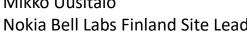


Panelists



Mikko Uusitalo Nokia Bell Labs Finland Site Lead





David Lund President **Public Safety Communication Europe**



Akihiro Nakao Professor The University of Tokyo Co-Chair for XGMF

Hannu Nikurautio Director NATO DIANA 6G Test Centre

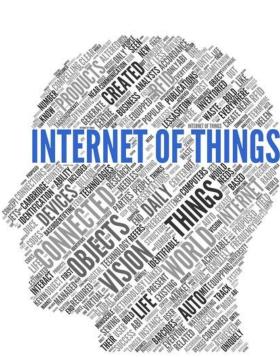


Tommy Svensson Professor Chalmers University of Technology

Mobile Technology Visions from 4G to 6G and Beyond







5G





xG

ABC (Always **Best Connected**) Vision from 2003

Next 50 billion connected things 2013 vision

6G metaverse 2023

Beyond 6G and digital twins resilient, sustainable and AI driven society?

Resilience of Mobile Networks – Examples of Actions



Short term actions (NOW)

- National strategies
 against 4G & 5G
 network failures due to
 natural disasters, power
 outages, external
 attacks
- Forced national roaming and other forms of operator collaborations

Medium term actions (2-3y)

- Make sure 3GPP standardization takes resilience seriously with a clear roadmap
- Different operation modes are needed for the system (normal mode, mild
- malfunctions, serious malfunctions, total network failure)

Long term actions (5-10y)

- Prepare mobile network to survive from total power outage at least to offer:
 - critical comms. for public authorities
- carrying emergency messages
- How should BS backup batteries be used in total power outage?
- How could mesh networking between user terminals be allowed in power outage?
 - How could AI be utilized to enable resilient-bydesign 6G?

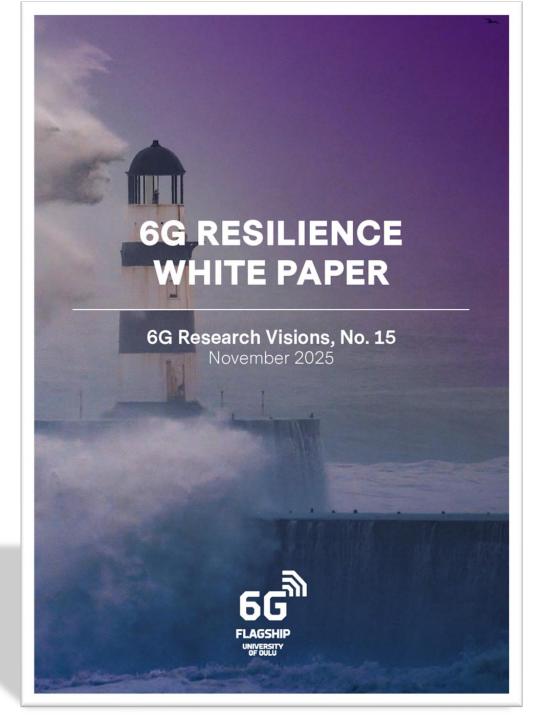
Public authorities will abandon their private mobile network in Finland by 2028 and start using a commercial 4G & 5G network.

How do we ensure reliable service delivery under stress?

Questions to be addressed



- **1. Technology**: What fundamental changes in network architecture are required to ensure resilience in 6G compared to previous generations? What new redundancy mechanisms can 6G introduce to ensure seamless failover during network outages?
- **2. Interdependencies of critical infrastructures**: Given that 6G will integrate deeply with energy grids, healthcare, and industrial automation, how can we ensure cross-sector resilience when a failure in one system could cascade across multiple domains? How can 6G networks remain operational during power grid failures or extreme weather events, especially in critical infrastructure applications?
- **3. Standards and regulation**: Should resilience be mandated in 6G standardization efforts (e.g., within 3GPP, ITU, and ETSI), and how can regulatory bodies enforce such requirements? Should governments set the minimum resilience requirements for 6G networks, and if so, how should compliance be incentivized or enforced?
- **4. Softwarization**: How can we secure 6G networks, particularly with the increasing adoption of Open RAN and software-defined networking, which introduce new <u>vulnerabilities e.g. via new supply chains or cloud based architecture</u>?
- **5. Business considerations**: <u>Is there a business case for resilience in 6G</u>, or will it always be seen as an additional cost with limited short-term returns? Will resilience become a key differentiator for mobile operators in the 6G era, and how can they market it as a competitive advantage?





Join the 6G Resilience White Paper Community! Become a Reviewer or Contributor

Collaborate with:

- 40+ Renowned Experts
- 18 Leading Universities and Research Centers

Scan the QR code and register now!

Shape the future of resilient wireless networks.







1 Vision and motivation

- 1.1 A new paradigm for 6G
- 1.2 Responding to global challenges
- 1.3 The research frontier
- 1.4 From performance to resilience

2 Mobile technologies in critical infrastructures

- 2.1 Evolution and impact of mobile cellular networks
- 2.2 The digital device
- 2.3 Edge cloud continuum
- 2.4 Intelligent systems for enhanced network resilience
- 2.5 Interplay between mobile networks and other sectors
- 2.6 The challenges ahead

3 Mobile network resilience definition

- 3.1 What is resilience?
- 3.2 Resilience in wireless networks
- 3.3 Case studies
- 3.4 Key insights and perspectives

4 Architectures for resilience

- 4.1 Resilient architecture foundations
- 4.2 Programmable and Al-native networks
- 4.3 Edge-native and localized networks for resilience
- 4. 4 Multi-access integration
- 4.5 Summary and architectural guidelines for resilient 6G

5 Technological enablers towards resilience

- 5.1 Networking techniques
- 5.2 Artificial intelligence methods and algorithms
- 5.3 Security & trust designs
- 5.4 Outlook: toward comprehensive resilience in 6G

6 Techno-economics of resilient 6G system

- 6.1 Resilience forces trends and uncertainties
- 6.2 Techno-economic lenses to explore resilience in 6G
- 6.3 Business model for resilience design in 6G
- 6.4 Recommendations business and regulatory aspects





More than wireless.

6GFLAGSHIP.COM • #6GFLAGSHIP







