

USE PROJECTION AT SATELLITE IMAGE PROCESSING IN LOCAL COORDINATE SYSTEM

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The review of the literature on given problem is reduced, basically, to study of the possibilities of the software products of some companies-producers for mathematical satellite data processing for orthorectification of scenes and uses for large-scale cartography. We have examined software ENVI of RSI, the leader in the data visualization field. As a result of analysis of technical documentation, we make the conclusion, that processing of scene based on the well-known and broadly wide-spread projection. The existing principles and ways of the local coordinate system description are founded on already created projection (parallel carrying, choice of the arbitrary central meridian) that in general can solve only some problems. Thereby, we have a no possibility to optimize the coordinate system, with taking into consideration for sizes and the forms of the places borders, expressed on planes of the projections. But only take to inaccuracy has flooded-reaped in some coordinate system. In our article are considered questions of the measurements processing in software products based on the general theory of the description of conformal projection. Urgency of the work and its need consists in minimization of root-sum-square uncertainty of the determination of the point position under its image on orthorectification image. That can provide neglected small its importance in contrast with accuracy natural measurements. Follows to note that measurements which founded on the remote sensing, allow greatly simplify the determinations of the point position in contrast with classical overland methods of the geodesies. Naturally, we necessary have algorithmic base and software for their processing on planes of the projections.

The practice of the using remote data in Russian does not give single meaning of the estimation on efficient using satellite image for large-scale mapping. While remote data effectively use in purpose of the monitoring the lands, small-scale mapping, but for renovation and making the plan of the scale 1:5000 remains the row of the problem, in accordance with accuracy, presented to output product. One of factor, influencing upon mistakes of the mutual position planned point, is mathematic algorithm of the projection description, in which are produced calculations. The Gauss-Kruger projection is most wide-spread projection in Russia, which is a quotient by event of UTM. The difference is only in private scale of the lengths on central meridian. International division of coordinate zones is accepted in projections Gauss-Kruger. The Coordinate system is formed for each zone of the projections, central meridian which in UTM and in Gauss-Kruger coincides (the Number of the zones differ on 30, for example 11 zones Gauss-Kruger corresponds to 41 zones UTM).

Practically all satellite images, has international coordinate system WGS-84. However, this scene centre has absolute coordinate and it may be a difference with comparatively GCP before 150 meters, coming from our experience. Registration image in software ENVI, allows install the correspondence to between coordinate system of the scene with local coordinate system. But for acceptable quality we necessary have not less 25 ground control points (GCP). That vastly enlarges the costs a field work, particularly if they are conducted in north nook. The transformation under given method is affine or other word that imposes enough strict conditions on even distribution these points on image. At the same time in mountain region, mistakes of the relative position without factor rational polynomials, caused by deviation from vertical position

of the camera, distortion for relief, reaches significant values that complicate the estimation of the picture processing accuracy.

Processing in state coordinate system often complicated in case of the getting of the input dates. We shall remind that registration of the image is produced on GCP. While coordinates of the input points for GCP surveying is possible to copy in arbitrary system in the local authority. But in state coordinate system is possible to copy in state inspectorate of geodesy.

We can choose arbitrary coordinate system for image registration. For small and not-raised territory it is not bad variant. However, coordinate system of received processed image will mathematically disconnect with any other system, and not subject to orthorectification.

Better to use such coordinate system, which answered presented accuracy to positional relationship for points on the image. Simultaneously, making the coordinate system will be comfortable to get with automatic mode (for example, using the algorithm in software with easy assigned input dates). In recent studying of the mathematical description of projection, the most interesting seems the variant of using composition projection with different assistance of known types of projection: transverse and conical projections. Man can assign only composition factors K_1 and K_2 and coordinate of the input point L_0, B_0 . The single condition of the using of such algorithm for simple mathematical processing is total sum of the factors must amount to 1 ($K_1 + K_2 = 1$). When the value one of factors equals 1, and the second equals 0, we get or conical projection, or transverse (Gauss-Kruger, UTM, depending on particular scale of the lengths on central meridian). The task of the choice of projections and factor receptions can be reduced to determination of area shape on two the most remote points (2 GCP).

On this case the accordance of mathematically described coordinate system with an unknown local Cartesian is concluded in allocation of error distribution of the point, depending on removing from central meridian. Beside us appear the possibility of modeling of the distortion on the whole area evenly, and reduce them to neglected small value. If required will possible recalculate from one system in another. Leave questions to secrecy under determined permit when using local coordinate system