OPPORTUNITIES OF SEMI-GLOBAL MATCHING FOR VEGETATION HEIGHT CLASSIFICATION – CASE STUDY HOHENFELS TRAINING AREA TO SUPPORT ENVIRONMENTAL MANAGEMENT OF MILITARY TRAINING AREAS

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ABSTRACT:

Military training areas often include valuable and threatened natural habitats like heathlands, dry grasslands or dunes which developed due to long term military use. However, the conservation of these areas is challenging due to reduced military training patterns and resulting succession which leads to grass inversion and shrub encroachment. Therefore, an effective control measurement and monitoring of this succession process is needed.
A very promising economically efficient measurement method is the Semi-Global Matching (SGM) algorithm. This algorithm is used for generating a digital surface model (DSM) from overlapping digital aerial images. It has been applied for different purposes (e.g. 3D modeling of cities), but it has been rarely used for vegetation height classification. In this master thesis, the SGM algorithm will be used to generate dense 3D point clouds for deriving a Digital Surface Model (DSM) and subsequently a vegetation height classification.
Recently, the SGM algorithm was integrated in the application ERDAS Photogrammetry which will be used for this master thesis. The study area is the Hohenfels Training Area in Bavaria. The approach will be based on aerial imagery (60/30 overlap) with 10 cm resolution.
The different effects of the settings and used interpolation methods will be described. Special interest will be paid to a comprehensive qualitative and quantitative evaluation of the DSM and the vegetation height classification. An earlier LiDAR derived DSM and vegetation classification for the study area will serve as basis for comparison. In conclusion, the results will be reviewed regarding to applicability, feasibility and possible enhancement methods.