

**MITSUBISHI ELECTRIC CORPORATION**  
**PUBLIC RELATIONS DIVISION**  
7-3, Marunouchi 2-chome, Chiyoda-ku, Tokyo, 100-8310 Japan

**FOR IMMEDIATE RELEASE**

**No. 3197**

*Customer Inquiries*

*Media Inquiries*

Advanced Technology R&D Center  
Mitsubishi Electric Corporation  
[www.MitsubishiElectric.com/ssl/contact/company/rd/form.html](http://www.MitsubishiElectric.com/ssl/contact/company/rd/form.html)  
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Public Relations Division  
Mitsubishi Electric Corporation  
[prd.gnews@nk.MitsubishiElectric.co.jp](mailto:prd.gnews@nk.MitsubishiElectric.co.jp)  
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## **Mitsubishi Electric Unveils Compact, Flexible and Highly Efficient Optical Module for LED Headlights in Smart Mobility Age**

*Advanced design and lighting will contribute to ease of driving and safety*

**TOKYO, June 7, 2018** – [Mitsubishi Electric Corporation](http://www.mitsubishi-electric.com) (TOKYO: 6503) announced today that it has developed a compact and highly luminous optical module for LED headlights using a unique system that simply combines a converging lens and projecting lens for more efficient LED headlights. Even though the new system measures only 20 millimeters high it achieves 180 percent luminous efficiency, which is equivalent to larger 40 millimeters to 60 millimeters projecting lenses. Optimal light-distribution control and design flexibility enhance driving safety and ease while lowering energy consumption, making the module an ideal solution for next-generation smart mobility. The new technology will be exhibited at the Mitsubishi Electric booth during CES Asia 2018 in Shanghai, China from June 13 to 15.



Design image of the newly developed optical module



Compact, flexible and highly efficient optical module for LED headlights

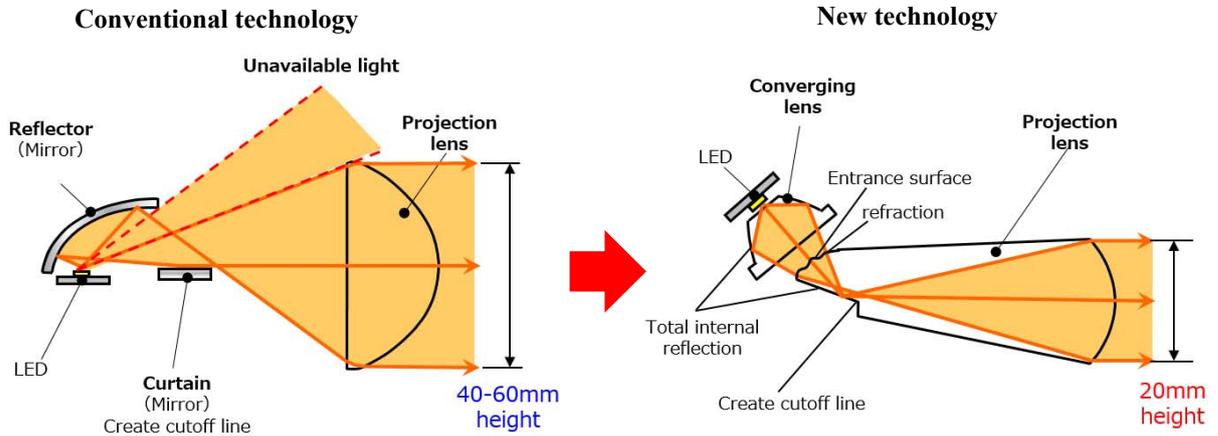
Headlight optical systems collect light projected from an LED light source to form a light beam with a cutoff line for the low beam. Conventional systems use reflectors with coated mirrors that are prone to reflection loss, low efficiency and take up space due to their large size. Mitsubishi Electric, aiming to enhance night-driving safety by achieving superior visibility for the driver and the elimination of glare for other vehicles and pedestrians, has developed an optical module for LED headlights that is compact, highly luminous-efficient, equipped with advanced and precise beam-control functions, and offers design flexibility.

## Features

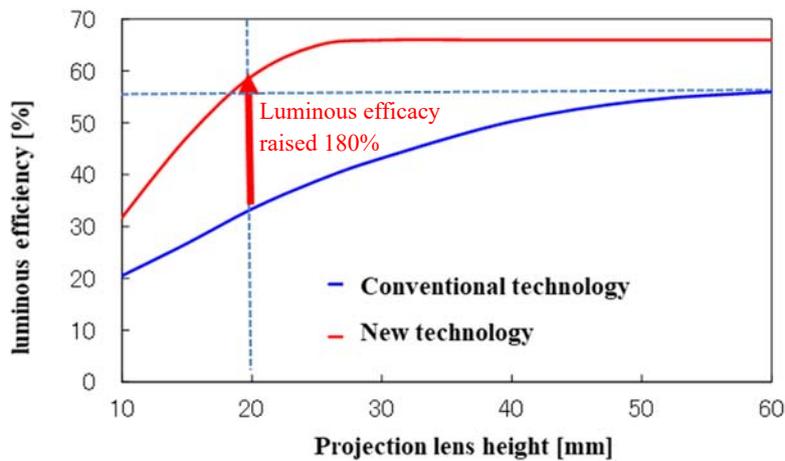
### 1) Direct projection for compactness and high luminous efficiency

- Unique optical system for LED light source convergence and projection.
- Compact 20mm high design incorporates no mirror.
- 180% luminous efficacy equivalent to that of larger 40mm–60mm projectors.
- Compactness and high luminous efficacy achieve design flexibility, resulting in diverse thin-, multiple- and single-light options for motorcycles and automobiles.

The optical system incorporates only two key components—a converging lens and a projection lens. The converging lens, which suppresses diffusion and forms a beam shape with no reflection loss, sends LED light to the projection lens, where the light strikes a reflective non-vacuum metalizing surface. The light is projected forward in parallel, resulting in high luminous efficiency.



Comparison of conventional technology and the newly developed optical module



Projection lens height versus luminous efficiency

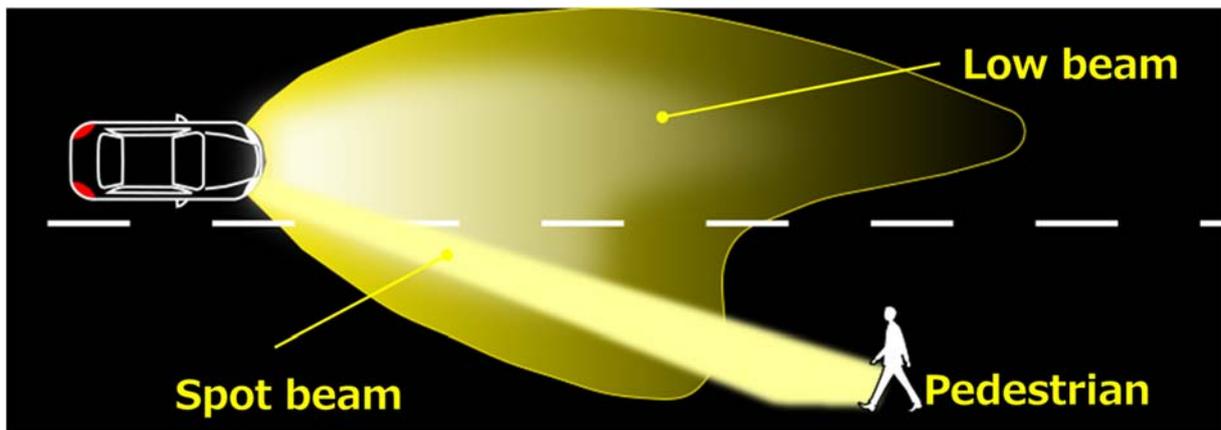
2) *Effective beam control for enhanced ease of driving and safety*

- Sensor detects pedestrians and illuminates them with a spot beam to compensate for low-beam lights.
- Color temperature\* can be adjusted for the driver's nighttime color visibility.
- Adaptive Driving Beam (ADB) by precise beam-control functions.

Obstacles that are not illuminated by low-beam headlights pose a challenge, so Mitsubishi Electric developed a function that projects a spot beam on obstacles detected by a sensor, enabling early identification of pedestrians, etc. for safer nighttime driving.

Furthermore, a human-system interface allows the light's color temperature to be adjusted according to the driver's needs, thereby improving night visibility for each driver. In addition, the LED lighting control includes an ADB for passive high-beam driving to secure superior visibility.

\* Quantitative measure of colors ranging from bluish white to yellowish white to red



Spot beam projection on a pedestrian

**Patents**

Patents for the technology announced in this press release number 5 in Japan and 15 abroad.

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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 4,431.1 billion yen (US\$ 41.8 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