Łukasiewicz
Institute
of Aviation

UNMANNED TECHNOLOGIES

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GENERAL COMPANY INFORMATION

Łukasiewicz Research Network - Institute of Aviation is one of the most modern research institutions in Europe, with traditions dating back to 1926. The Institute closely cooperates with the world's tycoons of the aviation industry and institutions from the space industry. The strategic research areas of the Institute are aviation, space and unmanned technologies. Tests and services for domestic and foreign industry in the field of metallic and composite materials, additive, remote sensing, energy and mining technologies are also carried out here. Łukasiewicz Research Network - Institute of Aviation is made up of eight research centers:

- AVIATION TECHNOLOGIES CENTER
  develops technologies dedicated to aircraft design, aerodynamic research and aircraft certification.

- SPACE TECHNOLOGIES CENTER
  conducts research and development in the field of space propulsion, space transportation, satellite testing and remote sensing.

- UNMANNED AERIAL VEHICLE TECHNOLOGIES CENTER
  conducts research and development in the field of drones and anti-drone systems.

- MATERIALS AND STRUCTURES RESEARCH CENTER
  offers materials and structural components testing in a wide range of loads and temperatures. Thanks to a large number of certified test stands it is a regional leader in fatigue and strength testing.

- COMPOSITE TECHNOLOGIES CENTER
  delivers composite technology solutions and composite material tests for the aerospace industry.

- ENGINEERING DESIGN CENTER
  is an engineering alliance between General Electric Company Polska Sp. z o.o. and Łukasiewicz Research Network – Institute of Aviation. The Center offers design, research and development services in the fields of aviation, gas power and renewable energy.

- ENGINEERING SERVICES CENTER
  provides mechanical and thermal engineering support to strategic research and development projects.

- ENERGY TECHNOLOGIES CENTER
  focuses on engineering areas: designing, manufacturing, analyzing and servicing parts for high-power gas turbines and wind turbines. One of the main tasks of this center is to implement a new energy era that will build a cleaner future.

OFFER

The main activity of Łukasiewicz Research Network - Institute of Aviation in the field of unmanned technologies is providing research services, delivering new technologies for specialized applications and conducting R&D projects. Institute specialists create advanced software for unmanned aerial systems (UAS) based on machine vision and artificial intelligence algorithms, produce precision mechanics and design electronics dedicated to UAS. Łukasiewicz Research Network - Institute of Aviation has domestic and international experience in planning and execution of test flights and integration of avionics systems. We cooperate with many domestic and foreign entities in the field of avionics systems dedicated to UAS.

Unmanned technologies offer:

- Development of UAS concepts for specialised tasks.
- Development of UAS with video processing and artificial intelligence algorithms.
- Development of anti-drone systems.
- Development of experimental unmanned systems.
- Modeling of avionic systems.
- Modeling of sensory systems (environment awareness, obstacle avoidance).
- Modeling of control systems - mobile GCSs.
- Development of propulsion systems - design and development.
- Development of emergency systems.
- Development of airspace management systems - integration with UTM/DTM systems.
- Support of UAS testing.
- Preparation of photoflight missions, data acquisition and data feeding into Spatial Information Systems (GIS).
- Creation of precise raster maps (orthophotomaps) and vector maps on the basis of aerial photos (possibility of multispectral photos).
- Creation of products for modern geomarketing, including creation of precise 3D models of objects.
- Creation of analysis of the indicated area with regard to the set criteria, solar potential analysis (based on precise 3D models), analysis of optimal investment location.
- Preparing advanced visualization of geodata with special emphasis on 3D modeling and integration of data obtained using UAV .
- Preparation of software development of UAS and GCS stations.
- Conducting aerodynamic, material, structural and composite tests.

UNMANNED SYSTEMS

Łukasiewicz Research Network - Institute of Aviation specializes in the development of unmanned systems for dedicated applications in various business sectors. Engineers are involved in implementation and mission planning, integration with UTM systems, design and manufacture of unmanned platforms and experimental demonstrators. Institute specializes in mechanics, electronics, diagnostics, and avionics systems. Our engineers develop embedded software in the areas of vision tracking and autopilots, GCS control systems, neural network/artificial intelligence, drone disposal systems, monitoring, sensory data collection and processing.

MECHATRONIC SYSTEMS

Łukasiewicz Research Network - Institute of Aviation offers laboratory, workshop and measurement facilities, where mechanical, electrical and electronic integration processes of UAS systems are performed. A well-developed tool base allows the development of new components, as well as testing of own systems and those supplied by external providers.

- On-board instrumentation for UAVs.
- Optoelectronic heads.
- Selection of sensors.
- Mechanical design.
- Electronic systems design.
- Control software development.
- Design and implementation of dedicated multisensor systems.
- Ground control stations-GCS development.

As part of our work on software, the Institute deals with:

- Computer vision processing.
- Detection and identification of objects.
- Neural network algorithms (AI).
- The ground software of GCS.
- Sense & avoid awareness systems.
- Navigation in GPS denied conditions.
- Emergency landing systems.
- UAS simulators.


ubuntu
HOLD MSN
RESUME MSN
SW AUTO
P/L A
P/L B
P/L C
P/L D

SUDIL1/SUDIL2 – DRONE COMBAT SYSTEM

SUDIL is a second generation anti-drone platform that automatically detects and tracks an unwanted flying object. The detected intruder is intercepted using a net and towed to a safe location with the ability drop it with parachute at any time. SUDIL can be integrated with a drone detection system, thus creating a comprehensive anti-drone defense system. The platform is equipped with emergency landing systems and has its own mobile ground control station.

Technical data:

Parameter	Value
Platform weight	< 25 kg
Operating time	30 minutes
Possibility to tow objects	up to 5 kg
Net thrower range	up to 12 m
Number of rotors	6/8

Technology development based on the SUDIL (Drone Interception System) project:

- Single and stereo optical sensors and auxiliary sensors: radar, LIDAR, other sensors.
- Sensor-based object detection and tracking.
- UAV control system based on sensor data (autonomous drone interception).
- Control software for the UAV platform.
- Software for ground control stations (GCS).

PIRAT – UAV test and service platform

Internally developed UAV project features a rotorcraft design in a multi-rotor layout, commonly referred to as an octocopter. This innovative drone is constructed using lightweight carbon composite materials, enhancing its overall structure.

PIRAT has undergone rigorous testing and is now ready for flight, positioning it as a viable option within the realm of emerging drone technology. Furthermore, its design includes versatile elements that could potentially be integrated into various other aircraft projects. Leveraging the X8-based multi-rotor configuration, PIRAT boasts an impressive payload capacity without The X8 multi-rotor provides impressive payload while maintaining a relatively small size.

Technical data:

Parameter	Value
Rotorcraft in a multicopter layout	4 sets of counter-rotating propulsion units
Dead weight with batteries	16.2 kg
Maximum takeoff weight (construction designed for increased payload)	25 kg
Continuous flight control with loss of one of the propulsion units equipped with eight	
T-motor	U8II 100kV motors
Diagonal between the axes of the motors 1220 mm	
Width	1590 mm
Cruising speed	10 m/s - 15 m/s

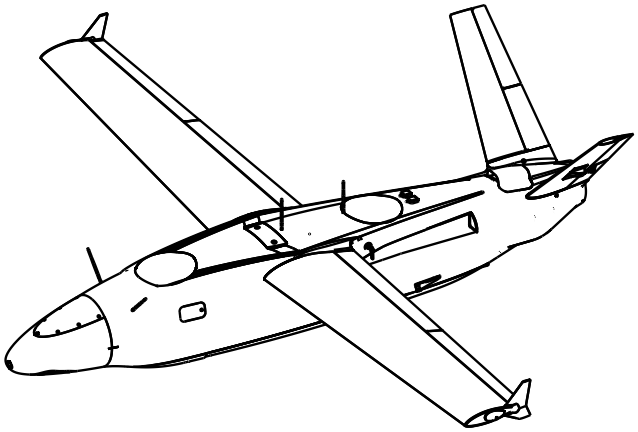
Key features:

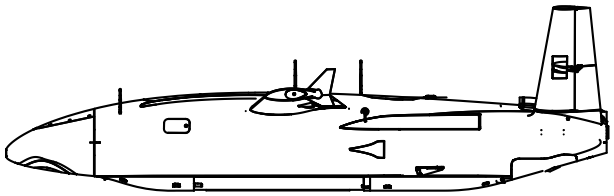
- Easy and quick customization to meet individual customer and mission needs.
- Emergency parachute system (automatic or manual).
- Automated mission capability.
- LTE connectivity.

HAASTA - UNMANNED AERIAL SYSTEM

Innovative hybrid-powered unmanned aerial system for surveillance, cargo transportation, photogrammetry, long-range reconnaissance or diversion.

HAASTA is also a technology demonstrator for innovative solutions designed at Łukasiewicz – Institute of Aviation for example: acoustically optimized propellers, thermoplastic housings with ability to reflect electromagnetic radiation, aerodynamic and propulsion optimalization or control systems based on artificial intelligence.





Key features:

- Load drop of 20 ÷ 30 kg (depending on configuration).
- Operation independent of airport infrastructure: launch from an air launcher, landing on a skid or gliding parachute.
- Platform difficult to destroy: small size, small RCS radar reflectivity footprint, low IR signature.
- Mobility - Ground Control Station (GCS) built on the car.
- Ability to quickly modify technology and adapt to mission needs.

Technical data:

Parameter	Value
Wingspan	3,9 [m]
Length	2,9 [m]
Height	0,95 [m]
Speed	120 ÷ 280 km/h
Altitude	Up to 7 000 m MSL
Payload	do 35 kg (ok 40 dm^3)
Drive	20HP ICE-electric hybrid
Flight time	Up to 10 hours
Operating Radius	• 30 km - standard radio or 80 km - in Mesch system • 170 km - LoS link with directional antennas (image data) • Satellite modem - range limited by the amount of fuel
Control system	Autonomous control and navigation system resistant to radio-electronic warfare systems

In military applications, the system is constructed with the capability to penetrate anti-aircraft defense systems, operate deep within enemy formations and carry out reconnaissance or airborne diversion tasks.

In civilian applications, it can monitor long linear infrastructure or provide observation for critical infrastructure.

HAASTA system does not need traditional airport infrastructure. The launch is carried out using a mobile launcher, which allows to perform many launch operations in a short time.

PHOENIX

The Phoenix (1:10) is fixed wing RC aircraft with electric push, that can be equipped with photovoltaic panels. Thanks to the autopilot system, the model can perform missions in automatic, semi-automatic and manual modes. It is mainly used for testing on-board systems and for carrying various cameras. It is adapted to land mapping, in particular to obtain images of agricultural and forest areas.

Technical data:

Parameter	Value
Wingspan	3,85 m
Take-off weight	25 kg
Payload	4.2 kg
Flight ceiling	3500 m AMSL
Flight time	45 minutes
Speed	35 m/s

SORA ASSISTANCE

SUPPORT FOR THE IMPLEMENTATION OF RISK ANALYSIS WITH THE SORA METHODOLOGY (SPECIFIC OPERATION RISK ASSESSMENT) FOR UNMANNED AERIAL VEHICLES

Łukasiewicz Research Network - Institute of Aviation offers risk assessment methodology, known as SORA, recommended by the EASA and Civil Aviation Authority since 2021. SORA Assistance service speed up the process of obtaining permits. It's required for UAV operations in the specific category, which are more complicated and therefore has higher risk. SORA risk evaluation methodology is a 10 steps process starting with the description of the operation and the evaluation of ground risk class and air risk class. It requires the UAV operator to be proficient with risk mitigation measures and knowledge of a number of additional issues.

Scope of support:

- Risk assessment with the SORA methodology.
- Preparation of the concept of operation for the mission
- based on information provided by the client.
- Completing the application to the Civil Aviation Authority.
- Creation of Operational Procedure and ConOps documents.
- Consultation to the extent necessary to collect
- detailed data on the planned operation.

For which UAV operations is a permit necessary?

- Flights above 120 m.
- Drones weighing more than 25 kg.
- Distances longer than 2 km from the UAV pilot.

The price and timing of the analysis are on a case-by-case basis, depending on the complexity of the UAV operation and the additional requirements that could be necessary to obtain a permit.

ADDITIVE TECHNOLOGY

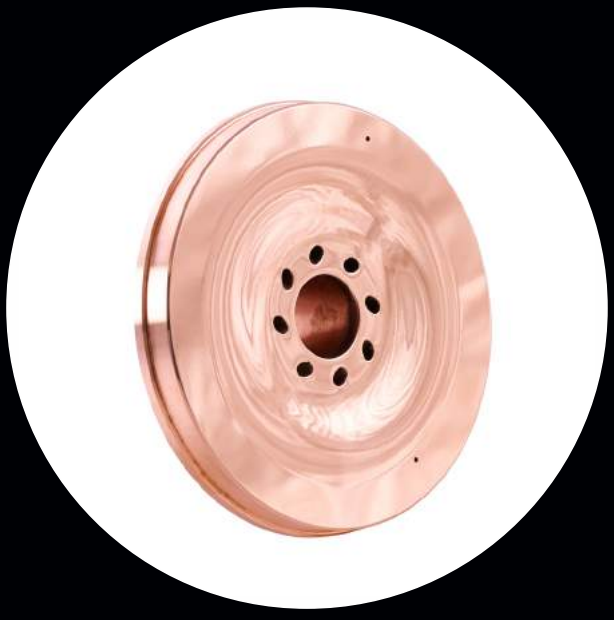
3D PRINTING FOR AEROSPACE: DESIGN, PRODUCTION, PROCESSING, RESEARCH

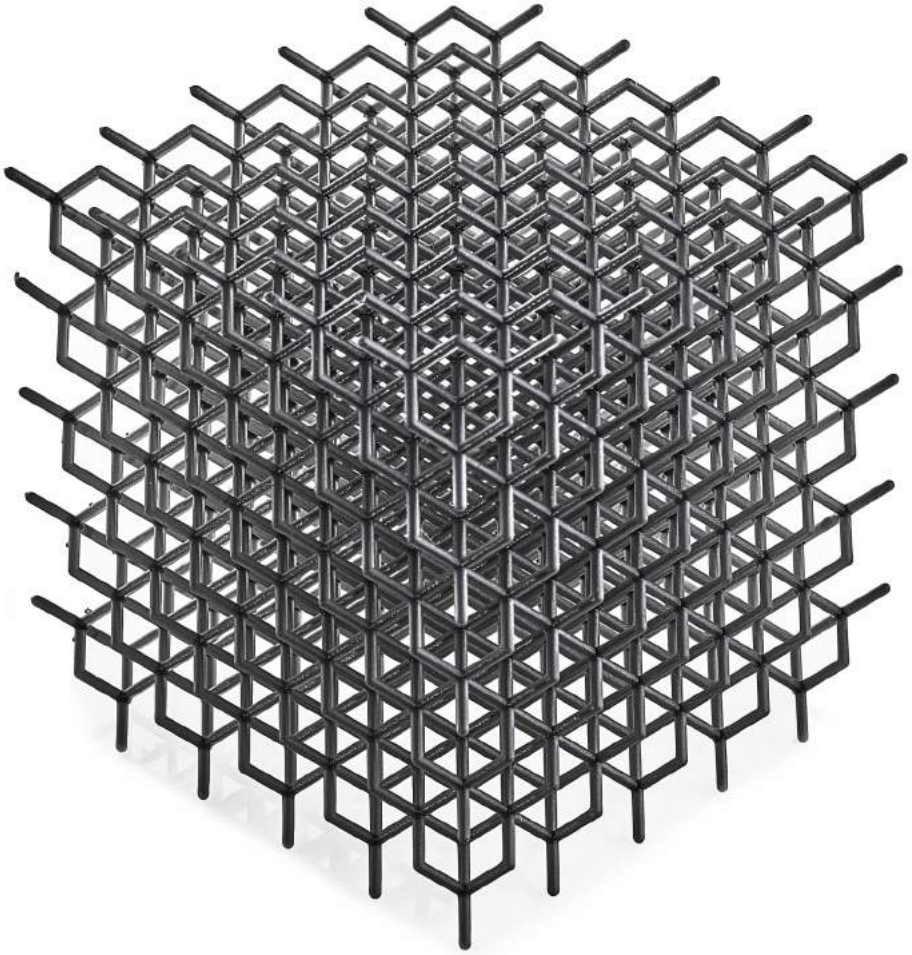
The offer of Łukasiewicz – Institute of Aviation within the framework of new manufacturing technologies includes a comprehensive service related to 3D printing mainly for the aerospace industry. The uniqueness of our offer is primarily due to the complementarity of the offer concentrated in one place - Design, manufacturing, heat and surface treatment, certified testing, quality control, as well as a wide range of completed projects, specialized machinery and experienced engineering staff.

Complete In-house capabilities:

- Design - 3D modeling.
- Process parameters optimization.
- R&D for internal and commercial projects.
- Quality control - geometrical validation (CMM, 3D scan).
- Material test (NDT, XCT, SEM).
- Structural tests (static, dynamic, fatigue, XRD, distortions).
- Thermal treatment.
- Post-processing / CNC.

The Institute provides parts from different metal alloys using powder bed technologies as well as wide range of polymer materials using DLP, MJP and FDM processes. We use a range of materials among others: metal alloys such as CuCrZr, 316L stainless steel and CoCr, as well as a variety of polymeric materials including elastomers, high temperature plastics, composites, photopolymers and ceramics.





HYBRID PROPULSION SYSTEMS LABORATORY

In June 2023, the hybrid drive laboratory was launched, made up of an electric engine roller dynamometer and a piston engine roller dynamometer.
At Łukasiewicz Research Network - Institute of Aviation it is the first test station for hybrid drives for aviation applications that meets R&D needs of the aviation market.

HYBRID DRIVE ROLLER DYNAMOMETER

The station is equipped with a battery simulator with the following main parameters:

- simulator power supply 3×400 V AC,
- continuous power 80 kW,
- instantaneous power 120 kW (60 sec.),
- output voltage adjustable 24-800V DC,
- rated current +/- (bidirectional) 267 A,
- peak current + / – (bidirectional) 400 A,
- rapid prototyping of the required energy storage capacity and conducting long-term tests with DC voltage.

Liquid cooling of motors/inverters.

- Water cooler #1 – maximum heat capacity 5 kW,
- Water cooler #2 – maximum heat capacity 10 kW,
- Water cooler # 3 – maximum heat capacity 30 kW.

Parameters of the tested generator in serial hybrid setup (internal combustion engine + energy storage charging generator):

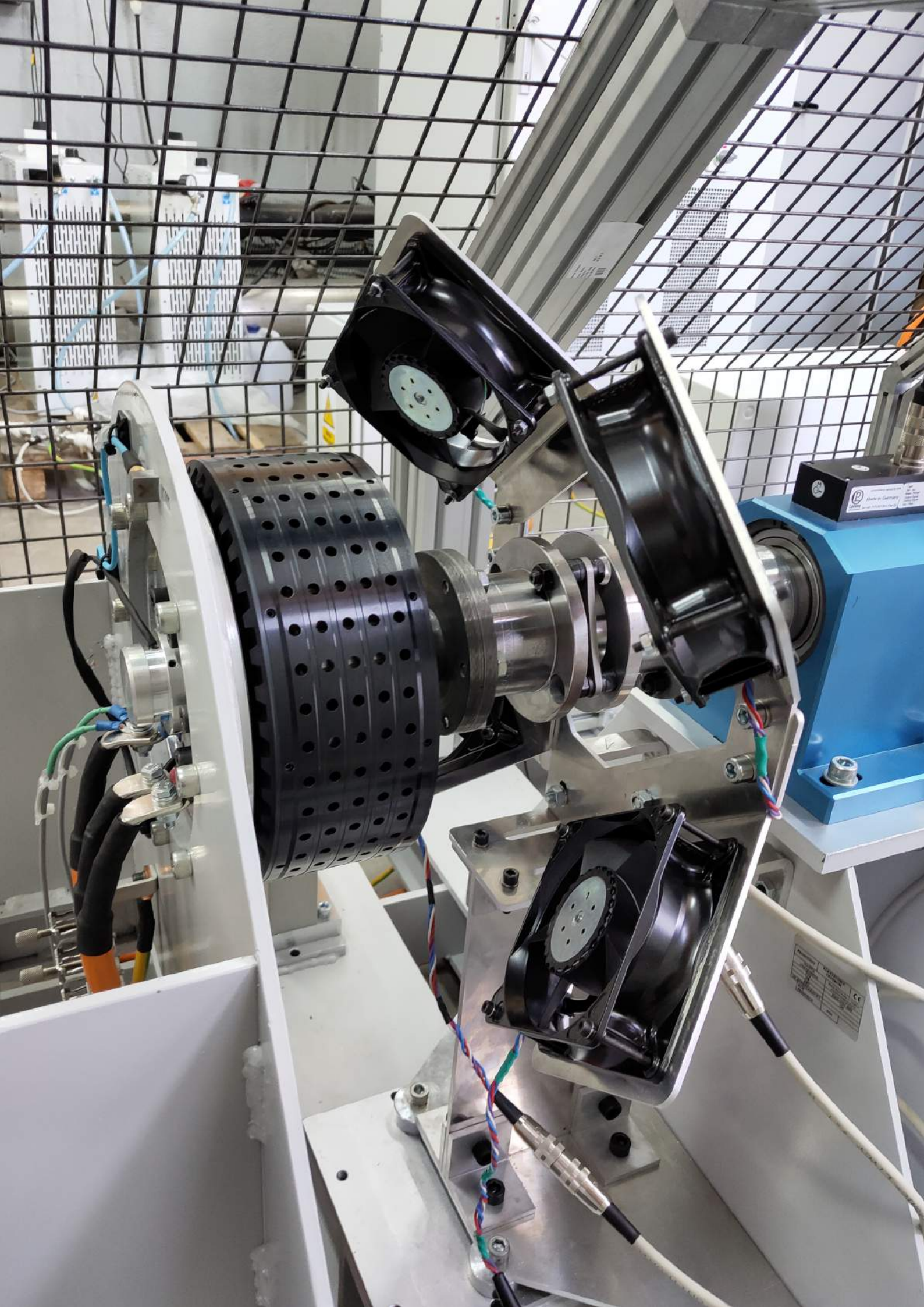
- Maximum electrical power returned to the grid – 80 kW (peak 120 kW – battery simulator constraints,
- maximum torque 100 Nm, maximum speed 12,000 rpm/ min or maximum torque 500 Nm, maximum speed 7,000 rpm/ min (depending on the torque meter installed).

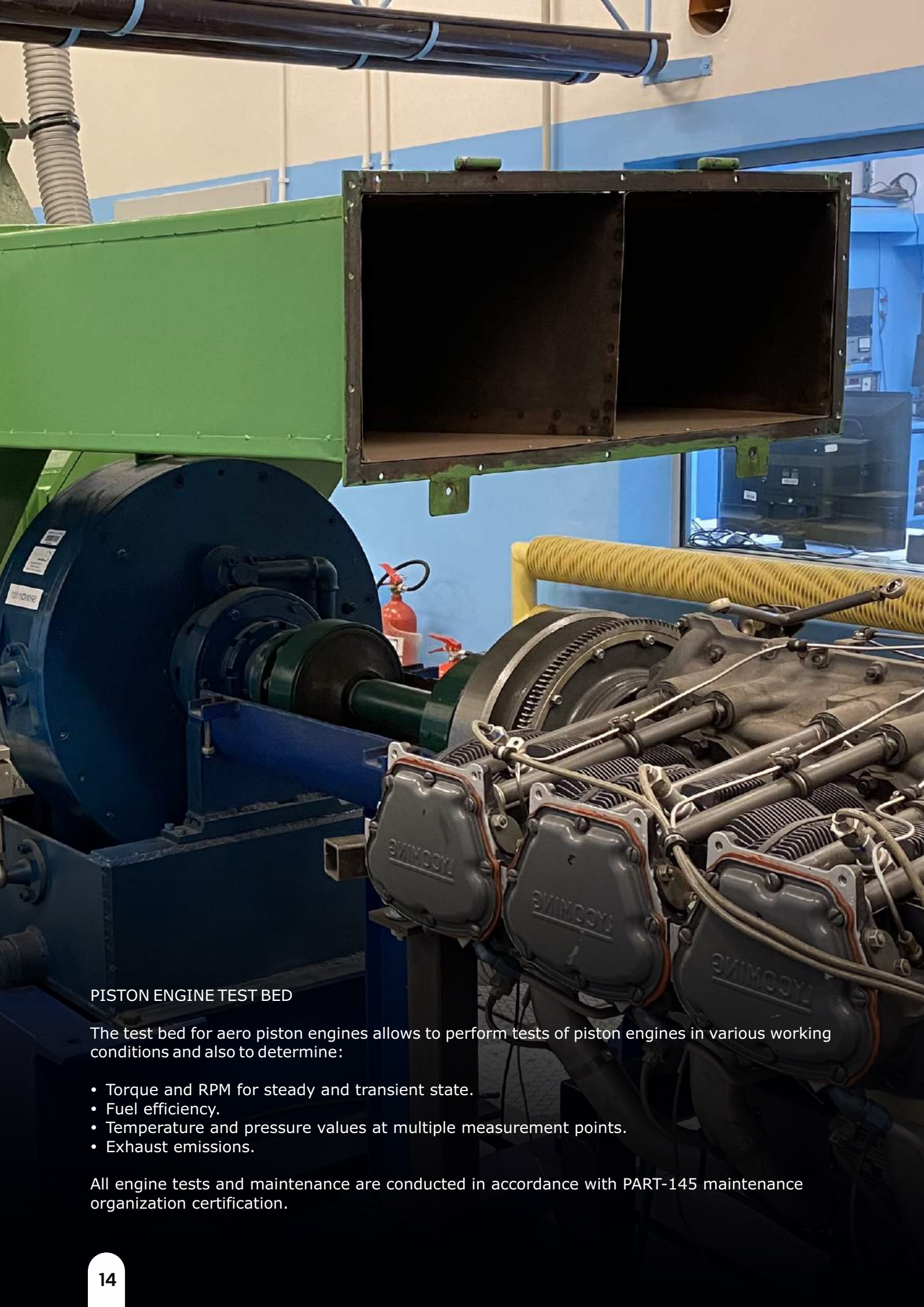
Parameters of the tested electric motor in parallel hybrid setup (internal combustion engine + load driving electric motor):

- The maximum total power of a hybrid drive: 200 kW,
- The maximum power of an electric motor powered by a battery simulator: 80 kW,
- Maximum speed 6000 rpm/ min,
- Maximum torque 700 Nm,
- The drive is loaded with an eddy current brake.

Design services:

The team designs dedicated test platform for the customer’s needs. Consulting on the selection of hybrid and electric drive components (internal combustion engine, electric motor, electric generator, inverters, energy storage cells) and measuring sensors.





PISTON ENGINE TEST BED

The test bed for aero piston engines allows to perform tests of piston engines in various working conditions and also to determine:

- Torque and RPM for steady and transient state.
- Fuel efficiency.
- Temperature and pressure values at multiple measurement points.
- Exhaust emissions.

All engine tests and maintenance are conducted in accordance with PART-145 maintenance organization certification.

REMOTE SENSING

Wide competences of employees of Łukasiewicz Research Network – Institute of Aviation are used to perform works in three main areas:

- Precision farming and Decision Support Systems.
- Environmental monitoring, works in the field of forestry, hydrology and geology.
- Technical inspections of industrial infrastructure, with particular emphasis on the energy sector.

The specialists deal with widely understood data acquisition and processing with the use of various types of sensors, including sensors installed on board of manned and unmanned aerial vehicles.

Activities are mainly focused on:

- Development and integration of optoelectronic systems.
- Operational acquisition of aerial photographs and data.
- Processing of satellite data.
- Creation of dedicated databases and operator applications.
- Development of robotic solutions (automatic driving platforms).

The works carried out include: devices recording electromagnetic radiation in the optical range (reflected from the tested object), LiDAR and radars .

Typical work includes sensor calibration, testing and integration, automation and robotics work, and a range of IT related activities including detection and identification algorithm development and web application design (WebAPI).

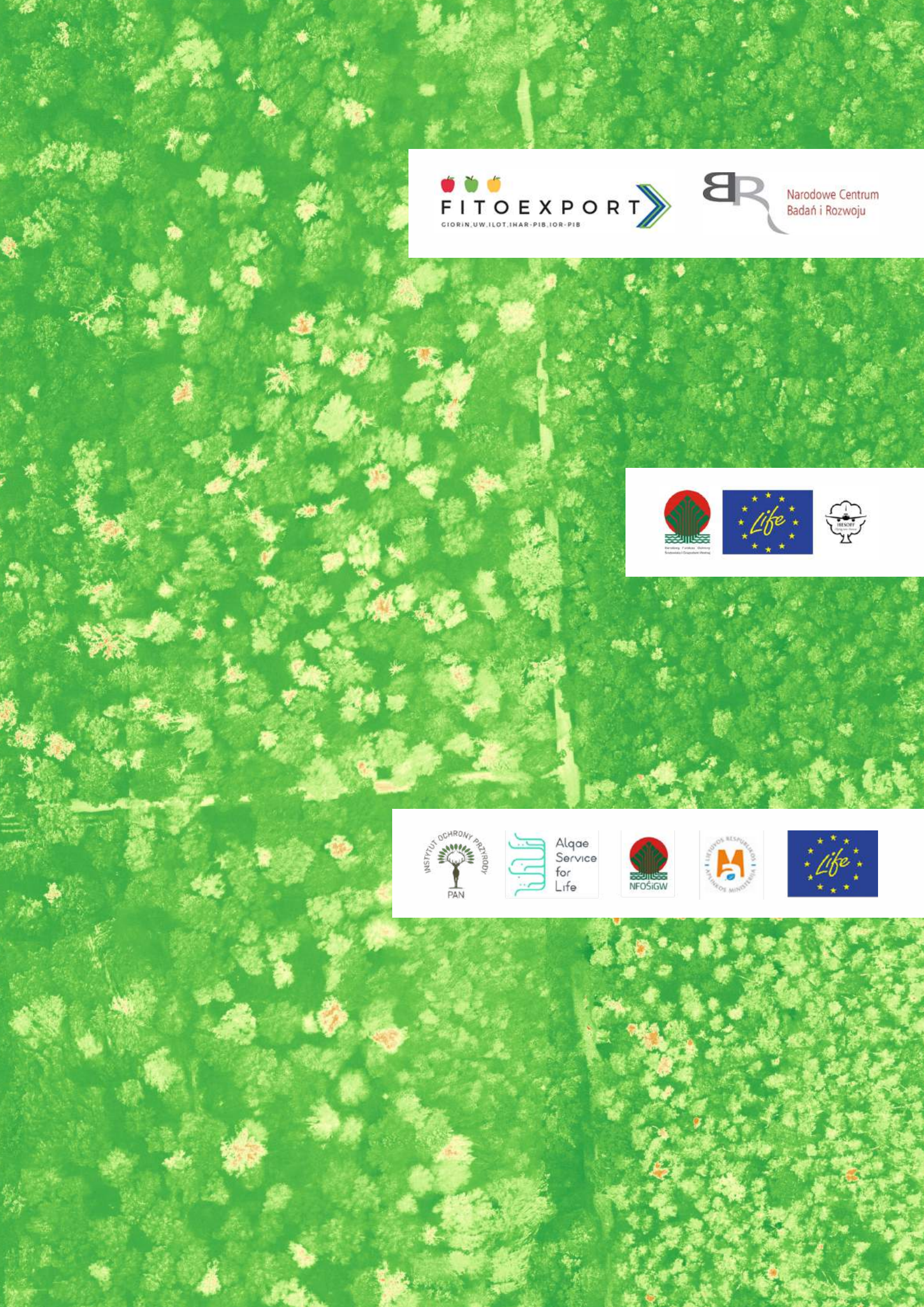
There are also field measurement campaigns, which usually last up to several working days and are carried out in teams of at least two people. Operational remote sensing works are conducted for each type of land cover. These are usually agricultural and forest regions, urbanized and industrial areas. Depending on the scope and nature of the analysis, the appropriate time and equipment with the relevant technical parameters are selected. The works include preparation of photogrammetric marker before the aerial photo mission, acquisition of reference data for UAV acquired data (spectral curves, water, soil and vegetation samples) and acquisition of photographic material (from the ground and from the air).

As part of the work in the field of remote sensing with UAVs, they are used:

- Various types of aircraft (for subsystem testing and data acquisition).
- Specialized cameras and measuring apparatus (e.g. wind meter).
- Precision GPS-RTK receivers (for field measurements and navigation).
- Photogrammetric station (for processing of metric and non-metric images).
- Cloud architecture (for data processing and visualization).

Specification of data that can be extracted:

- Number of spectral bands: up to 12.
- Ooptical bands: visible and NIR, SWIR, LWIR.
- Accuracy of orthophotomap: total error < 10 cm (RTK/PPK).
- Resolution (GSD) of multispectral orthophotomap: <1cm.
- Maximum duration of 1 flight: up to 1 hour.
- Mapping area during 1 flight: up to 5 km².
- Length of linear infrastructure which can be mapped during 1 flight: up to 20 km.


FITOEXPORT
GIORIN,UW,ILOT,IHAR-PIB,IOR-PIB
Narodowe Centrum
Badań i Rozwoju
Life
INSTYTUT OCHRONY PRZYRODY
PAN
Algae
Service
for
Life
NFOŚiGW
Life

FITOEXPORT (Gospostrateg1/385957/5/NCBR/2018) - Project in progress.

Development and implementation of methods of using modern remote sensing and photogrammetric technologies in the activities of the Main Inspectorate of Plant Health and Seed Inspection (PIORiN), in the field of control over agricultural production and trade in plants, with particular emphasis on modern methods of field evaluation of seed, rapid detection and effective monitoring of selected pathogens, use of innovative GIS tools and implementation of new data sources in the work of inspectors.

Capabilities:

- The use of multispectral data in the work of PIORiN inspectors.
- The implementation of the methods of remote sensing monitoring in the works of PIORiN.
- Training in data processing and interpretation.
- Creation of new standards for ground, aerial and satellite monitoring.
- Project carried out within the framework of the competition GOSPOSTRATEG, from the National Centre for Research and Development (NCBiR) funds.

HESOFF (LIFE11 ENV/PL/000459) – Project completed.

The HESOFF project was focused on the integration of innovative technologies with innovative methods of forest cultivation. Accordingly, there were two main objectives of the project: the evaluation of the action of phosphates as elicitors of resistance of trees to Phytophthora pathogens and the implementation and introduction of new methods of assessment of forest conditions and cultivation efficiency through imaging from unmanned aerial vehicle (UAV).

Capabilities:

- Development of the multispectral cameras QUERCUS.2 and QUERCUS.6 (two- and six-band) for manned and unmanned applications.
- Creation of the monitoring method of forest areas on the basis of multispectral data.
- Periodic monitoring with remote sensing data for the duration of the project.
- Project financed by European Commission and National Fund for Environmental Protection and Water Management within LIFE instrument.

BLOOMAP - Monitoring of cyanobacterial blooms for the project AlgaeService for LIFE (LIFE17 ENV/LT/000407) - in progress.

The Łukasiewicz team supports the Institute of Nature Conservation of the Polish Academy of Sciences in the acquisition of ground-based spectral characteristics, low-altitude aerial imaging using unmanned aerial vehicles (UAVs) and satellite imagery from the Sentinel-2 series. Studies are conducted on three areas, which are water reservoirs: Kraków - Podkamycze, Starorzecze Wisły - Koło Tynieckie (Kraków) and Lake Paprocańskie in Tychy. The result of the studies is cyclic monitoring of the above water reservoirs and classification of cyanobacterial biomass on the basis of remote sensing data.

Capabilities:

- Monitoring of cyanobacterial blooms based on ground, aerial (including UAVs) and satellite data (using Sentinel-2 series of satellites).
- Cyclic monitoring of three test areas (Krakow - Podkamycze, Krakow - Koło Tynieckie and Tychy - Lake Paprocańskie).
- Use of ten spectral bands for monitoring of water areas with UAVs.
- Approximately seventy hectares of surface waters monitored.
- Work carried out for the project financed by the European Commission and the National Fund for Environmental Protection and Water Management within LIFE instrument.

SCOPE OF WORK AS PART OF REMOTE SENSING

ANALYSIS OF AIR DATA

Łukasiewicz Research Network - Institute of Aviation conducts a variety of industrial works and R&D. Each time, during the tests and measurement campaigns, huge sets of data are collected, which are used for advanced analysis. In order to process them efficiently and effectively a special technical infrastructure has been created. It supports all activities related to handling data obtained with the use of various tools.

Łukasiewicz Research Network - Institute of Aviation includes Operations Center for Earth Observation Missions which is responsible for acquisition, archiving, processing, visualization and sharing of different types of data.

The Operations Center for Earth Observation Missions enables: monitoring of photo missions , rocket (planned) and satellite missions; storage of remote sensing and telemetry data in a secure manner; processing of data on a high computing power cluster; visualization of data. The structure of the Operations Center has been designed so that data processing and visualization is possible in nearly real time.

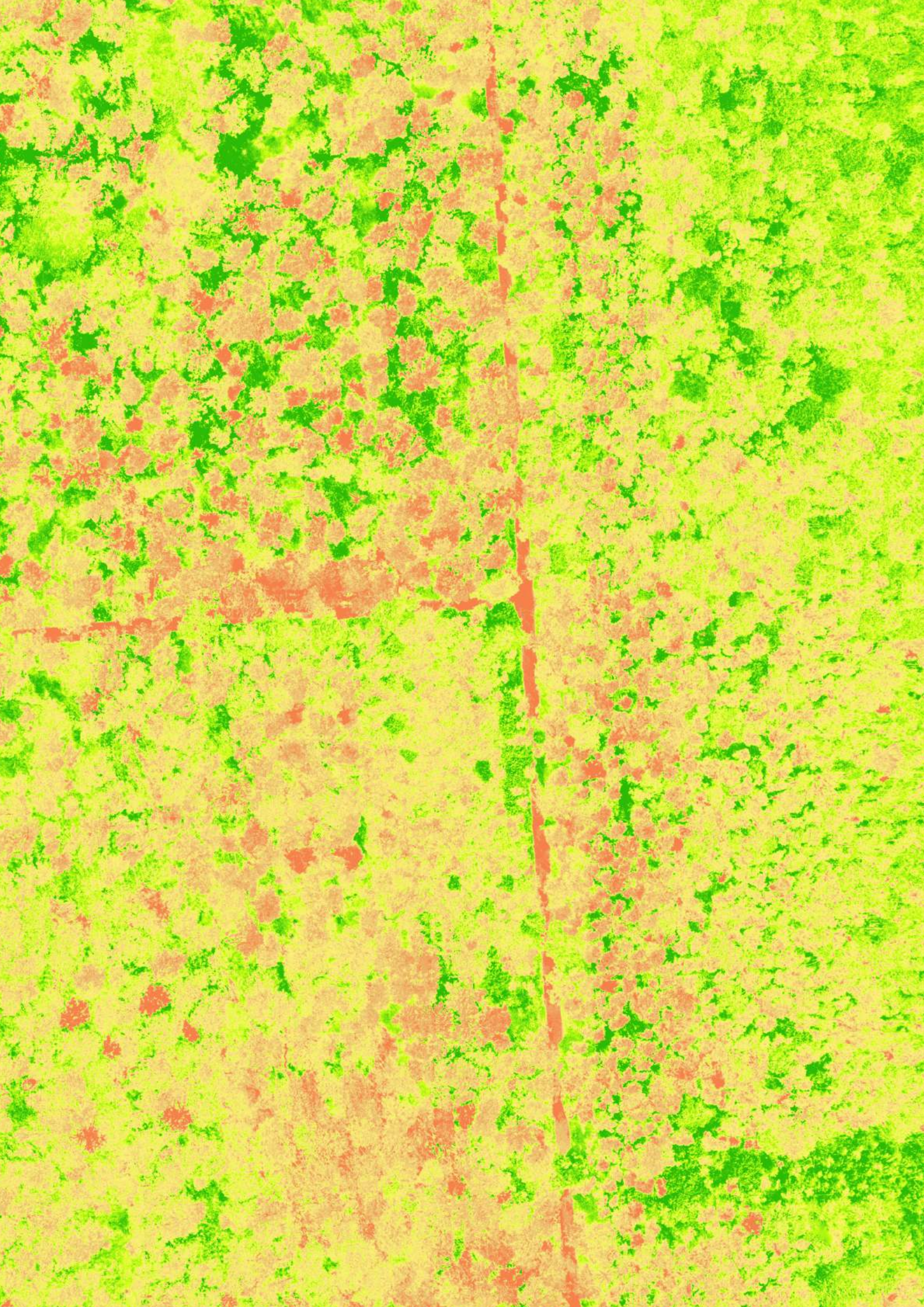
SPECTRAL ANALYSIS

Advanced spectral analyses are aimed at the analysis and identification of objects. Reflectance is a characteristic parameter on the basis of which composition and physicochemical properties can be inferred. Based on the analysis of spectral curves, it is possible to perform detection without direct contact with the studied object.

SPECTRAL SIGNATURES LABORATORY

Łukasiewicz Research Network - Institute of Aviation operates a laboratory within its infrastructure, the purpose of which is to provide for the analysis of aerial photographs, satellite images and images taken in unmanned space missions reference data allowing for identification of objects recorded in the ultraviolet, visible and infrared ranges. Three spectrometers are available to measure spectral signatures from 200 nm to 25,000 nm for liquids, suspensions, and solids. The laboratory is also equipped with a device to test the NPK content in soil and a fluorimeter to determine the condition of plants.

To meet the needs of the laboratory, a specialized station for obtaining multi-spectral images of the studied material was constructed. It is equipped with a multispectral camera (460- 1100 nm range), narrow band interference filters, reflectance markers <5% and reflectance>95%, and an illumination system with characteristics similar to the spectrum of the Sun. In addition, the Laboratory is equipped with an XRF spectrometer with an X-ray range, which is used to identify elements in a given substance and determine their quantity.

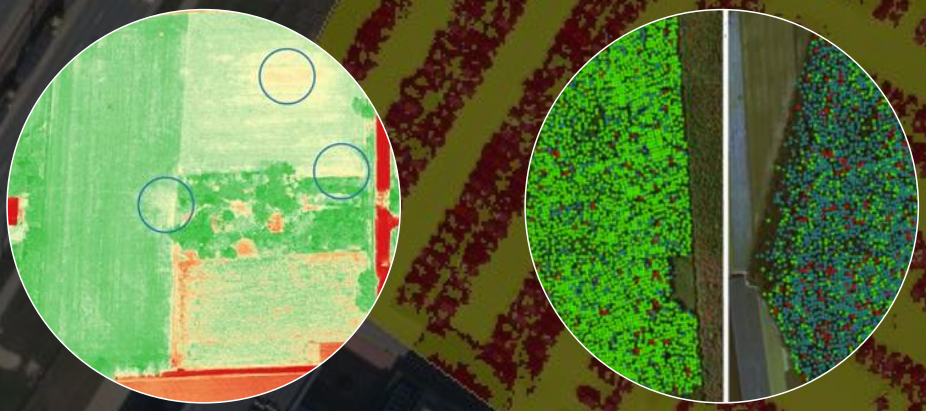


REMOTE SENSING ANALYSES

The Institute conducts industrial work with operational use of remote sensing data, which is the basic material for terrain monitoring and spatial analysis. The results of R&D work are very often implemented and used in cyclic works. In many situations, once developed algorithm can be then used in semi-automatic or automatic analysis of the selected phenomenon, in subsequent moments of time. The results of our work are widely implemented in various branches of economy.

Basic activities conducted at Łukasiewicz - Aviation Institute:

- Creation of green indicators and vegetation studies.
- Use of remote sensing in forest management works.
- Examination of water.
- Application of remote sensing in soil science.
- Remote sensing applications for pollution effects monitoring.



ADVANCED GEODATA VISUALIZATION

The Institute is involved in image data processing. Thanks to this, Łukasiewicz - Aviation Institute scientists acquire various types of images, which they then use for various visualizations and spatial analyses. Łukasiewicz Research Network - Institute of Aviation uses geoinformation, among others, to manage natural resources, analyze location of new investments and support enterprise management.

The Łukasiewicz Research Network - Institute of Aviation also conducts work in the field of creating accurate 3D models on the basis of aerial photographs and laser scanning. 3D models are most often used in Spatial Information Systems (GIS) to create advanced hybrid visualizations. The Institute carries out work in the field of geomarketing. This is the use of a variety of data and information for promotional purposes, which are precisely located in the adopted reference system. Geomarketing is strongly connected with the remotely piloted aircraft industry.

COOPERATION

Łukasiewicz Research Network - Institute of Aviation offers cooperation in:

- UAS research and development.
- Anti-drone technology.
- Integration of unmanned systems with urban information systems and UTM.
- Design and development of UAS for cargo transport.
- Obstacle detection and avoidance technologies - development and testing.
- Vision-based navigation.
- BVLOS missions and space control.

As part of the cooperation between NIAS (Nevada Institute for Autonomous Systems) and Łukasiewicz Research Network - Institute of Aviation, the integration of UAS with the UTM air control system developed by NASA, among others, was performed, followed by a series of unmanned missions in Nevada in 2018-2019. Unmanned aircraft of the Łukasiewicz Research Network - Institute of Aviation equipped with high-tech solutions for communication, safety, sensorics and security systems performed test missions in diverse environments such as deserts, airports, suburbs, city parks and in the final phase, strict centers of large cities.

Łukasiewicz Research Network - Institute of Aviation was the only foreign institution invited to participate in the U.S. tests of unmanned vehicle traffic management system in the urban area, which took place in the city of Reno, Nevada, USA. The project was coordinated by NASA's Ames Research Center in collaboration with the Nevada Institute of Autonomous Systems (NIAS) and the Federal Aviation Administration (FAA). Academic and scientific institutions as well as significant global companies operating in the drone market took part in the tests.

Łukasiewicz Research Network - Institute of Aviation implements a project of small hybrid airframe capable of continuous flight up to 1 hour, including 20 minutes of flight on electric drive only (realization of a silent reconnaissance flight).

FUTURE SKY URBAN AIR MOBILITY

Łukasiewicz Research Network - Institute of Aviation is also the co-coordinator of the Future Sky Urban Air Mobility initiative (with DLR). Within the program Łukasiewicz - ILOT is a leader of Assured - UAM project preparing formal and legal framework for the implementation of unmanned operations in urban space. At the same time Łukasiewicz - Institute of Aviation is a facilitator of the development of the European Roadmap for the Implementation of Urban Air Mobility and the Small Air Transport System.

ŁUKASIEWICZ RESEARCH NETWORK - INSTITUTE OF AVIATION AND ADVANCED PROTECTION SYSTEMS

Łukasiewicz Research Network - Institute of Aviation has partnered with Advanced Protection Systems, a technology company focused on preventing the threat posed by unwanted unmanned flying objects. The SUDIL interceptor platforms of the Łukasiewicz Research Network - Institute of Aviation will be integrated with a unique drone detection and neutralization system called SKYctrl and the ultra-precise FIELDctrl 3D MIMO radars.

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