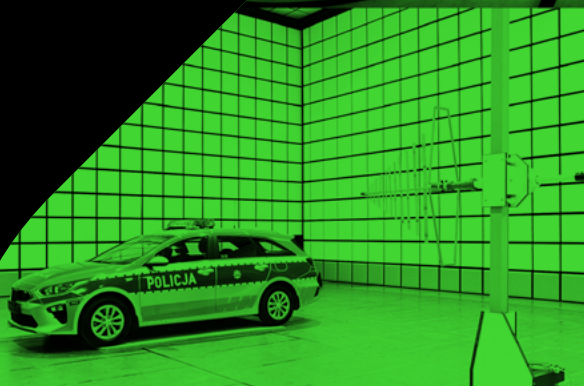
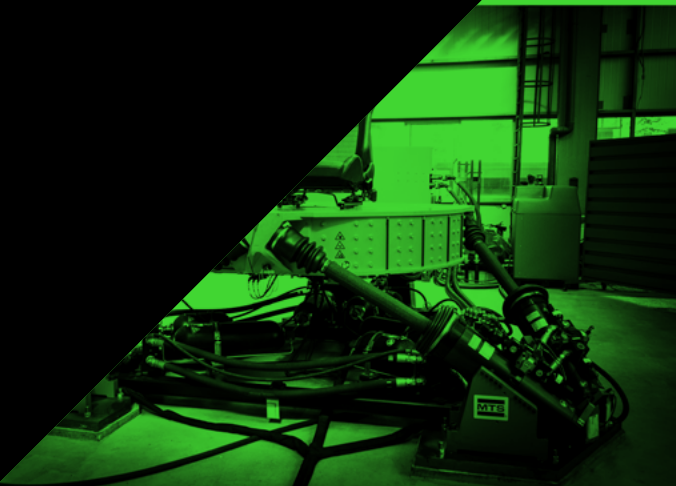


**Łukasiewicz**  
Automotive  
Industry Institute



### Łukasiewicz Research Network – Automotive Industry Institute

is a research institute being a member of the Łukasiewicz Research Network, which is the Europe's third-largest network of research institutes that provides attractive, competitive, and complete business solutions. Łukasiewicz – PIMOT carries out scientific research and development works in the field of automotive engineering. The Institute's activities are focused on such areas as improvement in the road traffic safety, development of road vehicles, research in the field of intelligent safety systems as well as state security and defences, and works on alternative vehicle powering sources, fuels, biofuels, and renewable energy sources.



FOR SCIENCE



FOR INDUSTRY



FOR BUSINESS

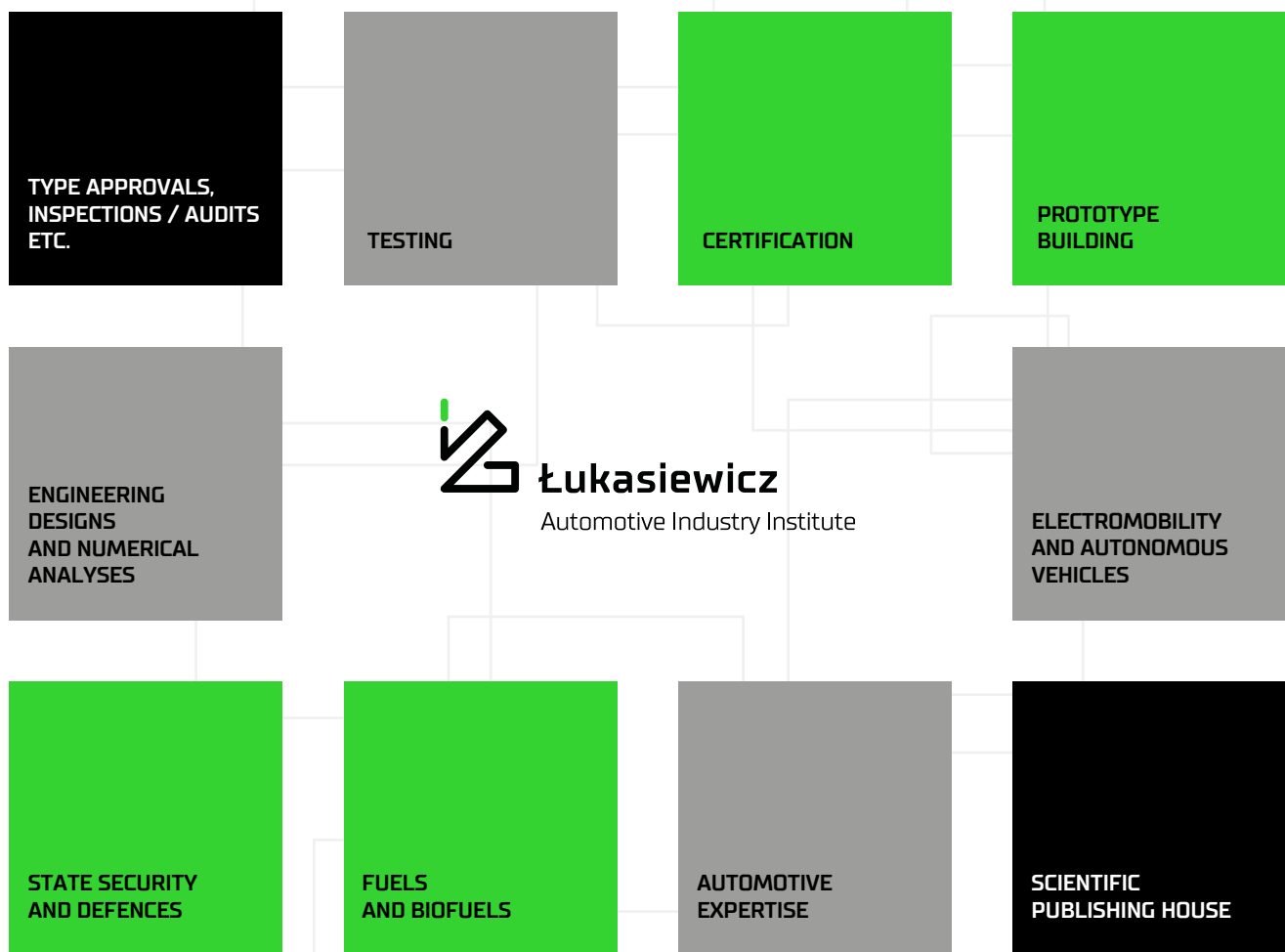


Since 1 April 2019, we have been a part of the Łukasiewicz Research Network. Within the Network, we participate in the works of the **CLEAN AND SMART MOBILITY** and **SUSTAINABLE ECONOMY AND ENERGY** Research Groups.

The Institute's research base consists of over ten specialized research laboratories, sections, and departments, unique in nationwide terms and continuously modernized. The research works carried out at **Łukasiewicz – PIMOT are of great importance for the development and improvement of** innovativeness and competitive power of Polish industry.

Our **offer is chiefly addressed to entrepreneurs**, especially those **representing the sectors of transport, fuels, renewable energy sources, as well as state security and defences and those who are seeking for strong scientific and research support** in the process of improving automotive products and introducing the products into world markets.

**Your contact and cooperation will be welcome!**



The Łukasiewicz Research Network – Automotive Industry Institute has been confirming for many years its technical competence by obtaining official accreditations as:



AB 082

Group of Laboratories



AK 021

Inspection Unit



AP 025

Calibrating Laboratory



AC 001

Product Certifying Unit



AC 215

Management Systems  
Certifying Unit



Within the powers granted by the type-approval authority, **we offer tests necessary for the obtaining of an EU-type vehicle-approval certificate**. We provide the surveillance of conformity of production for the needs of type approval of a vehicle, its parts, or equipment.

**WE CARRY OUT TESTS REQUIRED FOR AN INDIVIDUAL VEHICLE TYPE APPROVAL TO BE OBTAINED:**



Procedure	National single-piece approval <sup>1)</sup>	National individual approval <sup>2)</sup>	EU individual approval	
Vehicle category	L, T, R	M, N, O	M1, N1	Special purpose vehicles of category M, N, and O, meeting the requirements laid down in Article 44 of the Regulation specified below
Governing document	Regulation of the Minister of Transport, Construction and Maritime Economy	Regulation of the Minister of Transport, Construction and Maritime Economy	Regulation (EU) 2018/858 of the European Parliament and of the Council	

<sup>1)</sup> Vehicle categories not subject to EU regulations, terminology formerly used in Poland

<sup>2)</sup> Vehicle categories subject to the new EU regulations, terminology in accordance with Regulation (EU) 2018/858



We are empowered to issue **quality certificates for biocomponents**.

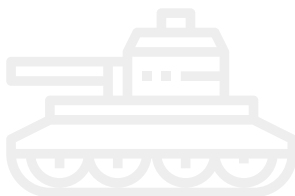
Our certification services offered include official certifying of conformity with the sustainable development criteria.

The Product Certifying Unit has been granted Accreditation Certificate No. AC 001 issued by the Polish Accreditation Centre; it has also been accredited by the Minister of National Defence in the field of state security and defences.



We are a holder of an Industrial Security Certificate granted by the Internal Security Agency. We ensure the protection of classified information provided with a clause **Secret and Confidential, NATO Secret, and EU Secret**.

We have been empowered **to revalidate automotive exhaust-gas analysers** within the authorization granted by the Central Office of Measures.



The Łukasiewicz Research Network – Automotive Industry Institute as a provider of services for state defences has a **NATO Commercial and Government Entity Code (NCAGE Code)**, granted to businesses within the NATO Codification System (NCS). Łukasiewicz-PIMOT participates in the product evaluation referred to in the Act on the System of Evaluation of the Products Intended for State Security and Defences and **has been granted accreditations by the Ministry of National Defence**.



23/MON/2018



19/MON/2018



## KEY PROJECTS:

WEEVIL – Ultralight and ultra-safe adaptable 3-wheeler

ELIPTIC – Electrification of public transport in cities

Active suspension systems of multifunctional high-mobility wheeled vehicles

Official driving licence examination adapted for the deaf

Establishing of a system to classify vehicles depending on their operational purpose; standardization of vehicle's central console in respect of the installation and arrangement of telecommunication and computer systems and equipment to control special-purpose signals

Development of an innovative aircraft engine powered by the JET A1 fuel

Development of innovative prototypes of lightweight and durable parts and structures for the adaptation or conversion of bodyworks of motor trucks, delivery vehicles, trailers, and semitrailers

Triggo – urban high-mobility means of transport, electrically driven

Development of a new electrically driven passenger car model based on an innovative hybrid load-bearing structure obtained in result of research and development works

Operational support autonomous platform PAWO

Development of an innovative modular driving axle with in-wheel electric motors

Centre for Transport Safety and Vehicle Diagnostics

Developing a method of production of ultra-lightweight composite posts / poles with pre-profiled reaction to a collision in the right-of-way conditions, intended for power-transmission, lighting, and communications applications

Keeping and updating an internet database on the available vehicles suitable for official driving licence examination, adapted for the disabled

Innovative system to support the motor insurance risk assessment, dedicated to the UBI (Usage Based Insurance)

Use of modern material technologies for improving mechanical properties and robustness to road conditions in suspension systems of off-road vehicles

Bus with a rear-mounted external electric drive system

Use of pre-cleaned biogas to fuel vehicle and farm machinery engines

## Operational Support Autonomous Platform PAWO

This project has led to the construction of PAWO, i.e. an electric cross-country vehicle adapted for operation in diverse terrain and climatic conditions, capable of moving in remote or autonomous control mode. The platform, dedicated to uniformed services, is a basic version prepared for being provided with specialized bodyworks suitable for specific tasks.



*The project "Operational Support Autonomous Platform" was financed by the NCRD (National Centre for Research and Development) within the programme "Future technologies for national defences – a competition for young scientists".*

## Weevil – ultralight and ultrasafe adaptable 3-wheeler

The project objective was the construction of an ultralight three-wheeled urban electric vehicle, provided with a new-generation prime mover of high efficiency. The vehicle is characterized by small width (1 220 mm) and "foldability" of its front axle (thanks to which the vehicle can be parked perpendicularly in the parallel parking spaces) as well as by a possibility of parking with using a joystick situated in the rear. The project was carried out within the "Horizon 2020" EU framework programme undertaken by an international consortium. The scope of responsibilities of Łukasiewicz – PIMOT as one of the consortium members included the vehicle safety issues and road tests.



*The project was financed within the "Horizon 2020" EU Research and Innovation programme under grant agreement No 653926.*



## Innovative system to support the motor insurance risk assessment, dedicated to the UBI

The project is aimed at the creation of an innovative system to support the motor insurance risk assessment, dedicated to the UBI (Usage Based Insurance). The system enables automatic, autonomous, and remote supervision of the vehicle driver, thanks to which the driver may be statistically profiled and qualitative data may be sent to insurers.

*The project "Innovative system to support the motor insurance risk assessment, dedicated to the UBI (Usage Based Insurance)" is subsidized by the NCRD (National Centre for Research and Development) within measure 4.1 of the Intelligent Development Operational Programme 2014-2020 co-financed by the European Regional Development Fund.*



## Use of pre-cleaned biogas to fuel vehicle and farm machinery engines

Source: Polska Grupa Biogazowa (Polish Biogas Group)



The project objective is to develop a bi-fuel system of fuelling a Common Rail diesel engine and to verify the efficiency of operation of such a fuelling system in real conditions on a selected vehicle or farm machine. The vehicle / machine engine will be fuelled with diesel oil and biogas of high CO<sub>2</sub> content (up to 50%).

*The project "Use of pre-cleaned biogas to fuel vehicle and farm machinery engines" is financed by the NCRD (National Centre for Research and Development) within the EUREKA Initiative.*

## Bus with a rear-mounted external electric drive system

The project is aimed at the construction of a class I electric bus with the energy source installed separately outside of the bus body. Such a solution will enable quick replacement of the energy storage system and will eliminate the problem of long-lasting battery recharging. The project output may be a response to the bus transport needs, with simultaneously raising the bus capacity and improving passengers' safety.

*The project "Bus with a rear-mounted external electric drive system" is subsidized by the NCRD (National Centre for Research and Development) within the Intelligent Development Operational Programme 2014-2020, measure 4.1 "Research and Development Works".*



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**Łukasiewicz Research Network – Automotive Industry Institute is a leader of the cluster “Centre for Transport Safety and Vehicle Diagnostics”**



**We are a member of two clusters of key importance:**



**We belong to:**

Working Group for “Environment-friendly transport solutions” (National Smart Specialisation No 6)

Group for the Development of Automotive Industry and Market at the Ministry of Economic Development, Labour and Technology

Technical Committees of the Polish Committee for Standardization



Union of Producers and Employers of Biogas Industry



European Technology and Innovation Platform



EUMOS – AISBL European Safe Logistics Association



### Type-approval services

Our services are chiefly oriented at servicing the manufacturers of vehicles (of any category) and the manufacturers of vehicle parts and equipment.

Our priority is to provide total customer servicing within the scope of the organizing and carrying out of tests, substantive support at the preparation of documents, and implementation of the procedures for controlling the conformity of production. Moreover, we cooperate with many other authorized institutions, thus to ensure the expected effectiveness of our services.



### Certification of automotive products and biomass

#### Product Certifying Unit (Accreditation No AC 001)

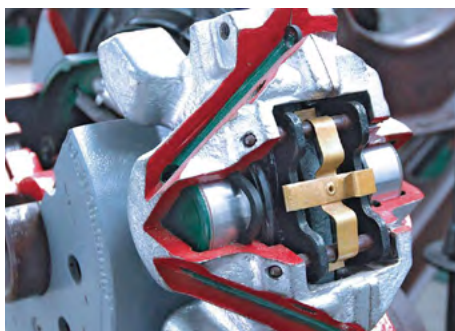
We provide services related to the certification of automotive products, motor vehicle driving simulators, special-purpose vehicles (e.g. road ambulances, armoured bank vehicles), bio-components, biofuels as well as liquid and gaseous fuels, and biomass certified according to the sustainable development criteria within the framework of the REDcert-EU and REDcert2 certification system recognized in the European Union.

#### Management Systems Certifying Unit (Accreditation No AC 215)

We offer the certification of management systems, dedicated to the entrepreneurs (manufacturers, distributors, and importers) who want to confirm that their management systems having been implemented are in conformity with the ISO 9001 standard requirements.

### Examining vehicles and their equipment in terms of passive safety

We offer testing services in the field of safety of vehicles and their equipment. Our unique testing equipment, including anthropomorphic test dummies of the Hybrid, Q, and P series, wireless data acquisition systems, and advanced high-speed cameras, enables thorough analysis of quick-changing processes. The tests are carried out on dynamic and static strength testing rigs as well as on crash-test facilities. The tests are carried out in compliance with the requirements of UN ECE Regulations, national and international standards and regulations, as well as according to individual order's requirements.



### Road testing of braking and steering systems

We test road vehicles, wheeled agricultural or forestry tractors, as well as two- and three-wheeled motor vehicles within the scope of their braking and steering systems.

The scope of the tests includes e.g. verification of conformity of the systems with the regulations in force and international standards, examination of the effectiveness of system functioning in various operating conditions, including the cases of failure of system components, and checking whether the components have been correctly selected.

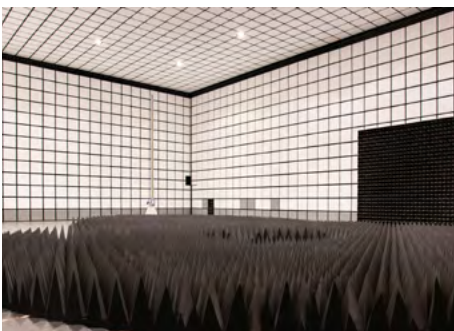


### Strength testing of the structures of vehicles and vehicle parts

We carry out research and development works for the needs of the automotive industry and trade as well as tests for the purposes of type approval of vehicles, their parts, and equipment. The range of our services includes in particular the testing of complete vehicles and their components, such as seats, steering systems, interior equipment, vehicle bodywork adaptations for special (e.g. medical) applications, child restraint systems, as well as the testing of vehicles' front protection systems (bull-bars, additional bumpers), dynamic and static testing of motor truck bodywork adaptations and cargo securement equipment. Moreover, our laboratory is the only one in Poland that has a facility for the crash-testing of complete vehicles with a mass of up to 5 t at speeds of up to 80 km/h (provided with both a deformable and non-deformable barrier), making it possible to take video records of the tests viewed from any side, from the bottom inclusive.

### Testing of advanced driver assistance systems [ADAS]

We carry out research and development works, pursuant to the NCAP, SAE, NHTSA, or ISO standard procedures, within the scope covering e.g. advanced emergency braking systems, lane departure warning systems, emergency steering systems, adaptive cruise control systems, or intelligent speed adaptation systems. In the tests, we use top world-class equipment, including a steering robot, inertial and satellite navigation systems, reference stations, and test dummies representing pedestrians and cyclists.



### Testing of vehicles and their equipment in terms of electromagnetic compatibility [EMC]

Our services include the electromagnetic compatibility testing of automotive vehicles, wheeled agricultural or forestry tractors, two- and three-wheeled motor vehicles, as well as electrical and electronic devices used in such vehicles. Our EMC testing chamber enables us to carry out comprehensive tests on specimens of up to 12 m total length and up to 50 t total mass.

### Designing and testing of vehicles' electric drives and energy storage systems

We run equipment performance and energy management simulations, which make it possible to select individual drive system components for vehicles of any type. Such components are examined and tested in compliance with the standards observed in the automotive industry. The drive systems having been designed are comprehensively tested on chassis dynamometers; for the all-embracing examination of electrochemical energy storage systems, authorial test stands are used, which represent real operation conditions.







### Durability testing of the structures of vehicles and their parts

We carry out static and dynamic durability tests of vehicles and their parts, based on current normative documents or pursuant to individual settlements agreed upon with the customer, with using measuring and tell-tale instrumentation of 5–500 kN force measuring range. Our services enable the customer to check the quality of his/her products, e.g. coupling devices and towing hooks, vehicle frames, or suspension system components, to assess the conformity with international regulations and standards and to verify the correctness of the design basis adopted.

### Vehicle testing for the purposes of state security and defences

We carry out tests according to customer's corporate test specifications as well as qualification tests of military, police, and other special-purpose vehicles and their equipment parts within the scope of e.g. the durability and endurance of their structures during long-lasting operation, dynamics of motion, obstacle-negotiation capability, resistance to the impact of environmental factors, electromagnetic compatibility, etc. We have the necessary licences and accreditations authorizing us to carry out testing and certification of products intended for military or police applications.



### Testing of road infrastructure in terms of safety

Our specialized crash-test facility makes it possible to test road infrastructure components, such as road barriers, crash cushions, or supporting structures for road infrastructure facilities, in respect of their passive safety level. The testing ground is adapted for the testing of infrastructure components sunk into the ground, cast, or erected; our specialized testing equipment ensures top quality of the measurements carried out.

### Examination of fuels and biofuels

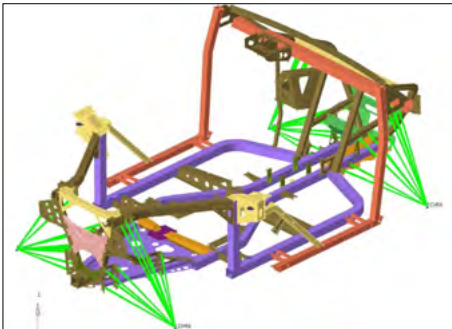
We examine the physicochemical and operational characteristics of liquid fuels (inclusive of LPG), biofuels, and biocomponents for conformity with current quality requirements. We carry out research works related to the evaluation of physicochemical and operational characteristics of fuels and lubricants as well as research and development works in the field of development of the technologies of petroleum-derivative fuels, alternative fuels, and biofuels. Moreover, we provide consulting services in the field of new fuel technologies and technical regulations applicable to fuels.





### Automotive expertise

We prepare assessment reports, issue experts' opinions, and carry out tests and experiments for courts, public prosecutor's offices, the Police, and other entities within the scope of automotive technical knowledge, reconstruction of road accidents and collisions, technical assessment of vehicles, and estimation of vehicle repair costs. We carry out audits in business entities and other organizational units of the public sector within the scope of fuel and materials management, motor vehicle fleet operation system and technical condition, and servicing and production base of the automotive industry and trade.



### Numerical analyses

We make strength calculations, which enable precise determining of the state of stress both in a complete structure and in individual nodes of the structure as early as at the designing stage. We offer our support within the scope of static stress analyses, non-linear dynamic analyses, modal analyses, fatigue analyses, multi-body dynamics (MBD) simulations, crash-test analyses, etc.

### Testing of automotive equipment and accessories

We test vehicle equipment and accessories in their broadest sense, from electronic and electrical equipment such as warning lamps, alarm systems, immobilisers, GPS localisers, battery chargers for mobile devices, through automotive accessories such as tow ropes, tow bars, or jacks of any kind for motor vehicles, to equipment improving the safety of car occupants, e.g. child seats and restraint systems, load-securing equipment, such as load-fastening belts, roof luggage racks, bicycle car racks, etc. In addition to that, we test assistive devices for people with dysfunctions of upper and lower limbs and instructor's pedal sets for driver-training vehicles. We do jobs within the scope of testing dynamic, environment-related, material, strength, and electrical properties of various products.



## LABORATORIES

**Vehicle Safety  
Laboratory**

**Simulation Tests  
Laboratory**

**Electronics  
and Acoustics  
Laboratory**

**Vehicle Tests  
Laboratory**

**Exhaust-Gas  
Analysers  
Laboratory**

**Analytical  
Laboratory**

**Measuring and  
Research Equipment  
Laboratory**

**Automotive  
Expertise  
and Driver Training  
Department**

**Type-Approval  
and Certification  
Department**

## CENTER FOR RESEARCH AND TECHNOLOGY DEVELOPMENT

**Research Group  
for Fuels  
and Bioeconomy**

**Research Group  
for New Automotive  
Technologies**

**Electric and Hybrid  
Vehicles Section**

**Engineering  
Design and Numerical  
Analyses Section**

**Autonomous  
Vehicles Section**

**Customer Service:**

 **+44 22 7777 302**

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