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VIBRATIONS OF A GYROCOPTER – AN ANALYSIS USING IMUS

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Abstract. As a part of a research project on the development of a low-cost sensor system for use on gyrocopters several investigations on the recording of aerial image blocks have been carried out during the last two years. The vibration of the gyrocopter platform is one of the critical factors that should be mitigated during the data collection. Apart from the wind-induced oscillation, the vibration induced by the motor, the propeller and the main rotor are prominent. To prevent negative impact to the imaging process, vibration absorbers are to be implemented on the sensor platform.

One focus of this research is a comparison between the vibrations within the passenger area and the vibrations at the undercarriage of the gyrocopter. The comparison is based on the use of three synchronized micro-electro mechanical motion trackers (MEMS IMUs), one fixed on the gyrocopter floor and the others fixed on the struts of the gyrocopter. The results indicate that the propeller and rotor-induced vibrations are somewhat bigger within the passenger area.

Fourier analysis shows that the rotor-induced vibration at a frequency of 12 Hz is predominant in all signals; its amplitude may vary strongly in time. Whereas the translational vibrations have negligible impact on the image quality, rotational vibrations around all three axes may effect significant blurring of aerial images according to common quality standards.

[Conference Paper](#) (PDF, 928 KB)

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