

COLLABORATIVE GRANT SCHEME
FOR R&D ORGANIZATIONS AND
PRIVATE SECTOR ENTERPRISES



Ministry of Education, Science
and Technological Development


INNOVATION
FUND



WORLD BANK GROUP



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THE COLLABORATIVE GRANT SCHEME PROGRAM

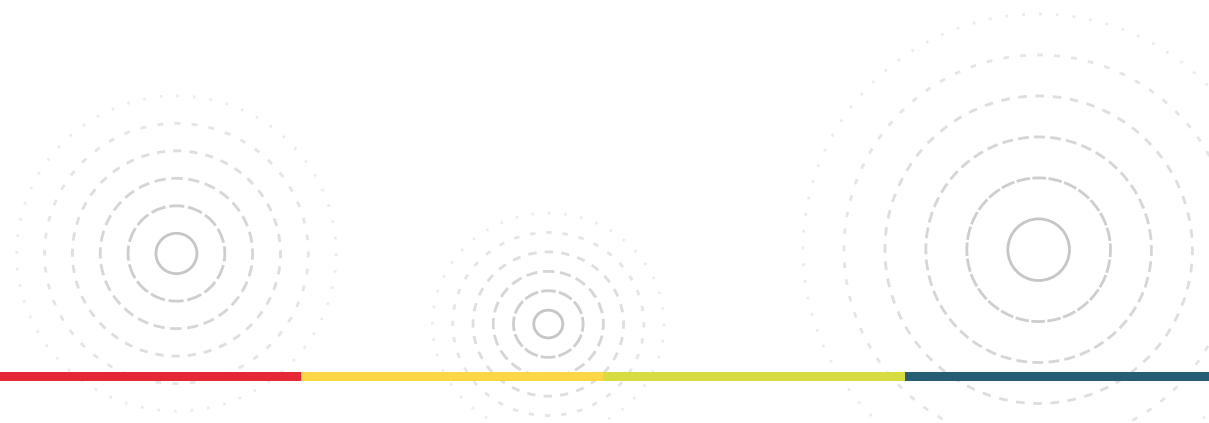


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THE COLLABORATIVE GRANT SCHEME PROGRAM

The Collaborative Grant Scheme program was designed with the technical assistance of the World Bank in the framework of the second component of the Serbia Research, Innovation and Technology Transfer Project, which was funded by EU IPA 2013. The implementation of the program was financed through the Direct Grant Agreement – “Creating a Comprehensive R&D Collaboration” signed between the Innovation Fund and the Ministry of Finance (Department for Contracting and Financing of EU Funded Programs) on February 5, 2016. Through this Agreement, a total of EUR 3.4 million was secured, of which EUR 2.4 million from EU IPA 2013 and EUR 1 million from the Ministry of Education, Science and Technological Development of the Republic of Serbia.



The Collaborative Grant Scheme program is designed to incentivize private-sector companies and public-sector R&D organizations to engage in joint scientific research and development projects with the goal of creating new commercially viable products and services, as well as innovative precompetitive technologies with significant future impact and market potential. Eligible applicants are consortia engaged in developing new commercially applicable technologies, product and services from all fields of science and technology. The Innovation Fund provides co-financing for research and development projects by granting up to EUR 300,000 per project. The IF co-financing covers a maximum of 70% of total eligible project costs, with mandatory consortium co-financing of at least 30% if the consortium's lead applicant is a micro or small enterprise. If the consortium's lead applicant is a medium-sized enterprise, the IF can cover a maximum of 60% of total eligible project costs.

Results

The first public call for proposals was opened in 2016, and a total of **14 projects** were approved for financing within the amount of **EUR 3 million**.

- Through these developmental initiatives:
- 12 new products have been successfully created,
- 5 advanced prototypes were produced
- 3 new technologies and technological processes for obtaining high added value products have been mastered and confirmed,
- 5 projects started generating commercial results by selling their innovations
- 5 projects saw technology transfer completed between the members of the consortium, and in this way knowledge and intellectual property originally derived from the field of scientific research organizations in the public sector were mobilized.

INNOVATION PROJECTS

CONSORTIUM LEADER: Agrounik, Beograd

MAIN PARTNER: Institute for plant protection, Belgrade

PARTNER: Bionik, Belgrade

PROJECT: Bacteriocin based product against *Erwinia amylovora*,
the Fire Blight Pathogen

SECTOR: Food and agriculture



The result of this successfully implemented project is the **ERWIX** formula – a brand new registered product for protecting plants from the fire blight pathogen, which will enable fruit producers to reduce the vast economic damage that originates from the spread of this bacterial infection. Apple, pear and quince growers who use **ERWIX**, which is applied as a biofilm, will ensure that their fruit is protected from the expansion of this harmful

bacteria. **ERWIX** accomplishes this by relying on the formula's “benevolent” bacteria which produce bacteriocin surfactin and have an antimicrobial effect on pathogens. During the formula's testing on three locations over the last two years, the intensity of the infection on pears was reduced by 96% on the branches and 88% on the flowers when compared to control groups.

CONSORTIUM LEADER: Bankom, Belgrade

MAIN PARTNER: Faculty of technology and metallurgy, University of Belgrade

PROJECT: High protein soybean-based probiotic feed with increased digestibility

SECTOR: Food and agriculture



The technology which was developed with the support of the Innovation Fund should enable the production of high-protein soy-based products with probiotic and prebiotic properties for human and animal nutrition. The product that the consortium has developed under the trade name **Tesla Protein**, allows for significantly higher utilization of soy, which is the main source of protein for animal feeding. The

current utilization of nutrients in standard soybean products is about 60%, while **Tesla Protein** has a utilization rate of about 92%. In addition, it also improves animal health, which allows for a reduction in the use of medicaments and increases productivity. It is expected that first financial results will be generated in 2019, with full production potential being achieved in 2020.

CONSORTIUM LEADER: Eugen Chocolate, Gložan

MAIN PARTNER: Faculty of technology, University of Novi Sad

PROJECT: Development of Innovative Chocolate
Products Fortified with Bioactive Compounds

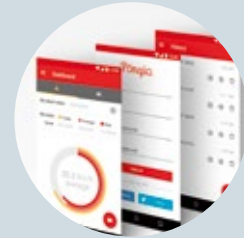
SECTOR: Food and agriculture



The result of the project is functional chocolate products enriched with encapsulated phytochemicals originating from sources such as green tea, blackberry and blueberry. The main technological challenge was to optimize the production of nutritionally enriched chocolate in terms of composition and processing parameters, especially considering the resistance of bioactive components. This included a series of laboratory and industrial test runs under

controlled conditions and comprehensive quality analysis, shelf life testing, package design and product labeling. Introduction of nutritionally enriched chocolate in the product palette of Eugen Chocolate contributes to the positioning of the company in the functional foods market, while the expected expansion of this market in the region will create the conditions to generate profits and improve the company's overall performance.

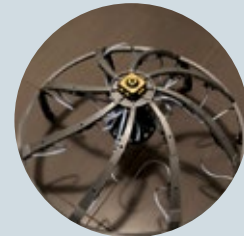
CONSORTIUM LEADER: Gecko Solutions, Belgrade
MAIN PARTNER: Faculty of mechanical engineering, University of Belgrade
PROJECT: S3T
SECTOR: IKT



Pongio, the application developed jointly by Gecko Solutions and the experts from the Faculty of mechanical engineering from the University of Belgrade, is the first interactive tool for table tennis which allows for measuring of striking speed, recording your opponent and analyzing it in real time or after the match. The app uses mobile phones or

tablet devices, it's free to download and can be used in broader social circles. It's designed for professionals, occasional competitors and enthusiasts and it allows for comparing the match parameters, strike tracking, improving one's style or technique based on the videos.

CONSORTIUM LEADER: GeoGis, Belgrade
MAIN PARTNER: Institute of physics, Belgrade
PARTNER: Institute of physics, Belgrade
PARTNER: Institute Mihajlo Pupin, Belgrade
PROJECT: Drone Surveying of Acoustic Noise Sources And Implementing In Gis
SECTOR: Environment and climate protection



This project saw the development of a device for automated airborne observation and recording of sound sources, and represents the first device of its kind. The data obtained through the deployment of this device can be used for acoustic mapping and zoning, designing environmental noise protection measures and implementing modern concepts of a sustainable environment such as “smart city”, “healthy city”, or “Blue Green Dream”. All this data

allows for the creation of a georeferenced map of sound sources, which is then added as a new layer in a Geographic Information System (GIS). Two prototypes of ultra-light acoustic cameras were constructed, and MEMS microphones with membranes made of the lightweight material graphene were raised to a higher technology readiness level and are expected to be an integral part of the next generation of devices.



CONSORTIUM LEADER: GreenLab, Žiča

MAIN PARTNER: Institute for molecular genetics and genetic engineering, Belgrade

PARTNER: Invetlab, Adaševci

PARTNER: Phytonet, Belgrade

PROJECT: Development of technological processes for production of innovative probiotic products for prevention and treatment of intestinal infections in animals

SECTOR: Food and agriculture



This innovative probiotic was developed as an adequate replacement for antibiotic use in prevention and treatment of intestinal infections in farm animals. Two probiotic formulations were designed – fermented liquid probiotic for local distribution, and lyophilized probiotic as feed additive for global distribution. The mixed probiotic culture was previously designed by IMGGE, based on three thermophilic lactic acid bacteria natural isolates. This probiotic has a unique probiotic potential, including antimicrobial activity against hardly curable patho-

gens (enterotoxigenic *Escherichia coli* (ETEC), *Clostridium difficile*, *Clostridium perfringens* and *Salmonella* sp.), boosting of protective immune response and improving the gut microbiota diversity. The technology for large scale production of fermented and lyophilized probiotic formulations were also developed and standardized within the project, while the efficacy of this innovative probiotic was demonstrated in farm clinical trials on pigs, cows, and poultry. The product is already available on the market and is generating revenue.

CONSORTIUM LEADER: LMB Soft, Niš

MAIN PARTNER: Electronic faculty, University of Niš

PARTNER: Innovation Center of Advanced Technologies, Niš

PROJECT: Development of new generation of sterile
PVC tubes docking devices for medical blood bag system

SECTOR: Medical and therapeutical devices



The consortium helming this project has developed a new sterile docking device (SDD) for connecting medical (PVC) tubes used in blood bag transfusion systems while fulfilling the key request in this industry – maintaining absolute sterility of liquids inside the bags despite heavy exterior bacterial contamination. The key innovation is the application of a very energy efficient dielectric heating method based on an RF electromagnetic field (using the principle found in microwave ovens). Prior to being

welded, the ends of the tubes are sealed and leaned against one another, making the compound significantly less exposed to environmental influences. The heat causes melting of the plastic at the ends of the tubes, which are then welded. Thus, the ends of the tubes are less exposed to contamination in an environment heated directly to the point of melting (over 200°C), which prevents contamination within the system, even in the presence of non-uniform material on the weld.

CONSORTIUM LEADER: Mont Stubline, Stubline

MAIN PARTNER: Faculty of mechanical engineering, University of Belgrade

PARTNER: DenHeat, Denmark

PROJECT: Development of Innovative Modular
Helicoid Heat Exchanger for Organic Waste

SECTOR: Energy and energy efficiency



The consortium led by Mont Stubline have developed an innovative heat exchanger solution to meet the demand of the biogas and biomass industry. After manufacturing 3 prototypes, 1:1 test plant and mobile test-rig for in-situ testing on existing plants, a series of performance tests has been carried out. This resulted in design and process regime optimization of the heat exchanger. Since the clients recognized the benefits of

a tailor-made solution and serious approach to testing, first orders for the new exchanger came in sooner than expected. Currently, 4 HEX batteries are being installed at HOLSTED biogas plant in Denmark. Negotiations have started with the industry's biggest players – German energy distributor EON and Danish plant owner Nature Energi A/S.



CONSORTIUM LEADER: NIRI 4NL Research And Development, Niš

MAIN PARTNER: Faculty of science and mathematics, University of Niš

PARTNER: KP Advertajzing, Niš

PROJECT: Classifieds Guard

SECTOR: Software and application development



The consortium led by NIRI 4NL has implemented a project named **Classified Ads Guard** for automated classification of small advertisements, designed for online retailers who operate mostly through classifieds. The ad classifier was developed in the period from April 2017 to March 2018 with the help of experts from the Faculty of Sciences and Mathematics, University of Nis. This software solution uses advanced artificial intelligence algorithms, which makes the classifier

very accurate and easy to apply in different language, geographic and domain barriers. The benefits that the smart Classified Ads Guard brings to Internet advertisers are: 20 times faster upload of internet ads by the end user; More precise classification of ads, and consequently easier search of desired products/ services; Reducing the manual work of moderators up to 50%; Raising the quality of services and the reputation of Internet users.



CONSORTIUM LEADER: NovelIC, Belgrade

MAIN PARTNER: School of electrical engineering, University of Belgrade

PROJECT: HUman DEtection Sensor, HUDES

SECTOR: Electrical engineering



The consortium led by the Novelic company has developed a radar sensor which remotely detects presence, movement, breathing and heartbeat of the observed person, and its primary application is monitoring of drivers and passengers in the car interior. The seat occupancy sensor called **Cabin Sense** can detect whether the seat is occupied and what are the vital signs of a person. Several leading automotive companies are already evaluating the

module and in 2018 one of the major automotive suppliers started a pilot product development based on the sensor, and thus the sensor has generated its first revenue. On top of that, Novelic has developed its own mmWave radar chip (RC060A1) to be used in the second generation of the seat occupancy sensor. **This is the first ever chip developed in Serbia by a Serbian company.**



CONSORTIUM LEADER: Otto Bock Sava, Kragujevac

MAIN PARTNER: Faculty of engineering, University of Kragujevac

PARTNER: Sim-Cert, Kruševac

PROJECT: Ultimate Cca – Oap Manufacturing System

SECTOR: Machines and mechanical engineering



The result of the project is a new technology in the form of an integrated system for production of orthopedic aids, based on the formation of a digital chain of compatible devices and the exploitation of CAD/CAM /CNC technology with the use of inverse engineering. This production concept is flexible, tailored to smaller markets, shortens the delivery time of orthopedic aids to customers and is significantly cheaper than the classic model of centralized production of orthopedic aids. As result of this technology,

several new technological processes were developed: production of orthopedic insoles; spine corsets in children aged up to 16 years; positive casts and prostheses/orthoses. The system has also led to significant improvements of services provided to customers, related to time reduction and fewer client visits during the process of designing and finalizing orthopedic aids, as well as the ability to create individual orthopedic aids “remotely”. The project has already begun generating significant revenue on the market.



CONSORTIUM LEADER: Quadra Graphic, Belgrade

MAIN PARTNER: Institute of physics, Belgrade

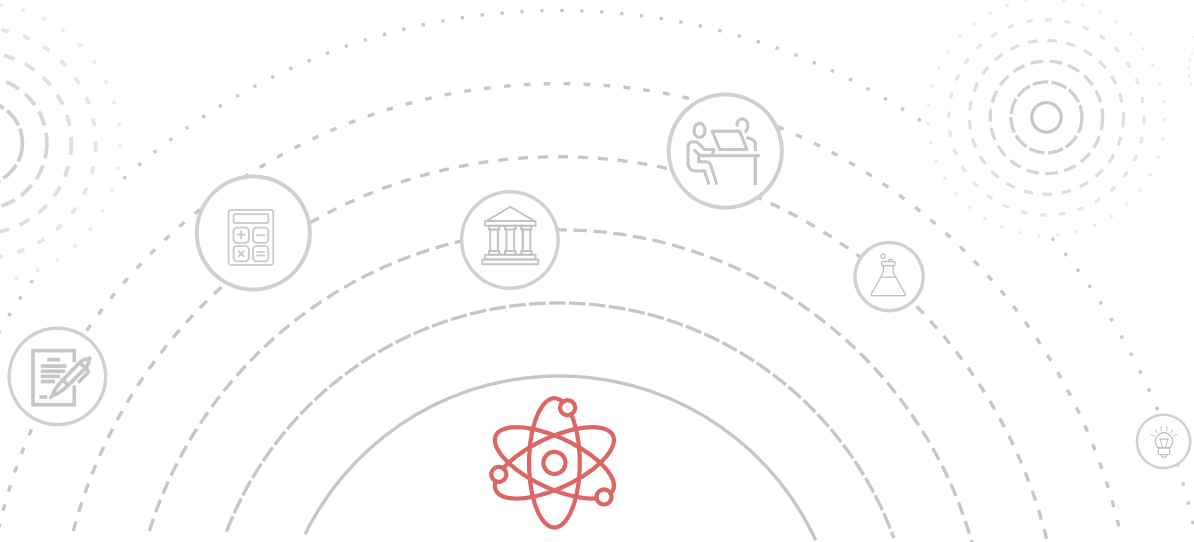
PROJECT: Upscaling Teslagram® technology based on variable and complex biological structures for security printing

SECTOR: Life sciences



Teslagram is a technology for protection against counterfeiting by attaching scales obtained from butterfly wings to valuables. **Teslagram** is unique in applying a distinct uncopiable security element to each and every protected item. With Teslagram, every banknote, every credit card, every item of clothing and every drug pill becomes a unique uncopiable item. The technology is protected by patents in Europe, United States, Canada, Korea, Japan and China.

This project has yielded a complete hardware-software process of production and identification of nanostructure-printed cards, and the printing technology makes these cards durable, resistant to scratching and bending, and resilient in warm, humid and mechanically adverse environments. Sales of the improved telecom vouchers developed through this new technology has significantly grown in the African and Asian markets as a direct consequence of development efforts supported by this project.



CONSORTIUM LEADER: Tetragon, Čačak

MAIN PARTNER: Faculty of technology and metallurgy, University of Belgrade

PROJECT: Development of eco-friendly water-born polychloroprene contact adhesives

SECTOR: Life sciences



The consortium has created a new eco-friendly water-based adhesive used in mattress, pillow and furniture industries and its eco-friendliness was confirmed by obtaining the prestigious OEKO-TEX certificate. This adhesive is intended for bonding the joints of two polyurethanes, textiles or latex. The consortium was focused on solving the problem which required the replacement of traditional adhesives based on solvents with adhesives on based on water, which would also rival the

characteristics of the former. The request from the market was to achieve very good initial gluing, to obtain a final gluing after only six hours, as well as to avoid potential problems related to applying the substance in different ways. With this in mind, the innovation was carried out on two types of glue. The first type of adhesive is designed for roller application and the other is based on spray application by using a spraying pistol. The product has already begun generating revenue on the market.



CONSORTIUM LEADER: Wipl-D, Belgrade

MAIN PARTNER: School of electrical engineering, University of Belgrade

PROJECT: New Generation of Electromagnetic Modeling Simulation Tools

SECTOR: Electrical engineering

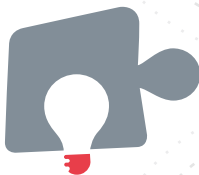


This innovative concept is implemented in two products: 3D EM Solver (WIPL-D Pro) and 2D EM Solver. Owing to these novelties, the simulation can be accelerated up to 10-100 times, and the accuracy can also be increased 10-100 times. Additionally, a new FEM Solver was developed in line with this innovative concept and added to the palette of WIPL-D tools, where it should enable handling of continuously

inhomogeneous and anisotropic materials. Although the launching of the official versions of these software tools is planned for March 2019, the beta versions were already delivered for seven contracts in the total amount of 63,000 USD and 9,000 EUR for the 3D and 2D tools respectively. However, the full impact of this development is expected to be reached in the next 5+ years.

REPUBLIC OF SERBIA

**INNOVATION
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