

## Updating GIS of Sofia Municipality Using UltraCamXp Images

S. Stoyanov

*GIS Sofia Ltd., Sofia, Bulgaria*

For updating the orthophoto plan of Sofia Municipality and creation a digital elevation model (DEM) over the territory GIS Sofia Ltd. ordered an aerial survey.

Execution of the flight was made by the croation company Geofoto in October, 2011. Digital aerial camera UltraCamXp (VEXCEL) was used. According to the requirements of the project the ground sample distance (GSD) is 10 cm. The average flight height is 1700 m. and the average elevation over the sea level–750 m. The number of the taken images is 2914 with forward overlap 60% and side overlap 30%.

Before executing of the photo flight 498 ground control points were pre-marked on the terrain. The coordinates of the pre-marked ground control are determined by GPS-receiver Topcon GGD with an accuracy of  $\pm 2$  cm in position and  $\pm 3$  cm in height.

The post processing was made in Sofia by a specialist of the company-executor. After that the images were given to the Military Geographic Service for declassification, according to Bulgarian laws.

All images are organized in 3 blocks for

processing by PHOTOMOD 5.23. The projection centers in block adjustment are included. Automatic tie points were applied mainly and manual where needed. The achieved average accuracy of the adjusted blocks is  $\pm 8.6$  cm in position and  $\pm 10.1$  cm in height.

For creating the TIN automatic points, brakelines and manual terrain points were used. The entire territory is covered with DEM with 2 m cell size.

Some socially and important projects are realized using the images of this flight. One of them is “Lesnovska river” project – regularly updated after every new flight. The dikes were examined and existing infractions were marked. With contour line was signalized the line of the previous flooding. All the data is going to be used by the local authorities in order to make a prevention strategies and plans against flood risk.

Another very important and topical project is the project for fire protection in the forest areas. The main purpose of the project is to situate towers for early warning in case of fire.

The final product is ortophotoplan of Sofia Municipality at scale of 1:1000.