CONNECT

5G in the hospital environment

Background

The German-French project 5G-OR was selected as one of four winning projects for the call „Technical developments and application ecosystems for 5G private networks“. The project partners are Fraunhofer IPA, Reutlingen University of Applied Sciences, Charité-Universitätsmedizin Berlin, SectorCon GmbH and KARL STORZ SE & Co KG. The French project partners are IHU-Strasbourg, the Institute of Research and Technology and RDS (Rhythm Diagnostic Systems). Together, theoretical fields of application are to be tested and analysed in practice in various operating theatres of the above-mentioned hospitals. The project, which will run for three years, is funded by the Federal Ministry for Economic Affairs and Climate Protection.

Networked digital world in hospitals and clinics

Digitalisation is also in full swing in the health sector. The most important trends are AI and big data, sensor technology and mobile health, e-health for the digital care of patients as well as digitisation in the operating theatre through robotics and better networking. The basis for entering a networked digital world in hospitals and other healthcare facilities is fast and secure data communication. But what added value can hospitals benefit from in the future through their own modern 5G network?

The aim of networking hospitals with modern 5G mobile radio standards is to pave the way for smart hospitals in the future by digitally supporting or fully automating processes that currently still require massive staff deployment.

The 5G-OR project, which started at the beginning of the year, deals with various use cases for 5G in clinics and hospitals. These primarily relate to the following areas and are being tested in practical application in hospitals in Mannheim, Strasbourg and Berlin:

1. **Permanent recording and analysis of vital patient parameters**

Especially in the past two years and the prevailing pandemic, the focus has been on the permanent monitoring of vital parameters. Despite the use of wearable devices and conventional machines, hospital staff are inundated with a multitude of acoustic and visual information. In view of the fact that there is a considerable shortage of medical staff, especially in the health sector, this flood of information quickly brings hospital staff to their respective limits. The hospital of the future will have all of the patients‘ vital data sent wirelessly to a central computer, where the data will be evaluated in real time with the help of artificial intelligence. In this way, hospital staff will receive information about which patients require acute action. 5G is intended to create the

basic framework for networking a large number of devices quickly, efficiently and with minimal communication delays via mobile radio.

2. AI-supported image and video data evaluations in the OR

In future, video sequences or diagnostic images from the operating theatre will be analysed live with the help of artificial intelligence and provide immediate feedback in the event of abnormalities or potential complications. In this context, 5G can provide large bandwidths for the huge amounts of data and simultaneously calculate many applications through edge computing. This saves valuable time and makes it possible to continue working directly on the patient without first having to upload the data to a remote cloud.

3. Tele-surgery with the help of provided real-time data

5G technology also offers the possibility of tele-surgery, in which doctor and patient can be separated not only spatially but also geographically. This is made possible on the one hand with the help of continuously transmitted real-time data and the use of a surgical robot that the doctor can control remotely. Here, technological progress has already reached the point where the doctor can feel resistance as haptic feedback thanks to integrated sensors. In order to ensure reliable, constant and almost delay-free transmission, the 5G mode „ultra reliable and low latency communications“ is necessary.

4. Parts supply in the operating theatre by robots

With the help of 5G campus networks, another project will make it possible for mobile robots to reliably provide all the necessary devices, instruments and materials in the operating theatre, thereby relieving the medical staff and providing them with targeted support. Such processes are already in daily use in industry, but in operating theatres they are exposed to special challenges in terms of precision, safety, flexibility and reliability, which are to be made possible by the 5G campus networks.

All in all, 5G mobile networks are expected to facilitate and accelerate the transmission of data within a hospital in the future, so that all doctors and specialists involved will have rapid access to important information and treatments can be continued and optimised without interruptions. The modern radio standard is intended to enable constant, delay-free and stable transmissions and to advance digitalisation within healthcare facilities.

Are you interested in digital processes and the use of 5G mobile networks in a medical context? We have researched and listed innovators for you. Take a deeper look into current projects and learn more about the practical implementation in everyday hospital life. arcoro CONNECT links interested parties with expertise and exciting projects in medical technology.

CLINIC / RESEARCH INSTITUTE	LOCATION	FIELD OF EXPERTISE
Fraunhofer IPA	Germany	Clinical health technologies / 5G
Institute of Research and Technology	France	Clinical health technologies / 5G
Charité-Universitätsmedizin Berlin	Germany	Clinical health technologies / 5G
IHU-Strasbourg	France	Clinical health technologies / 5G
Bonnner Universitätsklinik	Germany	Clinical health technologies / 5G
Leipziger Helios-Kranken-haus	Germany	Clinical health technologies / 5G
Düsseldorfer Universitäts-klinikum	Germany	Clinical health technologies / 5G