O-64

OVER 1000nm WAVELENGTH IMAGE DETECTION BY HEAD-SCANNING MECHANISM FOR NEAR-INFRARED ENDOSCOPE

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Recent years, a NIR Fluorescence Biomedical Imaging (FBI) is attracting attention. Wavelength range between 800 and 2000 nm is that where optical losses by scattering and infrared absorption diminish in biological objects. By using NIR, it is possible to observe arteries and veins under the skin [1] and indicate blood constitutes of in the brain. If an endoscope makes use of NIR, it's possible to observe of in vivo deeply and lead to early discovery of cancer and so on. Furthermore, NIR has high penetrating as compared with thickness of alimentary canal, the NIR endoscope can observe of kidney and liver from alimentary canal. However an existed endoscope using Si-CCD camera cannot capture OTN wavelength. The recent development of InGaAs-CCD can capture OTN wavelength, but it is still so large that can't be downsized for mounting endoscope.

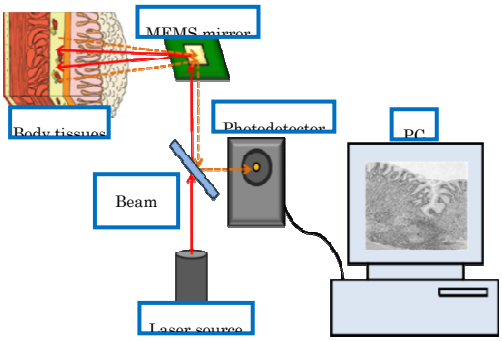


Fig.1 Image of Head-Scanning Mechanism

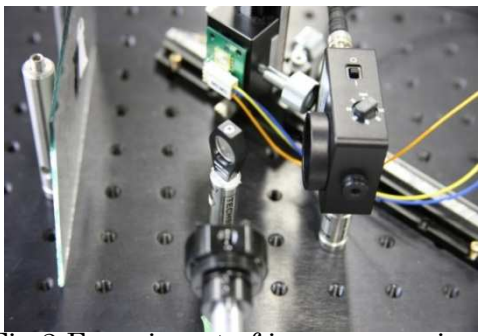
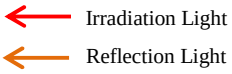


Fig.2 Experiment of image scanning

In this paper, we propose the head-scanning mechanism for a NIR endoscope which is able to capture OTN wavelength. The head-scanning mechanism mainly consists of a photodetector and a 2-axis Micro electro

mechanical system (MEMS) mirror (Fig.1, Fig.2). NIR laser is irradiated and scanned two-dimensional surface in vivo deeply by the 2-axis MEMS mirror. The reflection light is captured by the photodetector. Image scanning experiments on three different wavelength (wavelength: λ=735nm, 975nm, 1550nm) were conducted by using the proposed head-scanning mechanism. The experimental results suggest that the proposed method is able to capture OTN-NIR image and is useful for observe of in vivo deeply.



[1]Yoshihiko HAYAKAWA, Hiroyoshi YAMASHITA, Takashi OTSUBURAI, Yasutaka MIYOSETA, Morihisa SAGAWA, Atsushi KONDO, Yumiko TSUJI and Akira HONDA, “Near-infrared radiation imaging for the detection of alien substances under the skin”,MII,Vol.27 ,No.3 ,pp.50-54 (2010).