

**SPECIAL ISSUE**

**TACTILE INTERNET**

*Edited by G. Fettweis, M. Simsek, and C.-L. I*

**256 The IEEE 1918.1 “Tactile Internet” Standards Working Group and its Standards**

*By O. Holland, E. Steinbach, R. V. Prasad, Q. Liu, Z. Dawy, A. Aijaz, N. Pappas, K. Chandra, V. S. Rao, S. Oteafy, M. Eid, M. Luden, A. Bhardwaj, X. Liu, J. Sachs, and J. Araújo*

| INVITED PAPER | This article gives a summary of the IEEE P1918.1 working group’s standardization results.

**280 Low-Latency Networking: Where Latency Lurks and How to Tame It**

*By X. Jiang, H. Shokri-Ghadikolaei, G. Fodor, E. Modiano, Z. Pang, M. Zorzi, and C. Fischione*

| INVITED PAPER | This article presents a holistic analysis and classification of the main design principles and enabling technologies for the deployment of low-latency wireless networks.

**307 5G-Based Systems Design for Tactile Internet**

*By C. Li, C.-P. Li, K. Hosseini, S. Bum Lee, J. Jiang, W. Chen, G. Horn, T. Ji, J. E. Smee, and J. Li*

| INVITED PAPER | This article discusses the systems design of ultrareliable and low-latency communications in NR and LTE technologies from the physical and medium access control layer perspective.

**325 Adaptive 5G Low-Latency Communication for Tactile Internet Services**

*By J. Sachs, L. A. A. Andersson, J. Araújo, C. Curescu, J. Lundsjö, G. Rune, E. Steinbach, and G. Wikström*

| INVITED PAPER | This article provides an overview of Tactile Internet services and haptic interactions and communications.

**350 Softwarization and Network Coding in the Mobile Edge Cloud for the Tactile Internet**

*By J. A. Cabrera, R.-S. Schmoll, G. T. Nguyen, S. Pandi, and F. H. P. Fitzek*

| INVITED PAPER | This article highlights the importance of software-defined networking and network function virtualization for 5G networks and Tactile Internet applications and presents a holistic testbed as a key step toward creating an infrastructure for 5G systems and Tactile Internet applications.

**364 Leveraging Tactile Internet Cognizance and Operation via IoT and Edge Technologies**

*By S. M. A. Oteafy, and H. S. Hassanein*

| INVITED PAPER | This article presents novel techniques for Cloudlet-based cyber foraging to project how Tactile Internet interactions could benefit from IoT contextualization.

**376 Ultrareliable and Low-Latency Communication Techniques for Tactile Internet Services**

*By K. S. Kim, D. K. Kim, C.-B. Chae, S. Choi, Y.-C. Ko, J. Kim, Y.-G. Lim, M. Yang, S. Kim, B. Lim, K. Lee, and K. L. Ryu*

| INVITED PAPER | This article introduces novel physical layer solutions for spectrally efficient ultrareliable and low-latency communication techniques.

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| INVITED PAPER | This article presents the technology landscape for the Tactile Internet to enable high-performance industrial wireless communication.

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| INVITED PAPER | This article presents opportunities of Tactile Internet concepts that integrate interdisciplinary approaches from control theory, mechanical engineering, and communication protocol design.

### 447 **Haptic Codecs for the Tactile Internet**

By E. Steinbach, M. Strese, M. Eid, X. Liu, A. Bhardwaj, Q. Liu, M. Al-Ja'afreh, T. Mahmoodi, R. Hassen, A. El Saddik, and O. Holland

| INVITED PAPER | This article presents the fundamentals and state of the art in haptic codec design for the Tactile Internet.

### 471 **Tactile Robots as a Central Embodiment of the Tactile Internet**

By S. Haddadin, L. Johannsmeier, and F. Díaz Ledezma

| INVITED PAPER | This article discusses the concept of Tactile Robots connected with human operators via smart wearables as an essential multimodal embodiment of the coming Tactile Internet.

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