

Abstract Submitted
for the DFD10 Meeting of
The American Physical Society

Motion-cancelled PSP system for obtaining global unsteady fields of a moving object KENSUEKE MIYAMOTO, TAKESHI MIYAZAKI, Univ of Electro-Communications, HIROTAKA SAKAUE, JAXA — A motion-cancelled PSP system is introduced for obtaining global unsteady fields on a moving object. This system uses a reference- and signal-image simultaneously acquired by a digital camera. Each image is provided by a two-color pressure-sensitive paint (PSP). The luminescent outputs from the PSP are converted to the pressures or the oxygen concentrations. The existing system uses a color CMOS camera. The green and red images of the camera correspond to the reference and signal images, respectively. Due to the spectral overlay of the images, the pressure sensitivity of the existing system is poor (0.13 percent/kPa). To improve the sensitivity, a spectral separation is necessary. As an improved system, we use a two-CCD chip camera, which can select the band-pass filters in front of the chips. The filters can limit the wavelength range of each luminescent image that prevents the spectral overlay. A comparison with the existing system is provided, and the developed system is applied to an oscillating unsteady motion of a flat plate for demonstration.

Kensueke Miyamoto
Univ of Electro-Communications

Date submitted: 06 Aug 2010

Electronic form version 1.4