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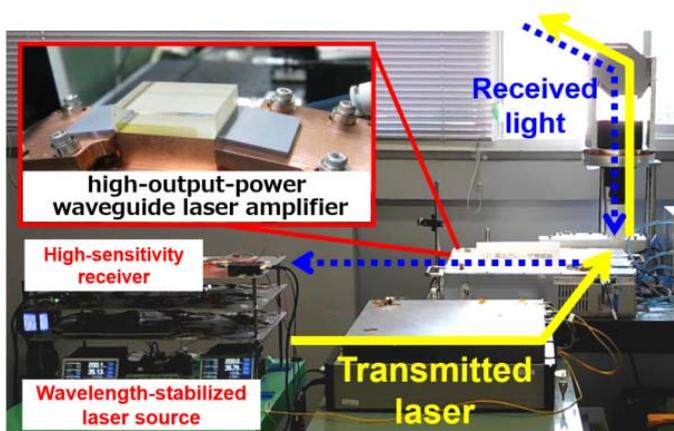
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## Mitsubishi Electric Testing Wind LIDAR and Water Vapor DIAL, Including Laser Amplifier with World's Highest Output, for Early Forecasting of Torrential Rain

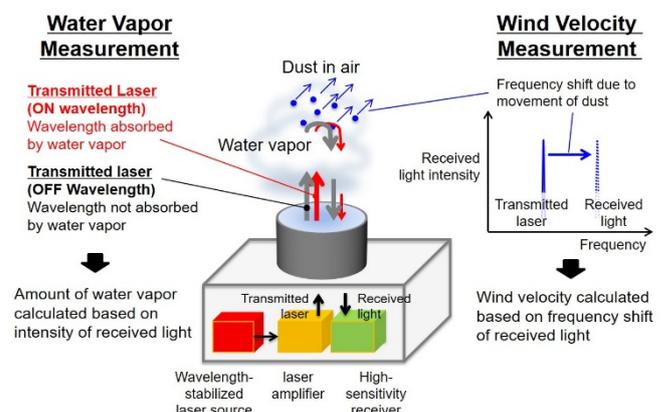
*Will facilitate better forecasting of torrential rain*

**TOKYO, October 11, 2018** – [Mitsubishi Electric Corporation](http://www.mitsubishielectric.com) (TOKYO: 6503) announced today that it has started demonstration testing of a new system equipped with wind LIDAR (light detection and ranging) and water vapor DIAL (differential absorption LIDAR) measuring methods for the early forecasting of torrential rain. The system incorporates a newly developed high-output-power waveguide laser amplifier that delivers what is believed to be the world's highest output, 15.8 millijoules, using an a single-frequency pulse laser in the 1.5 $\mu$ m wavelength, which is not harmful to human eyes. The tests are expected to demonstrate that the system simultaneously measures water vapor in the air and upward air currents, which cause cumulonimbus clouds, quicker, more accurately and in a wider range compared to conventional alternatives. Going forward, Mitsubishi Electric expects to make further improvements prior to launching a commercial system for the extra-early forecasting of torrential rain.

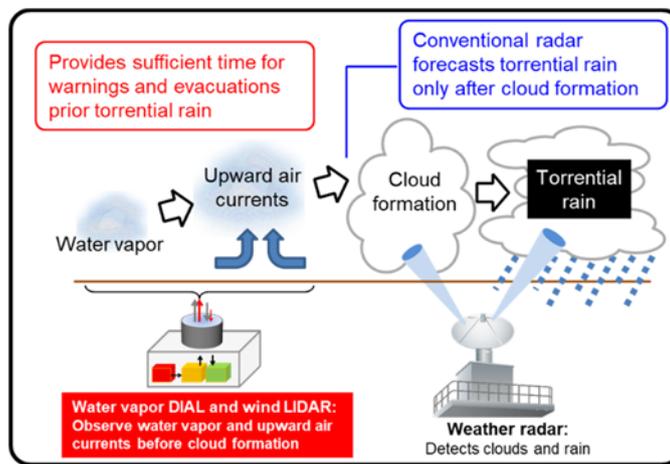
The wind LIDAR and water vapor DIAL demonstration system will be exhibited at CEATEC JAPAN 2018 at Makuhari Messe exhibition complex in Chiba Japan from October 16 to 19.



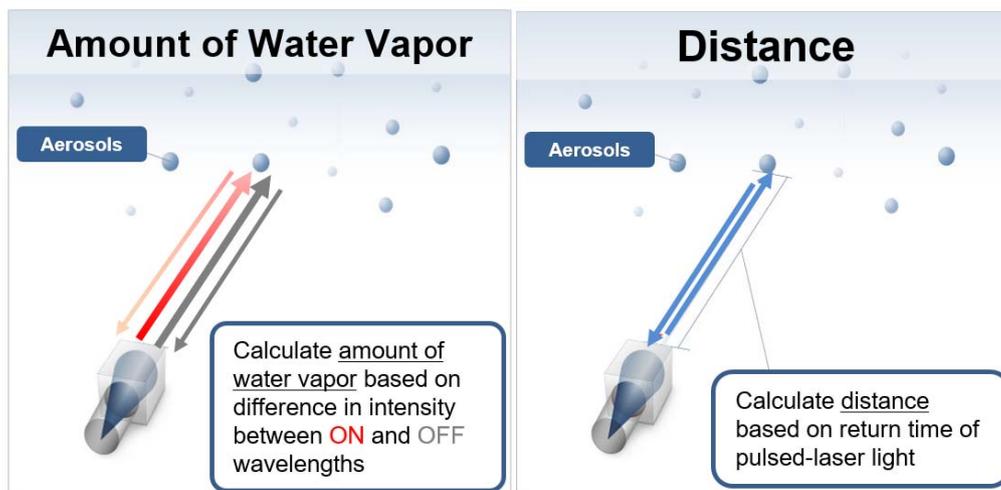
Demonstration water vapor DIAL and wind LIDAR



Principles of water vapor DIAL and wind LIDAR measurements



The new system, which is based on a conventional wind LIDAR that Mitsubishi Electric released on May 28, 2014, has been enhanced for the measurement of water atmospheric vapor. It transmits laser beams from the ground to simultaneously measure the amount and distance of water vapor as well as the speed and direction of wind.



Water vapor measurement

### Features of New DIAL and LIDAR System

#### 1) *Downsized laser amplifier with planar waveguide configuration*

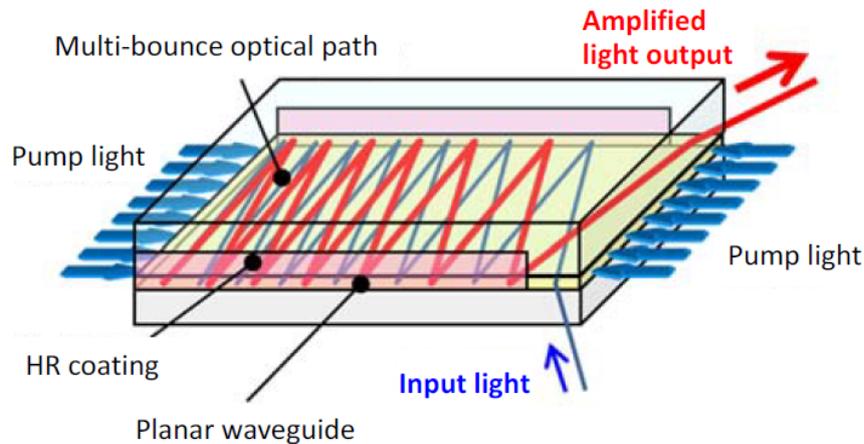
- Long optical path for amplification is folded to downsize and the laser beam is confined in the planar waveguide. The design is both compact (30 mm x 23 mm x 8 mm) and achieves an amplification factor of 400 times, which has similar characteristics of optical fiber amplifiers and 27% greater than that of conventional amplifiers which use solid-state laser materials.
- The high-power lasers are achieved with compact waveguides that use a double-clad waveguide structure composed of multiple layers.

#### 2) *Increased output for detecting tiny amounts of laser absorption in water vapor*

- Use of a single-frequency pulse laser in the 1.5 $\mu$ m wavelength facilitates highly sensitive detection.
- Mitsubishi Electric's original design suppresses both scattering losses due to the high output of a single wavelength and energy dissipation due to high amplification.
- Output is a world's leading 15.8 mJ (millijoules), which is about three times greater than that of the company's existing wind LIDAR.

3) *No danger to human eyes*

- Safe outdoor measurements are assured by using the 1.5 $\mu$ m wavelength, which is not harmful to human eyes.



Structure of planar waveguide laser amplifier

Extreme weather-related disasters are on the rise worldwide. In the case of torrential rain, early warnings must be issued as early as possible to enable communities to evacuate to safety. With conventional weather radars, however, cumulonimbus clouds can only be observed after they have formed, making it difficult to forecast torrential rain in time to carry out evacuations adequately. To facilitate better forecasting, Mitsubishi Electric has been extensively testing and refining the measurement accuracy of new water vapor DIAL and wind LIDAR methods, which are now in the stage of demonstration testing.

**Patents**

The patents for the developed technology announced in this press release number seven in Japan and seven in other countries.

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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