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**FOR IMMEDIATE RELEASE**

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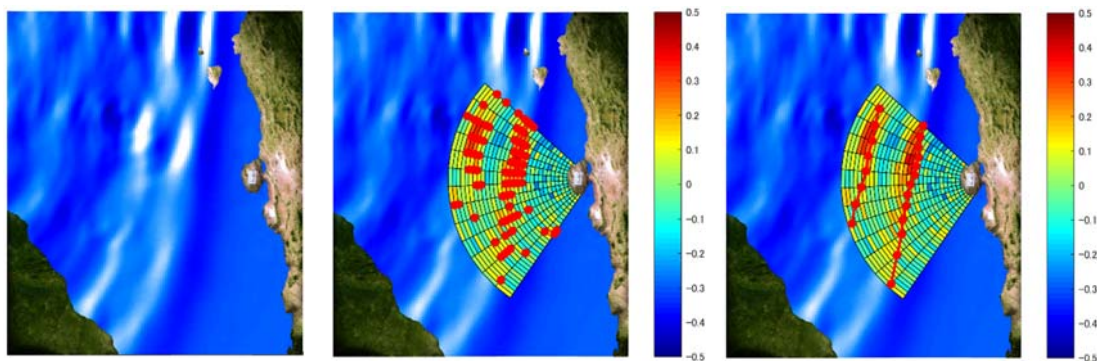
## **Mitsubishi Electric Develops Enhanced Tsunami Detection Technology**

*Will contribute to earlier and more accurate detection of tsunamis and facilitate timely evacuation*

**TOKYO, January 25, 2019** – [Mitsubishi Electric Corporation](http://www.MitsubishiElectric.com) (TOKYO: 6503) announced today that it has developed an high-frequency ocean surface radar technology that provides detailed measurement of tsunami sea levels, allowing more accurate and timely detection of the multiple wave-fronts of tsunamis. The technology is able to correctly detect tsunamis with an false alarm rate as low as 0.1 percent and estimate sea levels to within 50 centimeters\*, an improvement over 1m accuracy of conventional technology, enabling earlier and more accurate estimation of the scale of a tsunami, thereby facilitating timely evacuation and the minimization of casualties. Going forward, the company will continue to develop the technology together with universities, aiming at commercialization by the year 2025.

\* if measurement range of the radar is below 50 kilometers. The performance depends on measurement conditions such as the state of the sea and others

High-frequency ocean surface radars of the kind supplied by Mitsubishi Electric since 1999 are designed to monitor ordinary ocean currents, but cannot detect tsunamis. Following the Great East Japan Earthquake of March 11, 2011, which triggered a massive, deadly tsunami, it was reported that the tsunami had actually been detected by oceanographic radar. As a result, Mitsubishi Electric began working on tsunami multiple wave-front detection technology using high-frequency ocean surface radar. The company hopes that its enhanced technology will help minimize any further loss of life resulting from tsunamis.



Tsunami occurrence condition

Conventional method

Proposed method  
(Mitsubishi Electric simulation)

According to the Japan Society of Civil Engineers, oceanographic radar can observe ocean surface currents up to 50 kilometers offshore. Tsunamis can reach a speed of 98km/h at a tilted sea depth of 300 meters, so a tsunami 50 kilometers offshore can reach the coast in 30 minutes. The Urban Renaissance Agency has determined that a 10-minute early warning is required to successfully evacuate most coastal communities threatened by an approaching tsunami.

Mitsubishi Electric initially developed the world's first high frequency ocean surface radar offering enhanced tsunami monitoring accuracy, as announced in February 2015.\*\* The technology has now been further enhanced, allowing it to detect a tsunami's multiple wave-fronts by measuring the velocity of the ocean surface and to accurately estimate sea levels using high-frequency ocean surface radar technology.

\*\* Mitsubishi Electric's New Technologies Enhance Tsunami Radar Monitoring  
<http://www.mitsubishielectric.com/news/2015/0217-e.html> (February 17, 2015)

Mitsubishi Electric's technology improves the accuracy of tsunami detection by focusing on the characteristics of tsunami in regions with high flow velocity wave fronts. Using a proprietary algorithm it estimates the wave-front characteristics of the tsunami referencing a number of potential types and is thereby able to estimate the direction of travel. It also estimates the height of the tsunami from the collected Doppler velocities of wave-front data. This allows to detect tsunamis with a false alarm rate as low as 0.1 percent and improves the accuracy of tsunami sea level estimates to within 50 centimeters, an improvement over 1m accuracy of conventional technology, and enables earlier and more accurate estimation of the scale of a tsunami.

The deployment of high-frequency radio waves of the kind used for oceanographic radar enables information to be collected in areas extending more than 20 kilometers offshore. Conventional radar methods using microwaves and buoys are limited to line of sight because of the earth's curvature.

### **Patents**

Pending patents in this news release number one in Japan and one outside of Japan.

Patents in this news release number four in Japan and four outside of Japan.

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### **About Mitsubishi Electric Corporation**

With nearly 100 years of experience in providing reliable, high-quality products, Mitsubishi Electric Corporation (TOKYO: 6503) is a recognized world leader in the manufacture, marketing and sales of electrical and electronic equipment used in information processing and communications, space development and satellite communications, consumer electronics, industrial technology, energy, transportation and building equipment. Embracing the spirit of its corporate statement, Changes for the Better, and its environmental statement, Eco Changes, Mitsubishi Electric endeavors to be a global, leading green company, enriching society with technology. The company recorded consolidated group sales of 4,444.4 billion yen (in accordance with IFRS; US\$ 41.9 billion\*) in the fiscal year ended March 31, 2018. For more information visit:

[www.MitsubishiElectric.com](http://www.MitsubishiElectric.com)

\*At an exchange rate of 106 yen to the US dollar, the rate given by the Tokyo Foreign Exchange Market on March 31, 2018