

## Fast Actuators Sensors and Transceivers (FAST)

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**Abstract:** We will give an overview of the German zwanzig20 BMBF cluster FAST which aims at achieving a technological and economic breakthrough by means of real-time capabilities. The FAST consortium consist of 44 small and medium sized enterprises, 19 large companies, 8 universities, 6 research institutes and one association. The FAST partners encompass the whole competency and value chain from materials, semiconductors, components and software to complex systems and communication networks. FAST comprises around 20 projects and is scheduled from 2014 to 2020.

For many applications in the area of security, traffic, medical, sports, consumer electronics and communications, real-time capabilities enable new application functionality and markets. The entire process including sensing, data transfer, processing and actuation must have a negligible delay. This is in particular a huge challenge for systems that connect a high amount of sensors and actuators comprehensively via mobile communication networks. In this regard, FAST wants to get as close as possible to the ultimate physical limitation given by the speed of light. In ideal case, a signal needs only 0.1 ms for 30 km.

Examples for specific application of the real-time technologies are: 5G communications, automated driving, road traffic management, 10 Gb/s real-time Ethernet in vehicles, real-time radar, sensor networks, real-time automated industry, real-time control, testing and synchronization of machines, motors and work pieces, movement analysis and optimization of athletes and in the care sector, tele-surgery, remote treatment of patients, virtual reality apps, real-time connection of musicians via internet, and real-time cloud services.

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Moreover, we will present research of our chair in the area of high speed and low power consuming systems, transceivers and circuits.

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