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The ESA project SC4MGV "Assessment of Satellite Constellations for Monitoring the Variations in Earth's Gravity Field" – overview, objectives and first results

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In recent years several studies, publications and projects dealt with future gravity mission studies for time variable gravity field recovery of the successive era of GRACE and GRACE-FO. Besides improved satellite and sensor technology (e.g. laser interferometry and drag-free systems) sophisticated satellite formations and multi-satellite formations indicate a great potential for mitigating aliasing effects and for improving sensitivity and isotropy. Especially pendulum formations and Bender constellations, which consist of two inline satellite pairs – one on a near polar orbit and one on an inclined orbit – showed very promising results. Since pendulum formations are regarded as hardly feasible at the moment due to serious technological problems, e.g. large range rates and high precision active satellite pointing, the Bender constellations which make use of mature inline formations are regarded as an appropriate choice. In autumn 2012 ESA called for a project where the orbit design, gravity recovery approaches and post-processing algorithms should be optimized for Bender constellations. In this contribution, the project, its objectives, the project team as well as first results for the mission requirements and the orbit design are presented.