# A technique for direct optical coupling of an optical integrated circuit to optical fibers

## Development of a high-performance micro-optical converter to scale transmitted signal light

We have developed a technique for direct optical coupling of a silicon-photonics-based optical integrated circuit (optical IC) to standard 10-μm-diameter optical fibers. Conventional direct coupling techniques suffer a significant optical loss due to the optical waveguide of the optical IC being much narrower than the optical fiber, and to the difference in the refractive index between the waveguide and the fiber. The new optical coupling technique can reduce the optical loss to less than 1 dB per end face using a new optical converter that can change both the diameter of the signal light and the refractive index of the optical waveguide to those of the optical fiber. This technique allows low-loss optical coupling of an optical IC to the standard optical fibers by an easy assembly process of butt-coupling. Thus, it is expected to contribute to a reduction in the cost of a multi-channel optical IC.

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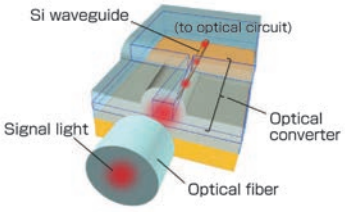
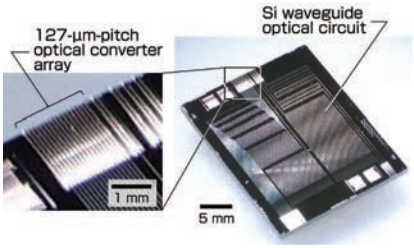



**Optical converter that can scale beam diameter of optical signal between silicon optical waveguide and optical fiber**




**Optical IC (right) containing fabricated optical converter array (left)**



# A system to integrate radiation data from various regions

## Creating big data by easy normalization of data in many formats

Since the accident of TEPCO Fukushima Daiichi Nuclear Power Plant in March 2011, efforts have been made to gather and integrate radiation data, but this task has required manual work of IT experts and thus has been too costly to sustain or extend. We have developed a software system and made publicly available an associated Web-based service to allow ordinary people to register and integrate radiation data from various sources and visualize them on maps, to deal with the spreading radioactive contamination. This service helps the general public collaboratively construct and maintain big data. Based on this infrastructure, we are planning to further provide technologies to support various services to assist individuals to manage radiation-exposure risks.

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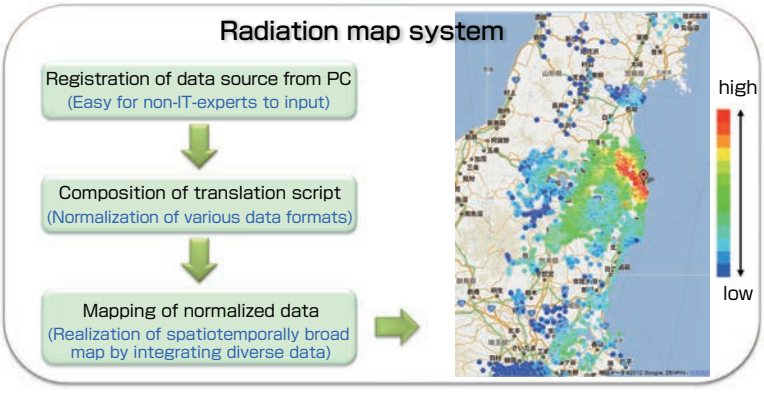


**Mechanism and screenshot of radiation map system**