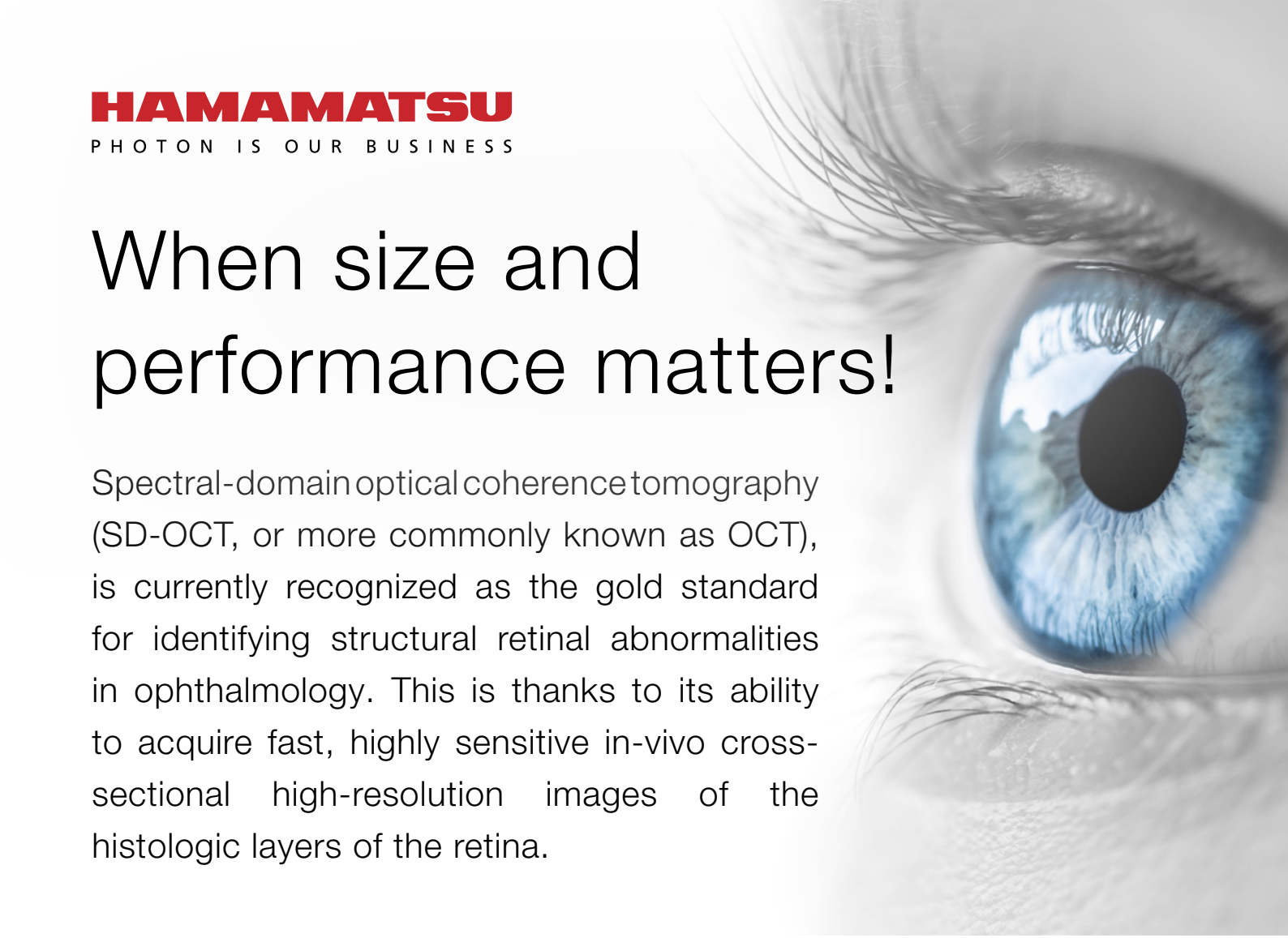
HAMAMATSU

PHOTON IS OUR BUSINESS



When size and performance matters!

Spectral-domain optical coherence tomography (SD-OCT, or more commonly known as OCT), is currently recognized as the gold standard for identifying structural retinal abnormalities in ophthalmology. This is thanks to its ability to acquire fast, highly sensitive in-vivo cross-sectional high-resolution images of the histologic layers of the retina.

Photonic Components for Optical Coherence Tomography (OCT)

OCT is particularly useful as a screening tool, both for early detection of disease and to monitor results of treatment. Early detection and fast treatment is crucial to the prevention of permanent loss of vision.

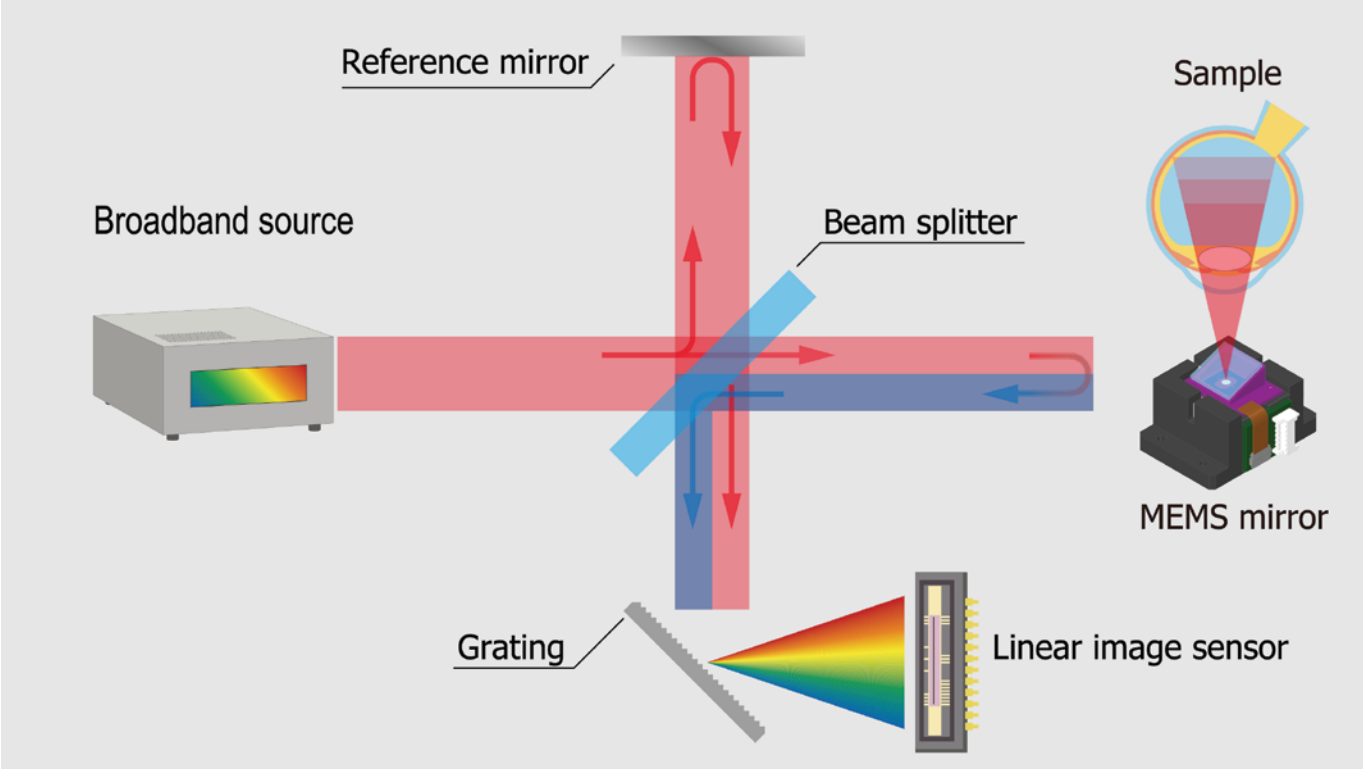
Today, the main issues for large-scale availability of OCT systems are:

- **Size and portability of complete systems**
- **High cost of OCT systems**

Due to these barriers unfortunately access to OCT systems and consequently to retinal screening can be difficult. However, the improvement in the field of optoelectronic components, and their miniaturization means it is now possible to develop low cost and compact devices[1,2] for OCT.

Hamamatsu Photonics, can support these new OCT systems, thanks to their extensive experience in the design and manufacture of optoelectronic components, combined with their continuous innovation and development process.

This is an example of an OCT configuration.



The light emitted from a broadband wavelength light source is split by a beam splitter into two components. One component, usually called reference light (in red) is directed onto the grating and later to the linear image sensor. The second component is reflected from the 2D MEMS Mirror onto the sample. The light reflected from the sample by the 2D MEMS comes back to the beam splitter, then to the grating and finally the linear image sensor.

Hamamatsu can provide a very large range of CMOS linear image sensors ideal for Spectroscopy applications. For example, the new S16514-2048-11 and S16596-4096-11 can combine long pixels (14 x 200 µm), smoothly varying spectral response, high near IR sensitivity and operation from a single 5 V supply.

Hamamatsu can also provide MEMS mirrors for OCT applications. In our portfolio we have compact electromagnetic MEMS mirrors based on Lorentz force, which can achieve two-dimensional scanning in linear mode, with high tilt angle and frequency, both with low voltage operation.

References

[1] First Clinical Application of Low-Cost OCT

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[2] Model-based motion compensation for corneal topography by optical coherence tomography

Joerg Wagner[3,4], Lucio Robledo[4], Simon Pezold[3], Laura Eggenschwiler[5], Pascal Hasler[5], David Goldblum[5] and Philippe C. Cattin[3]. (2020).

[3] Department of Biomedical Engineering, University of Basel, Switzerland. | [4] Haag-Streit AG, Köniz, Switzerland. | [5] Department of Ophtamology, University Hospital Basel, Switzerland.