

BG05M2OP001-1.001-0003

Center of Excellence in Informatics and Information and Communication Technologies

The main objective of the project is the establishment of a Center of Excellence (CoE), which integrates modern research infrastructure and teams of highly qualified scientists and specialists to conduct basic and applied research of high social importance in accordance with the priorities of the thematic area of Informatics and ICT of the Innovation strategy for smart specialization of the Republic of Bulgaria.

The CoE is building infrastructure in line with the standards of the European Technology Platforms, as well as with the European Commission's concept that electronic infrastructures are a key building block of the European Research Area. Open access policies on CPF infrastructure ensure the implementation of open science principles. The CVP infrastructure includes:

Data Center capable of storing and processing more than 3 PB of data, in accordance with current reliability requirements for power failures and maintenance organization for capacity expansion ensuring sustainable development.

Supercomputer complex based on the latest generation of technologies, with an emphasis on energy efficiency, peak performance over 1 PFLOP / s and 24×7 operating mode, which will enable the solution of wide range problems with high scientific and social impact.

Laboratory for 3D Digitization and Microstructural Analysis, which includes industrial computed tomography, 3D laser scanning and dynamic process digitalisation equipment. The huge amount of data being produced will be stored and analysed using the new capabilities of the Data Center and the Supercomputer Complex.

The Center of Excellence will establish Bulgaria as a regional leader in Informatics and ICT and enable leading multidisciplinary teams of scientists to utilize state-of-the-art high-performance computing resources, storage systems and 3D digitization tools for innovative high-tech and socio-economic effect.

The scientific infrastructure will be actively used by the academic partners of the CoE. It is also of great interest to the associate industrial partners. Open and free access will be provided to the scientific community in the country, including scientists from BAS institutes, universities and others. The CoE will provide an opportunity to work in an improved infrastructure environment for teams of researchers in the field of computational sciences, including Computational Mathematics, Computational Physics, Computational Chemistry and Pharmacy, Computational Biology, etc.

The direct impact of the Research and Development Complex of the CoE in Informatics and ICT is determined by the high scientific, scientific and applied and social importance of the projects included in the program for scientific and applied research.

The CoE will create conditions for stimulating the development of scientific capacity in Bulgaria in accordance with the highest European and world standards and promoting interdisciplinary research and approaches.

Much broader and more comprehensive is the impact of building an electronic infrastructure at the highest world level for the development of science, education and innovation in Bulgaria. The synergy of high-quality scientific approaches and innovative computing technologies will directly help to increase the capacity to transfer research results and generate innovation.

The CoE conducts research on 11 scientific projects, each using substantially the new infrastructure. The research projects include development, study and software implementation of high-performance methods and algorithms, as well as applications of state-of-the-art information technologies for solving priority problems and their application in practice. The results obtained will contribute to the development of research in areas such as the creation of new materials, pharmacy, ecology, climate change impact assessment, and more.

The CoE will actively support the accelerating of digital transformation processes and will help the smart decisions making based on Big Data analysis. Overall, the infrastructure will significantly improve the opportunities for successful participation of Bulgarian scientists in the European programs Horizon 2020 and Horizon Europe.

The greatest potential for impact of the new scientific infrastructure of the CoE is in the training of personnel in the use of state-of-the-art IT, which give a huge competitive advantage globally. The CoE's research infrastructure creates preconditions for the development of new technologies. The possibilities of applying advanced computing and 3D digitization (Industry 4.0) to create high value-added products are practically limitless. The center will provide training and knowledge transfer services. By the end of 2023, three calls for pilot applications will be announced to be developed jointly with small and medium enterprises. They will be given free access for implementation. Good practices are expected to be established, stimulating for the rest partners and a good example of collaboration between business and science.

The synergy between supercomputer simulations, Big Data and artificial intelligence is one of the paths for major technological breakthroughs. The project integrates the Data Center – as a storage and processing environment; the High-Performance Computing Complex – as an environment for solving problems with high computational complexity; as well as a team that has the capacity to consult, participate, train, assist with work within the Data Center.

New build infrastructure

40 servers Fujitsu Primergy RX 2540 M4 with a configuration:

NVIDIA Tesla V100 32GB

128 GB RAM

CPU 2x Intel Xeon Gold 5118 2.30GHz 24 core

2x800GB SSD

3*12TB HDD

NVIDIA Tesla V100 32GB

Double Precision Performance: 7 TFLOPS

Single Precision Performance: 14 TFLOPS

Tensor Performance

(applications in Artificial Intelligence): 112 TFLOPS

Coordinates of the project:

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