

# Spatial Configuration of Geodetic Points

Gabriela Głód, Beata Calka and Elzbieta Bielecka (Poland)

**Key words:** Geoinformation/GI; Professional practice; detailed geodetic network; surveying; geographic weighted regression, spatial pattern; choropleth map

## SUMMARY

Most of the research on the configuration of a geodetic control network has focused mainly on establishing such a network of geodetic control points to ensure its high precision and reliability at the lowest possible cost. The ex-post analysis of spatial pattern of geodetic control points has not been exhaustive so far. It was mainly limited to the assessment of spatial distribution of GNSS reference stations or geodetic control points of detailed network in typically agricultural areas.

This paper discusses the distribution of horizontal, detailed geodetic control points in a broader context. Specifically, it implements geographically weighted regression (GWR) to illustrate the spatial relationships between the location of geodetic points and the type of land use, buffer analysis to distinguish geodetic control points located near roads, railways, electric lines, and watercourses, while the global Moran's I and Getis-Ord statistics represent the spatial pattern of geodetic control points. Hence, this study aims to model spatial configuration of geodetic control with respect of Polish national regulation and relationship between the number of geodetic control points and land use. The results are related to surveying units, theretofore grouped according to land use types, namely: built-up, rural, forest, and miscellaneous. The conducted study proved that geodetic control points are scattered with significantly visible groupings along roads, railways, and built-up area. It also shows that information on the land use has a vital influence on the number of geodetic control points and indicates where geodetic control needs densification.