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**THE IMPACT OF PHASE DISTORTIONS IN MATRIX IMAGERS WITH INFORMATION FUSION ON IMAGE QUALITY**

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It is known that the image sampling with matrix detectors (MD) is accompanied by frequency aliasing if an object contains elements of the periodic frequency  $\nu_o$ , which is comparable with Nyquist frequency  $\nu_N$ . The frequency of additional signal is  $\nu_d=2\cdot(\nu_N-\nu_o)$ . The shape of the output signal and the frequency characteristics of matrix optical-electronic system (MOES) depend not only on the displacement of MD pixels and object periodic structure (Fig. 1), but also on their relative inclination (Fig. 2).

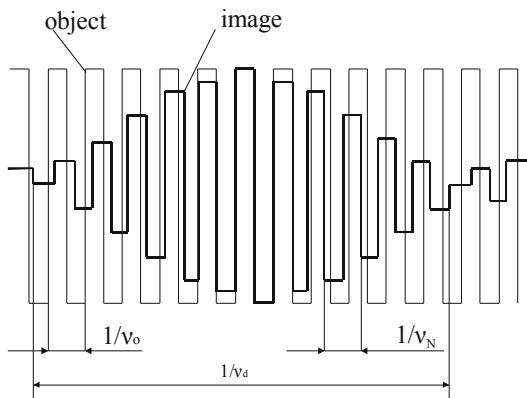


Fig. 1 – Contrast aliasing with the longitudinal displacement

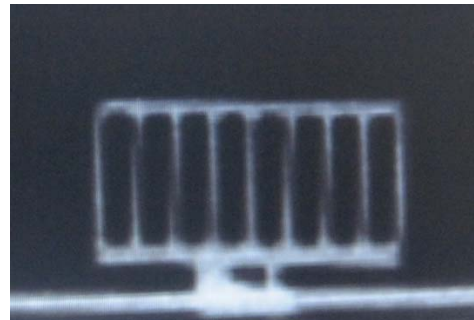


Fig. 2 – Contrast aliasing with the relative rotation

In two-channel MOES such phase distortions may be present independently of each other. Image fusion in channels nonmetering these distortions can lead to substantial loss of high-frequency components of the signal, which is very important while target detection and recognition.

The report studies sampling effect to modulation transfer function of two channel MOES with pixel level image fusion. A method for reducing the aliasing effects due to two channel MOES operation in panning mode was proposed. Also an equation for calculating modulation transfer function of the system was obtained. The resulting equation allows to adapt the parameters of input blocks of MOES channels to the nature of the spatial spectrum of background environment. Some features of visual perception of the panning mode imaging with two channel MOES was studied.

*Keywords:* multi-sensor imager, image fusion, aliasing distortion, image sampling.