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**Funded by:**

**Project Partners:**

**Associated Partners:**


**German organizations have combined forces in TACNET 4.0, a project to create a standard system for real time industrial communications. The so-called "tactile internet," based on 5G wireless technology, is being further developed with the support of the Federal Ministry of Education and Research (BMBF) in this project for the digitalization of production and robotics. Focusing on the needs of the market, the project serves as a basis for a wide range of industrial applications.**

Germany is scheduled to launch the 5th generation equipment and infrastructure (5G) in the year 2020. The future network will enable very high data rates and be a so called "tactile internet," that is, it will be capable of reaction times of less than a millisecond which are no longer perceptible for humans. However, the highest reliability and real-time communication required for networked

production (Industrie 4.0, I4.0) will not be supported end-to-end in the first phase. As a contributing partner in the BMBF sponsored program "5G: Tactile Internet," **TACNET 4.0** is developing the required concepts and algorithms and creating the right conditions for many Industrie 4.0 applications such as direct interaction between humans and machines or wireless process controls.

The greatest challenge **TACNET 4.0** faces is to integrate future 5G networks and other current as well as new industrial communications systems to support a wide range of industrial applications, including the integration of field bus systems. **TACNET 4.0** relies on open interfaces, so that network functions can be expanded, for example, through apps. Additionally, initial attempts are being undertaken to use mobile wireless networks for wide area coverage, instead of only the current local wireless sensor networks or WLAN.

**Vodafone Chair Contribution:**

The Vodafone Chair contributes expertise for the physical layer of 5G industrial radio:

- Multi-Connectivity using joint decoding to make use of the diversity of parallel independent radio channels for increased reliability at low transmit power
- Spectrum monitoring leveraging multiple distributed sensors for localization, enabling cognitive radio and dynamic radio resource management
- Flexible multi-carrier waveforms including Generalized Frequency Division Multiplexing for increased robustness in adverse radio channels and lower latency

