Innovations in Surveying Education. Geospatial Digital Training of Qualified Specialists and Implementation of Technologies in the Real Sector of Economy.

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SUMMARY

Geospatial digital engineering is a rapidly growing engineering discipline that focuses on spatial information, incorporating aspects of computer engineering, surveying and mapping.

Experts in this field design, develop and operate systems for collecting and analyzing spatial information and combine a number of relevant professions such as surveyor, cartographer, unmanned aerial vehicle ground control operator.

The purpose of creating the competence is to train experts with combined knowledge, skills and competencies that meet the modern demands and requirements of enterprises.

Geospatial engineering includes:

• field engineering survey,

• modern methods of geospatial data processing,

• geographical knowledge,

• knowledge of geodetic support of construction activities,

• knowledge of land management and cadastre.

Combining the skills and abilities of these professions allows a specialist to solve new, more complex tasks in real working

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conditions.

Work results: implementation of the program of secondary vocational education and additional vocational education on the basis of Novgorod State University with implementation of competence in the educational process:

• operation of unmanned aircraft systems as a component of an advanced personnel training network;

• professional development program "Unmanned Aerial Vehicle Ground Control Operator";

• professional retraining program "Unmanned Aviation Systems and Satellite Technologies".

The basic specialties for the competence "Geospatial Digital Engineering" are cartography, land management, aerial photographic geodesy, applied geodesy, operation of unmanned aerial systems, information systems (e.g., in urban planning), construction, environmental management of territories. These basic specialties are represented in more than 180 vocational education institutions in 59 cities of Russia.

Modern technologies applied in the professional activity of a specialist in the field of geospatial digital engineering include:

• Earth's remote sensing with unmanned aircraft systems and satellite technologies;

• Instrumental geodetic measurements with digital and automated equipment;

• Computer analysis of spatial data, three-dimensional aerospace modeling of terrain, objects and structures for engineering and surveying.

Importance of competence development

Russia's transition to a digital economy is causing a significant increase in the need for spatial data, as well as services, facilities and products based on them, in a wide range of applications.

The digital transformation of geodesy and cartography is taking place, as well as the transformation of industries – consumers of spatial data.

Secondary vocational education in surveying and geoinformation technologies takes this digital transformation into account and approximates its effects.

The greatest demand for spatial data will come from such industries as the electric power industry, housing and public utilities, financial sector, construction industry, transportation sector, and agriculture. New specialists will be in great demand in these industries.

This competence was presented at the High Technologies Championship in 10 regions of the Russian Federation with the final in Velikiy Novgorod in September 2023, where international representatives from such countries as Ghana, India, Syria and others participated.

The final of the Championship was visited by the leadership of the Russian Federation. They noted the importance of developing the system of secondary vocational education.

The industrial partner of the Championship in the Geospatial Digital Engineering competence is Public Law Company 'Roskadastr'.

Training with regard to the standards of the Geospatial Digital Engineering competence is also possible for foreigners interested in the development of this area in their own educational organizations and companies.