

JWG 2.1: Techniques and Metrology in Absolute Gravimetry

(Joint with the IGFS)

Chair: Vojtech Palinkas (Czech Republic)

Terms of Reference

Absolute ballistic gravimeters have become the primary measurement standards for the determination of free-fall acceleration. Currently the only way for the realization of the gravity reference is realized by the comparisons of the absolute gravimeters, which has to be organized and accomplished in such a way that the high requirements in gravity measurements in geosciences and metrology are fulfilled. Principal tasks of the Working Group are thus closely connected with the four-yearly International Comparisons of Absolute Gravimeters (ICAGs) and relevant Regional International Comparisons of Absolute Gravimeters (RICAGs) in the frame of regional structures of metrology community Regional Metrology Organizations (RMO) at the sites selected on a continental scale.

The Working Group will participate on the organization of comparisons under close cooperation with the BIPM Working Group on Gravimetry of Consultative Committee on Mass (CCM) and Related Quantities (CCM WGG) and the IAG Joint Working Group on Absolute Gravimetry and Absolute Gravity Reference System (JWG2.2). The connection between ICAGs and RICAGs has to be established by means of reliable absolute gravimeters participating in both kinds of comparisons. An important benefit of a distributed network of Regional Comparison Sites would be that it makes an invaluable contribution to establishing a Global Gravity Reference System. The sites should be related to RMO, for example, EURAMET – European Metrology Organization, SIM – Inter-American Metrology System, APMP - Asia-Pacific Metrology Program, etc.).

The Joint Working Group aims to deal with technical and metrological aspects in absolute gravimetry and their realization within a system of comparisons. The increasing demand for reliability and confidence in absolute gravity measurements requires further progress in the comparisons under certain aspects: organization, measurement optimization, combination of different methods of measurements, data analysis, estimation of uncertainties or investigations of systematic effects. In keeping with the above mentioned, the technical protocol of the comparisons has to be developed according to the rules of the international Mutual Recognition Arrangement for national measurement standards and for calibration and measurement certificates issued by National Metrology Institutes.

The WG will work in a close cooperation with metrology community on the implementation of the system of

calibration and verification of absolute gravimeters at relevant National Metrology Institutes and designated institutes as other possibility, besides the comparisons, to determine the metrological characteristics of absolute gravimeters.

The relevance to the Working Group is that its members are the specialists as well from geodetic and geophysical communities, as from the metrological community, and this working group focuses more to participation of individual scientists than the more official CCM WGG where the membership is related to the institutes responsible for the traceability in gravimetry. Such inter-communications within the Working Group as well as a linkage between this group and CCM WGG will make it possible to develop the ICAGs and RICAGs to be supported by both communities.

Objectives

- The participation in the organization (in collaboration with CCM WGG and JWGAG2.2) of the four-year period ICAGs and additional RICAGs at the sites selected on a continental scale.
- The elaboration of criteria and recommendations for a distributed network of Comparison Sites.
- The progress of the comparisons of absolute gravimeters in terms of optimization, measurement methods, data analysis, investigations of systematic effects and uncertainties.
- The development of the technical protocol of the comparisons.
- The collaboration with metrology community for the implementation of the system of calibration and verification of absolute gravimeters.

Members

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Corresponding Members

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