationalise the role of AI in the threat landscape and, in doing so, to identify measures that will lead to safe and secure deployment of AI alongside the population that the AI is meant to serve. This broad approach will be maintained in ETSI TC SAI.

■ Scott Cadzow, ***Chair of the ETSI Technical Committee Securing AI.***

REASON: Realising Enabling Architectures and Solutions for Open Networks

Vision

REASON is a project funded under the UK Future Open Networks Research Challenge (FONRC) aiming to develop and demonstrate novel resilient solutions for the realisation of open, intelligent, multi-technology, and multi-vendor future networks. The project operates across all layers of the network, from access technologies to orchestration, and encompasses the UK supply chain, infrastructure, business strategies, sustainable development goals, policies, standards, and security.

Architecture

REASON aims to articulate a comprehensive framework and blueprint for open network architectures, delineating a structured approach to the seamless convergence of both current technologies such as 5G, and emerging technologies, such as LiFi. At the heart of this new architecture is an intelligent multi-access technology controller driven by new network artificial intelligence and open interfaces. This endeavour is poised to establish a leading position on 6G innovation in the UK and will establish international links, fostering innovation and facilitating new developments across the entire technology spectrum through the application of common architectural principles.

Innovation

In addition to advancing towards standard network Key Performance Indicators (KPIs) and Key Value Indicators (KVI) as proposed in other 6G projects around security, trustworthiness, energy efficiency; REASON proposes new concepts and features for future networks that include:

- **Native Artificial Intelligence (AI):** REASON will develop new network monitoring data services and distributed analytics across the entire network stack to define new cognitive and AI planes within the architecture. This will build resilience into future networks and drive innovation for end-to-end service optimisation, network agility, and end-to-end trustworthiness of all network functions. Furthermore, edge intelligence provides a fully flexible approach for task-orientated computation offloading, data thinning, and autonomy for efficient mapping of network workloads to physical and virtual resources.

- **Multi-Access Realtime Intelligent Controller (MATRIC):** REASON provides a platform that provisions different access technologies, including wireless and wired access, spanning across radio and optical domains, as well as terrestrial and non-terrestrial frameworks, compromising both classical and quantum paradigms. This multi-technology strategy provides resilience and opens new possibilities for innovation, facilitating continuous optimization for enhanced operational efficiency. MATRIC extracts sensing and operational data, incorporates AI, and manages efficient utilization of resources (both software and hardware) in cooperation with orchestration mechanisms defined within REASON.

- **Sustainability and security:** The core tenets of sustainability and security permeate every REASON architectural component. System-level optimization of energy consumption and, more importantly, translation of this data into CO2 emission will be systematically assessed across hardware and software layers. Security considerations will extend beyond individual components and encompass both physical and cyber layers to address challenges inherent in REASON's open architecture approach.

Use cases

REASON proposes open network solutions that can be adapted for all future applications. During the research and development phase of the project, however, REASON focuses on five key use cases, defined by industry partners, to derive requirements, perform tests, and demonstrate REASON architecture capabilities. These five use case are:

- Metaverse at scale / Web 3.0
- Industrial Metaverse / Distributed Digital Twin
- Sustainability / Service Differentiation
- Virtual Production
- Autonomous self-configuring factory / collaborative robotics

REASON will showcase its preliminary outcomes and concepts at Mobile World Congress (Barcelona) and the ETSI Artificial Intelligence (AI) Conference (Sophia Antipolis) in February 2024.

REASON is a collaboration of five UK Universities (Bristol-project lead), Kings' College London, Queen's University Belfast, Southampton and Strathclyde, technology and solution suppliers (Parallel Wireless, Thales and Weaver Labs), British Telecom and the BBC. In addition, the project engages three major equipment vendors (Ericsson, Nokia, and Samsung), the Compound Semiconductors Centre in Wales, and Real Wireless as research suppliers.

More information:
https://reason-open-networks.ac.uk

■ Prof Harald Haas, ***Distinguished Professor of Mobile Communications, The University of Strathclyde.***

Testing AI-based systems for the European Single Market

In today's fast-evolving technological landscape, the European Single Market requires robust mechanisms to ensure the quality, reliability, and compliance of artificial intelligence systems. ETSI provides testing methods that respond to these challenges.

ETSI's work

The "Methods for testing and specification" (MTS) ETSI Technical Committee has been on the front line of the development of testing language specifications (e.g., TDL TTCN–3), as well as comprehensive specifications on compliance assessment procedures for AI-based systems. Its work primarily focuses on specifications for continuous and automated quality assurance for Machine Learning (ML) models, test types and objectives, as along with the assessment of reliability characteristics of ML-based systems. The fusion of these methodologies looks to be a significantly promising step forward in addressing the complexities and challenges of AI system testing, which is crucial for the European Single Market.

Responding to the challenges presented by AI

In general, the integration of AI systems within various sectors demands rigorous testing and certification processes in order to assure reliability and compliance. The ETSI Technical Committee on Methods for Testing and Specification (TC MTS) addresses this need with a comprehensive approach, exploring the intricacies of ML-based systems. Its focus on challenges such as stochastic solution approaches, robustness issues within neural networks, fair decision-making, and verification versus validation directly respond to pressing concerns regarding AI systems.

Thereby, the TC MTS's work on AI deploys a structured approach to test items and methods for various phases of the ML life cycle. From requirements-based testing to differential testing and adversarial attacks, these methodologies offer a diverse toolkit for the evaluation of AI systems' decisive quality criteria. In this context, the emphasis on quality attributes such as correctness, robustness, security, freedom of bias and explainability align with the fundamental principles required for reliable and trustworthy AI in the European single market.

CABCA: A novel approach

ETSI is currently working on "Continuous Auditing Based Conformity Assessment (CABCA)". Its aim is to evaluate and confirm an organization's adherence to legislative requirements, standardization documents, and self-imposed quality.

CABCA therefore carries high significance for machine learning operations, whereby quality requirements are defined on the basis of AI risk management frameworks. The key benefit in this context is found in the automation of the proactive detection of potential risks, as well as the continuous assessability of quality, legal and normative requirements. Such a framework is shown in Figure 1 (Industrial Grade Machine Learning for Enterprises, IML4E of Fraunhofer FOKUS), focusing on the continuous and automatic assessment of compliance during the development, operation and maintenance of AI-based software on an industrial scale.

In this work and in further standardization work on advanced development stages, the ETSI committee aims to clarify AI system compliance assessment and surveillance, while also focussing on clear characteristics regarding model information, test types, test depths, and objectives. With this in mind, ETSI is working on ways to increase resource efficiency and quality characteristics to ensure reliability trustworthiness in regard to AI. Given the planned European legislation pertaining to AI, the reliability and responsibility of AI-based systems must be built essentially on the foundations of European standardization. As part of this, the ETSI TC MTS documents can be used to understand how AI systems can be assessed in a consistent, comprehensive and robust manner, whether these assessments are carried out by testers, certifiers, manufacturers, providers or end users.

■ Taras Holoyad, ***Vice Chair of the ETSI TechnicalCommitteeMethodsforTesting and Specification.***

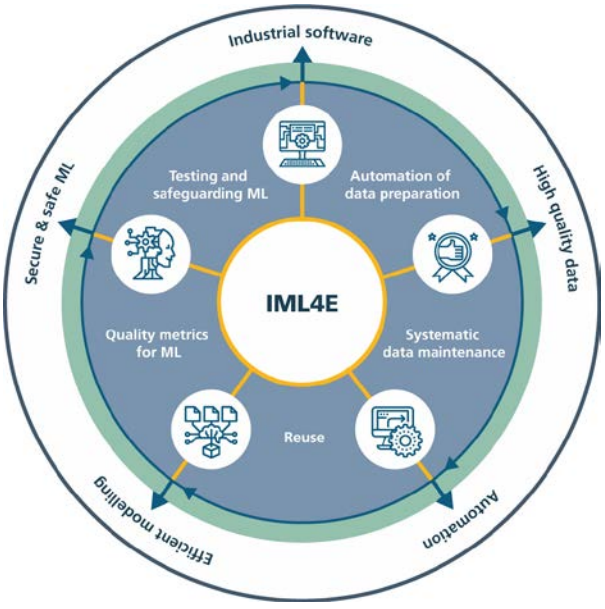


Figure 1: The IML4E project at a glance, Fraunhofer FOKUS, ***https://iml4e.org/***

AI gets real with 3GPP Release 18

Artificial Intelligence will benefit greatly from the availability of 5G-Advanced and in turn, the 5G system is set to benefit from AI and Machine Learning (ML) features. In 3GPP Release 18 a range of studies and specifications are reaching maturity with ten of the Working Groups now actively involved in the work. Here is a brief taster of the state of the art in those technical groups.

WG SA1 have a study (***TR22.874***) on traffic characteristics and performance requirements for AI/ML model transfer in the 5G System (5GS), which considers use cases and potential service and performance requirements for 5GS support for various applications (download, upload, updates…). Phase 2 of the work (***SP-230514***) specifies KPIs and functional requirements for the support for AI/ML data transfer, leveraging direct device connection under 5G network control.

WG SA2 has followed up with its study on 5G System Support for AI/ML-based Services (***TR23.700-80***), showing how AI/ML service providers could leverage 5GS as the platform, introducing intelligent transmission support for application layer AI/ML operation.

WG SA3 covers security and privacy. Their Study (***TR33.877***) covers the security aspects of AI/ML for the Next Generation Radio Access Network (NG-RAN). It introduces the 'NG-RAN AI/ML framework', covering functional entities and information flows between functions to realize an AI/ML architecture for data collection, model training, data inference and actions/feedback for the NG-RAN and UEs.

A second study in WG SA3 takes a look into the impact on Security and Privacy of AI/ML-based Services and Applications – Focusing on identifying key issues, potential threats, requirements and solutions to enable:

- Security management
- Authentication
- The UE and 5G system to secure AI/ML based services and operations
- Secure provisioning of the external parameters required for AI/ML (e.g., expected UE activity behaviours, expected UE mobility, etc.)

WG SA4 is midway through creating its feasibility study on Artificial Intelligence (AI) and Machine Learning (ML) for Media (***TR26.927***), which considers the use cases for media-based AI/ML scenarios, based on those defined in ***TR 22.874*** - 5G System (5GS); Study on traffic characteristics and performance requirements for AI/ML model transfer.

WG SA5 has a work item (***SP-230335***) to specify AI/ML management capabilities, including use cases, requirements and solutions for each phase of the AI/ML operational workflow for managing the AI/ML capabilities in the 5GS.

WG SA6 is looking at support for AI/ML services at the application enablement layer (***SP-231182***), which includes the following:

- Analyse Rel-18 and Rel-19 requirements in 3GPP .
- Identify potential solutions, including the information flows and developer-friendly application enablement APIs.
- Investigate possible impacts of application layer support for AI/ML services for different deployments and business models.

WG RAN1 now has a mature Study on AI/ML for the NR Air Interface (***TR38.843***). The Technical Report delivers a solid understanding of 3GPP's role in enabling an improved support for AI/ML over the 5G air interface, looking at aspects such as performance, complexity and more broadly at the potential impact on specifications of targeted use cases.

WG RAN3 are building on the Rel-17 conclusions captured in ***TR37.817*** to specify data collection enhancements and signalling support within existing NG-RAN interfaces and architecture (including non-split architecture and split architecture) for AI/ML-based Network Energy Saving, Load Balancing and Mobility Optimization. Several specifications in the 38 series are being updated.

WG CT3 and WG CT4 will specify the stage-3 protocol enhancements (CT aspects) for System Support for AI/ML-based Services. The work will enhance the CT WGs specifications based on the stage-2 requirements.

5G-Advanced support of Artificial Intelligence (AI)/Machine Learning (ML) is now well underway, with more enhancements expected in Release 19, starting in 2024.

■ Kevin Flynn, ***3GPP Marketing & Communications.***

5G ADVANCED

Standardized management of AI/ML model and data through oneM2M

Helping developers by reducing complexity and improving data reuse.

In 2020, oneM2M observed and acknowledged the need for high-quality and secure training data to facilitate the success of AI/ML services. Ever since, members have been conducting research to standardize common functions for effective data training and model management by developers.

Data collected and managed on IoT platforms requires features such as data annotation, linked IoT data, data license management, personal data protection regulations, and the expansion of AI/ML training data for use in AI/ML services. oneM2M is currently developing these features as key items to be included in Release 5. In particular, oneM2M approved Work Item WI-0105, "System enhancements to support AI capabilities," in 2021 to support AI functions within oneM2M systems.

Standards for Seven-step AI/ML Execution Process

Over a two-year period, oneM2M members have successfully developed the oneM2M Technical Report, TR-0068. Focusing on AI-enablement to oneM2M, the report covers standards-based technologies for representing and managing AI algorithms as oneM2M resources and for converting IoT data into training data. It is one of the key technical reports of oneM2M Release 5, published in July 2023.

oneM2M TR-0068 discusses and develops standards for multiple features in the seven-step AI/ML execution process (Data collection — Data preparation — Choosing a model — Training — Evaluation — Refining parameters — Prediction), treating them as common functions throughout oneM2M systems. Effectively, they allow for reliable and more effective AI service development by standardizing common service functions for data and model management throughout the entire AI service development process.

Benefits of Common Service AI/ML Functions

We can take Data Preparation as an example. This step of the AI/ML execution process often involves applying Data Augmentation techniques to expand insufficient datasets. If there are only 100 training image data elements stored on an IoT platform and 1,000 data sets are required for the model training, data augmentation techniques can be applied to expand the image data set. In traditional AI/ML systems, this data is stored and expanded in applications, which increases the complexity of the development process and reduces the reusability of the training data. There are many advantages to incorporating this feature into IoT platforms, including the reuse of training data and resource conservation.

Progress to AI/ML Standardization in oneM2M

oneM2M TR-0068 proposes the use of resources that distinguish training data from general data, along with others that apply data augmentation techniques required by AI/ML developers to create and manage training data. For example, a Rotation technique may rotate a source image by one degree to the right to create a total of 359 data sets with correct labeling added from one training image. Other techniques, such as Cropping, which cuts the image, and Flipping, which inverts the image, can be applied to expand the IoT data set.

Following an analysis of varied AI and IoT-related use cases, TR-0068 lists common standard functions such as data augmentation, training data labeling, IoT sensor calibration, and AI/ML model management. The results documented in TR-0068 are now moving on to the specifications development stage in the standardization process.

■ Prof. JaeSeung Song, ***Sejong University***

The AI Act and related standardization activities: the need for greater stakeholders' involvement

The ***AI Act*** is in the final stage of the European negotiation process. Given the importance of standards for the future operationalisation of the upcoming rules, there is a need for European stakeholders to participate actively in the ongoing AI-related standardization activities at European and international level. Let me explain why.

The proposed AI Act is structured as a product safety NLF1 legislation. NLF is a well-experimented regulatory scheme that provides high-level provisions and essential requirements in the main legal act, while economic operators can achieve compliance with these requirements through the use of harmonised standards. Specifically, the proposed AI Act adopts a horizontal and risk-based approach to the regulation of AI systems and puts forward requirements for high-risk AI systems. The operationalisation of the essential requirements included in the proposed AI Act will be done through harmonised standards that should be developed by Standards Development Organizations (SDOs).

In preparation for the adoption of the AI Act, the European Commission (EC) has already started actively engaging with SDOs in order to ensure that, without prejudice to the ongoing negotiation process, the technical ground can be prepared for the smooth implementation of the future AI Act. In this context, a ***first standardization request*** (SR) has been adopted. This SR lists the areas where standardization deliverables need to be developed to possibly grant a presumption of conformity to companies adopting them. In addition, given the particular nature and importance of these deliverables, the SR provides guidance on the way the standardization development process should be conducted, notably for what concerns: i) the involvement of ETSI, ii) the involvement of civil society experts, and iii) the need of standardization deliverables to be fully in line with European values and specificities.

European Standardization Organizations (ESOs) are the formal recipients of EC's SR. Thus, the ESOs are the Organizations which will submit the harmonised standards to the Commission. This does not mean that harmonised standards will be under all circumstances European standards. Agreements in place between ESOs and other SDOs ensure that international standards can be used and proposed as European harmonised standards in response to the SR.

Agreements exist and discussion forums have been set up (***JTC21*** at EU level and ***SC42*** at international level), but first challenges are appearing (notably for what concerns the need of specific expertise) in areas identified in the EC's SR (e.g. on accuracy and logging capabilities). It's time to ensure that we take up these challenges and ensure technical specifications are developed to prepare for the upcoming EU AI rules. **The EU is leading the way on the legislation, let's make sure we pool our specific expertise and lead AI-related standardization activities!**

■ Antoine-Alexandre André, ***Policy and Legal Officer, European Commission DG CNECT A.2 (Artificial Intelligence Policy Development and Coordination).***

New White Paper

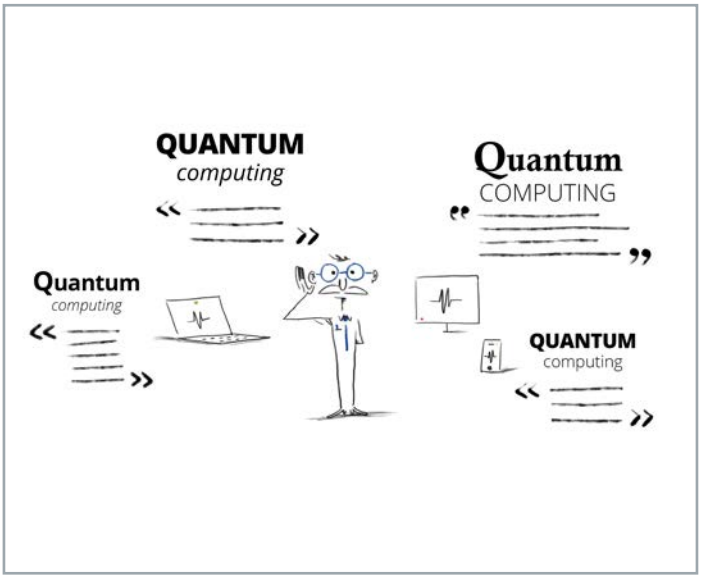
All-optical network facilitates the carbon shift

The Covid-19 pandemic has led to an inevitable surge in the use of digital technologies, making broadband networks vital for video conferences, online education, 4K/8K video, VR/AR gaming, and more.

Industry 4.0 intensifies data demands, urging networks to develop and roll out infrastructure updates. Fibre-powered broadband is emerging as the key solution, offering high-speed, low-latency, and energy-efficient connections. FTTH promises connection speeds of up to 1GB/s, which is between 20 and 100 times faster than the typical cable modem or DSL connection. With fibre technology innovations, the fibre connection will be extended to all networks, everywhere.

This White Paper conducts an in-depth exploration of the all-optical network, reviewing optical technology developments, market trends, and sustainability contributions. With sections on climate change, ICT industry emissions, broadband trends, and carbon reduction forecasts, ***this White Paper paves the way to a greener, faster, and more connected future.***

New Animated Video



Building a Quantum-Safe Future

Our new video takes viewers on an engaging and informative journey through the world of quantum computing, shedding light on its potential to revolutionize our technological landscape.

The video also addresses a critical question: How will we ensure the protection of critical and private data in the era of super-powered quantum computers? This is a serious matter in our ever-evolving digital age. ETSI recognizes the challenges surrounding quantum security and is already working on solutions to protect our most sensitive data.

You can watch our "Building a Quantum Safe Future" video at: ***https://www.etsi.org/media-library/videos***

This is the eighth episode in our animated video series explaining things in a simple and fun way. Check out the dedicated playlist on the ***ETSI YouTube Channel***.

Welcome to our new staff members

Kim Nordstrom

Technical Officer

After completing his Engineering studies in Helsinki, Kim started his career in the telecom industry at Siemens. He helped build their first 3G network before moving to Belgium, where he took on a role as an information security consultant for the EC, supporting the transition from paper to digital custom declarations. In 2013, he joined the Red Cross as part of its emergency response unit, running telecom and IT equipment in field hospitals in Germany and in the Jordan desert. After taking on the position of the first Chief Information Security Officer at transport company HSL, in 2020, he joined Husqvana Group in Sweden, where he oversaw cybersecurity regulatory compliance. He also holds a master's degree in economics and law, on top of being a certified information security auditor. In his leisure time, Kim enjoys target shooting and yoga.

Raluca Cimpeanu

IT Project Manager

Raluca, a Romanian native, first completed a bachelor's degree in information science at the University of Bucharest. She then expanded her knowledge with a master's degree in information management. After completing her studies, Raluca began working in the IT industry and gained valuable experience, showing her impressive versatility in roles as a project manager, business analyst, and product owner. Between 2017 and 2022, she lent her expertise to Veolia Romania as a consulting product owner in the IT department, where she drove the digitization of operational processes. Raluca moved to the South of France in 2019.

Michel Manglano

Head of Controlling and Accounting

Born in Paris, Michel moved to Nice in 1996. Despite his total lack of experience in accounting, a CFO recognized his potential and took Michel on in Thales Microsonics (later acquired by Temex, then Rakon) in Sophia as an accountant. The company specialized in time frequency components for the military and space sectors. To take his career up a level, Michel pursued a master's degree in business management and administration at IAE Nice. Following his graduation, he was promoted to finance controller in 2002, and then to finance manager, overseeing all of the company's manufacturing plants in France. In 2019, he moved over to Exelsius, an SME providing solutions for the PCBA (printed circuit board assembly) industry, where he assumed the role of Head of Finance and Administration. Michel maintains a keen interest in the stock market.

Lina Joumblat

IT Support Professional

Lina was born in Lebanon and moved to France when she was a young child. She pursued her studies at the Faculty of Arts in Nice, where she completed a master's degree in Applied Foreign Languages (LEA) with a focus on English and Spanish. Her career journey began at Fortinet, where she worked from 2009 to 2011 as a sales representative in the IT support department. Following this, she dedicated six years to Argeville, a company specializing in fragrances and flavors, working as a sales manager for the Middle East and Korea regions. From 2019 to 2022, Lina set up base in Kingsbury, United Kingdom, where she held the position of International Move Manager at Global Moving Services, a relocation company.

ETSI Redefines Email Security Standards

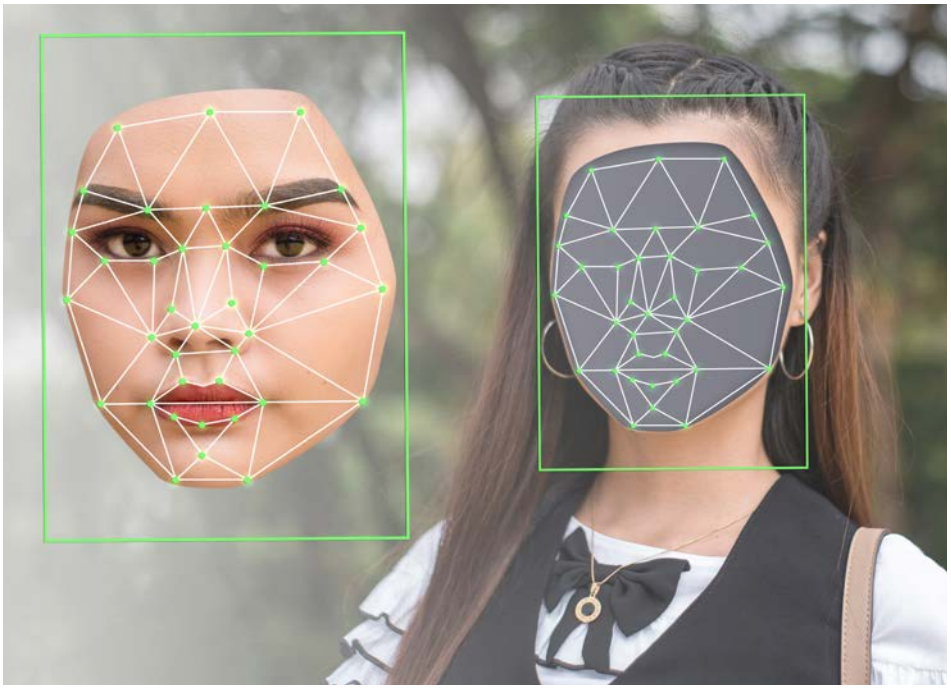
ETSI sets a new benchmark by publishing "Requirements for trusted service providers that issue publicly trusted S/MIME certificates", ***ETSI TS 119 411-6***. Effective 1 September, 2023, the standard ensures seamless compliance for Trusted Service Providers (TSPs) using S/MIME certificates. Secure MIME (S/MIME) certificates are used to sign, verify, encrypt, and decrypt email messages. Now your public key certificate is recognized by major IT players to not only protect email security but also to comply with EU e-signature standards. This new standard supports the EU eIDAS – Regulation (EU) 910/2014 and builds on the policy requirements for Trust Service Providers, the ETSI EN 319 411 series of standards used for eIDAS audits. ETSI shapes the future of email security.

ETSI's Deepfake Defender: Unleashing Tomorrow's Security Today!

ETSI creates the world's first defense against AI-generated deepfakes with ***ETSI GR SAI 011***, the Group Report on Secure Artificial Intelligence. Dive into the world of artificial intelligence and multimedia identity manipulation to analyse risks and discover strategic countermeasures. ETSI TC SAI Chair Scott Cadzow alerts on the transformative power of artificial intelligence in automating operations that is redefining the industry landscape. Experience how the report examines deepfake threats and other media threats across all audio, video and text formats, including AI-generated text software. ETSI's ISG SAI, now a TC, a pioneer in AI security, is once again leading the way with unprecedented insights. Embrace the future, stay safe with ETSI.

Tackling technological challenges for Reconfigurable Intelligent Services

ETSI has released a new report, ***ETSI GR RIS-002***, that outlines the technological challenges associated with deploying Reconfigurable Intelligent Services as a new network node. The report analyzes potential impacts on network architecture, protocol architecture, and a RIS control framework, providing recommendations for requirements and potential impacts on specifications supporting RIS as a new feature. As a new network node, RIS can be integrated into the network for various purposes, including improving communication, sensing, and localization enhancement. Given the diverse applications and scenarios, the topology of an RIS-integrated network can vary, and these variations have been captured and analyzed on a case-by-case basis in the report. The report also addresses how to control RIS and how to select a suitable RIS when multiple RIS are deployed.



Join us at upcoming events
Organized or supported by ETSI

ETSI Artificial Intelligence Conference

ETSI, Sophia Antipolis, France

5–7 February

The ETSI AI Conference — Status, Implementation, and Way Forward of AI Standardization — will explore the latest developments in Artificial Intelligence / Machine Learning (AI/ML) technology from the perspectives of Information and Communications Technologies (ICT). The programme will cover new technological trends in the field of AI/ML, related standardization activities within ETSI and other SDOs, AI/ML regulation in Europe (European AI Act) and around the world, how standards support and facilitate the implementation of AI/ML regulation, and related impacts on product design and conformity assessment for market access. Demonstrations and posters on the latest advances in the field of AI/ML applied to ICT systems and applications will also feature on the conference's programme.

PEMEA Plugtests™ 2024

ETSI, Sophia Antipolis, France and online

12–16 February

The very first PEMEA (Pan-European Mobile Emergency Application) PLUGTESTS™ event, organized with the support of ETSI TC EMTEL and the PEMEA Consortium, aims to enhance interoperability between PEMEA nodes and services from various vendors, ensuring seamless integration for different apps across platforms. The lab tests, conducted both on-site and remotely, will showcase interoperability, address use cases with special needs, and identify gaps in standards and operations that can be handled by ETSI and/or the PEMEA Consortium.

Participation is open to PEMEA node vendors, app developers, PSAP equipment providers and integrators, disability groups, and PEMEA operators.

ENISA-ESO Cybersecurity Conference 2024

Brussels, Belgium, and online

5 March

The European Standardization Organizations CEN, CENELEC and ETSI, are once again joining forces with ENISA, the EU Agency for Cybersecurity, to organize the annual Cybersecurity Standardization Conference. This conference's aim is to stimulate and promote dialogue among policy makers, industry, and research and standardization organizations, with a view to the effective implementation of EU cybersecurity legislation.

The ETSI conference: Non-Terrestrial Networks, a native component of 6G

ETSI, Sophia Antipolis, France

3–4 April

The ETSI NTN Conference will explore the various pathways available for the integration of satellites, HAPs and drones into the 3D architecture of future 6G networks. The programme will cover topics emerging from European and national research activities, as well as the latest relevant developments from the satellite and mobile industry.

Attendees will have the unique opportunity to gain further insights into the concept of NTN for 6G, discuss potential use cases, hear about the latest technological developments, and review the standardization activities in this exciting field.

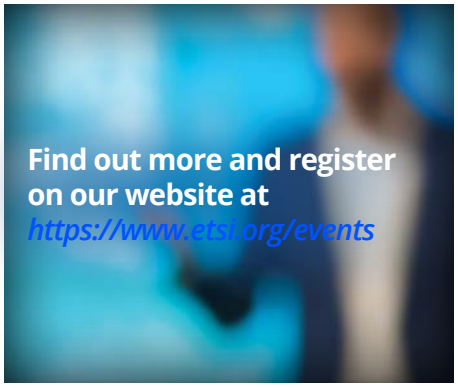
10th ETSI/IQC Quantum Safe Cryptography Conference

Singapore,

14–16 May

The event organized by ETSI and the Institute for Quantum Computing will be hosted by the Centre for Quantum Technologies at the National University of Singapore.

This event has been designed for members of business, government, and research communities with a stake in cryptographic standardization to facilitate the knowledge exchange and collaboration required for the safety of cyber infrastructures and business practices in an era of quantum computers. It aims to showcase the most recent developments from industry and government and the cutting-edge potential solutions resulting from the latest research. This is a perfect opportunity to learn from experts and connect with industry, academia, government, and standardization bodies to determine your next steps in quantum-safe migration.



ETSI at a glance

947 members

27% SMEs

+130 technical groups

30 conferences & Plugtests
Sept-Nov 2023

521 meetings
Sept-Nov 2023

107 partnerships

388 standards
Sept-Nov 2023

768 standards under development

4.5 M standards' downloads
Sept-Nov 2023

6,480 unique participants
Sept-Nov 2023

Members from **63** countries

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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