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# The 6C measurement - laboratory experiments and engineering applications

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With the development of BlueSeis3A (by iXblue, France, in collaboration with researchers from Ludwig-Maximilians University of Munich, Germany, within the framework of the European Research Council Project, ROMY) field experiments with co-located measurements of 3 components of translational motion and 3 components of rotational motion (6C - measurements) can be carried out. BlueSeis3A has a high sensitivity ($\sim 20\,\mathrm{nrads}^{-1}\mathrm{Hz}^{-1/2}$) in a broad frequency range (0.001 Hz to 50 Hz) and thus opens the possibility to investigate the benefit of 6C measurements in a broad range of applications. In this contribution, we first demonstrate in laboratory experiments that directly measured rotational motion makes it possible to correct classical seismometer recordings for the contribution of dynamic tilt and to improve the reconstruction of static displacement as it might occur in the near-field of volcanic long period events. As a second part we show the advantage of directly measured rotational motion for applications in civil engineering. Results from a recent measurement campaign in the Cathedral of Cologne, Germany, show the possibility to directly observe the torsional modes of a structure and to fully reconstruct the time history of a moving point in space with 6 degrees of freedom.