

How 6G is Reshaping the 5G World Forum

An IEEE Future Networks
Webinar Series
16 February 2022



Speakers



Ashutosh Dutta

Co-Chair, IEEE Future
Networks Initiative,
JHU/APL



Latif Ladid

Founder & President
IPv6 Forum



**Benoit
Pelletier**

VMware



Aloizio P. Silva

Commonwealth Cyber
Initiative (CCI) and
Virginia Tech

IEEE 5G World Forum History

IEEE 5G World Forum is the flagship conference of
IEEE Future Networks Initiative



FutureNetworks.ieee.org

- Premier Edition of the IEEE 5G World Forum: Santa Clara, USA, July 9 – 11, 2018
- IEEE 2nd 5G World Forum: Dresden, Germany Sept 30 – Oct 2, 2019
- IEEE 3rd 5G World Forum, Virtual Event Sept 10 – Oct 10, 2020, (co-sponsored by IEEE Bangalore Section)
- IEEE 4th 5G World Forum, Virtual Event 13-15 October 2021, (co-sponsored by IEEE Montreal Section)

On average, **700** registrants
and **110** papers/year



Formats

Technical papers

Industry Forums

Daily Plenary Keynote

Panels

Tutorials

Workshops

Topical and Verticals

Areas of Focus

Security

Mobility

Agriculture

Connecting the Unconnected

Healthcare

Smart Cities

AI/ML

and much more...



IEEE
5G WORLD FORUM

is now...

IEEE
Future Networks™
WORLD FORUM • 2022

fnwf.ieee.org

- See the call for papers at [FNWF.ieee.org/authors](https://fnwf.ieee.org/authors)
- **New for 2022: Symposia**
 - Symposium on 6G Mobile Networks
 - Symposium on Blockchain Future Networks
 - Symposium on Connecting the Un/Under-Connected in 5G and Beyond
 - Symposium on IoT & Sensor Networks
 - Symposium on Satellite & Space Communications
 - Symposium on Security for 5G and Beyond
 - Symposium on Next Generation Networks and Internet (NGNI)
 - Symposium on Optical Communication
 - Symposium on AI/ML-driven Communications
 - Symposium on 5G for CAM

Keynote Speaker / Honorary Chair



Vint Cerf

Co-inventor of TCP/IP

Google's Chief Internet Evangelist

6G Content Has Steadily Increased



Latif Ladid

Founder & President, IPv6 Forum

Founding Co-Chair, Future
Networks World Forum

6G VISIONS

IEEE
INGR))

International Network
Generations Roadmap

6G

 NEXT G
ALLIANCE

6G Impact: 2021 Keynotes

“6G: Enabling the cyber-physical continuum”



“The road to 6G and what 5G still has in store”

The Nokia logo, featuring the word "NOKIA" in a bold, blue, sans-serif font.

“What is Next?! 5G & Beyond”

The Bell logo, featuring the word "Bell" in a blue, serif font.

“Imagine Life With an Open Grid”

The VMware logo, featuring the word "vmware" in a lowercase, grey, sans-serif font with a registered trademark symbol.

“6G Vision”



“From 5G-Advanced to 6G: Connecting Everything in the Intelligence Era”

The Oppo logo, featuring the word "oppo" in a green, lowercase, sans-serif font.

“From 5G to 6G: Opportunities and Challenges”



6G Impact: 2021 Panels and Forums

6G Vertical Summit

Half-day summit with industry + academia discussing real technology opportunities within the physical constraints of the terahertz spectrum. New visions + “reality check.”

Worldwide 5G Industry Fora

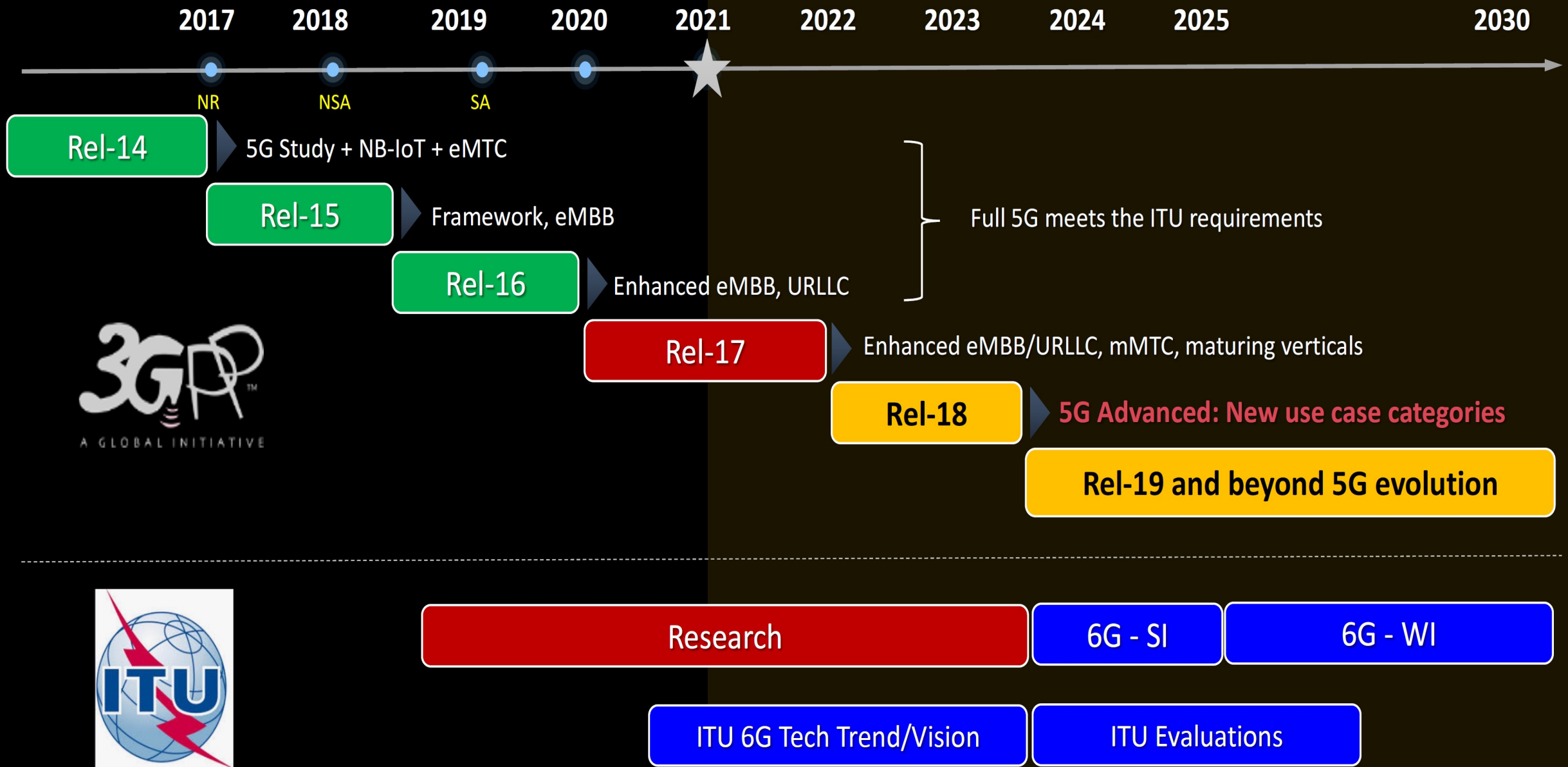
Annual full-day forum of global industry associations to collaborate and discuss activities, visions and future roadmaps toward future network deployment.

The Path to 6G








Industry + government half-day panel on the challenges to be faced (trust and security, resilience and sustainability, and more) on the path to 6G.

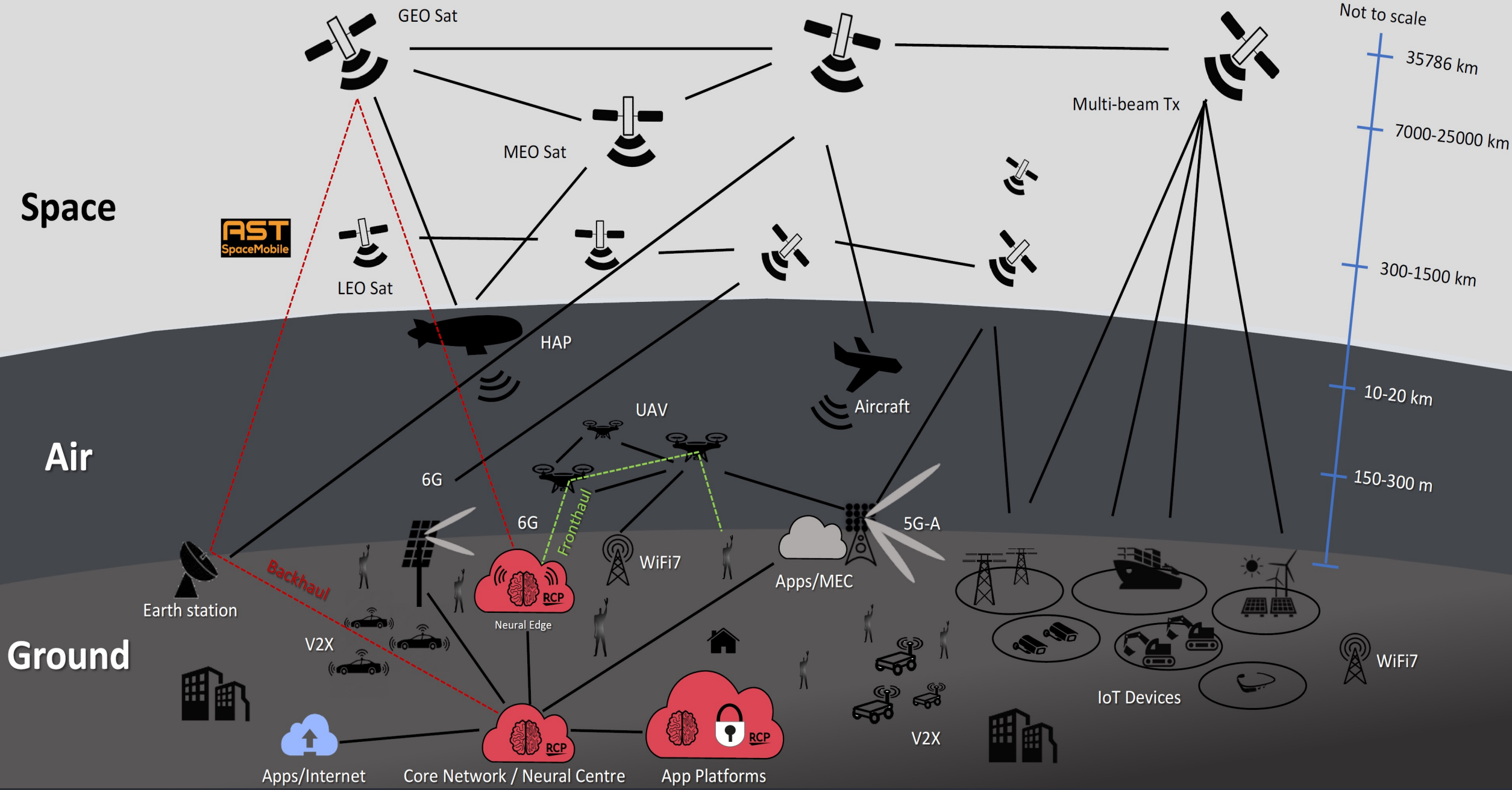
6G Must Be Quantum

Industry + academic panel on opportunities and challenges of integrating quantum internet and quantum-safe cybersecurity into future networks.



5G-6G Budget 2030

Country	B5G/6G Initiative
	<ul style="list-style-type: none">- Australian Digital Economy Strategy, AU\$ 1.2 billion- Modern Manufacturing Initiative, AU\$ 1.3 billion- 5G & 6G Security and Testbed, AU\$ 31.7 million / 4 years
	<ul style="list-style-type: none">- “Secure 5G & Beyond Act” March 2020- DoD Testbed programme, US\$ 600 million- Next-G initiative, industry federation
	<ul style="list-style-type: none">- MIC “Roadmap towards 6G”, June 2020- METI Support- US\$ 380 million
	<ul style="list-style-type: none">- MSIT 6G programme, September 2020- US\$ 200 million public support
	<ul style="list-style-type: none">- MIIT 6G programme, creation of IMT 2030 Promotion committee (2019)- Multi € billion until 2035, including industrialization
	<ul style="list-style-type: none">- 6G Flagship launched in February 2019- € 250 million / 7 years
	<ul style="list-style-type: none">- 6G Smart Networks and Services Joint Undertaking proposal- € 900 million / 7 years



6G Reference Architecture

New Attention on the Digital Divide



Benoit Pelletier

Director of NextGen Ecosystems
and Alliances, VMware

General Co-Chair, Future
Networks World Forum

Digital Divide More Pronounced Than Ever

- Between 37 – 45% of the world is not connected to the Internet*
- The COVID pandemic has exposed this as an issue even in developed countries
- Internet access is crucial for economic and educational opportunities
- Should be considered a basic utility or even a human right
- New network generations often exacerbate or increase the Digital Divide



Connecting the Unconnected: 2021 Sessions

Imagine Life With an Open Grid

Plenary keynote from Kaniz Mahdi on an open grid that can allow for increased automation in multiple aspects of life and society.

Connecting the Unconnected and Satellite Networking Trends and Challenges

INGR panel that took a 10-year view of the critical role of satellites for CTU, and the latest trends and challenges faced.

The Internet is Broken: We Need The Grid (Internet Evolution)

Industry panel on the Open Grid Alliance and the technologies needed to make next generation internet for all a reality.

Achieving Global Connectivity Using Aerial and Space Networks

Tutorial on possible network architectures for satellite-based backhaul connectivity and drone-based architectures and solutions.

TETRA Initiative

- Strategic Collaboration for Digital Equity
 - VMware - Mitacs - IEEE FNI CTU
- Research & Innovation Center in Montreal with a TETRA infrastructure platform
 - Serve as application development platform for IEEE FNI CTU Challenges
- Applied Research projects in the areas of:
 - Sustainable Grid
 - Digital Equity
 - Clean Tech
- TETRA will be showcased at the 2022 FNWF



IEEE Connecting the Unconnected

- Annual competition for early-stage Digital Divide projects and concepts
- 2021 Challenge
 - 260+ submissions from 69 countries
 - 11 winners chosen to share \$60,000 prize pool
- Annual Summit and awards ceremony
- 2022 Future Networks World Forum
 - Connecting the Unconnected Symposium
 - Planning in-person activities with TETRA



Most Popular Vertical and Topical Areas



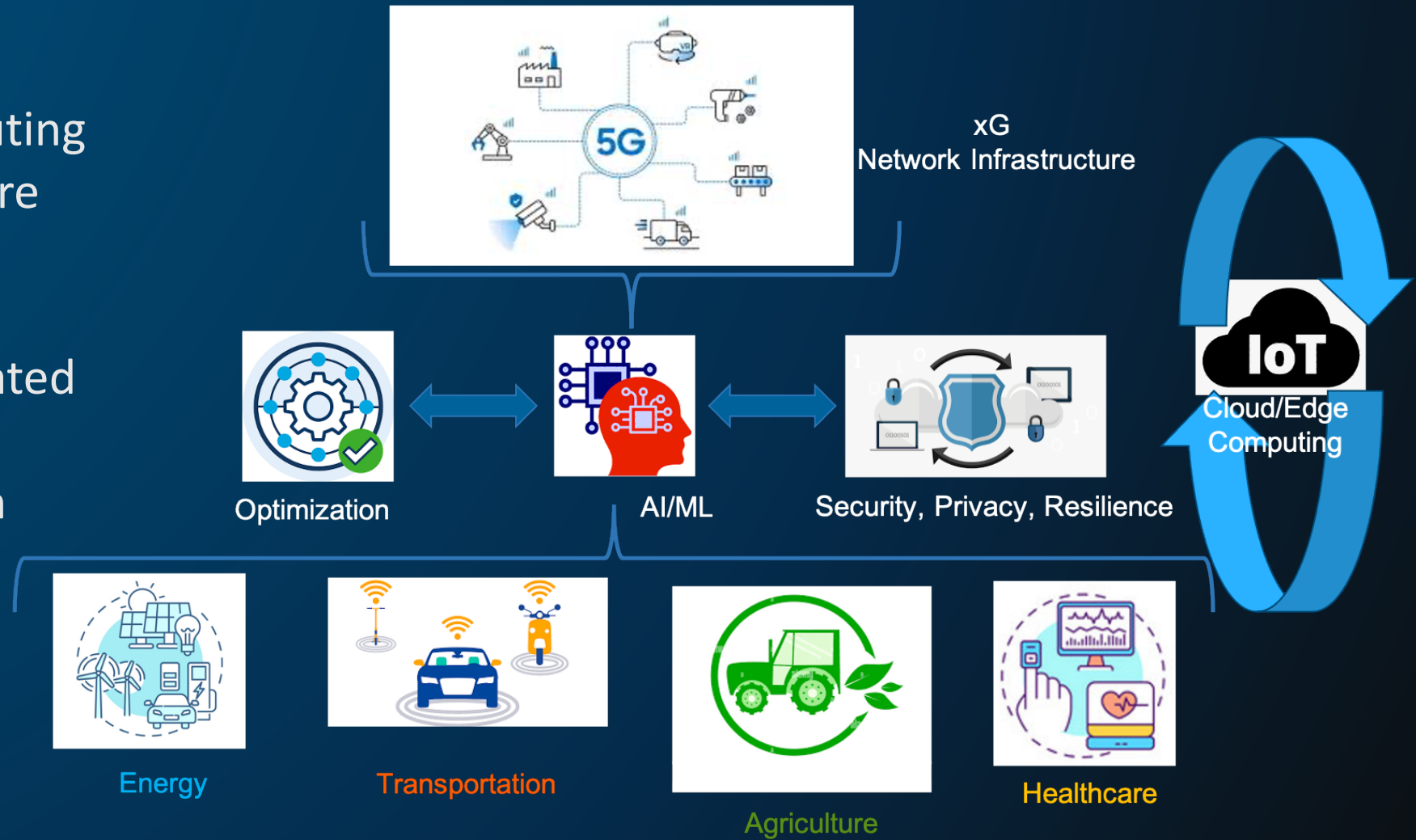
Aloizio P. Silva

xG Testbed Director, Commonwealth
Cyber Initiative (CCI) and Virginia Tech

Topical/Vertical Co-Chair, Future
Networks World Forum

Core Verticals and Topicals Sessions

- AI/ML
- IoT and Cloud Computing
- Sustainable Agriculture
- Security, Privacy and Resilience
- Connected & Automated Mobility (CAM)
- Systems Optimization
- Private 5G



5G for Connected & Automated Mobility (CAM)

ADDRESSED

CAM and connected autonomous vehicles effort to realize a large-scale testing and validation ecosystem both in

- ✓ Europe and North America

LOOKING INTO

Build a complete ecosystem around infrastructure, equipment and services on top of 5G advanced connectivity

- ✓ To enable cross-border trial and experimentation
- ✓ To identify gaps, create consensus, propose solutions, test and validate in the field

- Session structure included:

- ✓ Presentation on existing EU and US funded projects (i.e. 5GMoBix, 5G-CARMEN, 5GCroCO, 5G-PICTURE, COSMOS)
- ✓ Panel discussion leveraging EU, US and Canada challenges, solutions and opportunities to deploy an end-to-end CAM system.



5G Ecosystem Towards Smarter and Sustainable Agriculture: Opportunities and Challenges

ADDRESSED

Precision sustainable agriculture maximizing production and minimizing resources like water, fertilizers, pesticides and herbicides

LOOKING INTO

The challenges of using 5G and IoT coupled with AI
✓ To realize smart and sustainable agriculture, surpassing technical, financial, operation and management challenges

- Session structure included:
 - Talk on 5G, Edge and AI to accelerate digital transformation
 - ✓ Measuring and monitoring of animal welfare, Characterization of tree pests and pathogens, ML and computer vision for digital soil sensing and management
 - Talk on Agri-tech industry implementation
 - ✓ Food production and a look towards the future, How to use planes and drones to collect image and sensor data to increase crop production, How 5G and IoT can be used to fight the battle against food waste and hunger



Future Networks Security, Privacy and Resilience Vertical

ADDRESSED

The convergence of three pillars:
softwarization, virtualization and wireless networks

LOOKING INTO

The increased threat surface of 5G networks and the impact of cyber incidents on different layers and components of the network infrastructure

- Session structure included talks on
 - ✓ Security of SDN and NFV
 - ✓ Network Slicing Security
 - ✓ Optimization and Orchestration Security (including AI/ML Security, Fog/Edge Computing Security, Cloud Security, API Security, Supply Chain Security (hardware and software)
 - ✓ Data Security & Privacy, Open Source Security, Trust Metrics for E2E Security



IEEE
Future Networks™
WORLD FORUM • 2022

12-14 OCTOBER – MONTREAL, CANADA

Join us in Montreal!

[FNWF.ieee.org](https://fnwf.ieee.org)

**Call for Papers and
Proposals now open!**

