Quality in Engineering Geodesy - an Introduction to the Topic and to the Workshop

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SUMMARY

Kuhlmann et al. (2014) define engineering geodesy and highlight the importance of quality for the discipline within the definition „Engineering geodesy is the discipline of reality capture, setting-out and monitoring of local and regional geometry related phenomena, paying particular attention to quality assessment, sensor systems and reference frames“. This workshop focusses on the quality of (multi-)sensor systems with a special focus on accuracy and uncertainty (typical for engineering geodesy). Multi-sensor systems need a special focus on quality, since numerous aspects as e.g. calibration, uncertainty modelling and uncertainty integration in combination with sensor fusion are of importance.

The introduction, definition and quantification of quality characteristics leads to inherent quality models. These models can be assessed for exemplary processes and products by concrete quality parameters and criteria. A quality model is therefore always application related. In engineering geodetic practise and even sometimes is geodetic academia quality is often understood as fulfilling accuracy requirements only. If one restricts for accuracy different ways on how to deal with modelling uncertainty in measurements. E.g. stochastic or fuzzy models may pave the way to achieve optimal solutions. The consideration of stochastic dependencies leads to correlation modelling or even Bayesian approaches.

In contradiction, when a focus on geodetic networks is made, a complete quality model exist by subdividing quality into characteristics as accuracy and reliability, completed by sensitivity for specialized monitoring networks. For kinematic measurements integrity and robustness play crucial roles as application-related additional quality characteristics. Quality models may also overcome the classical technical aspects and include social, environmental and technical quality aspects in one Holistic Quality Model. The German Research Foundation (DFG) cluster “Integrative

Computational Design and Construction for Architecture" (IntCDC) hosted by the University of Stuttgart and the Max Planck Institute for Intelligent Systems gives room for the development of such a model. On the one hand, a general framework considering quality characteristics, parameters and criteria as well as control and decision points was created. On the other hand, very specific quality control and assessment were carried through e.g. by determining the cross sections of fibre composites that are the base for lightweight building components.

In this presentation the general ideas for quality models will be given. Additionally application-related quality issues, mainly in the domain of quality assessment, will be discussed for specific challenges. Finally, an overview about the content of the workshop will conclude the contribution.