RESEARCH AND DEVELOPMENT

Aiming to Improve the Business Value through Development of Advanced Technology

The OKI Group actively develops cutting-edge technologies with the aim of contributing to building "a safe, secure and comfortable society," as an important theme for R&D. We designate the important areas of technology for "a safe, secure and comfortable society" as "sensing," "smart network," and "data mining." We are further advancing the integration of OKI's traditional strengths of media processing technologies and optical broadband technologies with OKI's ability to build systems.

Furthermore, we are pouring effort into innovative development that will connect the fruits of research and development with new business value, aiming for the creation of new businesses.

01

Research and Development for OKI's Safe, Secure and Comfortable Society Vision

The IT foundation for a safe, secure and comfortable society is formed by organically connecting the technologies of "sensing," "smart network," and "data mining." Our efforts in these technological areas include the following:

Sensing

OKI has newly developed radio sensing technology, whereby people's activities and contexts can be detected with high sensitivity from fluctuations in radio waves. When combined with awareness technology, such vital changes as respiratory rate can even be recognized. With the arrival of the unprecedented aging society, this technology, together with image-sensing technologies, will contribute to the provision of safety and security.

Smart Network

OKI was the first in the world to develop a 920 MHz bandwidth wireless multi-hop network technology that can accommodate large-scale as well as small-scale systems, and offers enhanced efficiency in power consumption. This enables various sensors and equipment to be connected to networks, regardless of the environment. This technology is expected to be used in combination with data mining technology, and we envision its utilization in energy-saving applications at smart offices as well as in the disaster recovery field for remotely surveying the damage from earthquake, for example.

Data Mining

OKI is developing data mining technology to find and utilize hidden "meaningful information" from among an expansive environment of diversified information and information on people's activities conveyed via networks after obtained from sensing.

02

Research and Development Leveraging OKI's Strengths

OKI has strengths traditionally in media processing technologies for audio and video and optical broadband technologies, and is able to compete on a global level in these areas.

Aiming for Audio and Video Technologies that Provide Greater Comfort

Amid the rapid proliferation of smartphones, OKI is working to develop audio and video technologies that provide comfort, such as voice processing technologies that achieve clarity in reproduction even in noisy environments and video coding technologies that can operate even on devices with limited processing capabilities. Furthermore, we are also working to develop digital signage and other media processing systems that can integrate these technologies.

Aiming for Further Development of Broadband Networks

In order to realize further improvements in energy conservation, OKI is developing new optical broadband technology for next-generation optical access networks to realize virtual networks with more efficient bandwidth utilization.

03

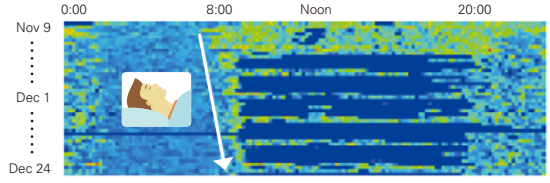
Development of Basic Technologies for the Future

The accumulation of technologies that we develop will become the foundation that supports OKI's future businesses. In particular, OKI is researching usability technologies, quantum cryptography technologies, and recognition technologies. Usability technologies are indispensable to terminal equipment that we have many years' research experiences. Quantum cryptography technologies will enable the realization of indecipherable encoding, when everything in society becomes interconnected and security turns to be more important. Recognition technologies, also, is necessary to replicate human intellectual functions.

Topics 1 Ultra-sensitive Human-detecting Sensor Technology Capable of Detecting Minute Movements, including Human Breathing

OKI developed a human-detecting sensor technology capable of distinguishing between large movements such as walking about a room to minute movements like breathing. Last year, the Company commercialized this technology to launch a personal monitoring system and is continuing to advance development of this technology to extract higher valuable information from the system's sensor signals. In the future, the system could, for example, help practitioners identify health risks from changes in a person's activities and internal stress from data on minute changes. We hope that it will contribute to supporting healthy and independent living and accordingly leading to a safer and more secure society.

The graph shows sensor-collected data on a person's movements in the house in autumn and winter, which are color-coded for the degree of movement. People's activity levels differ depending on the season, therefore, the data indicates a trend for inertia on cold mornings when temperatures are declining. We believe that extracting data in this way could have important health implications.



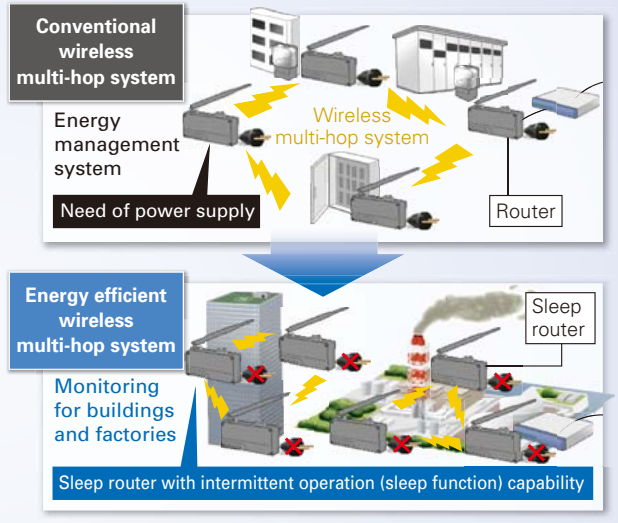
Comment from the Technical Engineer

We are working hard every day to broaden R&D into new territories for the next phase of advancing the technology. While honing OKI's strength in sensing technology, we are also deepening collaborations with experts in other fields and seeking new ways to interpret the data. These activities require constant testing and retesting of the technology, and this repetition is the foundation for OKI's strength in R&D.

Topics 2 Highly energy efficient wireless multi-hop technology enables battery-powered router devices

OKI developed highly energy efficient wireless multi-hop technology for wireless networks effectively collecting a vast range of sensor data. The technology will enable all of a network's wireless sensor-incorporated devices, including repeaters (router devices) to work on intermittent operation (sleep function), creating the potential for a whole network to be battery powered. In conventional sensor networks, such as ZigBee networks, only the wireless sensors in the network terminals have sleep capability, and it was necessary for the intermediate routers to have a power supply. Our development makes it possible for a network's routers to also operate on batteries, thereby enabling wireless sensor networks to extend over broader ranges. The extended range creates application potential in areas where supplying power is difficult, such as on bridges and in tunnels, to be used for social infrastructure maintenance and management and for building and factory monitoring.

Supposed applications



Comment from the Technical Engineer

Making wireless devices sleep when they are not sending communication signals is an effective way to save energy. Since, in data-relaying multi-hop communications, controlling the timing that a device sleeps is a key technology because the devices must be able to receive the relay data at any time.

We are advancing the technology to improve energy efficiency by lengthening the sleep periods while also having the ability to relay data with low-latency networking.