



UNIVERSITY REPORT

ESTABLISHMENT OF CENTERS FOR COMPETENCE AND EMPLOYABILITY
DEVELOPMENT IN RUSSIAN UNIVERSITIES

Moscow State University of Geodesy and Cartography (MIIGAiK)



ERASMUS+ Project: "Establishment of the Centers of competence and Employability Development (CCED)" (COMPLETE) (561603-EPP-1-2015-1-DE-EPPKA2_CBHE-JP

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2. General information about MIIGAiK



Moscow State University of Geodesy and Cartography (MIIGAiK) was established in **1779** and it is the center of higher geodetic education in Russia and the largest educational institution of this type in Europe. Thousands of the University graduates are taking part in the exploration of the territory and natural resources of Russia, in designing its maps, in constructing its cities, roads and industrial enterprises. The scientists working at MIIGAiK are always the avant-garde of geodesy, establishing and developing it as one of the fundamental Earth sciences.

The glorious past of MIIGAiK, deep-rooted pedagogical and scientific traditions, accumulated throughout 237 years of its development, the importance and vitality of geodetic science and practice for many branches of national economy, a wide range of specialists being trained at the University - all these assure the leading role of MIIGAiK as a specialized institution of higher education. In early 1900–s earth engineering has become one of the key educational profiles of MIIGAiK.

Today, the University is actively participating in the exploration of outer space and application of the results of this exploration to science, economy, agriculture, geological prospecting and ecology. MIIGAiK renders great assistance to many countries of the world in training national scientific and engineering staff for geodesy and cartography - more than 2,000 foreign graduates from the University are working now in 85 countries all over the world. Many national geodetic services and topographic enterprises of different countries have close and mutually advantageous economic and scientific relations with the University. Our years of experience in training specialists and researchers, highly qualified teachers, modern laboratories and field bases, vast contacts with various scientific institutions - all these guarantee those who study at the University the highest level of theoretical and practical training. MIIGAiK educates researchers by means of postgraduate courses; eight specialized academic councils are established for scientific theses and dissertations to be defended. The studies that are being conducted in MIIGAiK embrace almost the whole range of problems of geodesy, cartography and cadastre, as well as such specific fields as precise instrument-making, geoinformatics, ecology and remote sensing.

Since 2008 MIIGAiK has started process of integration into European educational field. Introduction of Bologna principles and design of training programmes in line with Bologna is one of the key directions of the University further development. Interaction with European and Russian HEIs within the frames of Erasmus+ programme enabled University to communicate for further developments.



Illustration 1. MIIGAiK, Old Building – Minsion of the Demidov family, 1789.



2.1. Mission of MIIGAiK

Holy preserving and multiplying the age-old traditions of Russian surveyors and cartographers, the University implements its **mission** – to create spheres of new knowledge in the field of Earth sciences, that allow the expanded reproduction of the intellectual resources of cartographic and geodetic research and production complex of Russia, to be the locomotive of scientific and technical progress in cartography and geodesy production as a major factor in the successful implementation of the ongoing Russian economic and land reforms, informatisation and rational use of land and property complex of Russia, as well as to meet the needs of the population in receiving high qualification demanded by the labor market in the country and abroad.

The **main strategic goal** of MIIGAiK - staffing cartographic and geodetic Russian industry, based on research and world-class development, which is to prepare professionals primarily of higher qualifications for the generation of new knowledge, its preservation and dissemination, creation and transfer of new technologies and products based on demand creation and meet the demand of domestic and foreign markets, specialized in relation to the scientific and educational activities of the university focus areas.

Achieving the strategic goals MIIGAiK carried out through the establishment of research, innovative corporate culture, through the direct involvement of students, teachers, researchers in joint implementation of research projects, development and commercialization of products. The main competitive advantage of the University in its mission is the presence of historically unique professional schools (geodetic, mapping, remote sensing of the Earth), which, as in the educational and scientific activities focus on priority areas of science, technology and engi-



neering, covering space, cartographic surveying, cadastral and information and communication technology, optical technology, laser technology, environmental monitoring, instrumentation and others. research performed at the University play a fundamental role and determine the content and technology of the educational process. This is the basis of the fact that in the field of Earth Sciences University is considered one of the leading scientific and educational centers of Europe and the world. The fact of international recognition of the University and its alumni contributions to the development of Geodesy, Cartography and Remote Sensing technology is the authority and membership MIIGAiK in numerous foreign scientific and educational organizations.

2.1.1. Strategic tasks:

- establishment and strengthening of productive linkages and commercial partnerships with leading industrial organizations, leading academic and educational institutions, educational, scientific and technical centers, providing market entry of scientific research;
- ensuring the priority of innovative activity in the field of education, scientific and technical activities, in the production of scientific and technical products and services;
- creation and development of new educational technologies through the support of scientific and pedagogical schools, scientific and technical centers and productive ideas of teachers, staff and students;
- implementation of the results of fundamental and applied scientific research and innovation in the field of Earth Sciences in the educational process in order to improve the quality and competitiveness of graduates on the labor market, both in Russia and abroad;
- formation in the outlook of students, faculty and staff, along with the priority of academic values in the education of a harmonious and benevolent personality, striving for realization of the business ideas, as well as the spirit of leadership and corporate culture, the ability to live and win in a competitive environment;
- ensuring integration (national adaptation) education, science and culture of Russia into the global educational environment and culture.
- formation of long-term staff and research groundwork needed to strengthen and improve the competitiveness of the industry;
- fixation of the industry oriented education programs and research in the international market.

2.2. Administrative structure

The general management of the University performs the Academic Council of the University - the chosen representative body. The position of the Academic Council is composed of the



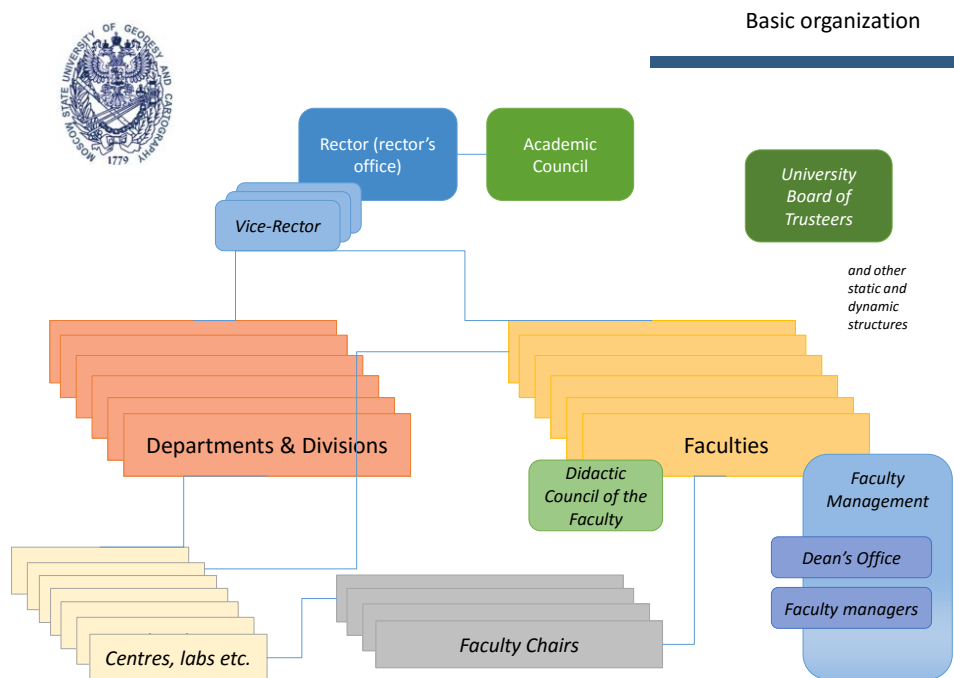
Rector, who is its chairman, vice-rectors and deans. Other members of the Academic Council of the University shall be elected for the conference by secret ballot on the Board validity period - five years. The norms of representation in the composition of the Scientific Council of the departments and students and the number of members of the Academic Council shall be determined by the Academic Council acting.

Direct control is performed by the University Rector. The rector is elected on a competitive basis a staff vote to university staff conference for five years and is approved by the Ministry of Education and Science of the Russian Federation. election procedure determined by the Regulations on the election of the Rector, approved by the Academic Council of the University.

The University Academic Council coordinates interaction of the university structural divisions through regular review of fundamental issues of the educational process at its meetings. Decisions of the Academic Council of the University are realized through the order of the rector.

Direct management of the Faculty activities is performed by Dean, elected by the Academic Council of the University by secret ballot for a period of five years from among the appropriate expertise, with a degree and the title.

Illustration 2. Basic organisation of the MIIGAiK administrative structure.



Today there are six faculties of full-time study and the Faculty of distance learning (correspondence and evening training, retraining and advanced training), as well as two colleges in the structure of the University.



Faculties of MIIGAiK

- *Geodesic Faculty*
- *Faculty of Cartography and Geoinformatics*
- *Faculty of optical-information systems and technologies*
- *Faculty of Economics and management of territories*
- *Faculty of Applied Space*
- *Faculty of Humanities*
- *Faculty of distance learning.*

The main academic unit of the University is chair. Chairs are managed by the heads, elected by secret ballot for a period of five years from among the appropriate expertise, with a degree or title. Training is conducted in 33 chairs, 28 of which are responsible for awarding degrees.

Chairs of MIIGAiK:

- *Astronomy and Space Geodesy*
- *Higher Geodesy*
- *Higher Mathematics*
- *Surveying*
- *Applied Geodesy*
- *Applied Informatics*
- *Design*
- *Registration and publication of maps*
- *Cartography*
- *Geography*
- *Military*
- *Information Measuring Systems*
- *Optoelectronic devices*
- *Applied Optics*
- *Designing optical devices*
- *Physics*
- *Cadastre and land rights foundations*
- *Economics and Entrepreneurship*
- *Philosophy and Social and Economic Sciences*
- *Real Estate Management and development of territories*
- *Architecture and Landscape*
- *Architectural Design*
- *Linguistics*
- *Civil Law and Procedure*
- *Russian history and culture*
- *Criminal Law and Procedure*
- *Physical Education*
- *Land law and the state registration of real estate*
- *Aerospace shooting*
- *Computer equipment and automated processing of aerospace information*
- *Space and Environment Monitoring*



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- *Photogrammetry*
 - *Distance learning.*

The structure of the University also includes the Centre of Training and Retraining of managers and specialists and Center for retraining and advanced training of higher and vocational education teachers. There are two scientific research centers as well - "Geodynamics" and "Geomonitoring", and typography, two colleges (Moscow College of Geodesy and Cartography, Kirov College of Economics and Law), scientific and technical library, a sports complex.

2.3. Study programmes

In accordance with the license and accreditation documents MIIGAiK offers study programmes of higher education of both Bachelor (4-5 years) and Master (2 years) level according to the Bologna system and Specialist level (5 years) according to the former one-level system. The University also includes post-graduate and doctoral studies. There are **about 4500 – 5000 students** in MIIGAiK. Study programmes for students, graduate students, doctoral students, retraining and advanced training cover 25 areas of training relating to 9 integrated groups.

Current study programmes:

- *Applied geodesy*
- *Surveying and Remote Sensing*
- *Applied Informatics*
- *Cartography and Geoinformatics*
- *Design*
- *Surveying and Remote Sensing*
- *Information Systems and Technology*
- *Electronic and optoelectronic devices and special purpose systems*
- *Optotechnics*
- *Laser equipment and laser technology*
- *Information Security*
- *Land management and cadastre*
- *Management*
- *State and municipal management*
- *Economy*
- *Law*
- *Architecture*

The priority study programs for the University remain cartography and surveying areas of training. MIIGAiK was and remains a major innovation center for training highly qualified Russian cartography and geodesy profile. Along with specialized areas of training MIIGAiK considers actual development of the so-called "non-core" areas, today substantial part of the educational programs of preparation of economists, lawyers, managers, information technology specialists and quality management more closely tied to the technical areas of training at the



university. MIIGAiK also provides study programmes in the four military areas of training (military topography, navigation etc.).

Table 1. MIIGAiK Study Programms.

Number of study programmms offered in MIIGAiK								
	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	2013/2014	2014/2015
Total:	53	139	146	148	200	206	197	185
Professional training programmms	-	41	36	36	36	37	31	29
Vocational training programes	5	36	35	35	59	60	58	58
Higher education programmms	33	32	40	40	66	68	67	56
Post graduate studies	8	8	9	9	9	9	9	8
Retraining/upskilling programmms	7	22	26	28	30	32	32	34

2.4. Research and innovative projects

Scientific schools MIIGAiK are formed with the participation of outstanding scientists of our country known all over the world: academics - Struve, Kupfer, Savic, Magnitsky; corresponding members of the Russian Academy of Sciencies - Krasovsky, Molodensky, professor Chebotarev, Kislov, Drobyshhev, Lobanov, Bolshakov, Dubovik, Urmayev, Plakhov, Bugaevskiy, Dubinovskiy and others.

Currently, more than a dozen scientific schools of cartography and geodesy recognized in Russia and abroad operate successfully in MIIGAiK. Two scientific schools of MIIGAiK are the regular winners of competititon conducted by the Federal Agency for Science and Innovations and the Council for Grants of the President of the Russian Federation (in 2006, 2008, 2010, 2012, 2013, 2014 and 2015). They are recognized as the leading scientific schools of Russia, namely:

- the school under the leadership of Prof. Savinykh
"Development of the theory and methodology of dynamic mapping of the Earth's surface based on satellite imagery", and
- the school under the guidance of Prof. Yambaev
"Development of the theory and methodology of geodetic monitoring of crustal movements and deformations"

Research activities performed by the MIIGAiK team are adressing the following **key issues**:

- Meeting the requirements of defense and economic development in general and the Russian Federation in terms of improving the accuracy and timeliness of geo-



detic and cartographic works, change the scope, content, forms and means of communication to consumers of geodetic and cartographic information;

- Formation of the Russian Federation, a single spatial data infrastructure necessary to improve the work of public authorities, local governments, business entities;
- Providing cartographic and geodetic information, land and property, and the tax systems of the country at all levels of government;
- Providing industries necessary geodetic and cartographic materials and geospatial data of areas;
- Cartographic and geodetic support of works on delimitation and demarcation of the state, including the sea, while the Russian border at four - six directions;
- Creation of a high-precision geodetic framework for the operation of navigation systems for civilian and military purposes;
- Creation of new types of products based on digital technology, including maps of increased information content, geographic information systems for the public authorities;
- Transition from the planned updates of cartographic products to the organization of topographic monitoring, providing rapid adjustment of maps and plans, and others.

The ongoing research activities in MIIGAiK include research and development in the following priority areas of science, technology and engineering and critical technologies of the Russian Federation, approved by Presidential Decree number 899 07-07-2011:

a) priority areas:

- information and telecommunication systems;
- rational use of natural resources;
- transport and space systems;

b) the critical technologies:

- technology access to broadband multimedia services;
- information technology, management, navigation systems;
- technology and software distributed and high performance computing;
- monitoring and forecasting the state of the technology environment, the prevention and elimination of pollution;
- warning technology and the elimination of emergency situations of natural and technogenic character;
- technology of high-speed vehicles and intelligent control systems with new modes of transport;
- technology of rocket and space, and a new generation of transport equipment.

The research activities of MIIGAiK are supported within different grant national and international programmes financed by the government and private sector, such as:



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- ✓ *State assignment of the Ministry of Education and Science of the Russian Federation*
 - ✓ *Scientific-methodical themes commissioned by departments of the Russian Ministry of Education and Science*
 - ✓ *Grants of the Russian Science Foundation*
 - ✓ *State support for research*
 - ✓ *Studies conducted by leading scientific schools of the Russian Federation*
 - ✓ *State support of scientific research conducted by young scientists*
 - ✓ *Grants of the Russian Foundation for Fundamental Research*
 - ✓ *Grants of the All-Russia public organization "Russian Geographical Society"*
 - ✓ *Federal Target Programm "Promotion, development and use of GLONASS system for 2012-2020."*
 - ✓ *Russian Federal Space Program*
 - ✓ *EU Grant MAIRES*
 - ✓ *EU Grant PRoVIDE.*

2.4.1. MIIGAiK – research and education cluster

In accordance with the development program of the University the central task of innovation development of MIIGAiK is to create an innovative consolidated scientific-educational system (scientific-educational cluster) in the field of geodesy, cartography and cadastre, the basic element of which would be the Moscow State University of Geodesy and Cartography (MIIGAiK). According to the opinion of the experts, this is the most appropriate way to solve the problems of a substantial improvement of quality of education. This collaboration provides a real opportunity to combine training on the basis of the fundamental knowledge gained at the University, and practical training for graduates in successfully working scientific and industrial organizations. Generated university cluster will provide the satisfaction of current and future staffing needs of the Russian economy in the field of geodesy, cartography and cadastre.

Cluster advantages:

- multimedia classrooms infrastructure;
- hardware and software systems of education, research and university management;
- computer-aided distance learning and electronic educational resources;
- electronic library catalog and electronic editions
- modern station receiving satellite information;
- systems and technologies of reception, archiving, cataloging, organizing access to remote sensing data obtained by terrestrial and aerospace sensors;
- bank of geodata and unified information environment containing geospatial data with different spatial, spectral-temporal, radiometric resolution, obtained by remote sensing equipment terrestrial-foot, air and space-based, similar to the distribution-area not shared infrastructure, access to satellite data of the European Space Agency (ESA), providing different ways of integration, including data directory interfaces, deployment services, standards compliant OpenGIS and other GIS systems.
- modern scientific and educational center, equipped with modern unique equipment, allowing to carry out the fundamental world-class scientific research and solving prac-



tical, scientific, national economic and educational challenges in the field of geodesy, space geodesy, satellite navigation, gravity, relativity, planetary geodynamic processes of planetary variations in the gravitational field of the Earth and the Earth-Moon system.

2.5. International cooperation

The University takes an active part in the international events of scientific and educational spheres, having necessary materials and personnel, which enables it to widen and intensify step-by-step the forms of its international cooperation. The international activity of the University includes some directions:

- training of foreign citizens (it was started in 1946);
- establishment of relations and development of cooperation with governmental and international organizations and companies working in the field of higher education;
- rendering of assistance to foreign universities - partners in organization of the teaching process in the field of geodesy and cartography;
- undertaking of joint international training and research projects;
- participation of the University scientists and students in various international scientific congresses, conferences, seminars;
- international exchange of students for work placements and study of special disciplines.

The scale of the international cooperation is growing continuously and today MIIGAIK has close and mutually advantageous ties with a number of profile higher educational institutions of Europe (Austria, Bulgaria, Germany, Spain, Czech Republic), Asia (Vietnam, Korea, Mongolia, China) and America (Argentina, Mexico). Today the number of our foreign partners is over 50. MIIGAIK conferred an Honorary Doctorate on eleven foreign scientists who made a considerable contribution to the development of geodesic science and higher education.

The major direction of the university activity is to participate in international cooperation in the field of education and science. The priorities for cooperation in this field are determined by the development of new methods and technologies in geodesy, cartography, remote sensing.

An important aspect of international activity is cooperation with the leading international organizations in the field of geodesy and cartography such as the International Federation of Surveyors, International Cartographic Association, International Society for Photogrammetry and Remote Sensing, International Geodetic and Geophysics Union etc. Since 2010 MIIGAIK is a member of the UN International Committee on Global Navigation Satellite Systems. Also MIIGAIK is a member of the National Committee for Economic Cooperation with Latin American countries.



2.5.1. Cooperation within CIS

Moscow State University of Geodesy and Cartography for several decades was involved in the establishment and development of the foreign national schools of higher education in the spheres of geodesy, cartography, photogrammetry, inventory and space methods for studying the Earth and planets of the Solar system. Since 1949 over 2,400 engineers have graduated from MIIGAiK, 240 candidates and doctors of technical sciences for 96 countries. Of the 54 heads of the specialized departments of Geodesy and Cartography in the CIS universities 26 candidates and doctors of engineering science received their degrees in MIIGAiK.



As a result of extensive discussions within professional community of the CIS and positive recommendations of the relevant executive bodies was in May 2010 the CIS Council of the Heads of Governments adopted official decision to grant MIIGAiK status of the **CIS base institution for training in the field of geodesy, cartography, cadastre and remote sensing of the Earth**. In accordance with the Regulation on the Base institution of the CIS member states the main tasks of MIIGAiK are the following:

- Development of common approaches to standardization of study programs in the field of geodesy, cartography, cadastre and remote sensing;
- Methodical and informational support of training, retraining and advanced training of personnel in the system of specialized secondary, higher (undergraduate, specialist's, master's) and postgraduate education;
- Coordination of the activities of educational institutions of the CIS member states to introduce modern methods and forms of training, based on geographic information and telecommunications technologies into the educational process;
- Development of recommendations and models of educational programs of higher and postgraduate education with the needs of the CIS member states;
- Organization of the Inter-University system of training and retraining of specialists, scientific and research staff through various forms of further education.

In addition to academic work, MIIGAiK actively cooperates with the CIS countries in the field of scientific research and retraining:

- seminars, schools of excellence, retraining and advanced training courses (involving up to 100 people from CIS countries annually);
- exchange of teaching staff in the framework of academic mobility (up to 20 people per year).



The dynamics of the enrolment of the CIS citizens in MIIGAiK to the higher education study programs (Bachelor, Master, and Specialist) is positive. The average number of the CIS students is 150 people per year. Today, the citizens of the CIS countries - the future experts in the field of geodesy, cartography, cadastre and remote sensing represent about 60% of all foreign nationals studying in the university.

2.5.2. International projects

World educational system has undergone significant changes in recent years. An important element of the development and maintenance of the international status of the educational institution is its active involvement into the international educational programs, such as ERASMUS+ (former TEMPUS) program of the European Union. It makes possible not only to get acquainted with the experience of setting education in other countries, but also to ensure the training of qualified personnel for the university, to find out new opportunities for development of joint research projects, networking, joint study programmes and double diplomas, academic mobility etc. Moreover, some projects are focused on the structural measures and aimed at reforming the education system at large in accordance with the standards and principles of the Bologna Process – European Higher Education Area and best national practices.

MIIGAiK has an extensive experience in implementing of the European projects improving quality and competitiveness of the Russian education system. Among the projects successfully implemented in 2013-2016 the following key projects should be mentioned:

- *“Validation of non-formal/informal learning in Russia” 544405-TEMPUS-1-2013-1-AT-TEMPUS-SMHES (VALERU 2014 – 2016);*
- *“Independent Quality Assurance model for degree programmes in Russia” 530838-TEMPUS-1-2012-1-RU-TEMPUS-SMGR (IQA, 2012 - 2016);*
- *“Elaboration of Qualification Framework for Landmanagement Studies at Russian Universities” 530690-TEMPUS-1-2012-1-PL-TEMPUS-SMHES (ELFRUS, 2012-2015);*
- *“Berufliche und unternehmerische Selbständigkeit durch Entrepreneurship-Erziehung und Gründungsberatung” 544202-TEMPUS-1-2013-1-AT-TEMPUS-JPHES (BUSEEG, 2013 - 2016);*
- *“On-line Quality Assurance of Study Programmes” 543727-TEMPUS-1-2013-1-IT-TEMPUS-SMGR (EQUASP, 2013 - 2016).*

MIIGAiK has a wide pool of experts from Russia and foreign countries, as well as intergovernmental and international organizations, working closely with the regions and the federal and regional executive authorities in the field of education. In MIIGAiK has qualified administrative staff experienced in project management and organization of events of different level and format both in Russia and abroad; a team of professional IT-specialists for the development of sites and platforms. MIIGAiK is able to provide material and technical base necessary for the implementation of projects, including the possibility of the production of printed products.



3. Employability in MIIGAiK

According to the results of monitoring of the labor market in different years it can be noted that the need for personnel with education in the sphere of geodesy, cartography, space geodesy, astronomogeodeziya, the study of natural resources, remote sensing, navigation, geoinformatics, Aerospace Research of the Earth, monitoring facilities, metrology, photogrammetry, geo-ecology, gravimetry, land use information and information and measuring systems, inventories, land monitoring, optical and opto-electronic systems, economics, architecture, information security, law (land and environmental law) is increasing every year. Through the MIIGAiK Employment Center and faculties' administration which also provides assistance to employment the MIIGAiK graduates regularly receive requests from various governmental authorities of the Russian Federation, educational, research and industrial institutions and organizations of the Moscow city and region, other Russian regions and from abroad. The need for cartographic-geodesic work in the organizations of the Moscow region is increasing from year to year.

3.1. COMPLETE survey

The survey was conducted in MIIGAiK in the framework of the project «COMPLETE - The creation of centers for the development of competencies and employability skills» (Establishment of Centers for Competence and Employability Development) of the European Union program "Erasmus Plus" with the aim of defining a set of competences required of MIIGAiK graduates to be competitive in the market labor. Different target groups (students, graduates and employees) were invited to answer the questions.

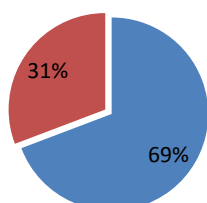
Though the promotion campaign of this survey was rather intensive only the graduates turned out to be supportive. This fact tells about the interest and understanding of the issue from their side. Not all the students are ready to think seriously about the competences and needs of the labor market. Besides, MIIGAiK students are regularly involved in various short internal surveys within the framework of internal quality assurance. Partly those QA surveys cover the issues of the desired competences and etc. Moreover, MIIGAiK students participate in the informal surveys, including surveys concerning the interest in developing of soft skills, conducted by the Department on social work, which is responsible for additional training activities. As to the employees, this is a common problem of low interest and involvement in academic issues. In case of MIIGAiK the additional difficulty is the specific status of main employees – we cooperate with state authorities and affiliated companies working with in the spheres concerning the issues of national defence, state security etc. This fact explains rather official relations and limited possibilities to involve such kind of companies into the online surveys etc..

Anyway the following compacted and evaluated information gained from written surveys with MIIGAiK graduates gives us a chance to know the opinion of this most competent target group

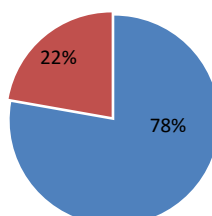


which is a kind of 'transition' group connecting the university and labor market. Here is the analysis of results.

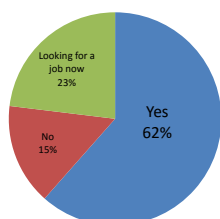
Among the graduates who answered the questions 69% are currently employed.



Moreover, 78% of them work within their fields of professional studies.



After graduation 62% of them had to look for a job and 23% are looking at the moment.



The most common and efficient ways to find a good job for the graduates are:

- ✓ *With the help of relatives or friends*
- ✓ *On the recommendation of the department (after the internship)*
- ✓ *Search ads (newspapers, Internet, ads in high schools, etc.)*
- ✓ *With the resume through recruitment agencies or specialized sites,*

The most important criterias for choosing the company and position are:

- ✓ *Official employment*
- ✓ *Schedule (8-hours working day)*
- ✓ *Wage level*
- ✓ *Career Perspective*

As to the most frequent difficulties the graduates usually come across regarding employment, they are:

- ✓ *Lack of experience*
- ✓ *Lack of jobs*
- ✓ *Inability to focus on the labor market*

The three main advantages of the graduates for the employment after graduation are:



- ✓ *Ready for further training,*
- ✓ *Ready to start a career with the grass-roots levels,*
- ✓ *Ready to realize the creative potential,*

As to the main drawbacks of the graduates in employment after graduation, they are:

- ✓ *Lack of practical training*
- ✓ *High expectations on the level of wages*
- ✓ *High estimate of personal professional capacity,*
- ✓ *Reluctance to embark on a career with the grass-roots levels,*
- ✓ *Lack of experience in the specialty*
- ✓ *Psychological unwillingness to work,*

Among the competencies needed in their work, which were not sufficiently formed during the study process in the university, the graduates named:

- ✓ *Ability to work with specialized software products*
- ✓ *Ability to present the products, services*
- ✓ *Ability to negotiate*

The graduates are sure that the most required general professional competences (soft skills) at the time are:

- ✓ *Ability to competently conduct business correspondence, report, reports, and other documents*
- ✓ *Knowledge of foreign languages*
- ✓ *Competent Russian language*

As to the three most important competencies that are required from the graduates in the labor market, the majority pointed out the following

- ✓ *Communication skills,*
- ✓ *Information search and analytical skills,*
- ✓ *Presentation skills.*

Describing different types of general competences and personal characteristics required by the labour market, the graduates tried to select the top relying on their own experience. In their opinion, attention should be paid to the development and self-development of the following soft skills and abilities.

Required behavioral characteristics:

- ✓ *Focus on results*
- ✓ *Responsibility, discipline*
- ✓ *The ability to comply with corporate standards, to maintain the company's loyalty*
- ✓ *The ability to effectively use the working time*
- ✓ *The ability to operate in all conditions, under pressure, under stress*
- ✓ *The ability to build the work process in the organization*

Required communication competencies:



-
- ✓ *The ability to clearly express their ideas*
 - ✓ *Ability to negotiate*
 - ✓ *The ability to establish contacts in a group*

Required skills associated with team work:

- ✓ *Ability to take responsibility*
- ✓ *Ability to work in a team and to achieve collective goals*
- ✓ *A positive attitude to reality*

Analytical competences, self-education and professional development:

- ✓ *Ability to learn new skills quickly*
- ✓ *Analytical thinking*
- ✓ *Readiness for continuous professional growth*

Innovative competences:

- ✓ *Initiative, independence*
- ✓ *Ability to generate new ideas*
- ✓ *Ability to abstract, to go beyond the situation*

The results of the COMPLETE survey along with the data received from other sources provide the background information regarding the needs and possible directions for further developments in MIIGAiK aimed at employability.

3.2. COMPLETE interviews

The interviews with employers from the MIIGAiK focus sector have been carried out in order to identify a set of competences which make graduates more competitive at the labour market in the framework of the Erasmus+ project 'COMPLETE- Establishment of Centers for Competence and Employability Development'. The aim of the interviews was to get the employers' opinion about the skills and knowledge should be acquired by the MIIGAiK graduates to stay competitive at the labour market.

Representatives from **five privat and state companies**, cooperating with MIIGAiK and working in the **sector** of geodesy, cartography, geology, construction, IT support of spatial development and remote sensing etc., were invited to answer the questions. Among them: *Closed Joint Stock Company 'Softline Solutions'*, *State Unitary Enterprise 'MOSGORTREST'* and others. The graduates from MIIGAiK work at all the invited companies at the moment. All the companies were **represented by** the high level specialists in the sector (engineers), occupying top managerial positions and directly responsible for the general and professional assessment of the candidates. It should be underlined that it is common for the companies of such type to have HR specialists only for the formal documentation processing, but all the essential questions regarding recruitment of new staff are in the sphere of responsibility of the sector professionals.



Summing up the results of the interviews it is possible to say the following.

At the moment the graduates with **academic degree** of engineers (geodesy and cartography) and managers are in shortage at the companies. About 2-5 graduates (those, who have graduated over the past year/two years) are employed yearly by the responding companies. Usually they prefer those who have working experience over 3 years after graduation. The **ratio** between graduates and experienced workers having the degree from HEI among those who are hired at the companies is 1:10 or 2:8.

For the most part the employers are satisfied with the qualifications acquired by graduates. But among the **weaknesses** of professional training they outlined the lack of independence, communicative skills. Besides those weaknesses the graduates are qualified nowadays as good as before and even better. The employers think that there is a general problem of rather weak soft skill and suppose that the practical aspect of professional training is not satisfactory in the modern HEIs.

Nearly all the companies have the fixed routine for selecting candidates. Usually they have multilevel **selection procedure** starting with the call for the vacant position in the Internet (company web page and special resources as Head Hunter etc.) or with the received request from the candidate. Procedure includes at least two levels: the formal criteria review at the level of HR and the professional assessment at the level of particular department. The most popular tool to select candidates is interview. The approach is usually identified by the high level specialist responsible for the assessment of professional skills and the choice is definitely linked with the supposed responsibilities.

Not all the employers know about the amendment made to the Russia Labour Code concerning **professional standards**. But the majority of them is ready to apply the approved professional standards for the sphere of geodesy and cartography and make the changes to the way of selecting candidates considering the qualification requirements, skills, knowledge and competence. This is in process at the moment and they expect a set of new local instructions in the companies with more precise rules.

Selecting the candidates, not only their professional skills, but also **personality and general professional abilities (soft skills)** are considered by the HR managers and professionals together. The employers regard the following criteria as the most important:

- ✓ *stress tolerance,*
- ✓ *communicative skills,*
- ✓ *politeness,*
- ✓ *literate Russian language,*
- ✓ *knowledge of foreign languages,*
- ✓ *independence,*
- ✓ *willingness to self-development,*
- ✓ *ability to learn,*
- ✓ *ability to manage time,*
- ✓ *discipline,*
- ✓ *understanding of business processes,*
- ✓ *business writing skills,*
- ✓ *openness to new knowledge,*
- ✓ *teamwork,*



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- ✓ *responsibility and*
 - ✓ *initiative.*

Among the **communicative competences** all the employers consider the abilities to express one-self clearly, to work in a team and negotiating skills the most important for any company. In terms of behavioural traits they expect the employees to be first of all responsible and self-disciplined as long as the engineering sector requires careful attitude to all the aspects. The work usually concerns the issues of security, defence, people lives, state interests etc. And among the analytical skills and abilities for personal development the employers consider firstly the ability to understand new concepts quickly, being career oriented and strive for professional growth. They also pointed out the requirement to be able to work within the established processes in the company instead of inventing new. First of all they stressed the need to follow the new engineering trends, technologies, methods, approaches etc. That is why employees have to be flexible and perceptive, ready to learn.

According to the employers' opinion the **main reason for rejecting candidates** is the lack of professional skills and knowledge. As to the soft skills and personal characteristics they are on the second place in fact. They need professionals first of all. Other aspects could be more or less improved and developed in process inside the company. Though there are rejection cases on the ground of the lack of soft skills as well.

Speaking about the **forms of collaboration with HEIs** qualifying students, including MIIGAiK first of all, to perform activities undertaken at companies all the employers' representatives find promising job placements. They are accustomed to this form of collaboration and ready to develop it. Unfortunately all the other forms are a little bit unclear and less attractive for the companies. They understand the necessity to influence somehow the study programmes etc. but it is new, time requiring and indirect long term investment, if it is possible to say so. But anyway, most of the companies are willing to participate (to some extent) in the development of educational programmes and overall planning of professional education provided for students in the sphere of geodesy and cartography, land surveying and GIS technologies. All the companies already have the partnership agreements with MIIGAiK concerning work placements to students from the engineering faculties. They are ready to discuss if necessary any new type of social partnership in addition, if MIIGAiK is ready to develop and introduce the concept and show the advantages.

3.3. Other data

Demand in the labor market is determined by the number of employed graduates of educational institutions. Thus, the number of employed graduates MIIGAiK in 2015 amounted to 95% of the total amount released. 6 graduates are registered as unemployed people at the Employment Service of Moscow population. More than 70% of the graduates of the University of the total number of workers employed in the specialty.



Table 2. Employment of the MIIGAIK graduates, 2015.

Annual graduates' survey, 2015. MIIGAIK Employment Center "Career"							
Graduation year	Employed (people./%)		Unemployed (people./%)			Number of respondents (people./%)	
2015 Study program "Cartography"	32 (43,3%)		42 (56,7%)			74 (100%)	
	Work according to the degree		Wprk partly according to the degree		Work not according to the degree	32 (100%)	
	18 (56,3%)		11 (34,4%)		3 (9,3%)		
	Work experience according to the degree						
	No experience	Less than 1 year	1 - 2 years	2 - 3 years	Over 3 years	74 (100%)	
	28 (37,8%)	30(40,6%)	14 (18,9%)	1(1,4%)	1(1,4%)		
	Wage level (RUB)						
	10000-20000	20001-30000	30001-40000	40001-50000	50001-60000	over 60000	32 (100%)
	7 (21,9%)	3 (9,3%)	12 (37,5%)	4 (12,5%)	4 (12,5%)	2 (6,3%)	
	Do you think the level of preparation of graduates in MIIGAIK fits the requirements of the labor market?						
Yes	Nearly yes	Not completely	Now	Difficult to assess	61(100%)		
20 (32,8%)	22 (36,1%)	15 (24,6%)	1 (1,6%)	3 (4,9%)			
2015 Study Program "Applied Geodesy"	Employed (people./%)		Unemployed (people./%)			Number of respondents (people./%)	
	24 (80%)		6 (20%)			30 (100%)	
	Work according to the degree		Wprk partly according to the degree		Work not according to the degree	24 (100%)	
	16 (66,7%)		3 (12,5%)		5 (20,8%)		
	Work experience according to the degree						
	No experience	Less than 1 year	1 - 2 years	2 - 3 years	Over 3 years	30 (100%)	
	7 (23,3%)	8 (26,7%)	12 (40%)	2 (6,7%)	1 (3,3%)		
	Wage level (RUB)						
	10000-20000	20001-30000	30001-40000	40001-50000	50001-60000	Over 60000	24 (100%)
	2 (8,2%)	1 (4,2%)	7 (29,2%)	7 (29,2%)	6 (25%)	1 (4,2%)	
Do you think the level of preparation of graduates in MIIGAIK fits the requirements of the labor market?							
Yes	Nearly yes	Not completely	Now	Difficult to assess	24 (100%)		
12 (50%)	8 (33,3%)	4 (16,7%)	0 (0%)	0 (0%)			

Table 3. Employment of the MIIGAIK graduates, 2010 - 2014.

Joint results of Annual graduates' surveys, 2010 - 2014. MIIGAIK Employment Center "Career"					
Graduation year	Employed (people./%)		Unemployed (people./%)		Number of respondents (people./%)
2009	320 (62.8%)		189 (37.2%)		509 (100%)
2010	241 (50.4%)		237 (49.6%)		478 (100%)
2011	315 (60%)		208 (40%)		523 (100%)
2012	329 (66%)		170 (34%)		499 (82% from all the graduates (612))
2013	293 (64%)		163 (36%)		456 (100%)
	Employed according to the degree		Employed not according to the degree		Number of respondents (people./%)
2009	226 (70.6%)		94 (29.4%)		320 (100%)
2010	156 (64.7%)		85 (35.3%)		241 (100%)
2011	203 (65%)		112 (35%)		315 (100%)
2012	241 (73.3%)		88 (26.7%)		329 (100%)
2013	209 (71%)		84 (29%)		293(100%)
	Were employed according to the degree with the help of:				
	Friends	Internet	MIIGAIK	After the work placement	Number of respondents (people./%)
2009	110 (48.7%)	46 (20.3%)	4 (1.8%)	66 (29.2%)	226 (100%)
2010	73 (46.8%)	38 (24.3%)	14 (9%)	31 (19.9%)	156 (100%)
2011	93 (46%)	44 (22%)	15 (7%)	51 (25%)	203 (100%)
2012	111 (46%)	55 (22.8%)	25 (10.4%)	50 (20.8%)	241(100%)
2013	83 (39.7%)	59(28,2%)	23 (11%)	44(21,1%)	209 (100%)
	Working experience according to the degree				
	Less than 1 year	1-2 years	over 2 years	Number of respondents (people./%)	
2009	34 (15%)	146 (64.6%)	46 (20.4%)	226 (100%)	
2010	37 (23.7%)	83 (53.2%)	36 (23.1%)	156 (100%)	
2011	61 (30%)	108 (53%)	34 (17%)	203 (100%)	
2012	76 (31,5%)	127 (52,7%)	38 (15,8%)	241 (100%)	
2013	87(41,6%)	95(45,4%)	27(13%)	209(100%)	

Monitoring of employment of graduates of Russian universities, the results MIIGAIK:



1. Percentage of employment of graduates in the 1st year after the release of MIIGAiK: 95%
 - **4th place** out of 182 universities in Moscow;
 - **13th place** out of 817 universities in Russia.

2. The level of the average salary of graduates in the first year after the release of MIIGAiK:
41.6 thousand rubles / month
 - **54th place** out of 182 universities in Moscow;
 - **88th place** out of 817 universities in Russia.

3. Geographical distribution of graduates in 2013:
44 regions of Russia and 15 countries.

Source: Ministry of Education of Russia, <http://graduate.edu.ru/>

The University maintains partnerships with a large number of employers in both the scientific and industrial spheres. MIIGAiK promptly responds to changes in the labor market and employers' requirements for the training of highly qualified specialists in the field of geodesy, cartography and cadastre. Permanent University's strategic partners are agencies and organizations that are customers of experts. It:

- Ministry of Internal Affairs of Russia;
- Ministry of Industry and Energy of the Russian Federation;
- Ministry of Transport of the Russian Federation;
- Ministry of Economic Development and Trade of the Russian Federation;
- Ministry of Defence;
- Ministry of Emergency Situations of Russia;
- Ministry of Natural Resources of the Russian Federation;
- Ministry of Agriculture;
- Ministry of Finance;
- Ministry of Justice;
- Rosreestr;
- Federal Agency for Information Technology;
- Federal Agency for Construction, Housing and Utilities;
- Federal Agency for Military and Technical Cooperation;
- Federal Agency of Education;
- Federal Security Service,
- Federal Space Agency;
- Federal Agency for Real Estate Cadastre;
- Federal Agency for Industry;
- Federal Agency for Special Construction;
- Federal Service for Hydrometeorology and Environmental Monitoring;

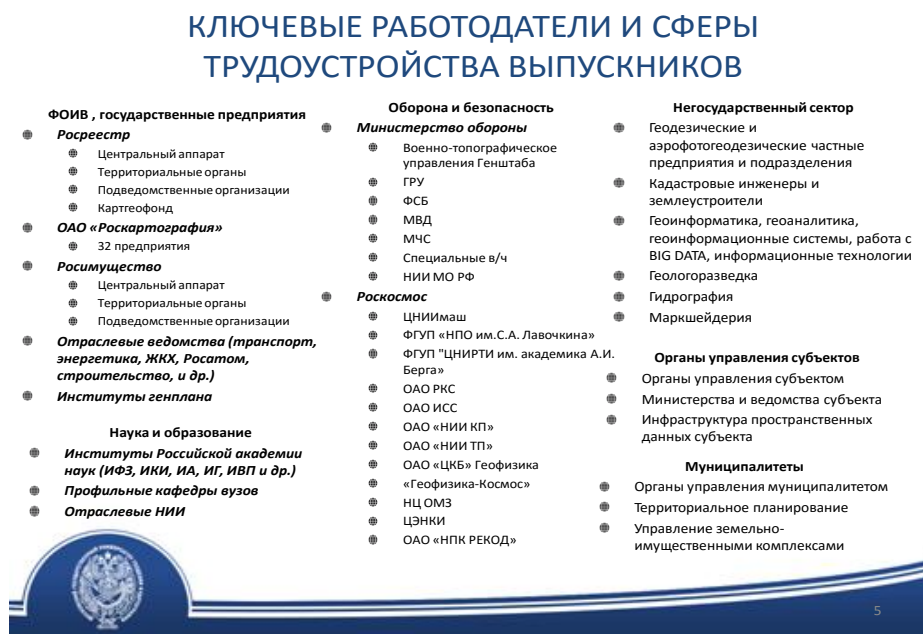


- Federal Air Navigation Service;
- Roskartografia
- Regional Surveying Company;
- Aerospace;
- Cosmonaut Training Centre n.a. Y.A. Gagarin;
- NGO "Comet"
- NPO Lavochkin, and others.

Official feedback from the key employers regarding the quality of of the graduates of MIIGAik is introduced on the University web-site (in Russian).

<http://www.miigaik.ru/about/otzyvy/>

Illustration 3. Key employers and spheres of employment of MIIGAik graduates (RUS)



According to the results of the informal students’ surveys conducted by the Department on social work within the training events and concerning the issue of competences the students suppose necessary for successful employment the picture ist he following.

Illustration 4. Successful employment – Students’ perspective





4. Key directions of MIIGAiK activities concerning employability

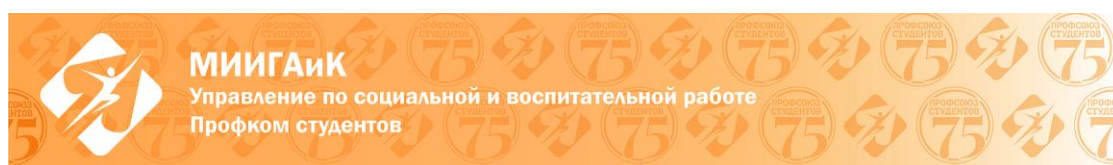
A wide range of activities aimed directly and indirectly at the employability is implemented in MIIGAiK. Different university units are involved in the work.

University administration provides the high level cooperation with employers via official participation in different organizations and associations, events and processes, including the leading role of MIIGAiK in the development of professional standards in the sector.

Faculties are responsible for teaching to develop professional and general competences fixed in each study program and based on the particular federal state educational standard. They are also responsible for the work placements, professional orientation, and cooperation with employers within the study programs development and updating. In MIIGAiK faculties are often assists the graduates recruiting via the links with the generations of graduates (requests from the senior alumny representing employers to recommend new candidates).

Methodological support for the faculties' academic and administrative staff concerning the development and further implementation of study programs with regard to the competences is provided by the newly established university administration unit – Direction of Study Programs. The MIIGAiK Center for retraining and advanced training of higher and vocational education managers and teachers lays an important role in this respect as well. It offers different programmms to let the staff to be able to implement new teaching methods and approaches, to link the education process and labour market needs and demands

Very important activities concerning the employability issue are conducted by the established Center of the Supplementary Linguistic Education with is based in the Chair of Linguistics.



<http://www.mgugik.ru/>

Organization of educational work in the extracurricular environment by the MIIGAiK Office for social and educational work under the Vice-Rector on social work contributes to the employability related activities very much. The Office includes such subdivisions as: Department of social and educational work, Information department, Cultural and leisure center and the Employment center "Career". The main directions of this educational and social work are:

- ✓ extracurricular training;
- ✓ social work;
- ✓ moral and patriotic education;



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- ✓ cultural work and creative development;
 - ✓ health and fitness and sports activities;
 - ✓ **development of student self-government;**
 - ✓ crime prevention;
 - ✓ **adaptation to the professional environment (labor education);**
 - ✓ information work.

4.1. Career Center

The Employment center for students and graduates "Career" promotes employment of students and graduates of MIIGAiK, temporary employment, assistance with work placements.

The Center organizes:

- Job fairs in MIIGAiK;
- Presentations of Companies to Work;
- Lectures, seminars, trainings on employment

The Center provides information about the events in Moscow:

- Job fairs;
- Career Days;
- "Open doors" Days of various companies.

The Employment Center for students and graduates "Career" throughout the year conducts a search for new organizations - employers by sending information letters about the employment center "Career" MIIGAiK. Students are offered information about the concrete vacancies and possibilities for the work placement. They can get consultations and assistance in CV writing etc. Every year in April a job fair for senior students and graduates of the university is held in MIIGAiK. The fair takes place within one day, lasting about 4 hours. A number of the companies from the sector and representatives of the governmental authorities working are usually invited to introduce their opportunities. Basically, the event attracts surveying and mapping organizations. Around 30 companies take part in the fair each year. About 120 vacancies are usually offered to students and graduates. Traditionally job fair attracts senior students and graduates of the university. Representatives of employers conduct interviews with everyone, and senior students have an opportunity to find a place for pre-diploma work placement. Students and graduates are given an opportunity to leave CVs and fill out the questionnaires for companies.

As a part of the Job Fair various seminars and workshops for students and graduates are held in MIIGAiK. One of these is the "Self-presentation for employment or successful interview"



Since 2009 we cooperate with the Moscow employment center. In 2016 within the program of support for young workers 5 students from MIIGAiK were employed.

4.2. Training activities

The development of the student self-government system was carried out by trade union organization, student councils, student active university clubs. The specialized Office works on the involvement of students in the public life of the university, creating conditions for the realization of their student projects and ideas.

The young and creative team of the Office on social work pays serious attention to the university training activities developing soft skills and various abilities. Annual duo event named "School of the Active" and "School of the Creative Active" takes place in MIIGAiK. The slogan of the event is "New Horizons". It is organized together with the Students' Union. During the School students take an active part in training sessions, master classes, round tables. Participants, divided into groups, work on existing projects (in order to improve them). Spring school, higher-level school, for the students, who take the most prominent part in the students' life more than one year. Autumn school - for freshmen, who want to integrate into the social life of the university. The School is a successful project which helps students to gain new knowledge and develop useful skills for the future professional and social life not only with the assistance of the University staff, but also via learning from specially invited best coaches, business trainers, experts in the field of students' self-government and work with youth. The School is usually attended by more than 100 students. Within the "School of the Creative Active" training is conducted in several thematic areas: direction, management activities, design, graphic design, video support events, PR and work with sponsors, sound engineering and technical support measures, overall structure of the organization of shows and cultural events at the university. It is necessary to say that for some students this type of skills turned out to become a second profession and helped them to be self-employed or even to start own business.

Corporate Institute of students' self-government (CISS) - a comprehensive program that allows the MIIGAiK students to improve their social skills on the principle of lifelong learning throughout the academic year. A set of the CISS activities:

All-Russia projects

«Training Day»	<i>Soft skills of wide range</i>
«Moscow Creative Laboratory»	<i>Skills organization of creative events, event management</i>
«Spectrum»	<i>Skills in the media environment: journalism, photography and video journalism, media management</i>



Local projects

Training programmes (soft skills) Successful employment/Public speech	<i>Specific spheres of soft skills</i>
Business games	<i>Soft skills of wide range</i>
Networking sessions	<i>Communication skills and build a network of useful contacts</i>

Training Day is a non-profit educational project aimed at the acquisition of a wide range of „overprofessional“ skills (soft skills) which youth audience needed in the modern world - self-organization skills and team work, project thinking, leadership competencies etc.

Format: one-day intensive activity, in which speakers and project coaches work with participants in interactive lectures and trainings format.

In the near future it is expected to cover a vast majority of the regions of Russia. To ensure the rapid growth a unified methodological framework will be created (methodological guidelines, film about the project technology, program of training webinars for regional action groups, package of necessary documents for the Regional Directorate of the project). By now a unique Internet portal is developed. It allows regional activists of the project to publish information about events, to conduct competitive selection procedures for coaches, to organize online registration of participants in all the cities, to conduct registration of participants at the arriving to the event, to receive feedback from participants in electronic form, etc.

4.3. Language education

The program provided by the MIIGAIK Center for Supplementary Linguistic Education is designed for those who want to improve English language skills and get more qualified to carry out translation work at a professional level. The aim of the program is to train specialist - translator who owns foreign language communicative competence in the field of professional communication.

Learning objectives:

- formation of students' communication skills of speaking, listening, reading and writing in all kinds of speech activity of the English language associated with the perception and the product of discourse, interaction and mediation;
- formation of professional translation skills, mastery of the elements of the translation strategy and technology, the accumulation of experience in the translation of texts of varying complexity from English into Russian;



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- Improving knowledge of professional vocabulary of the English language in accordance with the main student specialization;
 - Formation of knowledge of the English language of the theory, skills, linguistic thinking, analysis and comparison of language material, the ability to operate freely and clearly understand basic scientific concepts and phenomena of language;
 - Learning practical knowledge shared cultural speech criteria and basic functional styles of language, the ability to use theoretical knowledge in practice an interpreter to overcome possible linguistic difficulties in the process of communication.

4.4. Cooperation with employers

MIIGAIK is a founder of the **Consortium on personnel strategy for cartographic and geodetic support of social and economic development, defense and security of the Russian Federation**. Consortium organizes different events with the involvement of industrial enterprises (for more details - see <http://rugeo.miigaik.ru> Consortium's website.)

Consortium Objectives:

- ✓ Discussion, development and joint implementation of human resources strategies for industries and individual companies to ensure the development of cartographic and geodetic support social and economic development, defense and security of the Russian Federation, increasing the competitiveness of individual companies through improved human capital management technologies.
- ✓ Discussion and proposals, organization Foresight sessions, training programs, the development of projects to improve the quality of human capital involved by industry (including, in terms of development of professional standards, the implementation of a network of training, to attract staff of the new formation, training, organization of basic chairs , training, retraining, etc..).
- ✓ Developing a common policy implementation and incentive mechanisms to attract young people to address the development challenges of cartographic and geodetic support social and economic development, defense and security of the Russian Federation.

Consortium functions:

- ✓ Organizes interaction of educational, scientific organizations, business and government to form a coherent development priorities positions of cartographic and geodetic support and implementation of strategic government programs.
- ✓ Organizes set of expert groups and is involved in research on the forecast of staffing requirements and monitoring industry sector towards staffing.



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- ✓ Identifies technological advance in accordance with the structure of the demand to be met by the business and society, the developed technology markets, competence centers in the field of cartography and geodesy software.
 - ✓ Defines the short-, medium- and long-term priorities in the implementation of educational programs, research and development on the basis of forecast studies.
 - ✓ organizes the development of educational programs that provide technology group can form the basis for the emergence of new markets of high-tech products (services) industry. Specifies whether to study abroad in terms of technologies that are not developed in Russia, but are key to the development of the industry sector.
 - ✓ Generates a proposal to regulate the industry sectors of education, including regulations regarding industry standards, quality of education, professional standards, support mechanisms for new educational programs.
 - ✓ Develops and accompanies the implementation of the priorities of educational programs in the industry areas focused on the creation of a personnel reserve, the new formation cadres.
 - ✓ Develops roadmaps for human capital development by industry.
 - ✓ Generates a training plan for all stages of the creation of innovative products, including the cross-cutting technologies, and participates in its implementation through various forms of cooperation of educational institutions, scientific and industrial