

Applying of Space Remote Sensing Data in Urban Development

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As of today in the urban self-governance architecture structure the space imaging as one of the types of urban development documentation, or at least as a source for preparation of this documentation, is not clearly understood and underestimated by staff and even the developers of the documentation. In the best case the images are used for visual clarification of a particular location or to recognition of objects of urban development. However these images can provide a significant amount of information for correction and further control of urban development documentation and allow to econom significant funds during the documentation development.

First step during as part of a try to use the image as a base for further work was the image coordinates binding to the coordinate system used in urban self-governance architecture structure. The binding was done using land anchor points with binding accuracy check by 10 pivot control points. To achieve acceptable results it is enough that binding is done using 4-5 points and the rule that 3-4 of the points are chosen close to the image corners area and one point is located in central area to adjust offsets is followed.

Having image translated into urban coordinate system it is possible to use the image to clarify information about urban development objects and urban territories sensing. Having images from different time periods and from different satellites gives the possibility of correct and quality comparison of given calculated results (most importantly object areas and object locations) from different sources, such as: images, maps, schemes, general plan of a city, rules of land tenure and housing, planning projects, territories and land lots surveying, etc.

Vectorization of sensed territory boundaries from an image is needed to get the digital estimation of territory sensing. Digitizing was done using spectral analysis with visual adjustment.

First and widely used application of the images

is monitoring of urban territory. City housing boundaries, water objects, roads, natural and artificial landscapes can be vectorized automatically and with high quality using the image. Processing of high-detailed images requires adjustment and clarification by generalization of images of objects fragmentary which impacts area of vectorized polygon. Swamps, meadow vegetation, various grounds, landscaping elements are much more laborious and require manual adjustment. It is close to impossible to digitize buildings, especially the ones with gable roofs. The only reliable method is manual digitizing of the buildings.

General plan of a city and rules of land tenure and housing are prepared using maps with 1:10 000 scale according to standards, but at the same time rules of land tenure and housing have to be fulfilled with land lots boundaries which have accuracy equal or more detailed than 1:2 000. Fulfillment of such requirements and combining it with images in such scales is very laborious and expensive which is why it is not used in development of rules of land tenure and housing, thus reducing development cost. However partly the issue is solved by using space image for boundaries adjustments.

Territory balancing is a very important element of territory planning and sensing. Space images usage allows estimate with very high precision areas of water objects, green spaces (noticeably the real boundaries instead of assumed boundaries), landscaping, etc.

To conclude, usage of high-detailed space images with high definition during development of urban development documentation, especially documents of territorial planning and sensing, allows (even using old maps as sources) to get an accurate and quality data, adjust boundaries of territories and reduce cost of development and further correction of urban development documentation.

Provided with step by step instructions and corresponding software the methods for binding

and processing (including vectorization) of space images can be utilized by regular staff of urban self-governance architecture structure. Additional expenses for development of the instructions, acquiring of specialized software and education of personnel pays off in a very short time period. Urban development documents with high quality

are popular and allow to increase the investment attractiveness of urban territories. The return of spent funds is done by providing paid details from information systems supporting urban development activities and development of territories by investors.