Mathematical Methods and People of Geomatics

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Abstract

Geomatics is the art, science and technology of dealing with geo-referenced (spatially tagged) information; from acquisition, orientation, interpretation, storage to dissemination. Geomatics disciplines include geodesy, precise navigation, photogrammetric computer vision, remote sensing, geographic information systems, and geographic data representation and visualization.

Since the 19th century, geodesy, and particularly physical geodesy and its gravity field determination problem, used to be one of the paradigms of the applicability of mathematics to real life situations. However, in the last thirty years, computing, imaging and satellite navigation technologies have driven geomatics away from a measurement dominated discipline to a modelling one. As a result, mathematics has become the fundamental enabling discipline of geomatics. (And applied mathematicians have become part of the landscape in geomatics' research and development teams.)

The presentation will introduce geomatics and its general current challenges. After that, some particular problems related to the author experience will be described in more detail. They include static and dynamic network modelling for Earth observation and positioning, gravity field determination and precise inertial/satellite navigation.

The presentation will conclude with the author's view on the role of mathematicians in geomatics; namely, on their analytical, algorithmic, numerical and computing skills.