ETSI Research Conference 2023

Maximizing the Impact of European 6G Research through Standardization

Overview of German 6G Program

Presented by Hans D. Schotten

6G Platform Germany

06/02/2023

6G Platform Germany

The German 6G Program

02.02.2023

Hans D. Schotten

German 6G Program

6G program announced in April 2021

- 6G Platform, October 2021 – 2025
- Four 6G Research Hubs, 2021 – 2025
- Eighteen 6G Industry Projects, 2022 - 2025
- Seven Projects on Resilience, 2023 – 2025
- AI-NET, 2021 - 2024

6G Platform Germany

Our Mission

- Umbrella organisation and networking platform for 6G program
- Managing liaisons and collaboration with other international 6G programs
  - Avoid duplication of work
  - Initiate matchmaking process in order to join forces
- Harmonisation of concepts and results for joint dissemination
- Creating an innovation network with SMEs and start-ups
- Ensuring acceptance of 6G concepts in society by a bidirectional science communication process
- Creating a skilled worker force
- Creating harmonized German contributions to UN SDGs

Hans D. Schotten

6G Platform Germany

6G Program

Goals

Cyber-security and resilience by design
Energy efficiency and sustainability
Technology and digital sovereignty

Vision

Human in the centre
of a hyperconnected and sustainable world
based on resilient infrastructure

Technology

Communication technology with strong links to AI and microelectronics/ RF technology
(and SW engineering, quantum technology, cobots, digital twins, …)

Hans D. Schotten

6G Platform Germany Working Groups

WG1

Science Communication

WG2

Societal perspective

Sustainability and participation

WG3

Maximising impact

Involving vertical industries, SMEs, innovation management

WG4

Building a global 6G vision

Vision, use cases and roadmaps

WG5

Security, Resilience, and Trustworthiness

WG 1 Science Communication

WHY?

Concerns about electromagnetic exposition, privacy issues, technological sovereignty and participation (in particular in rural areas)

6G?

The use of new frequency bands, the integration of sensing capabilities in networks, the required investments, some new applications might result in similar concerns.

Vertical user groups are today reluctant to support 6G processes.

How?

Early dialogue with public, all stakeholders, press, political decision makers, vertical user groups ➔ white papers, video clips, workshops.

Collaboration on joint deliverables

Joint dissemination and science communication activities

Joint workshops addressing stakeholder groups

6G Program

Regulatory Questions

- Energy Efficiency
  - KPIs, direct and indirect effects, life cycle, energy CAPEX and OPEX, …
- Privacy and Data Protection
  - Sensing capabilities (JC&S), exposure to third parties, use of AI functions and intelligent network functions, …
- Technology Sovereignty
- Security, Resilience, Critical Infrastructure, Zero Trust
- Trust aaS
- AI usage and AI ACT (incl. AI specific security problems)
- Coverage Requirements and Participation
- Electromagnetic Exposition
- Spectrum …

6G Research Hubs

6GEM

6G-RIC
Research and
Innovation Cluster

Open6GHub

6G-life

- Four 6G research hubs with an overall budget of approx. 250 M Euro started in 2021
- 160 research groups at overall 21 universities and 15 research institutes
- More than 40 SMEs are already part of the research network

6G Industry Projects

18 projects starting in H2, 2022, all lead by industry

Overall around 70 industry partners, 20+ universities, and 9 research institutes are involved.

Industry participation includes

- major infrastructure vendors,
- four major MNOs,
- test- and measurement equipment and service providers,
- major semiconductor manufacturers,
- OEMs in automotive, airplanes, drones, robots, automation equipment, commercial vehicles, medical equipment, …
- infrastructure operators (factories, airports, …),
- more than 40 small and medium companies with products completing the 6G ecosystem or benefiting from 6G connectivity.

6G Industry Projects (Coordinator)

6G-ANNA (Nokia)	6G-NetFab (ADVA)
6G-TakeOff (Dt Telekom)	6G-LICRIS (R&S)
6G-ICAS4Mobility (Bosch)	ESSENCE-6GM (Nokia)
6G-Campus (NXP)	6G-TERAKOM (Ericsson)
6G-CampuSens (Infineon)	Nitrides-4-6G (Tesat)
KOMSENS-6G (Nokia)	MassIMO (Infineon)
6G-Health (Vodafone)	USWA (NXP)
6G_NeXt (Deutsche Telekom)	INTERSOUL (SilOriX)
6G-Terafactory (ADVA)	6G-ADLANTIK (R&S)

6G Industry Projects

Focus **use case scenarios and application areas** are

- Campus networks (automation, campus logistics, …),
- Medical scenarios (hospitals, emergency, operation theatre, …)
- Mobility (automotive, commercial vehicles, drones, …)
- Global coverage (satellites, rural areas, in-X networking, …)

Almost all **components** and many new **system engineering concepts for 6G systems** will be addressed with a focus on

- Joint Communications and Sensing,
- Realtime and sync'ed networking,
- D2D, infrastructure-less, nomadic and organic networking,
- Device management, authentication, security concepts,
- Disaggregation, Open RAN evolution, OpenXG, open interfaces for third parties, …,
- Massive usage of AI everywhere,
- RF components (antennas, modulators, microelectronics),
- mmW and THz technology integration,
- Energy-efficient Terabit and other specialized transceiver technologies.

Projects on Resilience

Resilience of communication infrastructure and digital systems:

Architecture, technologies and modules (HW and SW), and management.

Seven projects started in January 2023,

addressing the cyber(-physical) resilience, security and protection of connectivity infrastructure, data, and data processing.

Results will be input to 6G Platform WGs.

AKITA (Bundesanstalt für Straßenwesen)

- Road tunnel operation center

ConnRAD (Bosch)

- Connected and automated driving functions

FRONT-RUNNER (ADTRAN (ADVA))

- Optical access networks

HealthNet (AWARE7)

- Health sector infrastructure

Q-TREX (TU Dresden)

- Quantum communication

RePro (Univ. of Braunschweig)

- Industrial and campus networks

RILKOSAN (Univ. of Lübeck)

- Industrial and campus networks

Contact Information

Prof. Dr. Hans D. Schotten

6G Platform Office

German Research Center for Artificial Intelligence (DFKI)

and University of Kaiserslautern

Email: schotten@dfki.de

Mob: +49 173 388 9470

We will be at

Hannover Fair HMI 2023, EUCNC 2023 (Gothenburg), EUMW 2023 (Berlin), 6G Summit Dresden , ICC 2023 (Rome), … .