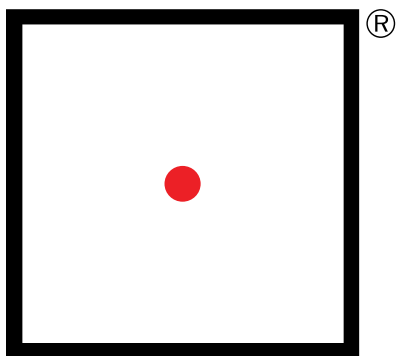


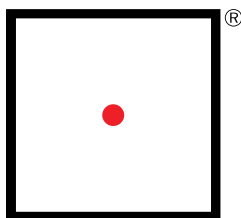
2019



**Polski
Produkt
Przyszłości**

Awards catalogue

21st Annual Competition Polish Product of the Future



**Polski
Produkt
Przyszłości**

AWARDS CATALOGUE

21st Annual Competition

Polish Product of the Future



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Dear Sir or Madam,

Competition is one of the driving forces behind progress in the market economy. It imposes innovation, promotes those who in the eyes of consumers seek new ways and solutions and also allows for a better response to the needs of societies. Among other reasons, this is why the Polish Agency for Enterprise Development along with the National Centre for Research and Development organises the Polish Product of the Future competition, which dates back 21 years.

In the history of the competition, about one thousand innovative projects have been registered so far, all hailing from so-called high technologies industries; among others medical, pharmaceutical, electronic and chemical. Since the beginning, the Competition Jury has rewarded over 50 projects and granted more than one hundred distinctions.

The accuracy of nominations and choices are proven by the subsequent successes of the rewarded projects. Several of them

rapidly established themselves both on the Polish market and abroad. Among the previous laureates are companies whose potential has been recognised by stock market investors and scientific institutions that can boast of the highest scientific category A+.

It is no different in the case of the winners of the XXI edition of the Polish Product of the Future. Seventy-two projects that are a result of innovative research and development were entered to compete for the title of the best of Polish innovations. We rewarded the best and described them in this catalogue.

Polish Product of the Future is the result of the work of brilliant scientists, engineers - innovators and visionaries. Therefore it is worth to introduce companies and technologies that will, in the near future, set new standards and paths in the most important areas of our life and economy.

We encourage you to read and invite you to participate in subsequent editions of the competition!



Małgorzata Oleszczuk
President of PARP



Prof. Maciej Chorowski, PhD, Eng.
NCBR Director

About the competition

History

The aim of the Polish Product of the Future competition is to select and promote innovative products and technologies developed in Poland that have the potential to be present not only on the domestic market, but also globally. The competition's mission is also to honour the people who are behind these projects, such as entrepreneurs, scientists, researchers and creators of innovative solutions, both those who work on their own and those who are part of scientific and business consortia. These are people who are passionate about civilisation development based on seeking new solutions.

The project is organised jointly by the Polish Agency for Enterprise Development and the National Centre for Research and Development. The mission of the former is to support innovation and research activities of SMEs, increase exports, develop human resources, and increase the use of new technologies in business. The aim of the latter is to support Polish scientific

units and companies in developing their ability to create and use solutions based on the results of research.

The winners are selected by the Committee, which includes representatives of the most important institutions in the country, such as the Chancellery of the President, Chancellery of the Prime Minister, Ministry of Entrepreneurship and Technology, Ministry of Science and Higher Education, Patent Office of the Republic of Poland, Polish Development Fund, Main Technical Organisation, Warsaw University of Technology, University of Warsaw and media representatives. The significance of the event is highlighted by the patronage of the Minister of Entrepreneurship and Technology and the Minister of Science and Higher Education.

Awards and distinctions for the most-innovative products and technologies are granted in three categories: product of the future of a scientific unit, product of the future of an enterprise, and product of the future of a consortium of a scientific unit and enterprise.

The winners have the opportunity to obtaining a grant of up to PLN 100,000 for the development, promotion or internationalisation of the product. Those who are singled

out can obtain such a grant in the amount of PLN 25,000. In addition, all winners get the right to use the prestigious phrase and slogan 'Polish Product of the Future' in correspondence and promotion.

In the 21-year history of the competition, almost 1,000 innovative projects have been submitted from various sectors of the economy, including medical, pharmaceutical, electronic and electrotechnical, chemical, and industrial automation. There have been 56 projects that have received awards, and 116 have been singled out.

Among the projects that won and were singled out, many have achieved unprecedented market success, while others are constantly developing.

The Institute of Heavy Organic Synthesis 'Blachownia' and GrupaAzoty – ZakładyAzotoweKędzierzyn S.A. – winner for 'Plastics plasticisers' in 2014 and for, Specialty Esters' in 2016 are today at the forefront of entities submitting inventions and utility models. In addition, GrupaAzoty is constantly developing specialty ester ranges.

Two years ago, the Institute of Electron Technology – winner for 'Quantum cascade lasers' in 2012 – was listed in the European

Commission's KETs map ('KETs Technology Centres'), which are tasked with enabling companies to accelerate the pace of innovation and commercialisation of new ideas.

The National Centre for Nuclear Research, which is last year's winner of the IntraLine-IOERT prize (cancer treatment method based on irradiation of a malignant area, while keeping healthy tissue), is preparing an already finished device for treating patients in the Wielkopolska Cancer Centre. It also intends to launch the product onto the American market.

The winners of the Polish Project of the Future competition have also won awards and distinctions at innovation trade fairs and exhibitions, including the ITM International Trade Fairs Poland: Innovations, Technologies and Machines in Poznań, International Exhibition of Inventions, New Technology and Products in Geneva, and World Exhibition on Innovation, Research and New Technologies – Brussels Innova in Brussels.

The 21st edition of the competition has had 72 projects submitted. The best of these have been recognised and awarded, and are outlined in this catalogue.

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Bone substitution biomaterial FlexiOss®

Description of the solution

The innovative bone replacement biomaterial FlexiOss® is a bioactive preparation based on hydroxyapatite ceramics and an organic polymer. FlexiOss® is protected by Polish and European patents. It's an original solution for modern two-phase implant biomaterials of the third generation. In terms of its composition and properties, it's similar to bone tissue, and is characterised by biocompatibility, bioactivity and non-toxicity. Due to its high and varied porosity, it can be used as a scaffold for osteogenic cells coming from the edges of the bone defect and, thanks to its high ion reactivity (bioactivity), it can significantly influence the bone regeneration process. Dry biomaterial is able to absorb the liquid in which it's soaked (physiological salt, blood, plasma), gaining elastic properties. During surgery, it can be individually adjusted by cutting or bending to the dimensions (shape) of the defect to be replaced. Thanks to its cohesiveness, it doesn't move and doesn't separate from the implant site.

Innovation

The innovative feature of FlexiOss® relies on its haemostatic properties – by absorbing blood at the surgical site, it prevents clot formation. It can also act as a carrier for antibacterial drugs, which allows limiting the use of antibiotics in the perioperative period. From the patient's point of view, FlexiOss® provides the possibility of correct bone tissue reconstruction and low risk of inflammatory foci, infection and rejection. The composite does not contain zoonotic components, unlike many commercial biomaterials based on animal collagen.

Application of the solution

The FlexiOss® implant will be used to treat non-load-bearing bone defects, especially in trauma and orthopaedic surgery, as well as in veterinary medicine. Treatments involving the material in dental surgery may include cyst fillings or treatment of fistulas. The composite can also be potentially used as a

complement to titanium scaffolds used in orthopaedics, as well as a treatment of bone damage resulting from the removal of neoplastically changed areas of bone tissue.

Implementation status

The FlexiOss® implant preparation has been tested on animals and humans in medical experiments. Currently, a clinical trial project is being implemented under Measure 1.2 of the Regional Operational Programme for Lubelskie voivodship - Targeted Trials. Medical Inventi S.A. has obtained

a project under Measure 3.3.3 of the Smart Growth Operational Programme – Support for SMEs in the marketing of product brands – in order to increase the recognition of the FlexiOss® brand on foreign markets. At present, the FlexiOss® medical device is in the process of certification.

Advantages of the solution

The commercialisation of the product is in line with the development of the global market for implantable bone replacement preparations. Thanks to its unique featur-

FlexiOss® is an innovative bioactive bone substitute composite based on porous ion reactive hydroxyapatite ceramics and an organic polymer. It's an original solution for modern third-generation implant preparations thanks to its composition being biocompatible with bone tissue, its bioactivity, influence on bone tissue regeneration and support of the bone reconstruction process, as well as surgical manageability and elasticity.

a grant in the form of a technology loan for the launch of FlexiOss® production on an industrial scale. The production technology of the biocomposite is based on process innovation resulting from commissioned research and development works as part of the project under Sub-measure 2.3.2 'Vouchers for Innovations for SMEs' of the Smart Growth Operational Programme for the period 2014-2020. Medical Inventi S.A., the owner of all intellectual property rights related to FlexiOss®, has also implemented

res, such as advantageous integration with the patient's bone following implantation, and progressive bone reconstruction eliminating the need for reoperation in order to remove the implant, FlexiOss® may potentially significantly reduce the costs of medical procedures and prevent additional stress and pain for patients. Thanks to its surgical handiness, the biocomposite may facilitate the work of surgeons who often perform surgeries for many hours.

If the invention is successfully commercialised, the production of bone replacement will increase the availability of biomaterial for surgeons of orthopaedic and dental units at a better price than that offered by foreign preparations. The affordable price is due to the product being made in Poland, and will enable more implantation procedures in patients with bone and dental injuries. The introduction of FlexiOss® to the market may, therefore, contribute to a higher growth rate of the whole industry, especially in Poland, all the more so since the export potential of the innovative product is high, as is the size of the target market.

Comparison with the state of the art

In comparison with competing products with surgical handiness, the FlexiOss® bone graft substitute biocomposite has the following innovative features:

- it consists of synthetic hydroxyapatite

with high ion reactivity, unparalleled in other preparations, which enables the absorption of calcium and phosphate ions from tissue fluids; thanks to this, it's possible to form one's own biological apatite on its surface;

- it's characterised by high bioactivity, accelerating the ossification of the implanted biomaterial, which results in a faster healing process for the patient;

- it shows high elasticity and ductility;

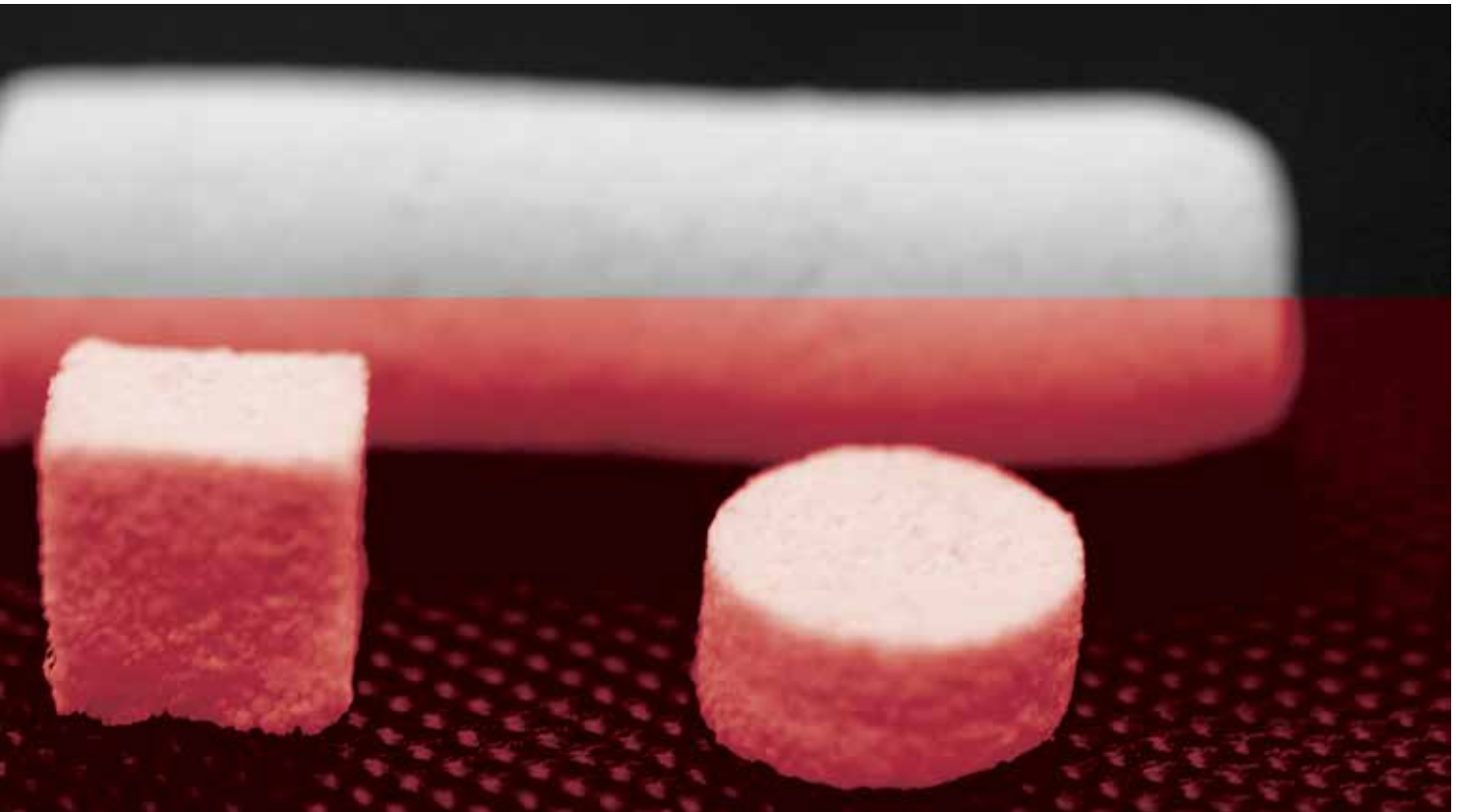
- thanks to its micro and macroporosity, it has a haemostatic effect;

- thanks to the use of a sugar polymer in the composite, instead of the collagen used in competing products, the risk of viral contamination or immunological reactions is minimised.

*Bone substitution biomaterial
FlexiOss®*



*Various forms of FlexiOss®
material*



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Medical Inventi

Bin-e - a smart waste bin for efficient waste management

Description of the solution

Bin-e is a device for smart waste management in offices and public spaces. Its wide range of functions enables efficient sorting, optimised collection and decreased disposal costs. It automatically recognises, sorts and compresses recyclables. The user puts the item inside. Then, the AI-based image recognition system identifies the type of waste, assigns it to the relevant category, and places it into one of the four compartments.

Innovation

Thanks to its software, Bin-e is constantly learning new objects and improving the recognition system. The compression module reduces the volume of plastics and paper. Each compartment has sensors that allow for control of the fill level. The data from the sensors enables automatic notifications when one of the bins is full. Each smart bin



Bin-e - a smart waste bin that automatically recognises, sorts and compresses waste

and the entire device network can be easily managed via an app. The IoT-Platform provides real-time data and summary reports for valuable waste management insight.

Application of the solution

Bin-e is designed for offices and public indoor spaces, e.g. railway stations, shopping centres and airports. It increases the environmental value of the building, and helps reach CSR goals and promote green initiatives. The device also enables you to introduce an efficient sorting system wherever people struggle with waste segregation. In the traditional model, waste is sorted manually into separate recycling bins.

Implementation status

Bin-e was launched in the spring of 2018. The device is sold by distributors in Poland, the United Kingdom and Sweden.

Advantages of the solution

Bin-e has the potential to increase recycling rates by improving the entire process on many levels – from users to waste management companies. Lower waste disposal costs. Automatic compression and segregation reduce the collection frequency, allowing to avoid unnecessarily high costs of waste disposal. Waste collection companies can optimise collection routes, and reduce

Bin-e is a smart waste bin for efficient waste management in offices and public spaces. It automatically recognises, sorts and compresses waste.

Public spaces and office soften lack proper infrastructure. Even if different bins are provided, confusing recycling guidelines and regional differences result in the waste being thrown into the wrong compartment. Bin-e eliminates this issue. It's also the perfect solution for smart buildings with integrated sensor systems. It connects all the dots of an efficient, data-driven waste management system.

the cost and CO2 emissions of waste transport. The smart bin also ensures high-quality raw materials for recycling, because it eliminates waste being thrown into the wrong compartment. Thanks to its numerous functions, Bin-e is fast-forwarding the path to a resource-efficient and sustainable economy.

Comparison with the state of the art

The device is innovative on a national and a global scale. None of the existing solutions feature as many functions as Bin-e – automatic sorting, compression, fill level control, an IoT-Platform and a mobile app. It's the only smart bin in the world that combines object recognition, artificial intelligence and data processing.



*Application of the device
in ecological office spaces*

*The creators of the project
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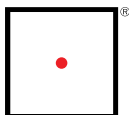
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Bine



**Polski
Produkt
Przyszłości**

Genomtec ID - pocket-sized molecular biology lab

Description of the solution

Genomtec ID is a pocket-sized molecular biology lab. It combines mobility, ease of use and speed of analysis with professional amplification and detection of specific DNA and RNA fragments. The device uses microfluidic technologies and a lab-on-chip system. Potential test materials include whole blood, swabs, cerebrospinal fluid and many more. The proprietary, patented technology consists of controlling the processes that occur on the microfluidic card using photon energy. As a result, it's possible to carry out isothermal amplification and detection of fragments of genetic material that are specific for a given pathogen or any mutations in a record time of less than 20 minutes and with an efficiency of 99% – even for eight pathogens at the same time. Together with the nucleic acid isolation and concentration system, this allows for a significant reduction in the DNA or RNA detection limit, and thus enables earlier detection of infection. Te-

sting may be performed for bacteria, viruses, genetic mutations and fungi.

Innovation

Genomtec ID operates based on the innovative Isothermal Nucleic Acid Amplification Technology (INAAT), which amplifies and detects specific DNA and RNA fragments – the “golden standard” of molecular diagnostics. The SNAAT™ proprietary detection method used in Genomtec ID offers incredible ease of testing without the need to use a specialist laboratory or employ diagnostics professionals.

Application of the solution

Genomtec ID will be used among the following client groups:

- Private and public health care: networks of clinics, individual doctors, family doctors, especially paediatricians and gynaecologists.

- Shadow market clients: NGOs and governments: supporting neglected patients in emerging markets; 'last mile' doctors in Africa and Asia.
- Security services at airports; the army.

Implementation status

Currently, in cooperation with the Wrocław Medical University and the University of Wrocław, we are conducting clinical trials of diagnostic tests aimed at detecting the most oncogenic types of the human papillomavirus and bacteria that cause Lyme disease. In addition, project work is carried

saliva, urine or cerebrospinal fluid, but also in animal diagnostics or even in agriculture, the food industry or environmental contamination control. These are the anticipated applications of Genomtec Fresh.

Genomtec ID will allow for the reduction of antibiotic resistance, lower the percentage of side effects of medication, speed up the treatment process and reduce the cost of treatment.

On the other hand, Genomtec Fresh will make it possible to reduce the consumption of plant protection products in agriculture

Genomtec ID is a handy, innovative diagnostic device that amplifies and detects specific DNA and RNA fragments – the “golden standard” of molecular diagnostics. Optical heating and detection technology enables the simultaneous identification of up to eight pathogens in a single biological sample.

out on a microfluidic card. We are also overseeing lab work on the optimisation of the SNAAT method to be used for the early diagnosis of tumours from a blood sample based on the measurement of circulating RNA.

Advantages of the solution

Genomtec's technology can be used not only in human diagnostics for testing samples of biological materials such as blood,

while increasing the quality and quantity of crops.

Comparison with the state of the art

At present, there are no fully mobile diagnostic devices available commercially. There's a group of companies that have announced that they're working on such solutions. Biomeme has declared that its products will soon make their debut on the market. The product by Biomeme (US) is

based on the qPCR technology. However, the principle of its operation differs from Genomtec ID. The Biomeme device is more difficult to operate, since it requires that a user separately isolate the genetic material. The devices by Roche and Abbot that are currently available on the market are based on the qPCR and NEAR technologies respectively, and typically allow for the identification of just one pathogen in a biological sample while offering a limited portfolio of diagnostic tests. These systems are also very expensive – their cost fluctuates between several and several thousand euros.



Pocket-sized molecular biology lab Genomtec ID

Sample of Genomtec ID



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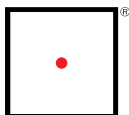
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GENOMTEC 



**Polski
Produkt
Przyszłości**

POLYCOR - anticorrosive pigments

Description of the solution

POLYCOR, a product family of anticorrosive pigments, is NanoPure's response to one of the most basic needs of many industries (e.g. ship building, architecture, aviation), which is protection of structure and machinery from destructive atmospheric impacts on metallic surfaces and elements – corrosion. The product developed by NanoPure is completely neutral to the environment, modern, and easy to apply in existing production lines of anticorrosion additives based on modified conductive polymers. The technology used during the POLYCOR production process was invented in NanoPure's laboratories and is unique on a global scale. The product is being developed as a project implemented under Smart Growth Operational Programme 2014-2020 co-financed by the European Regional Development Fund.

Innovation

The innovation of the solution developed by NanoPure revolves around developing a product that responds to the three most important challenges posed to anticorrosive additives by manufacturers of protective paint systems. These include anti-

corrosive performance exceeding that of regular protective paints, eliminating negative environmental impacts, and lowering pigmentation costs compared with regular anticorrosion additives. Examinations and tests conducted by prestigious scientific institutions have confirmed that the POLYCOR product family provides better anticorrosion performance than systems manufactured by the biggest producers on the paints market. NanoPure's pigments are based on conductive polymers, and because of this, they don't have any negative environmental impact. This means that the POLYCOR product family can be used in any environment, such as urban, marine, rural and others. Another advantage is better anticorrosive properties of coatings, with a 20 times lower concentration of POLYCOR pigment compared with conventional anticorrosion additives. It allows manufacturers to significantly reduce the paint production cost.

Application of the solution

The POLYCOR product family is designed to be used as an anticorrosion pigment for major types of organic coatings, such as alkyd, epoxy and acrylic. It can also be used as

an anticorrosion additive in powder paints. Further areas of implementation are still being developed by NanoPure.

Implementation status

Currently, in addition to cooperation with industry partners (potential clients), NanoPure is carrying out the implementation process. The most important elements are adaptation of the production hall for an innovative production line, the purchase of essential devices for the line, and final optimisation of process parameters. All of these tasks should be completed at the beginning of 2020, as per the business plan. At that time, a commercial scale of production will begin.

environments. Because of this, the POLYCOR product family is the perfect solution for a market that demands non-toxic and 'green' additives for organic coatings. The paint industry can abandon hazardous anticorrosion pigments by applying NanoPure's solution, without decreasing the quality of protection. According to EU and industry reports, environmental issues related to the impact of paints are currently the most important research challenge for the paint industry.

It's important to mention that the lifetime of machinery and structures will be extended because of the better anticorrosion properties of coatings with NanoPure's pigments. Because of this, the cost of main-

POLYCOR is a product family designed as an anticorrosion additive for different types of paints (e.g. epoxy, alkyd). It's based on the innovative technology of modified conductive polymer synthesis. NanoPure has submitted a patent application for this technology.

Advantages of the solution

The POLYCOR product family allows manufacturers to significantly reduce the cost of pigmentation of anticorrosive organic coatings, which may result in lowering prices for customers.

NanoPure's anticorrosion pigments are also completely environmentally friendly, and can be safely used in all biological

taining metal equipment will be reduced. It will also increase the safety of structures made from steel and other metals.

Comparison with the state of the art

Research conducted by NanoPure showed that coatings with only a 0.5% w/w concentration of POLYCOR have two to three times better performance than commercially available coatings with the addition

of 8-12% w/w zinc phosphate. Despite a higher cost per kg, coatings with NanoPure's anticorrosion additives are still 50% cheaper in terms of the overall pigmentation cost (compared with coatings with zinc phosphate). Also, the POLYCOR product family increases the mechanical properties of coatings. During the tests, NanoPure confirmed that coatings with the addition

of POLYCOR have a 50% higher adhesion to steel substrates compared with coatings with zinc phosphate. This is a crucial aspect when applying the coating on soiled substrates.



Synthesis of POLYCOR anticorrosive pigments

POLYCOR anticorrosive pigment tests



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World's Safest Runway Lighting

Description of the solution

S4GA is the designer and distributor of the World's Safest Runway Lighting for airports. It's the only system in the world that operates 365 days a year using only solar energy. A distinguishing feature of S4GA technology is its five levels of protection against total loss of navigation lighting at airports. Traditional systems have one level of protection (in the event of a power failure). The S4GA system is the only real alternative to traditional lighting systems (which compared with the S4GA system are less secure, more expensive, and require costly maintenance).

Innovation

The launched hybrid airport lighting system has challenged the status quo and, in a way, changed the industry's rules. S4GA has created a system that combines two unique features: safety and the ability to be used by countries with limited access to a power grid.

The system's power supply is based on two independent sources – photovoltaic energy

and a traditional airport power supply. The first innovative factor is the combination of two ideas that have never before been used in airport lighting systems – solar power and a conventional power supply. The hybrid system has the advantages of traditional systems, while the typical disadvantages associated with the reliability of cables are eliminated by using a solar panel with a battery. In this way, the S4GA lighting system has a distributed power supply (each lamp is equipped with a built-in battery that keeps the system operating in the event of a power failure). This makes the S4GA system the World's Safest Runway Lighting.

The second factor that complements the dual power supply is the logic behind lighting control and monitoring based on wireless radio communication. Wireless control allows the airport to be completely independent of cable power supplies (traditional lighting is controlled via a power cable). Radio communication is based on the MESH dynamic (not static) network protocol that maintains control over the lighting system in the event of a failure of individual lights or the power sup-

ply. The system is fully compatible with civil and military radio requirements for airports.

In a global context, the use of solar energy to power off-grid systems is not a novel idea. However, in the conservative industry of airport navigation lighting, S4GA has introduced a very innovative system that allows airports in developing countries to modernise their airport infrastructure quickly and within a limited budget. At the same time, the solution is safer than conventional ones.

those regions are forced to invest in airport infrastructure. The reason is a forecasted three-fold increase in passenger traffic over the next 10 years. At the same time, those countries have a low level of airport infrastructure that doesn't meet the standards of the International Civil Aviation Organization. S4GA clients are airport companies managing infrastructure in countries that are struggling with the problem of modernisation of airports and limited budgets. S4GA clients aren't able to take advantage

S4GA is the designer and distributor of the World's Safest Runway Lighting for airports. A distinguishing feature of S4GA technology is its five levels of protection against total loss of navigation lighting at airports, and the ability to power the system 365 days a year exclusively with solar energy. S4GA provides systems for countries such as Ethiopia, Peru, and the Maldives, which are struggling with access to a power grid, but have high photovoltaic potential.

Application of the solution

Hybrid lighting systems can be used by both civil and military airports. S4GA provides systems for countries struggling with a lack of access to electrical infrastructure while at the same time possessing high photovoltaic potential (countries with lots of sunny days). The key regions for S4GA are Africa, South-East Asia and South America. The governments of countries located in

of traditional cable solutions due to a lack of electricity or an uncertain supply, and the fact that they can't afford conventional solutions.

Implementation status

The system was launched in mid-2018, and the first installations are currently being carried out at airports in Ethiopia and Côte d'Ivoire.

Advantages of the solution

The main advantages of the S4GA system are:

- a higher level of airport operational safety,
- the ability to operate independently of a cable electricity supply,
- return on investment thanks to energy savings (the annual cost of electricity for a traditional system is PLN 250,000-400,000),
- a lower purchase cost of the entire system,
- the use of renewable energy – reduction of the airport's negative impact on the natural environment.

Comparison with the state of the art

According to Solutions4GA Sp. z o.o., there are currently no comparable solutions used by competing companies in the airport lighting industry.



The system at Thessaloniki Airport



The System at Maldives Dhaalu Airport



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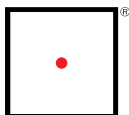
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Polski
Produkt
Przyszłości

ChitoVelum® Pro (INCI: Aqua, Chitosan, Carbon dioxide).

Technology for manufacturing safe and natural cosmetics and wound dressings.

Description of the solution

KAEM Maria Krystyna Krupska Manufacturing Facility AG medicahas the exclusive right to use the patented technology involving the chitosan dissolution process using carbonic acid, which is a method developed during research carried out in the laboratories of Gdańsk University of Technology. The company promotes it's technologies under the names ChitoVelum® and ChitoVelum®Pro. Hydrogels from the ChitoVelum® family are 100% natural substances.

Innovation

Such functionalities are possible thanks to the use of chitosan (a natural polymer ob-

tained from shellfish shells or fungal cell walls). In contrast to the currently available alternatives, in the products offered by Chitone sp. z o.o., the hydrogels from the ChitoVelum® family perform the same three fold function:

- ChitoVelum® is the only cosmetic ingredient that forms a cosmetic base (thanks to this, it's not necessary to add any typical substances responsible for the consistency and/or stability of cosmetic formulations),
- ChitoVelum® is an active ingredient whose effects include moisturising, providing ideal conditions for skin regeneration, and protecting against various adverse external factors,
- ChitoVelum® has antimicrobial activity, and acts as natural preservative.

The use of hydrogels from the ChitoVelum® family has the potential to be a disruptive innovation for the cosmetic market.

Application of the solution

ChitoVelum® is a natural substance that allows the production of safe and natural cosmetic products. The solution developed by the company is particularly important in the context of the increase of skin dise-

ases indicated by WHO, including contact dermatitis and various types of dermatoses (e.g. AD and psoriasis), which are increasingly often a result of skin contact with various chemical substances. That's why the safety of cosmetic products is becoming more and more important.

first cosmetic product 'Chitozan Natural Sun' has already been launched – this is a product intended for care and regeneration of irritated skin, especially after sunburn, insect bites and invasive cosmetic procedures. Chitone sp. z o.o. is continuing R&D to develop a full product range; the launch of these products will be the last stage of the full implementation process for the ChitoVelum® technology. Chitone sp. z o.o. is planning a diversified approach to implementation:

The ChitoVelum® Pro substance brings the highest level of safety to cosmetic products. ChitoVelum® Pro makes it possible to manufacture products without preservatives and other chemicals that are negatively perceived by consumers. In addition, ChitoVelum® Pro provides protective and regenerative effects to the skin in a manner that so far has only been achieved by advanced wound dressing materials.

ases indicated by WHO, including contact dermatitis and various types of dermatoses (e.g. AD and psoriasis), which are increasingly often a result of skin contact with various chemical substances. That's why the safety of cosmetic products is becoming more and more important.

Implementation status

The ChitoVelum® technology is currently at an early stage of implementation. The

- production under its own brand,
- contract manufacturing (wholesale), and
- licensing.

Thanks to this strategy, it'll be possible to reach a wide range of consumers and maximise social, economic and environmental benefits.

Advantages of the solution

- reduction in the incidence of skin diseases,

in particular contact dermatitis,
-reduction of social costs related to the decrease in expenses for visits to dermatological clinics and the purchase of medications that eliminate the symptoms of contact dermatitis;
- reduction in the amount of preservatives entering the environment.

Comparison with the state of the art

Manufacturers of natural cosmetics often eliminate compounds with an increased risk to health. However, such declarations usually concern cosmetics ingredients that are the most negatively perceived by consumers. Such components are replaced by other ones that often also have an increased risk to health, but are less known. This happens because manufacturers don't have the proper technology to eliminate all negatively perceived compounds, in particular, preservatives, the use of which is a compromise between microbiological safety and the threat to consumer health.



*Team Chitone Sp. z o.o. at a research and development laboratory
(from the left: Dr. Robert Tylingo - Research and Development Specialist / Creator of ChitoVelum® technology;
Grzegorz Gorczyca, PhD, Eng. - President of the Board / Creator ChitoVelum® technology;
Krzysztof Malicki - Member of the Board/Implementations Specialist).*



The first product launched on the market: „Chitozan Natural Sun”



Company information

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**POLITECHNIKA
GDAŃSKA**



Chitone

AudioMovie - Movie for all

Description of the solution

AudioMovie is a globally unique, innovative solution that works as an application for portable devices. It provides audio description (AD) and audio subtitles (AS) in cinemas and during film festivals. It can be used by anyone, but is mainly dedicated to people with visual impairments, seniors, people suffering from dyslexia, and foreigners. At present, all these people have limited access to Polish culture and are sometimes excluded from social life.

Innovation

AudioMovie is a technologically complete solution with all legal formalities finalised. It can be implemented in Poland and abroad as a new product or service that eliminates social exclusion while increasing social activation.

Application of the solution

The solution can be used by cinemas, film festivals or TV stations. As research shows,



AudioMovie BlackBox mini adapter

some people in Poland don't go to the cinema because they can't read subtitles (dyslexics and elderly people). Others don't go due to their sight disabilities, because cinemas often lack adequate equipment to provide audio description to the blind or visually impaired. AudioMovie allows you to use your smartphone to play alternative voice-over channels in the cinema or while watching television. It helps blind people, seniors and foreigners enjoy films. During the screening, they can listen to audio de-

Advantages of the solution

The application allows people with different needs, regardless of their health or disability, knowledge, language or age, to fully enjoy watching movies. It makes the cinema accessible to everyone.

Comparison with the state of the art

Due to its functionality, the application is globally unique and doesn't have an equiva-

AudioMovie is a globally innovative application for mobile devices designed for use in cinemas and during film festivals. It provides audio description and audio subtitles to people with sight dysfunctions, and audio subtitles to the elderly, people suffering from dyslexia, and foreigners.

scription, voice-over or dubbing in any language.

Implementation status

The system has been launched in four cinemas:

- 'Kino pod Baranami' in Kraków,
- 'Elektronik' in Warsaw,
- 'Helios' in Sosnowiec,
- 'Nowe Horyzonty' in Wrocław.

lent competitive solution. None of the similar solutions are as universal as AudioMovie, as they require additional expenses and don't guarantee the same level of reliability.

The AudioMovie application provides audio and video synchronisation, which isn't currently offered by other solutions available on the market. Having this application, cinemas and multiplexes can eliminate the fixed costs of purchasing and maintaining

expensive headsets. The application doesn't use up much of the device's battery, and allows the user to comfortably use the portable device that they prefer and are the most familiar with.



Research of the AudioMovie system in the Silesian branch of the Polish Association of the Blind.



Company information

The solution was developed by a consortium consisting of:

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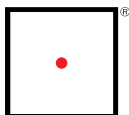
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**Polski
Produkt
Przyszłości**

Multifunctional therapy and rehabilitation system using advanced ICT technologies

Description of the solution

As a medical device, the product consists of:

- a microprocessor-based control unit with a touch panel, equipped with modules for powering, monitoring and controlling the operation of the applicators;
- a set of 28 therapeutic applicators for therapy with a pulse magnetic field and light energy, dedicated to various user groups and treatment methods;
- a set of applications and ICT-based tools referred to as 'e-management';
- a knowledge base – a collection of clinical data on the efficacy of the forms of therapy delivered by the device, accessible via a web browser.

The device is a result of the implementation of the project 'Multifunctional therapy and rehabilitation system using advanced ICT technologies' co-financed by the European Regional Development Fund under Prior-

ity Axis I: 'Using research and development activity in the economy', Measure 1.2: 'Research and development activity of companies', under the Regional Operational Plan of the Mazovian Voivodship for 2014–2020.

Innovation

Modern control unit system solutions, including Wi-Fi and Bluetooth, allow for remote control and supervision of the physical therapy treatments being delivered. They facilitate the use of multiple therapeutic devices in therapy rooms, as well as the use of individual users' equipment by means of mobile applications. A modern control unit cooperating with modularly constructed applicators enables the delivery and performance of many physical therapy treatments at the same time, including combined therapy treatments. The device is able to diagnose applicators and visualise them on the screen, transmit optical and acoustic

signals indicating the operational status of the device, control the application duration time and provide a current preview of it, as well as ensure communication with users at different authorisation levels. The control unit is equipped with an advanced user interface with functions offering easier access for people with disabilities. The rechargeable battery operation ensures the functionality of the device, even when access to a power supply is limited.

Application of the solution

The device is designed to be used at professional facilities, such as hospitals, clinics,

portable sets are recommended for carrying out procedures in the home environment. Using the device improves the treatment effects in many chronic disorders, and alleviates adverse effects related to ageing.

Implementation status

The system has successfully passed tests carried out by an accredited laboratory with regard to safety and technical standard requirements that apply to the product as a medical device. Further more, full functional testing of the prototype was carried out under operational conditions, clinical assessment was performed, and indica-

The multifunctional system for therapy and physical rehabilitation using a magnetic field and light energy is a modern medical device designed for use at medical facilities and at home. The product is innovative, because it uses advanced technical solutions and ICT technologies that allow, among others, e-management and easy access to medical e-services, for example, for people with disabilities.

health resorts and rehabilitation centres to provide medical therapy and therapeutic rehabilitation procedures. Indications for use of the system include disease of the osteoarticular system, neurological disorders, problems related to impairment of peripheral circulation, in which the use of Viofor S-PRO treatments brings regenerative, analgesic, anti-inflammatory, antispastic or relaxing effects. For individual customers,

tions for use were determined. The device has been certified for conformity with EU MDD Directive 93/42/EEC and its placement in the ISO 13485 and ISO 9001 quality systems.

Advantages of the solution

Patient benefits. Patients will be able to undergo rehabilitation and treatment at home

to a greater extent, which will improve the comfort of the procedures and the patients' quality of life. This will make it possible to reduce hospital stay times without disturbing patients' professional and family lives, whilst at the same time decreasing the risk of hospital-acquired infections. The increased availability of physical treatments will lead to a decrease in the amount of drugs consumed, in particular analgesic and anti-inflammatory medications, thereby reducing the number of complications associated with their use.

Healthcare system benefits.

The promotion of new standards in medicine related to carrying out medical procedures using ICT tools – remote access to the device and remote supervision over the therapy process – will reduce the costs of hospital stays and increase the number of patients covered by rehabilitation and treatment. The emergence of a new model of the provision of medical services based on making the equipment available to patients in their homes will lead to the development of hybrid rehabilitation – a new standard in the provision of medical benefits relying on therapy continuation at the patient's home.



Portable set



Clinical applicator

Comparison with the state of the art

The e-Management System introduces many innovative functionalities, such as remote setting of therapy parameters, sending messages and questionnaires to patients and operators, and programming therapy parameters or the number of treatments for a given device. Access to an up-to-date knowledge base makes it possible to personalise therapies based on test results obtained from clinical observation and practical use. The solutions used in the product allow for remote control over the correct operation of the device, and for software updates. No medical devices for physical therapy currently available around the world feature these new functionalities.

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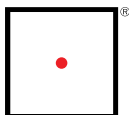
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Viofor S-PRO



**Polski
Produkt
Przyszłości**

Series of brushless motors with permanent magnets and optical rotor position sensors

Description of the solution

In order for brushless motors to work properly, the position of the rotor in relation to the stator must be determined. Hall sensors or encoders are responsible for this. There are also sensorless electronic circuits that detect the position of the rotor on the basis of the rotation voltage in unpowered phases.

In the developed engines, the position of the rotor is determined by three optical sensors (slot optocouplers), covered by a suitably shaped aperture placed on the rotor shaft. This solution, in relation to Hall sensors, determines the position of the rotor much more precisely. In addition, it is not sensitive to variable magnetic fields, e.g. caused by a motor reversal. All of the developed motors can work with various types of position sensors as well as with electronic circuits. The

developed series consists of motors with the following power ratings: 30, 60, 100, 150, 250 and 500 W. Depending on the needs, the motors can have rotational speeds from 500 to 6000 rpm and supply voltages from 12 to 230 V.

Innovation

An innovative feature of the developed motors that distinguishes them from brushless motors is the high precision of determining the position of the rotor in relation to the stator. It has been achieved through the use of optical sensors – slot optocouplers. Accurately determining the position of the motor shaft makes it possible to precisely adjust the speed and position in the control process. The second innovative distinguishing feature of the developed motors is the extremely low cogging torque of less than 1% of

the rated torque. This, in turn, is the effect of appropriately shaping the magnetic circuits. As a result of the low cogging torque, the motors operate quietly and without vibration. The generated driving torque is practically devoid of the ripples that are typical for permanent magnet motors.

Application of the solution

There are many possible applications: in servo-drives of machining tools, in many medical devices (medical scanners, rehabilitation devices), in robots used in the pharmaceutical and the food industry, in industrial manipulators, etc. Due to the lack

pared with asynchronous motors) due to the necessity of long-term operation of the motors.

Implementation status

The results of the research are at the 8th TRL level of technological readiness. The research has already been completed and the final form of the technology has been demonstrated.

Advantages of the solution

The introduction of the solution to the market may positively influence the develop-

The series of innovative brushless motors is distinguished by their high precision in determining the position of the rotor in relation to the stator. This effect was achieved through the use of optical sensors and the appropriate shape of magnetic circuits. The new motors run quietly and without the vibration characteristic of this type of devices.

of sparks and safe supply voltage (24 V DC), they can operate in particularly difficult conditions – where there is a risk of explosion and in conditions of unusual humidity (e.g. in distribution chambers of heating pipelines to drive solenoid valves and gate valves). In the event of a power outage, these motors can be powered by batteries.

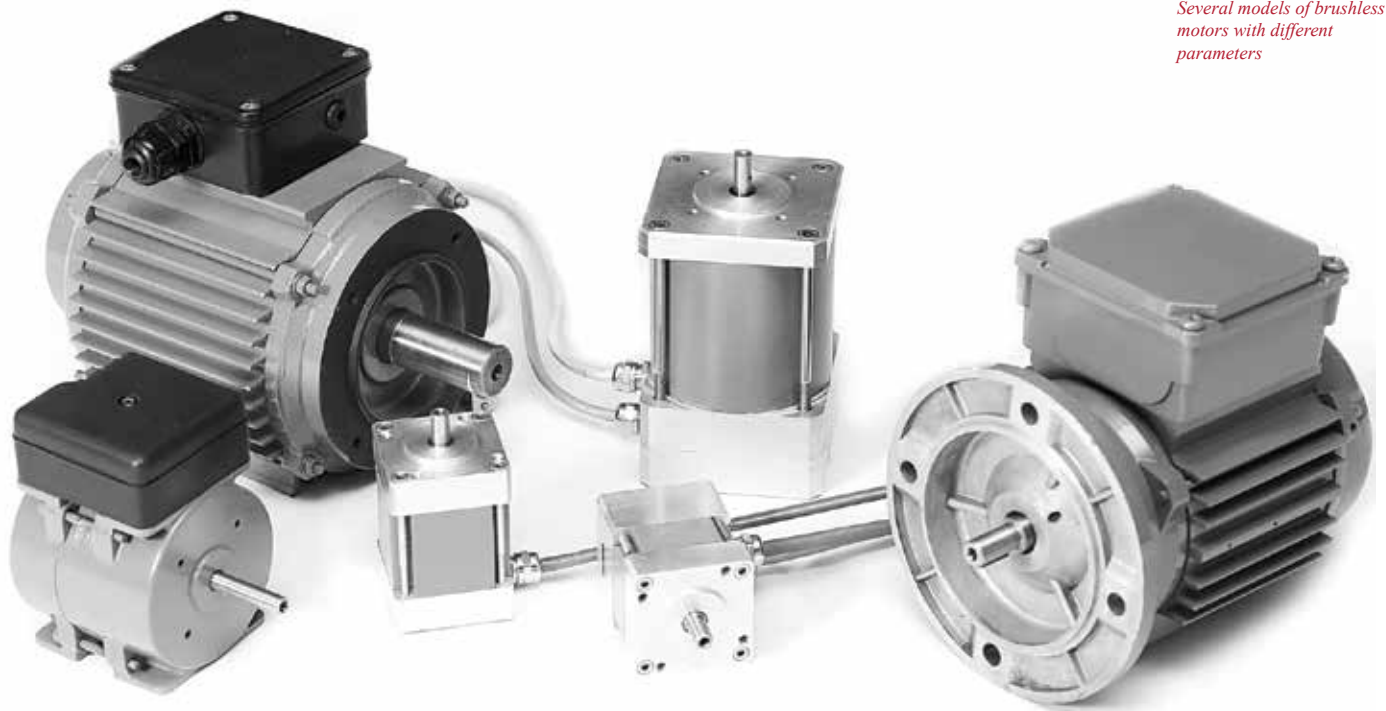
Due to their high efficiency, they may be of interest to pump and fan manufacturers, as there are significant energy savings (com-

ment of companies producing servo-drives of numerically controlled machining tools, printing and military equipment, as well as rehabilitation and medical equipment. In addition, the application of the solution will have a positive impact on the environment through:

- the reduction of noise emission,
- the reduction of fire/explosion risk,
- significant power savings.

Comparison with the state of the art

Brushless permanent magnet motors have many advantages over other motors: high efficiency, low weight and dimensions, very long service life, and being inhibited practically only by bearing life. They are almost maintenance-free and have minimal losses in the rotors.



Several models of brushless motors with different parameters



Engine model: BLDC5

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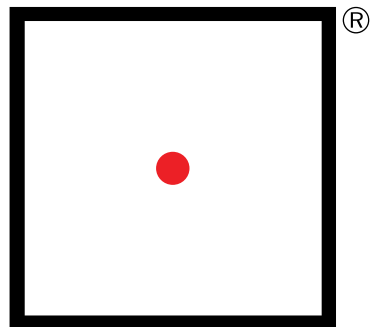
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Honorary patronage

