The Siberian State Academy of Geodesy as a Platform for Development and Realization of Information Technologies in Geodesy, Cartography and Cadastre

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The Siberian State Academy of Geodesy (SSGA) has always been and still is an active leader and a developer of information technologies that are considered as the basic tool for overwhelming majority of cartographic, surveying and cadastral techniques. Beginning from its foundation in 1933 as the Siberian Institute of Astrogeodesy, the institute's main products were the following: lists of reference points, Earth's figure parameters and its gravity field, topographic and special-purpose maps representing all possible processes, phenomena and objects as well as predictable ones.

Cartographic and geodetic data have gained of great importance at the fronts of the Great Patriotic War in reforming national economy, developing eastern and northern regions, and, particularly, in recent years in formation of land cadastre and real estate. Therefore, the interest to state-of-the-art products like databases and intelligent databases is significant.

The market principles of economic life, sharply increased market participants' community keeping in possession and using immense volumes of real estate, have essentially made difficult the solution of social and economic problems. Today a local coordinate system is the most important in data preparation required for managerial decision-making in the regions and municipal formations. The former techniques for its determination are out of date, therefore, there is a necessity for unique research and development work the results of which are required both by any subject of the Russian Federation and a large city.

The key factor in choosing parameters of a local coordinate system is to minimize its distortions when being referred to the height reference surface. Up to now the vertical reference surface and the central meridian position of cylindrical conformal transversal projection (Gauss-Krüger-Projection) are used. In addition to these parameters we have offered to choose the line orientation of least distortions in order to minimize the distortions on areas having the greatest extent on latitude. There are also some peculiarities, but the most important is a possibility of accurate transformation of a local coordinate system into a national one. To use the last mentioned is always a problem caused by the top secret restrictions as well as by the departmental technical regulations. The technical regulations can have rather conventional character in the version offered except for an access to a key for datum transformation. It should be emphasized that we are dealing with the provision of information and coordinates for any region and populated locality development.

Using databases is of current interest in all spheres of life activity including also land and real estate relations. Today it is necessary to integrate the whole information in the unified coordinate environment in form of databases, the primary layer of which is a digital model of terrain object contours generated by using aerial and satellite imagery data. For example, in one of the "oil" city of Tyumen Region is used a database developed on the basis of FireBird database management system and integrating the databases that contain different sources of information on companies and organizations of the Federal Agency of Geodesy and Cartography (Roskartographia) and the Federal Real Estate Cadastre Agency (Rosnedvizhimost), and local government bodies. In this case the graphic information is represented in various layer scales which are generalized to improve its visual acceptability. The database structure allows its dynamical extension, as well as provides the extension of departmental and private databases, and maintains the system integrity. The above-mentioned confirms the distinctive importance of information products and their role in adequate decision-making and providing population by necessary data.

For the coordination of educational, scientific and production programs in a given field, competitive recovery of domestic information products, the Siberian State Academy of Geodesy together with ITE "Siberian Fair" and supported by the Siberian Branch of the Russian Academy of Sciences (SB RAS), the administration of Novosibirsk Region and Municipal Administration of Novosibirsk have being organized the international forum "GeoSiberia" since 2005. Within the forum a specialized exhibition of equipment, software, innovative technologies, a scientific congress and thematic round-table discussions is hold. The participants of "GeoSiberia-2009", which took place in April, discussed one of the urgent topics "High Rise Building" significant for development of regional construction industry on the round-table "**Engineering Surveys for Construction and Redevelopment of Building Projects**. The key problems in construction of high-rise buildings were a lack of legislation and regulations to be used in maintenance of high-rise building projects, foundation deformations, tilts of buildings, and drawbacks of instrumental monitoring for the ready-built objects as well as the efficiency and reliability of surveying works.

The metro builders participated in the forum have mentioned that the Siberian State Academy of Geodesy's alumni are well-grounded and familiar not only with groundings in theory but software and instrumentation. President of FIG Prof. Stig Enemark and a representative of Leica Geosystems (Switzerland) Joël van Cranenbroeck have appreciated in value the Siberian higher school of surveyors and promised to render the academy and its partners information support in the development of domestic professional education and its integration into innovative production.

Thus, we may courageously affirm that the Siberian State Academy of Geodesy and its alumni are successfully developing "depth of the country" and actively use the best domestic and foreign information technologies.