

MONITORING URBAN AREAS ON THE BASIS OF VERY HIGH RESOLUTION SATELLITE IMAGERY

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The RF Urban Planning Code requires to perform a monitoring of built-up areas. Monitoring is defined as a complex system of interrelated actions which combine regular monitoring of urban areas and estimation / forecast of their natural and man-made changes.

As the practice shows, better on-line monitoring can be provided using satellite imagery data. Examples of satellite imagery successful applications in urban planning can be found both in Russia and abroad. It's necessary to generalize individual experiences and improve the existing methods of photogrammetric and thematic processing of satellite images. The aim of the work was to develop a satellite monitoring technology for urban areas and make all its parts effective.

The city is a very complicated object, managed by a great number of services in charge of urban planning, roads, housing and public utilities, public health, etc. Now the introduction of information systems, designed for urban planning applications, makes it necessary to create base maps of urban areas, uniform for all municipal services and adapted in its accuracy and object composition to address specific problems. Their object composition is wider, as compared to conventional topographic maps, e.g., the graphic material additionally represents traffic lights and bus-stops for transport applications, billboards and individual trees - for the area improvement applications. Such a detailed object composition requires to use satellite images with a very high resolution (1m and better), which reflect more details.

The workflow embraces the following processes: collection of source data, including satellite imagery and documents from different departments, photogrammetric processing of satellite images, interpretation and mapping of changes (Figure 1). The paper contains characteristics of each step.

It also defines requirements for satellite imagery parameters, such as spatial and radiometric resolutions, a spectral range, a revisit period, a season of acquisition, etc. Photogrammetric processing of images involves adjustment of old and new images with control points. Change detection and mapping is carried out in two steps: automated recognition of areas, where changes took place, and further detailed visual interpretation of the areas. The list of materials, intended for constant storage, is made.

