FOR IMMEDIATE RELEASE

Highly reliable wireless communication technology for remote monitoring of factories and buildings

-- Reduction of arrival delay of alarm signals to one-tenth --

Tokyo, September 1, 2011 --- Hitachi, Ltd. (NYSE: HIT/TSE: 6501, hereafter, Hitachi) today announced the development of technology to increase the reliability of remote monitoring systems using cellular mobile telephone networks to wirelessly transmit data collected from sensor terminal measuring the status equipment in factories and buildings to monitoring center. This technology reduces the arrival time of alarm signals. By avoiding other radio waves which interfere with data transmission from the sensor terminals, not only the data communication error ratio is reduced but also transmission of irregular data measured by the sensor terminal is prioritized. With apply this technology, it enables the stable wireless collection of data measured by the sensor terminals as well as important alarm information. Results of verification experiments performed with a prototype system set up in a Hitachi's factory showed that sensor terminal data communication error ratio was reduced to about one-hundredth of previous levels and that the alarm signal arrival time delay using a cellular mobile telephone network was reduced to about one-tenth.

With the recent increase in environmental awareness, companies have started to introduce energy management systems (EMS) to optimize facility operations. EMS uses sensor terminals to measure the power consumption of equipment or the temperature and humidity of the environment within a facility and transmits the data via a communication network to a control center where the data is collected, analyzed and used to control facility conditions. Although current EMS use reliable wired networks to send data, there is growing interest in using wireless networks especially in facilities where it is difficult to lay new lines, as set-up costs are lower and changes in layout are easily achieved. Further, where there is a significant distance between the factory/building and the monitoring center, use of the already widely established cellular mobile telephone network is thought to be particularly efficient. However, when sensor terminals are used within factory/buildings, the radio waves emitted from sensor terminals and radio waves emitted from wireless LAN and existing equipment interfere with one another increasing data

communication error. Also, if the cellular mobile telephone network is using, when the network is congested, there is a delay in the arrival of alarm signals from the sensor terminal reporting irregularity in the facility and environmental conditions, therefore delaying the response of the monitoring center to such emergency changes. Regarding this two issues, in order to achieve highly reliable wireless network based remote monitoring, the development of a communication control technology able to reliably send alarm signals to the monitoring center without a time delay was necessary.

Under this circumstances, Hitachi developed a wireless communication technology which reduces the data communication error ratio as well as decreasing the arrival time delay of alarm signals in remote monitoring using cellular mobile telephone network.

Using 30 sensor terminals (IEEE standard 802.15.4[*1]) loaded with this new wireless communication control technology, verification experiments were conducted within a factory environment equipped with both wireless LAN and various equipment. The experiments confirmed a data communication error ratio less than 10^{-6} (one-hundredth that of a similar system without this new technology) within the three seconds it took for the data to be transmitted from a sensor terminal to a gateway[*2]. In addition, when verification experiments were conducted using an EVDO[*3] compliant cellular mobile telephone network to connect a monitoring center and a remote facility, it was found that at an average data throughput of 30 kbps, data non arrival was less than 10^{-6} and the arrival delay was within six seconds. This is equivalent to one tenth that in a similar set up not using this new technology.

It is expected that this new wireless communication technology will be applied to not only EMS but also to social infrastructure such as Smart Cities which aim to achieve next-generation energy and societal systems on city or regional basis.

These results will be presented at the Institute of Electrical Engineers of Japan “Electronics, Information and Systems Society Conference” to be held from 7th to 9th September 2011 at the University of Toyama, Toyama, Japan, and the Institute of Electronics, Information and Communication Engineers “Society Conference” to be held from 13th to 16th September 2011 at the Hokkaido University, Sapporo, Japan.

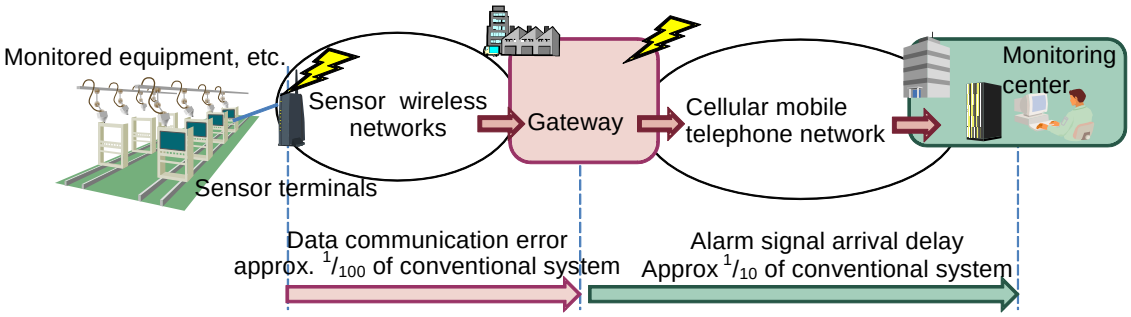
Details of the technology developed are described below.

(1) Communication control technology to reduce data communication error in wireless sensor networks

Data communication error in wireless networks is often caused by interference between the radio waves emitted from sensor terminals and the radio waves emitted from existing equipment. Interference avoidance technology was developed which monitors the conditions generating interference, and avoids the use of frequency bandwidths where interference is generated by using a frequency range in which communication is smooth and no interference occurs. Further, as simultaneous transmission from multiple sensor terminals may be the source of error, time division-multiplexing which assigns communication time slots was combined with interference avoidance to reduce data communication error without increasing the delay in data arrival time.

(2) Technology to reduce arrival signal delay in mobile cellular networks

The main cause of delay in alarm signal arrival is data clogging which occurs at the gateway when mobile cellular network communication speed decreases instantaneously. Focusing on this issue, technology was developed which, when a decrease in cellular mobile telephone network communication speed is detected, the gateway selectively sends only important alarm signals. By applying this technology, data clogging is relieved and time delay in signal arrival can be maintained below a threshold.



Wireless network remote monitoring system configuration

■Notes

*1. IEEE standard 802.15.4: A wireless communications standards for the WPAN (Wireless Personal-Area Network) being developed by the IEEE (Institute of Electrical and Electronics Engineers).

*2. Gateway: As shown in above figure, it is a device that mediates between wireless sensor networks and mobile networks.

*3. EVDO (Evolution Data Optimized): A third-generation mobile telecommunications standard standardized by the 3GPP2 (Third Generation Partnership Project 2).

■ About Hitachi, Ltd.

Hitachi, Ltd., (NYSE:HIT / TSE:6501), headquartered in Tokyo, Japan, is a leading global electronics company with approximately 360,000 employees worldwide. Fiscal 2009 (ended March 31, 2010) consolidated revenues totaled 8,968 billion yen ($96.4 billion). Hitachi will focus more than ever on the Social Innovation Business, which includes information and telecommunication systems, power systems, environmental, industrial and transportation systems, and social and urban systems, as well as the sophisticated materials and key devices that support them. For more information on Hitachi, please visit the company's website at http://www.hitachi.com.

###

Information contained in this news release is current as of the date of the press announcement, but may be subject to change without prior notice.
