

**Project № BG05M20P001-1.002-0011 „Center of Competence MIRACle –
Mechatronics, Innovation, Robotics, Automation, Clean Technologies“**

Leading organisation: Institute of Mechanics - BAS

Partners: Institute of Information and Communication Technologies (IICT) – BAS;

Central Laboratory of Solar Energy and New Energy Sources (CL SENES) – BAS;

Sofia University “St. Kliment Ohridski”;

Technical University of Sofia;

University "Prof. Dr. Assen Zlatarov" – Burgas;

Higher School of Insurance and Finance;

GIS – transfer center

Associated partners:

INSTITUTE OF ROBOTICS, JOHANNES KEPLER UNIVERSITY LINZ, LINZ, AUSTRIA.

LABORATORY OF ROBOTICS AND MECHATRONICS, DICEM – UNIVERSITY OF CASSINO AND SOUTH LATIUM, CASSINO (FR), ITALY.

LABORATORIO DE INGENIERIA MECANICA, ESCUELA POLITECNICA SUPERIOR, UNIVERSITY OF LA CORUÑA, FERROL, SPAIN.

DEPARTMENT OF ENGINEERING AND MATHEMATICS, SHEFFIELD HALLAM UNIVERSITY, SHEFFIELD, UK. TECHNISCHE UNIVERSITÄT ILMENAU, TU ILMENAU, GERMANY.

CLUSTER MECHATRONICS AND AUTOMATION

R&D&I CONSORTIUM (SOFIA TECH PARK)

NATIONAL SECTOR ORGANIZATION FOR ELECTRIC MOBILITY

AMG TECHNOLOGY LTD.

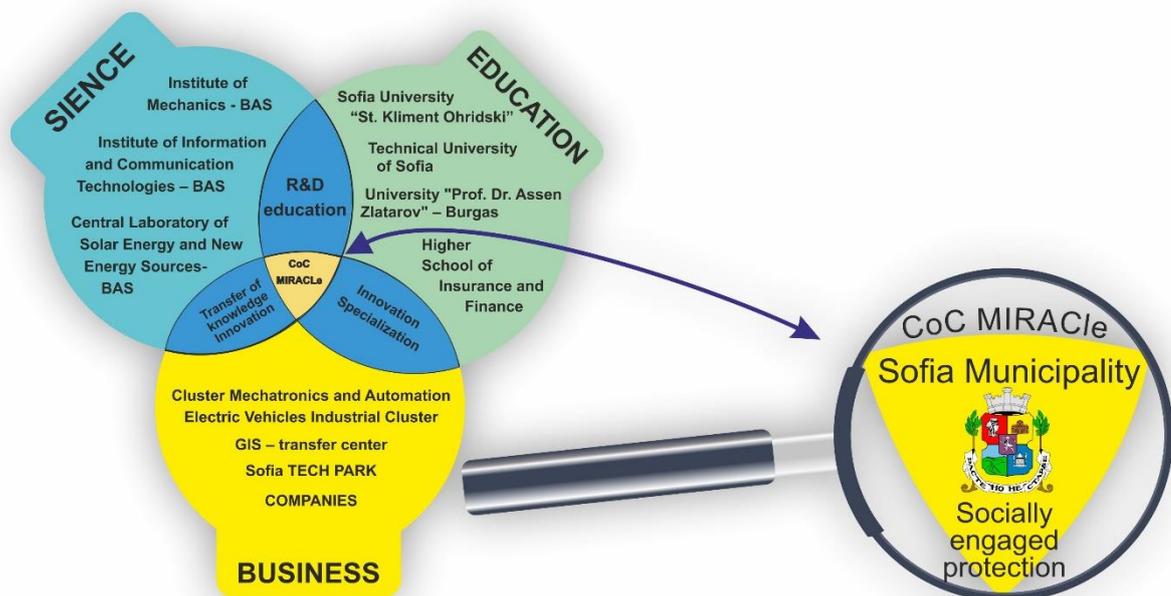
MEDICAL CENTER “REPROBIOMED” - SOFIA

Budget: BNG 22 570 752,32

The objective of the project MIRACle is to establish a Center of Competence related to the thematic field “Mechatronic and Clean Technologies” of the Innovation Strategy for Smart Specialization of the Republic of Bulgaria, and consisting a critical mass of leading scientists and talented, successful researchers and inventors in all scientific fields in the pointed out thematic field, including the creation of the most modern research infrastructure with appropriate defined organization structure and own research and innovation programmes in order to provide opportunities for competitive development of the scientific field “Mechatronics” and full scientific support to the economic sectors as regards that thematic field.

Specific objectives of the projects are to:

- Provide reproduction of scientific and research staff in the indicated thematic field by inviting leading scientists and researchers (from the country and abroad) to conduct scientific studies and to provide specialization of scientists and inventors at a high level;
- Create and introduce new training and educational methods and programmes in the field of mechatronics and clean technologies including for scientists and representatives of business field;
- Establish sufficient favourable and attractive conditions for development of high qualified young scientists, specialization of researchers and inventors at a high level in the field of mechatronics and clean technologies, as well as for continuity of knowledge and experience among different generations of researchers;
- Establish strategical partnerships with leading technological institutions and companies in Europe related to initiation of scientific and research projects funded by EC framework programmes;
- Achieve effective closing of a knowledge triangle “science-education-business” at the Center of Competence MIRACLe.



The scientific infrastructure is organized in laboratories which are consolidated into **4 main bases**:

Base 1 will be built on the territory of Bulgarian Academy of Science (including laboratories at IMeh, IICT, CL SENES), **base 2** – on the territory of Technical University of Sofia, **base 3** will be developed on the territory of Sofia University “St. Climent Ohridski” and **base 4** will be exported within University "Prof. Dr. Assen Zlatarov" – Burgas. The main bases include

creation of new scientific laboratories and their modernization that best meet the priority direction of thematic field “Mechatronics and Clean Technologies”.

Scientific and research activities in the laboratories are grouped into **6 work packages (WP)**: WP1 Innovation solutions in robotics and automation; WP 2 Bio-mechatronic systems; WP 3 Intelligent environment, processes and technologies in mechatronics; WP 4 New methods and tools for controlling and testing mechatronic elements; WP5 Mathematical provision and modeling of complex systems and processes; WP 6 3D modeling, elaboration and implementation of pilot models of elements, details and systems related to mechatronics.

Expected results from scientific and research activity:

The successful project implementation will ensure opportunities for new solutions in the field of industrial robotics, automation of production processes, as well as for testing and optimizing innovation technological processes – high- speeded, high temperature using nanoelements and etc.; creation of innovative mechatronics systems for cell manipulation; construction of modern technological cells for production of special materials and alloys, as well as to replace the imported and expansive tools with such materials.

The successful project implementation will give opportunities to apply 3D visualization and digitalization of cultural and historical heritage, as well as to provide an access to disabled people (blind or partially sighted) to perception; to obtain new knowledge and applications in the field of intelligent systems and creation of intelligent urbanized environment.

The successful project implementation will provide opportunities for integration of specially elaborated lightweight sections, organic elements and textiles in mechatronics and bio-mechatronics systems.

The successful project implementation will ensure opportunities for new quality as regards the control and testing the elements, units and systems in mechatronics, particularly in metrological assurance, intelligent sensors, devices and systems for measuring and quality control; monitoring and nondestructive testing; testing of macromechatronic systems; studying micro- and nanomechatronics of mechatronics systems.