



PROJECT
**BG05M2OP001-1.002-0023: CENTER OF COMPETENCE "INTELLIGENT
MECHATRONIC, ECO-AND ENERGY-SAVING SYSTEMS AND TECHNOLOGIES"**

The main activity under the project Center of competence “Intelligent mechatronic, eco-and energy-saving systems and technologies” is to carry out market-oriented research by prominent researchers and their research teams in the field of mechatronics and clean technologies. Partners for the implementation of the project are Technical University of Gabrovo; Technical University Sofia - Plovdiv branch; Technical University of Varna; Sofia University St. Kliment Ohridski – Faculty of chemistry and pharmacy; Institute of system engineering and robotics - BAS; Institute of electronics - BAS; Central laboratory of applied physics – BAS.

For its successful realization, the first stage of the project is the reconstruction and modernization of the building facilities or parts of them as well as purchasing, installing and implementing of high-tech equipment, specialized software, tools and furniture, which will help establishing full-equipped labs, training halls and working spaces. The purchased equipment in the newly constructed laboratories will be in accordance with the best world standards and practices and will allow the development of joint activities with different scientific organizations from home and abroad, as well as with business organizations, governmental and non-governmental institutions. The established, scientific infrastructure will encourage the development of applied sciences and innovations in the sphere of mechatronics and clean technologies to create economic growth, quality jobs and help people handle national, European and world challenges. Simultaneously, there will be ongoing activities for attracting leading researchers and specialists from Bulgaria and abroad who are to work together, exchange ideas and experience about the scientific studies and the training of the next generation scientific scholars.

The research activities within the Center of Competence are oriented in two main directions, “**Intelligent mechatronic systems and technologies**” and “**Energy-saving systems and clean technologies**” distributed in eight laboratory complexes:

1. «**Energy-saving systems and technologies for design and production of hi-tech products**» - includes four laboratories - energy-saving technologies for life cycle extension and operational security improvement of engineering products, CAD/CAM systems for design and production of high-tech products, additive and energy-saving technologies and equipment, intelligent technologies based on intense energy flows.

2. «**Intelligent mechatronic measurement and control systems**» - three laboratories are supplied with measuring equipment enabling the survey of underwater noises, signals and vibrations of marine vessels and equipment, systems for examining the structure and properties of materials, as well as measurement of static and dynamic values.

3. «**Electronics and Sensors**» includes two laboratories for development of temperature and humidity sensor elements, gases sensor elements and development of micro-electronic and microprocessor devices and systems.

4. «**Distributed systems and intelligent Sensor Networks in mechatronics**» - five laboratories will be supplied with state-of-the-art equipment enabling processing and storage of data from sensor networks and distributed embedded systems, processing of visual information in intelligent transport systems, as well as biosensors and data processing in systems for support of elderly people and high-risk patients.

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5. **«Robotics and intelligent automation systems»** where the focus is on smart (intelligent) and specialized robots, autonomous aircrafts, intelligent, automated production systems and high-speed automation, inspection and interactive robotics, autonomous robots and collective robotics, special electric drives in robotics.

6. **«Nanostructured materials and disperse systems in clean technologies»** examination and introduction of innovative nanostructured materials and disperse systems and rheology in clean technologies.

7. **«Intelligent energy-saving systems and technologies»** - seven new laboratories will be opened and scientific and applied research for development of means and methods for solving energy and infrastructure problems related to mass electrical mobility will be carried out; research in the area of eco- and energy-saving contactless electric power transmitters, electric drive and electrical equipment, modern energy efficient electrical components and systems with application in the industrial sector, study of environmentally friendly, energy-saving and electromagnetically compatible photometric LED and RES components and technologies, energy efficient systems and technologies using thermal and hydraulic power and secondary and renewable energy sources, drive and positioning systems and integrated energy-saving technologies.

8. **«Intelligent mechatronic systems in the means of transport and industry»** - the scientific research in the five laboratories should contribute to the development of the automated manufacturing systems, robotics, industrial nanotechnologies, design, production and use of optical and laser technologies in automotive industry.

The scientific program of the project is open to the businesses, governmental and non-governmental organizations and institutions.