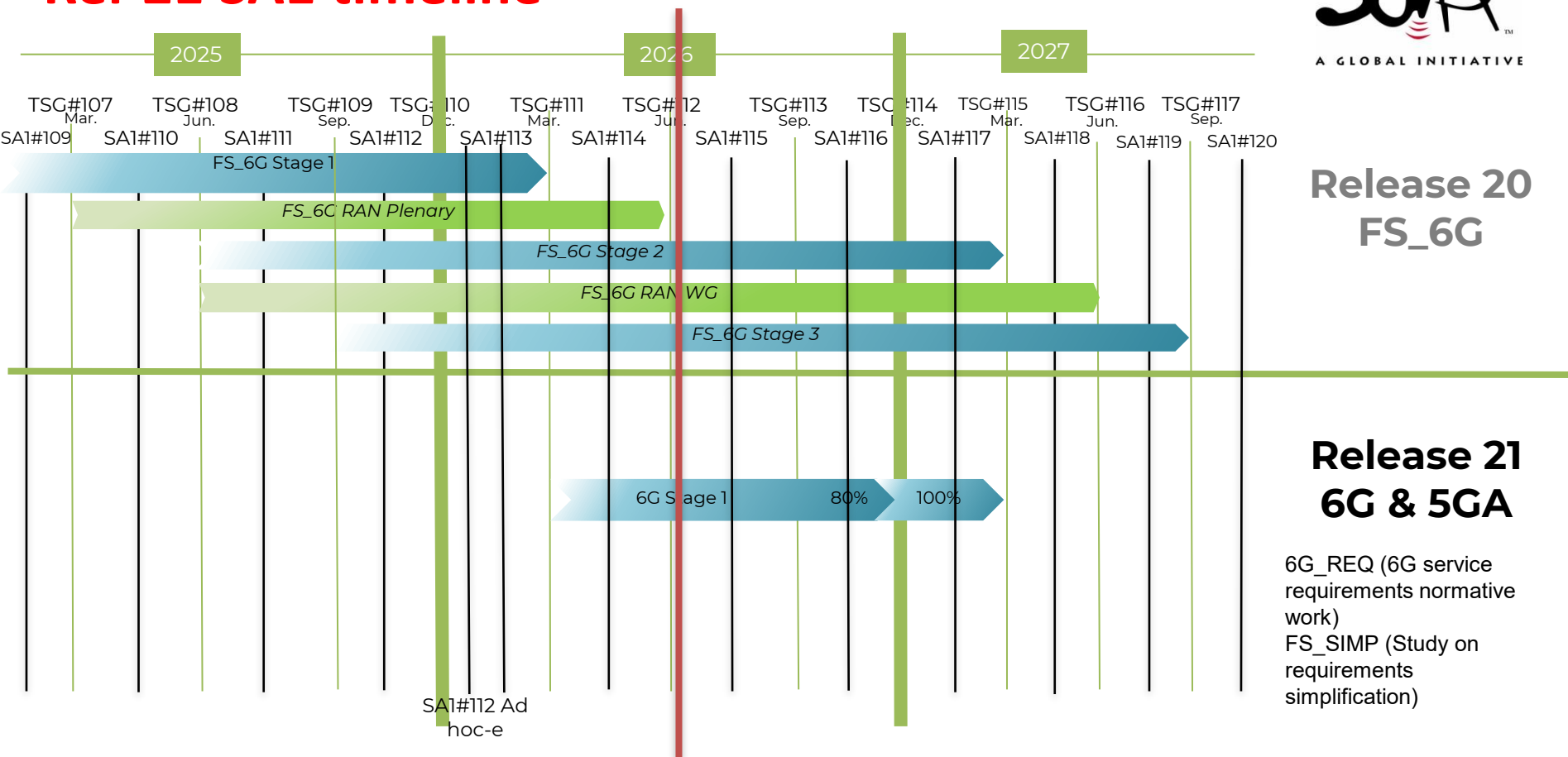




SA WG1 update on use cases and service requirements

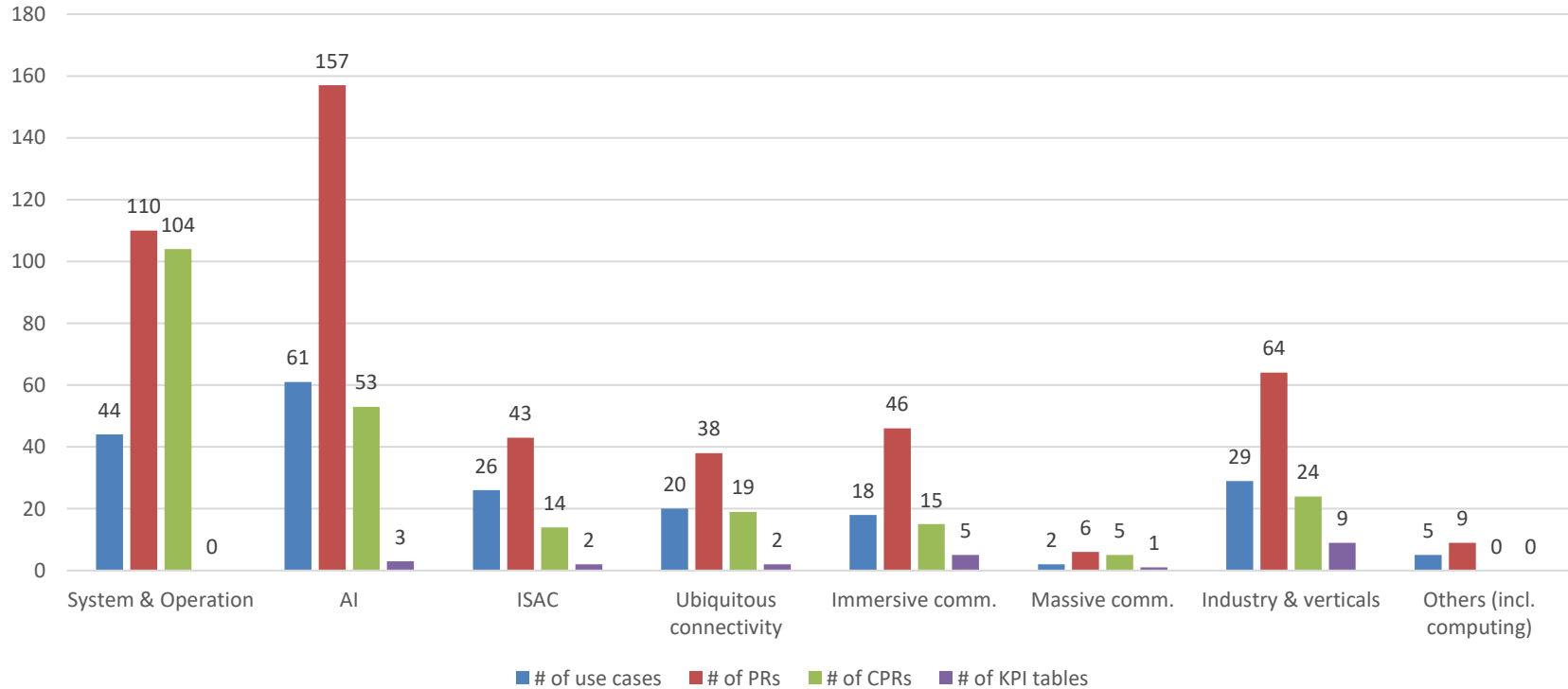
Vasil Aleksiev
SA1 Chair, Deutsche Telekom AG

Rel-21 SA1 timeline



FS_6G REQ Study Status

3GPP SA1 6G study (FS_6G_REQ) is complete, [TR 22.870](#) was approved at TSG#111 (Mar 2026)



6G_REQ Normative work status

3GPP SA1 6G normative work (6G_REQ) is 20% completed, [TS 22.870](#) draft version 0.2.0 is available

Transferring consolidated potential requirements from the study

- 163 CPRs from 6G System and operational aspects, AI, Ubiquitous Connectivity, Massive Communication, Verticals are already part of TS22.270 (20 requirements with Editor's notes);
- Pending: ISAC, Immersive, IMS, Computing

Transferring consolidated KPIs

- Massive Communication KPIs with two editor's notes and some values not confirmed;
- Pending: Verticals, AI, Immersive, ISAC.

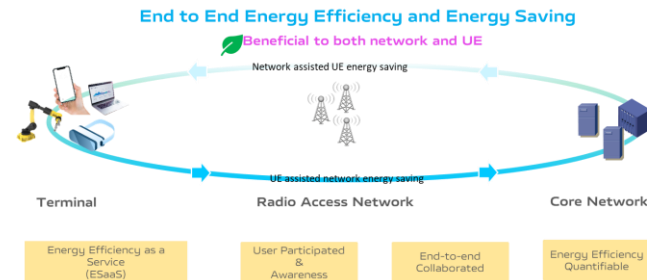
Open topics

- Where to place ISAC, Immersive, IMS requirements (in TS 22.270 or other existing specs);
- Computing (definition of computing service and discussions on related requirements);
- New requirements to complement existing ones for better description of capabilities & features
- Description clauses, scope, informative annexes.

6G System and Operational Aspects

- 📶 **Support for legacy services and requirements**
 - Inherit all 5G functional/performance;
 - Mobility between 6G CN and 5G CN or EPC;
 - Exclude requirements tied to E-UTRAN/UTRAN/GERAN.
- 📶 **Enhancements to legacy services and capabilities**
 - Event-triggered network sharing, FWA optimization, SMS verification, intra-PLMN traffic routing, network slicing improvements, UAC for new services
- 📶 **Device support**
 - Support for UEs with different characteristics and different service needs.
- 📶 **Non-AI or Immersive related IMS enhancements**
 - Minimise user perception on the transition handling, MMTEL over IP-CAN, multi-service resilience.
- 📶 **Security and privacy**
 - Quantum-resistant authentication/ communications;
 - Threat management and resilience;
 - Privacy and identity protection.

- 📶 **Lawful interception and access** – LI support, security and privacy balance, data retention.
- 📶 **Resilience** – service continuity and degradation mitigation, on-demand provisioning, disaster coordination, and operational simplification.
- 📶 **Energy related aspects** – network and UE energy optimization with carbon-aware operation.



- 📶 **Data collection framework, flexible charging, other operational support** (NDT, validation, and OAM).

6G AI – capabilities

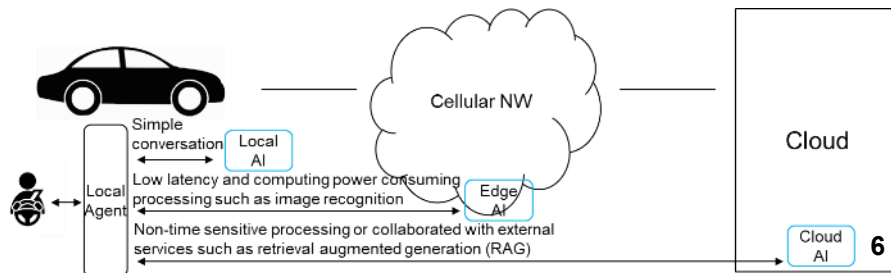
AI native 6G system

 Enhanced support for AI applications

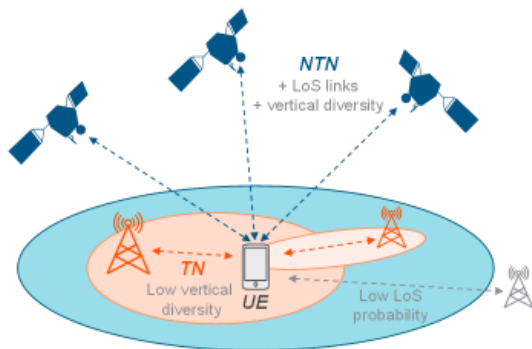
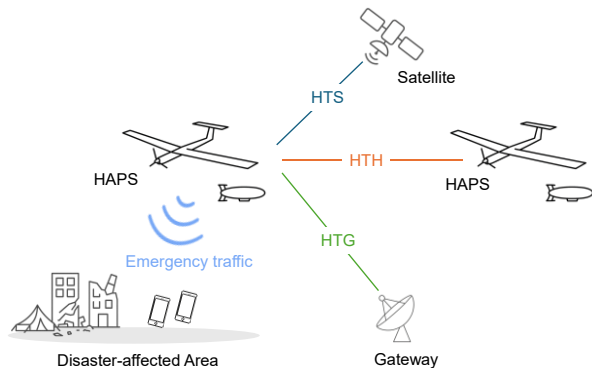
 Burst latency: A new KPI defining max allowed latency for a specific data burst size.

 Uplink Throughput KPI: Significant increase required

 Service Latency Breakdown KPI: Ability to distinguish between Communication Latency and Compute Latency.



6G Ubiquitous Connectivity



Connectivity scenarios

- Always on broadband/IoT for massive devices in sparse/dense satellite setups, with service continuity during handovers;
- Drones, vessels gain resilient backhaul and broadband services, minimizing interruptions via link switching.



Positioning and timing

- 3GPP satellite-based positioning (standalone or hybrid with non-3GPP positioning) for UEs;
- Independent satellite-based time synchronization, decoupling from GNSS.



Resilience features

- PLMN coordination for disasters/traffic spikes; HAPS-ground mobility; direct UE-UE comms on HAPS without ground routing.



Satellite based positioning accuracy KPI

- Target: 1-5 m horizontal and 1-5 m vertical accuracy (for UAV positioning) using hybrid based positioning and non-3GPP positioning which is not under control of the 6G System;
- Target: 0,1s positioning service latency (for airplane taxiway).



Satellite based communication KPI

- DL target: 6 Gbit/s per plane with speed up to 1500 km/h;
- UL target: 3 Gbit/s per plane with speed up to 1500 km/h.

6G Massive Communication



Coverage and Emergency Support

- Wide-area scenarios like rural areas and deep indoor environments;
- Emergency services (e.g., calls) shall be available in these areas;
- Low-throughput basic services (MO/MT messaging, SMS, small data) shall work reliably there.



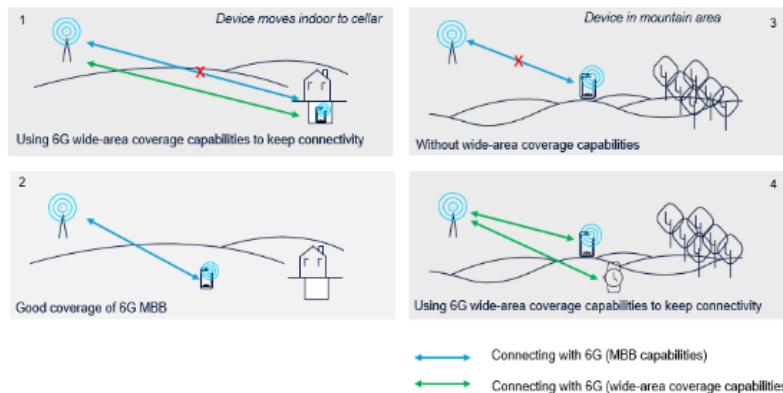
Device and Third-Party Capabilities

- Low-complexity devices in massive deployments (e.g., next-gen smart meters with low power, limited antennas);
- Operators can allow authorised 3rd parties to configure parameters based on application needs (MO/MT traffic, data volume).



KPI highlights

- UL/DL Target: 5-7 Mbit/s, latency target: 100ms, payload target: up to 20 MB



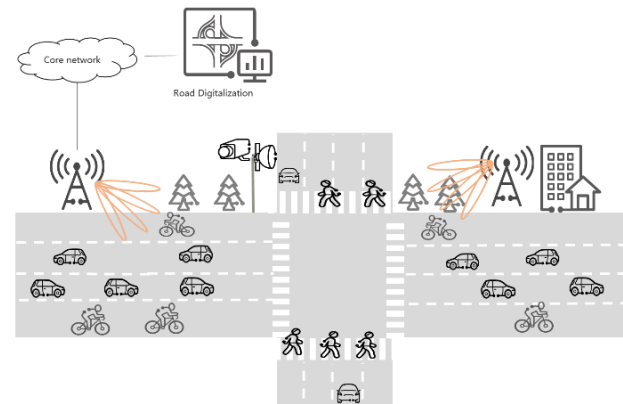
6G Further use cases on Industry and Verticals

- 📶 **Localised network (e.g., factories, hospitals, disaster zones)**
 - Maintain full local functionality (authentication, routing, voice/data) even when the backhaul to the operator's core network is severed, support for "local credentials" where the Vertical owns the USIM and auth identity;
 - Minimize service interruption when the serving network changes between different localized networks, or between a localized network and the PLMN;
 - UE-to-UE communication within a localized network.
- 📶 **MCX services** – Service continuity/minimize interruption across networks/modes, interworking with non-3GPP systems.
- 📶 **Robotics** – Dynamic grouping of UEs, data sharing among multiple UEs, info exposure.
- 📶 **Others** – Reliable time sync, slice info exposure, diverse long battery life IoT devices.
- 📶 **KPIs highlights**
 - Digital Twin support – sensing is expected to contribute to enrich the DT model, target 10cm location accuracy, 1-10 ms latency;
 - Services with high reliability (target: 99,999%) and low latency (target 1ms) (decentr. PowerGr);
 - Horizontal positioning accuracy target: 2cm, vertical positioning accuracy target: 10cm (outdoor machine control);
 - Time sync accuracy target: 1 μ s, service area: 20 km x 30 km, (critical communication for smart grids).

6G ISAC – capabilities

More complexity in relation to 5G Rel19

- Detection and analysis: detect, classify (e.g., distinguishing UAVs from birds or identifying UAV traits), and count sensing targets. Predict target characteristics (e.g., vehicle shape/size);
- Service integration and exposure: linking sensing results to communication areas, target density-based services, and exposure of results within time windows. Exposure alongside other traffic (e.g., audio/video);
- Security and efficiency: monitoring, validation against 3rd party assistance info, combined communication/sensing/positioning;
- Infrastructure flexibility: Operators can provide services via shared RAN (e.g., 5G/6G wireless sensing).
- ISAC improves mobile network performance by detecting line-of-sight blockages.

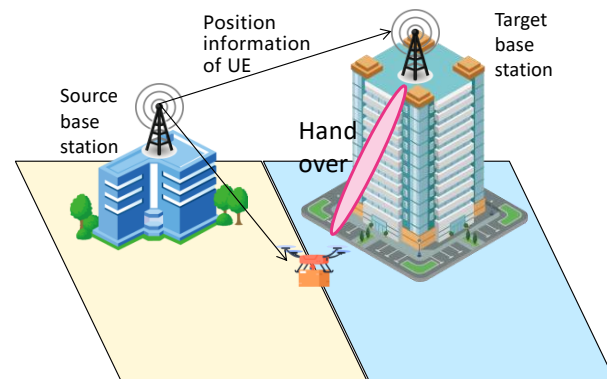


Sensing Resolution KPI: The ability to distinguish objects close together.

- Target: 0.2m range resolution (for road digitalisation)/0.01m gestures recognition;
- Target: 0.2m/s velocity resolution (for road digitalisation).

Accuracy of Positioning estimate KPI (Sensing-based):

- Target: 0.1m (horizontal/vertical) for structural monitoring and high-topology mapping



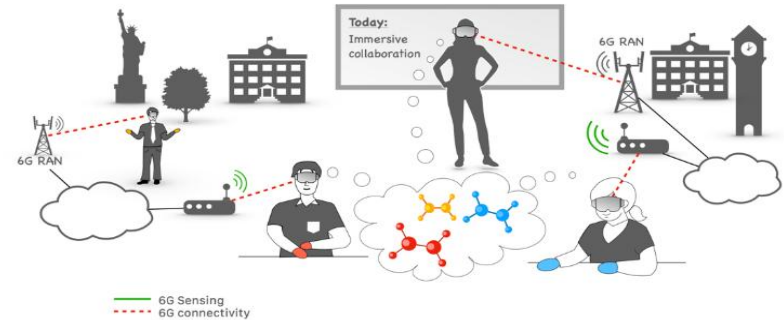
6G Immersive Communication

Application–Network Collaboration

- Application-level information (e.g., traffic patterns, expected service quality) or user experience feedback from UEs or third parties can be received by the network to optimize communication performance.

Multimodal and XR Communication Support

- Synchronization of heterogeneous data flows (possibly across multiple UEs) for multimodal or multi-user experiences;
- Spatial association of XR content (e.g. holograms with positioning info) to ensure safe and context-accurate Interactions for users.



KPIs highlights

- Target: DL up to 1 Gbps user experienced data rate for holographic telepresence in healthcare with 99.999 % reliability;
- Target: < 10 ms end-to-end latency for split rendering in education/gaming scenarios.

Synchronisation (New KPI): The maximum time offset between different media streams (e.g., audio, video, haptics) or between different devices in a group.

- Target: 1 - 10 μ s for immersive audio production in live events.

Thank you