



## Maksim Loban

### Technology Transfer Office

Belarusian State University of Informatics and Rad

<https://science.bsuir.by/en/>

### Bilateral Meetings

- (1:00p.m. - 4:00p.m.)

#### Description

The main areas of research and development activities of the Belarusian University, founded in 1964: microelectronics and nanotechnologies, electromagnetic compatibility, microwave technologies, information security and speech technologies, information technologies, telecommunications. The University has more than 300 patents for inventions and cooperates with partners from more than 70 countries around the globe.

#### Organization Type

University,

#### Email

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#### Country

Belarus

#### City

Minsk, 6 P. Brovki street [Google map](#)

#### Offer

### **Technology for analyzing and predicting the level of electromagnetic environmental pollution by 2G/3**

The proposed technology solves the problem of system analysis and prediction of the level of electromagnetic background created by modern and future systems of mobile communications near the Earth's surface at the human height in areas with different population density (urban, suburban, rural area). This makes it possible to assess electromagnetic ecology of the environment and electromagnetic safety of the population in the context of intensive development of 4G/5G networks and services.

#### We offer:

- 1) Methodology and algorithms for system analysis of electromagnetic ecology of areas and electromagnetic safety of the population based on the analysis of integrated system characteristics of mobile communication networks and services to ensure high standards of electromagnetic ecology of the environment and electromagnetic safety of the population.
- 2) Development of the specialized expert system for collecting and processing information and computer analysis of

electromagnetic pollution of territories in 30 MHz - 300 GHz frequency band, with the development of versions in the languages of customers, including software, installation of stationary and mobile tools for monitoring of electromagnetic pollution of the environment.

This technology is for

- 1) Operators of mobile communications which are interested in creation and operation of safe and environmentally friendly cellular radio networks, in safe wireless information service for the population.
- 2) Research centers and enterprises that develop and deliver the software and specialized expert systems for collecting and processing information and computer analysis of electromagnetic pollution of the environment and electromagnetic safety of population in the context of intensive development of 4G/5G mobile communication systems and services.
- 3) Local authorities, research centers monitoring the environment, assessing the electromagnetic ecology of territories and electromagnetic safety of the population.

Cooperation Offered

1. Outsourcing co-operation
2. Technical co-operation

Offer

**Technologies and hardware-software complexes for ensuring electromagnetic compatibility (EMC) in on-**

Designed to analyze and provide EMC in local on-board and ground-based radio-electronic groups, generate specifications for on-board and ground-based radio-electronic systems taking into consideration the EMC requirements, as well as to simulate radio reception in a complex electromagnetic environment.

Distinctive features and advantages:

- products significantly outperform analogues in terms of modeling of non-linear
- effects in radio receivers when operating in a complex electromagnetic environment;
- the possibility of simultaneous joint analysis of a huge number of parasitic
- electromagnetic couplings of various nature has been implemented;
- analysis of EMC based on a system criterion that takes into account the combined
- influence of parasitic electromagnetic couplings of all types in the onboard
- radioelectronic grouping;
- high speed performance and practical efficiency, a significant increase in quality, and
- cost reduction for the design of complex objects (aircraft, ships, etc.).

Cooperation Offered

1. Outsourcing co-operation
2. Technical co-operation

Offer

## **Wireless sensor system for air temperature and humidity monitoring**

The system is designed to remotely measure the environmental temperature and humidity with the help of radio-frequency identification technology of the UHF band (860–960) MHz. The system is represented by a unique hardware and software complex that includes: sensor RFID tags, RFID readers with an antenna, and original software for processing and indication of air temperature and humidity parameters in real time. Passive sensor nodes are based on inexpensive NMV2D CABO ISO17025 chips and a microstrip antenna. Relative humidity measurement is based on the psychrometric method. To ensure coverage of a large area, it is possible to install additional antennas and sensor nodes with their integration into a single monitoring system.

Advantages:

- monitoring of temperature and humidity in real time;
- wireless data transfer system;
- high accuracy of temperature and humidity measurement;
- wide range of temperature measurement;
- reading range of sensor nodes exceeds the reading range of analogs twice;
- battery-free sensor tags;
- the possibility of using the monitoring system over large areas;
- the possibility to mount sensors on any surface;
- low net cost.

Cooperation Offered

1. Outsourcing co-operation
2. Technical co-operation

Offer

## **Production technology of heat-conductive matrix board for mounting LED dots**

Aluminum anodized boards with copper metallization provide efficient heat dissipation, transmission of increased operating currents (up to 40%) without increasing the temperature of the LED crystal.

Dielectric thickness - 30 micrometers

Thickness of the copper metallization - 30 micrometers

Thermal conductivity - 0.05 °C/W

Cooperation Offered

1. Outsourcing co-operation
2. Technical co-operation

Offer

## **Technology for production of multifunctional aluminum heaters**

This technology allows to create composite highly absorbing coatings based on anodic alumina with embedded nanopillars of plasmonic metal nanoparticles.

Application areas:

- Automotive and tractor equipment.
- Electronic industry.
- Battery production.
- Hydraulic equipment.
- Packaging machines.
- Control cabinets.

Advantages:

- adjustable electrical resistance in the range from 60 to 800 Ohm/m;
- maximum operating temperature up to 400°C;
- aluminum base;
- carbon filament heating tape;
- ultra-thin shape;
- low heat loss.

Cooperation Offered

1. Outsourcing co-operation
2. Technical co-operation

Offer

## **Fuel level sensor**

Fuel level sensor is used in the systems for measuring and controlling the number of fuels and lubricants (gasolines, diesel fuel, oils) in fixed capacities and tanks of vehicles. The device is designed to generate an electric signal in proportion to the tanking volume (capacitance) and determines the tanking level. Based on the calibration charts, the tanking level is converted to the volume with the generation of one of four types of signals: resistance equivalent, frequency, level or interface one (in accordance with RS232/RS485).

Technical characteristics

- Operating principle: capacitive,

- Error of measurement, %:  $\pm 1$ ,
- Rated voltage, V: 12/24,
- Operational temperature range, Celsius degrees: -40...+60,
- Consumption current, mA: not more than 20,
- Length of detector element, mm: 200...4000.

#### Cooperation Offered

1. Outsourcing co-operation
2. Technical co-operation

Offer

### **Services on microwave technologies and metrology support**

The Center of microwave technologies and metrology support is providing the following services:

- 1) Development of scalar and vector network, microwave power meters and high-frequency signal generators. Software for microwave devices.
- 2) Calibration of measuring instruments of microwave and EHF ranges (generators; oscillators of sweeping frequency; meters of VSWR, attenuation, complex transmission and reflection coefficients, wattmeters; power converters; attenuators in the corresponding frequency ranges.
- 3) Metrology testing. Testing modules and units of microwave and EHF ranges;
- 4) Investigation of material properties in the frequency range from 0.01 to 220 GHz.

The Center is officially accredited by the Belarusian State Center for Accreditation to provide services on calibration and metrology testing.

#### Cooperation Offered

1. Outsourcing co-operation
2. Technical co-operation

Offer

### **Services on modeling and design of integrated circuits**

The University provides a range of services for the electronic industry:

1. Development of the manufacturing process and optimization of designing of the performance characteristics of power electronic devices.
2. Development and industrial production of customized analog, digital, and mixed integrated circuits.
3. Development of compact models for various types of semiconductor devices and sensors.
4. Quantum-mechanical and molecular-dynamic modeling of the properties of functional materials and nanostructures.

## **Advantages:**

- original methods of calibration and verification of the parameters of technological process models, as well as charge carrier transportation models;
- special software that allows to adapt the results to the conditions of real production;
- best experience of practical interaction with electronic industry enterprises.

**Keywords:** microelectronics

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