



Geodetic basis and sheet structure of the Second Military Survey of the Habsburg Empire – The problems of Tyrol and Salzburg, and the unified geodetic datum of the survey

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The Second Military Survey of the Habsburg Empire (*Franziszeische Landesaufnahme*) was based on the first triangulation net of the Empire, ordered by Emperor Franz I in 1806. In the documents of the Military Archive in Vienna, coordinates of 566 points of this network were digitized. Eight basepoints were later used as projection centers for the different parts of the Empire (Wien-Stephansdom for Lower and Upper Austria, Vorarlberg, Moravia, Hungary and Dalmatia; Gusterberg for Bohemia; Schöklberg for Styria; Krimberg for Illyria and Küstenland; Löwenburg for Galizia and Bukovina, Ivanic for Croatia; Hermannstadt for Transylvania and the Duomo San Salvatore in Milano for Lombardy and Veneto).

Two provinces, mapped in the early phase of the survey, have no real projection. In spite of the earlier literature items, mainly concerning the cadastral systems, the map sheet systems of Tyrol and Salzburg do not follow the projections centered at Innsbruck and Gusterberg, respectively. Indeed, these sheets are similar to the ones of the First Military Survey in cartographic point of view and also with respect to their projection. According to our present knowledge, they cannot be interpreted as Cassini-projected ones, and definitely not with the projection centers at the Pfarrturm in Innsbruck and the Gusterberg at Kremsmünster. The map sheets of these lands can be rectified using quadratic formulae with remanent errors of maximum 220 meters (Tyrol) and 500 meters (Salzburg), which are much higher values than the fitting accuracy

of the sheets in other parts of the Empire. According to my analysis, Liechtenstein is also without definite projection center but it is covered by only one extended sheet and its rectification can be done with an accuracy of 30 meters.

Analysing the Molodensky-type geodetic datum parameters of the different parts of the survey, it became obvious that in the geodetic base in main part of the Empire can be interpreted as a uniform one. The datum parameters in the zones centered at Vienna, Gusterberg, Schöcklberg, Krimberg and Ivanic are very similar in a range of 30 meters. According to the geodetic accuracy of the first part of the 19th century, this is one system. In other lands of the Empire, such as Lombardy-Veneto, Galizia and Transylvania, the parameters are different, perhaps as a result of different orientation of the geoid surface.