

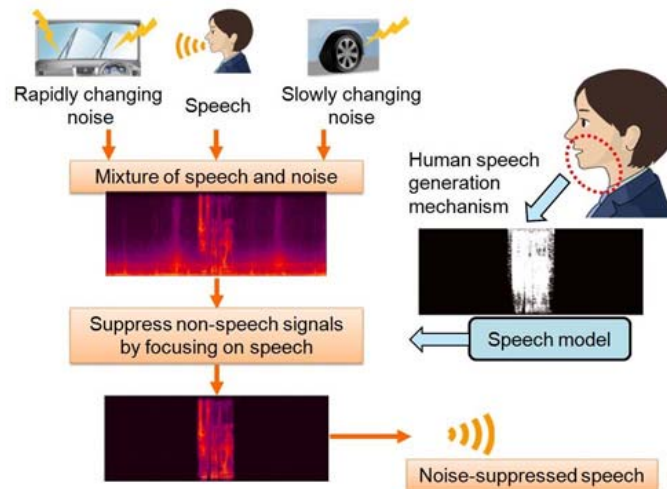
## Mitsubishi Electric Develops Noise-suppression Technology for Hands-free Voice Calls via Car Navigation Systems

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Improves clarity in speech communication by drastically suppressing surrounding noises

Mitsubishi Electric Corporation (TOKYO: 6503) has developed breakthrough noise-suppression technology that significantly improves the quality of hands-free voice communication in noisy conditions, such as making a voice call via a car navigation system. The technology improves voice clarity by removing 96% of ambient sound, including rapidly changing noise from turn signals or wipers, which are difficult to suppress using conventional methods.

Mitsubishi Electric aims to launch its new technology in car navigation systems in 2018. It will also explore applications for voice communication in other high-noise environments, such as factories and elevators.



While it is very difficult to develop a model that can precisely handle all noises, human speech can be clearly characterized in terms of airflow from the lungs, vocal cord vibrations and the shape of the vocal tract. Mitsubishi Electric's powerful speech model exploits such characteristics, and incorporates a machine-learning method based on artificial neural networks that distinguish clearly between speech and non-speech sounds.

This breakthrough noise-suppression technology significantly improves the quality of hands-free voice communication compared to conventional methods. Using massive amounts of data, the system learns how to process both slowly and rapidly varying noises typically present inside a car, including external noise from the road and other cars and internal noise from the air conditioner, turn signals and windshield wipers.

In tests, Mitsubishi Electric's new system suppressed 96% of the ambient noise, compared to only 78% for a conventional system. Also, the Mean Opinion Score, a measure of perceived quality, was 0.7 point higher than the conventional system, indicating that all listeners are expected to notice improved noise suppression.

Current noise-suppression technology is used in applications such as echo cancellation for speakerphones and active noise cancellation for headphones. In the case of hands-free voice communication in cars, existing technologies can suppress stable or slowly varying noises from the road, wind, air conditioners, etc., but no current technology can efficiently suppress rapidly changing noise from other vehicles, turn signals, wipers and so on.

Mitsubishi Electric has an outstanding track record in developing robust solutions for noise processing, as exemplified by winning the CHiME Challenge, an international competition for speech recognition under noisy conditions, in 2013.

#### **Patents**

Pending patents for the technology announced in this news release number three in Japan and seven abroad.

#### **About Mitsubishi Electric Corporation**

With over 90 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 4,054.3 billion yen (US\$ 39.3 billion\*) in the fiscal year ended March 31, 2014. For more information visit <http://www.MitsubishiElectric.com> \*At an exchange rate of 103 yen to the US dollar, the rate given by the Tokyo Foreign Exchange Market on March 31, 2014