



Selected Areas in Communications Symposium

Track on Tactile Internet

TRACK CHAIR:

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SCOPE AND MOTIVATION

Wireless communication is pushing into new realms. Whereas to date the main focusses of wireless communications in terms of human senses have been vision and hearing and associated visual, video and audio applications, content and interactions, capabilities of emerging wireless communication systems and human interfacing technologies make it possible for other senses—such as touch and feel—to be carried over wireless communication networks and conveyed to/from humans. The underlying wireless communication requirements to serve such cases can include low latency, and in some cases extremely high reliability due to the use cases that such human haptic interaction might involve—such as remote medical surgery, for example. Moreover, interactions involving machines are also key. These include human interactions with machines, e.g., for humans to undertake remote (haptic/manual) work such as from a central location to allow their skills to be distributed over a far wider area without, e.g., time consuming and wasteful travel, and machine-to-machine interactions. In the latter case, a common computational entity might control robots in a factory, for example, even down to the level of instructing changes in forces/impulses exerted by the robots in real-time based on information from haptic sensors on this robots in a high-speed manufacturing environment. It is such scenarios that push latency requirements to as low as the sub-millisecond range and reliability requirements to as high as the five-nines of the 5G Ultra-Reliable Low Latency Communication (URLLC) mode of operation. And in many cases the requirements for such machine-to-machine interaction might even be significantly more challenging than that.

The Tactile Internet (TI) serves as the underlying communication capability able to realize such requirements across a range of networks end-to-end. It can serve haptics involving humans, machines, or humans and machines, and even the most challenging machine-to-machine interactions in terms of latency and reliability. The TI not only offers a range of use cases demonstrating the key advantages of emerging communication systems such as 5G and opening up whole new markets upon which such new dimensions of advancement (latency and reliability) are based, it might also push the bounds of latency and reliability even further than URLLC. Further, it potentially demonstrates the vast densities/numbers of connected entities/devices that can be served in emerging communication networks—such as to connect all the sensors and actuators wirelessly with a central control unit in the aforementioned factory scenario.

This symposium invites paper submissions on the TI and its enablers.



TOPICS OF INTEREST

Solutions to reduce end-to-end latency and/or introduce higher reliability in Tactile Internet applications, including:

Air interface and signal processing techniques,

Advanced radio resource management techniques,

Redundant or multi-point transmission, multi-point connectivity,

Novel approaches towards session management and the protocol stack,

Network infrastructure and core network concepts,

Cloud-RAN and mobile edge-cloud concepts in the context of latency- or reliability-critical applications,

Architectural enablers for distributed or edge computing,

Technical solutions to allow for a co-existence of traffic with stringent latency/reliability requirements and other traffic (e.g., with ultra-high throughput requirements),

Haptic codecs,

New waveform design,

Ad-hoc networking, routing, handover, and meshing,

Novel deployment concepts and system architectures.

Network and cloud solutions, including:

Context-aware computing,

Cloud-based mobile architectures,

Communication architectures and protocols for Tactile Internet applications,

Multi-service architectures and interworking,

(Secure) network coding,

Mobile edge cloud computing, personal clouds & cloudlets,

Network edge intelligence.

Revolutions in hardware

Low latency and low power circuits

Reconfigurable multi-standard systems



Design of new 3D chips and haptic devices

Results from prototypes, test-beds and demonstrations

Wireless communication technical solutions addressing specific novel applications for TI, such as:

Human-to-human interpersonal haptic interaction,

Human remote haptic control of machines,

Computer remote haptic control of machines,

Machines-to-machine haptic interaction,

Industrial applications,

Financial/trading applications,

Vehicular applications,

Drone applications,

Medical applications,

Other applications for the TI.

IMPORTANT DATES

Paper Submission: 15 April 2020

Notification: 25 July 2020

Camera Ready and Registration: 1 September 2020

SUBMISSION INSTRUCTION

All papers for technical symposia should be submitted via EDAS through the following link: <https://edas.info/N27054>