



THE INSTITUTE OF AVIATION

Warszawa, 2019

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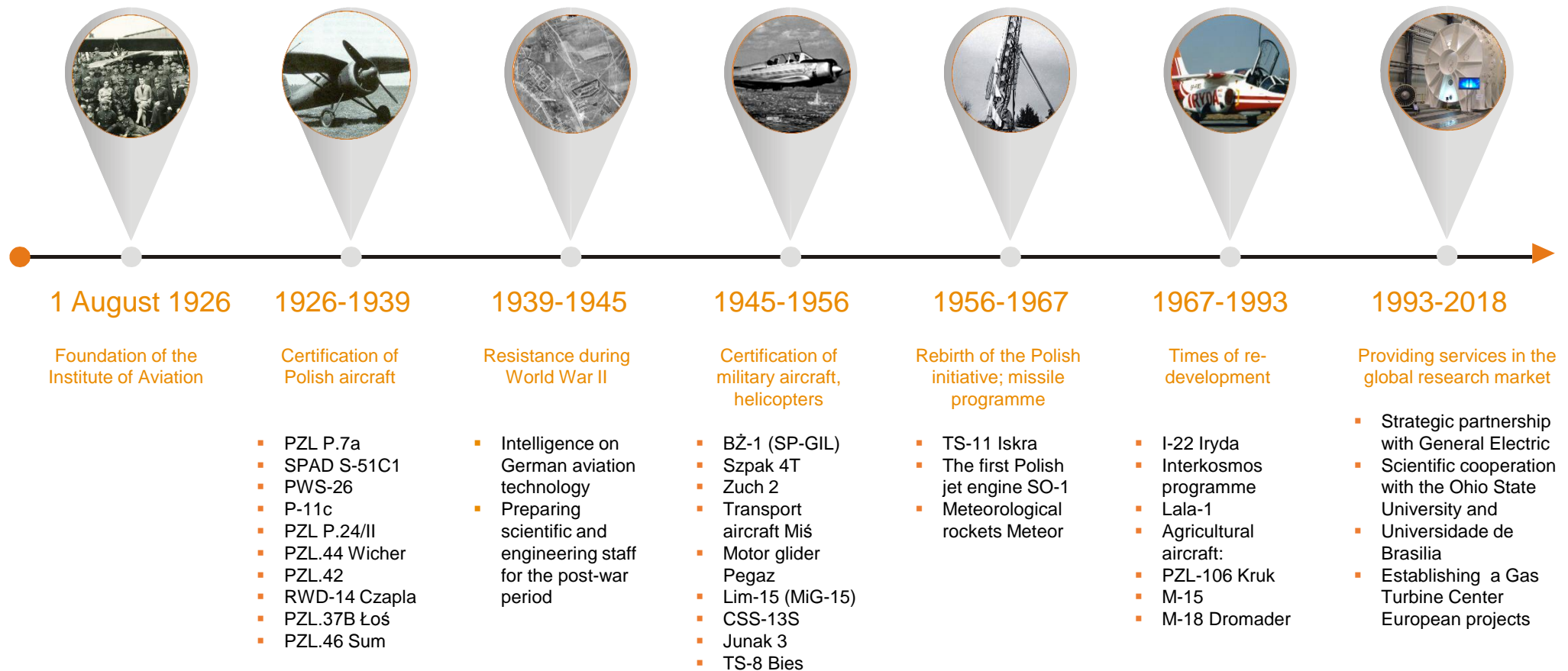
MISSION AND STRATEGY



The mission of the Institute of Aviation is to provide research services of the highest quality to companies worldwide.

The strategy is based on both stimulating and achieving active participation of diverse international scientific priorities. The Institute of Aviation continues and expands its research into all aspects of the aviation sector. We promote and implement research results and conduct educational activity through cooperation with institutions and organizations worldwide.

HISTORY OF SUCCESS

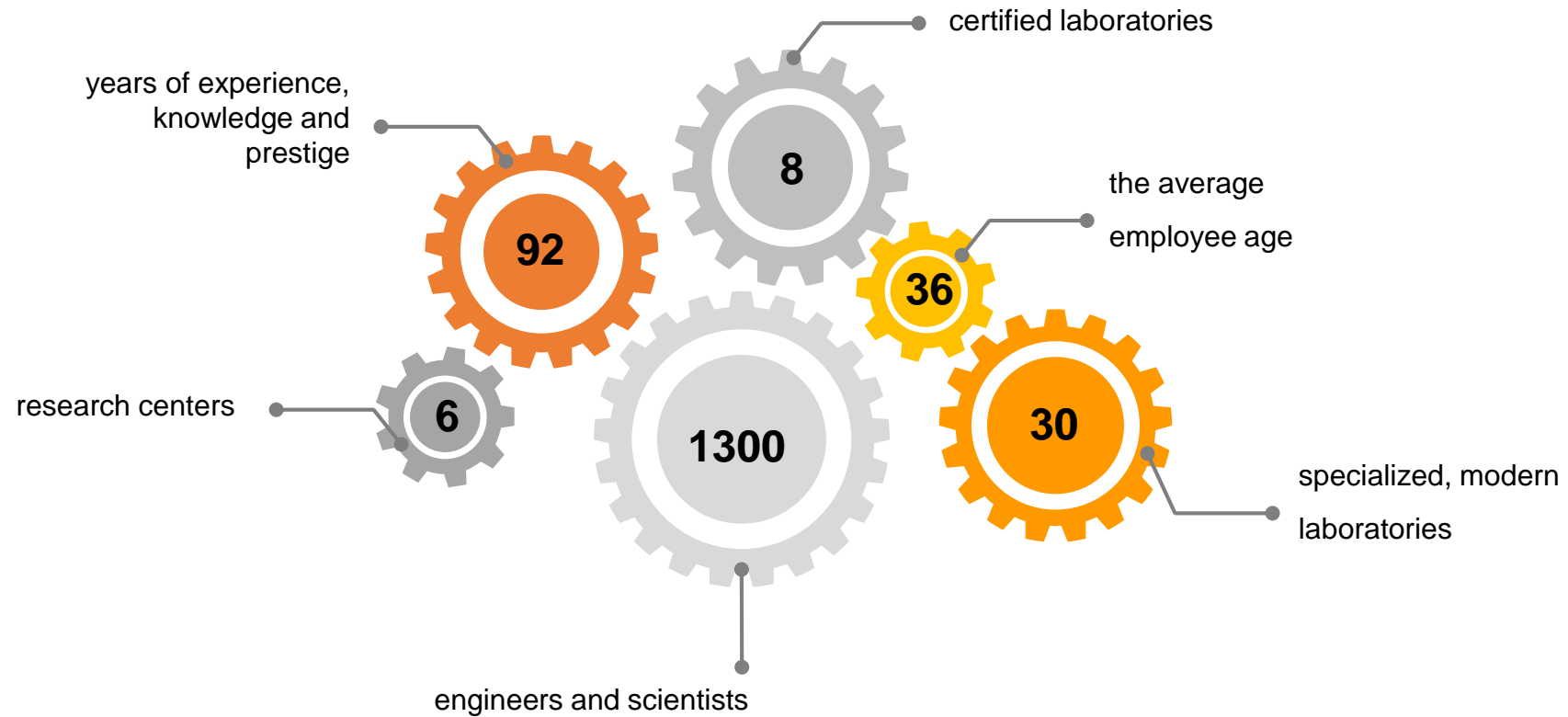


INSTITUTE OF AVIATION AT PRESENT

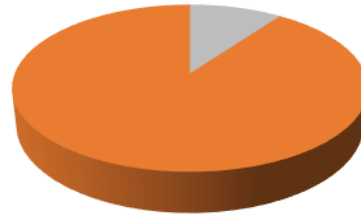
- Authorization to confer the academic degree of doctor of technical sciences in the field of construction study and machinery operation.
- Polish-American doctoral study in 2+2 Formula
- Polish-Brazilian Center of Excellence in Aviation and Space High Technology
- The Polish Wind Tunnel Cluster
- The Technological Support of Innovative Aircraft Project Cluster



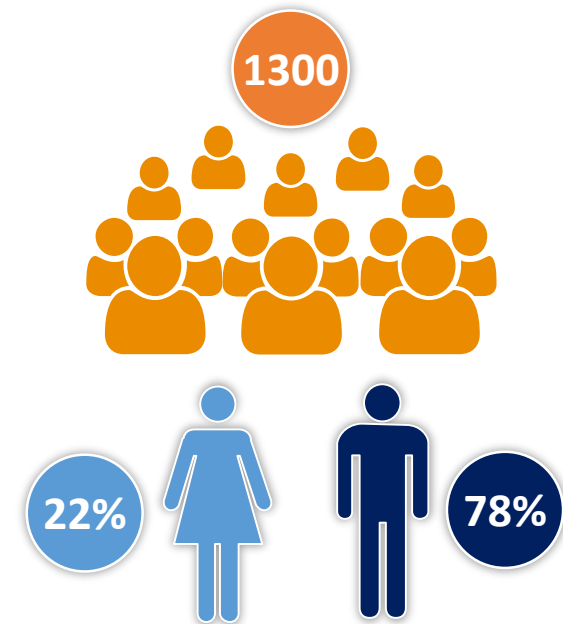
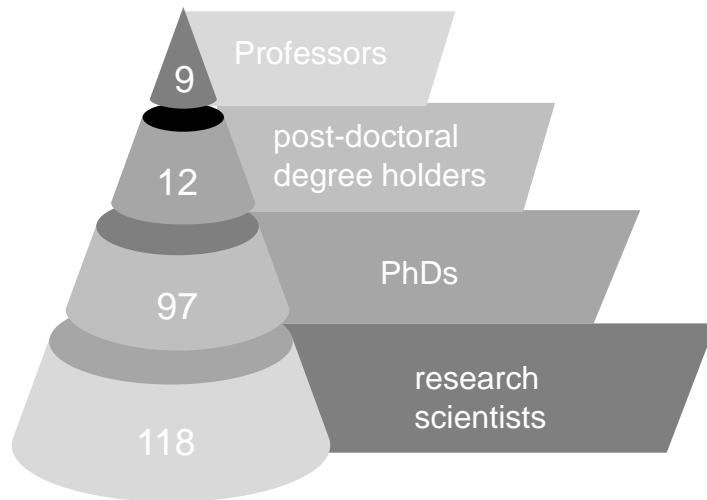
INSTITUTE OF AVIATION IN NUMBERS



EMPLOYEES



90% tertiary education
10% secondary education



INDUSTRIAL PARTNERS



SCIENTIFIC PARTNERS



INSTITUTE 4.0

- Industry 4.0
- Digital Science
- Digital Factory
- Cyber-Physical Communication
- Additive
- Digital Innovation
- Integrated Automation
- Intelligent Gripping Systems
- Internet of Things

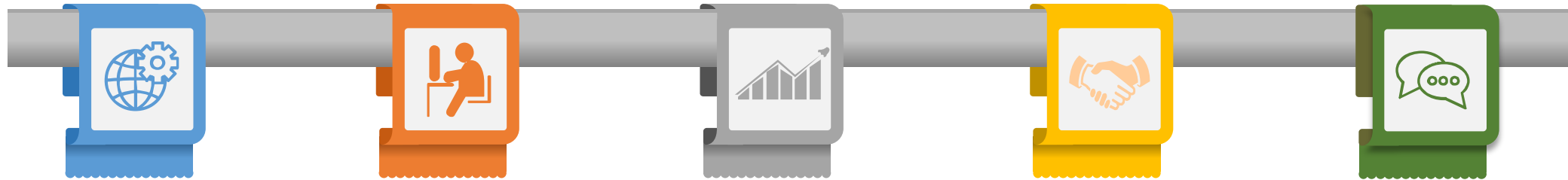


THE SCOPE OF ACTIVITY

- engines
- design
- aeroelasticity
- turbines
- energy
- transport
- rockets
- composites
- helicopters
- avionics
- equipment
- structures
- aerodynamics
- remote sensing
- space technology
- landing gears
- material tests
- UAV
- propulsion
- bearings



ACTIVITIES



TESTS

- tests of construction elements
- tests of structures under operating conditions
- material tests
- non-destructive tests
- aerodynamic tests
- engine fuels
- research and analysis of catalysts
- composite structures tests
- environmental tests
- rockets propulsion tests
- bearings tests
- high-pressure tests
- transport systems tests
- landing gears
- rockets
- measurement & research work on aircraft engines
- remote sensing tests

DESIGN

- measurement and computation support and services
- preparation of specimens
- CFD and experimental analysis
- design of aviation equipment
- design of metal structures
- design of composite structures
- design of technological equipment
- design and construction work on avionics
- design and testing of rocket propulsion

ANALYSIS, PROFESSIONAL EVALUATION, CERTIFICATION

- certification of aircraft
- flight dynamics analysis
- analysis of internal ballistics of rocket engines
- professional evaluation, research, aircraft equipment assessment
- development of forecasts and strategies for aircraft transportation developing
- quantitative and qualitative research on passenger and freight market

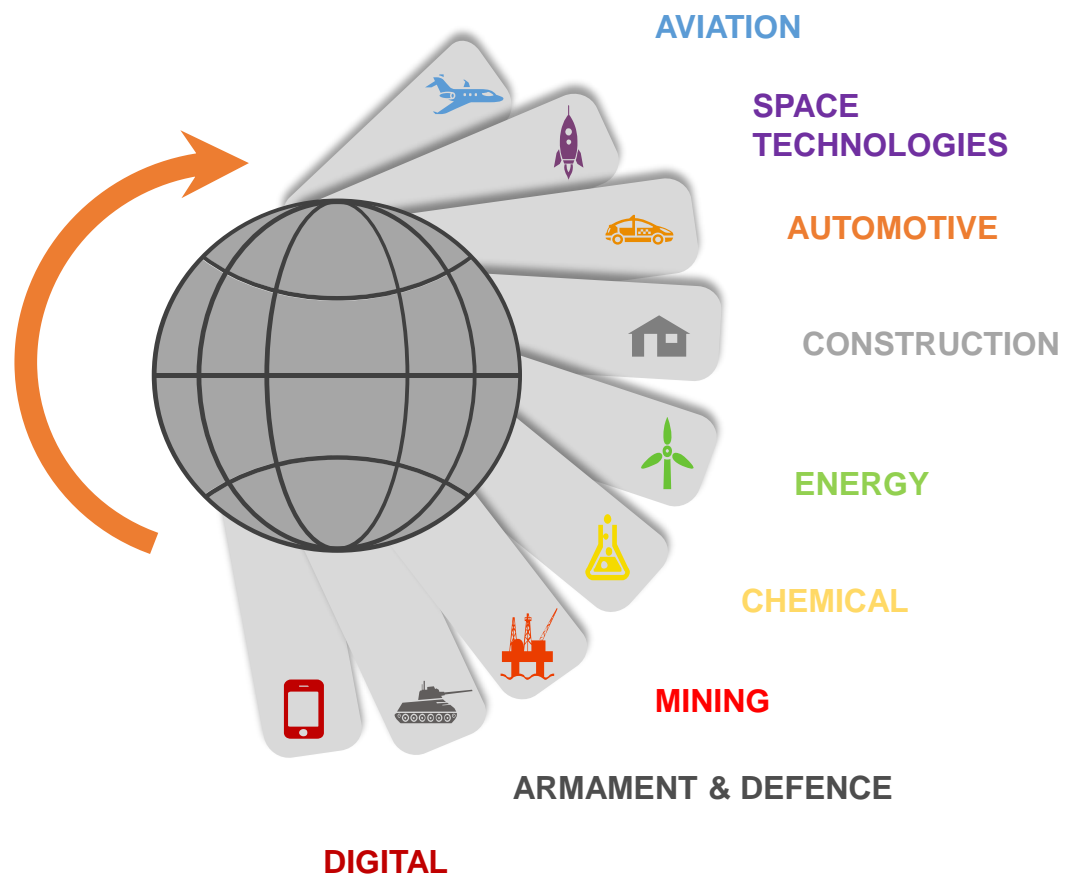
MANAGEMENT

- design and implementation of software, including the use of artificial intelligence in optimization, modeling and management of transport systems
- modeling and design of passenger and freight transport systems
- developing of safety and protection elements in aircraft transport
- organization and management of the aircraft design process and its optimization
- developing in-flight testing programs

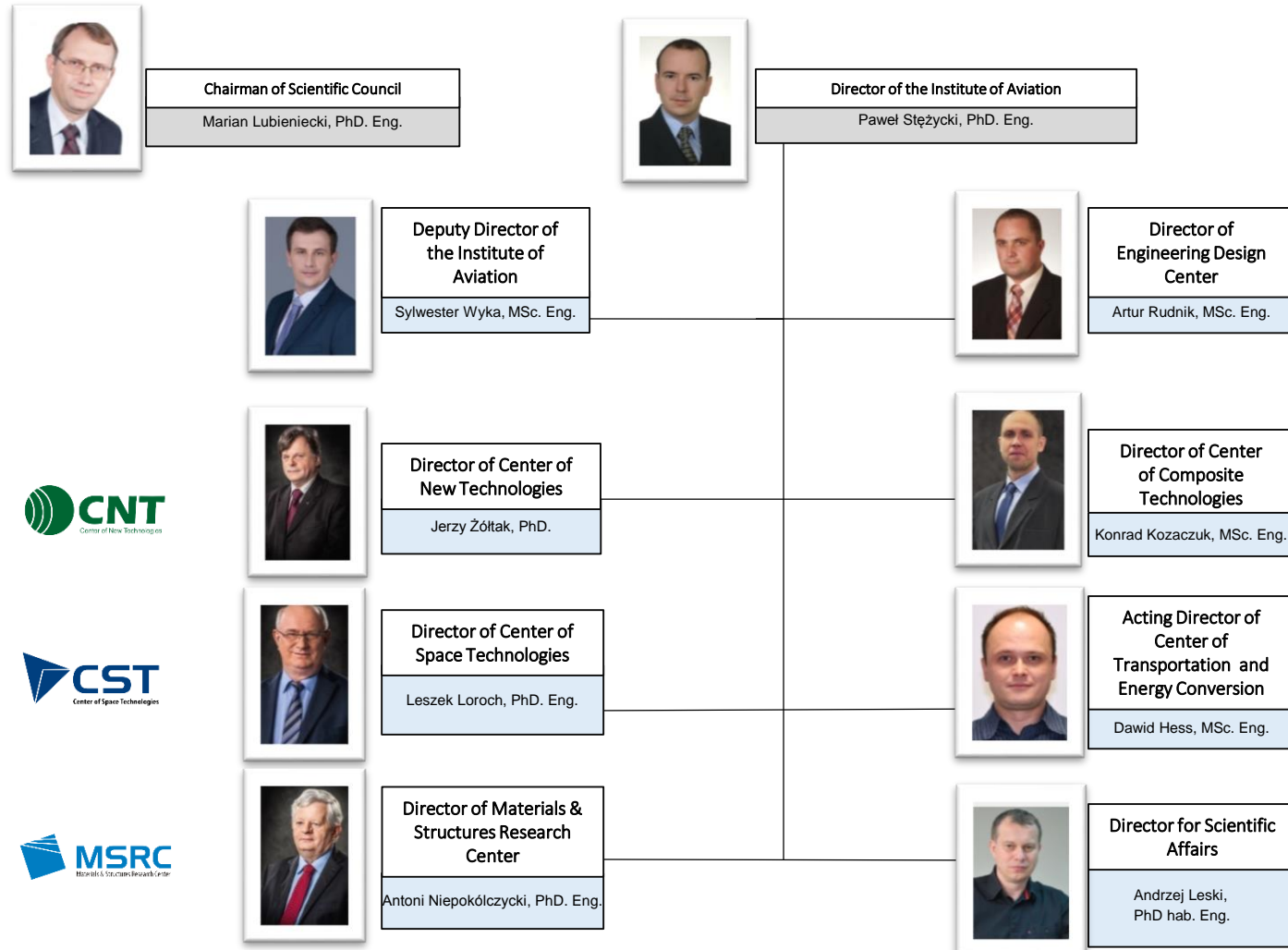
OTHER

- planning and execution of flights (UAV, manned)
- UAV positioning
- acquisition and processing of aerial photographs
- optimization of radio links

SECTOR STUDIES



ORGANIZATION STRUCTURE





CENTER FOR COMPOSITE TECHNOLOGIES

The mission of the Center for Composite Technologies of the Institute of Aviation is to deliver composite technology solutions and composite material tests to the aviation industry.



Composite Testing Laboratory

- Strength tests
- Fracture toughness tests
- Physicochemical tests
- Certification testing of composite materials according to FA9/CS25 standards



Composite Structures Manufacturing Division

- Technology development for composite components
- Forms and equipment preparation
- Non-destructive tests
- AFP (Automated Fiber Plcmt.)



Project Management Division

- Development of research projects
- FEM analysis
- Advanced composite materials
- Thermoplastic composite materials

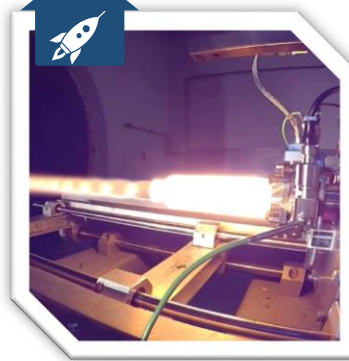
CENTER OF SPACE TECHNOLOGIES

The mission of the Center of Space Technologies is to conduct research in the field of space technology for the needs of their implementation by the national and international entities.



Aircraft Propulsion Division

- Safety testing for General Aviation
- Research of piston engines
- Engine dyno tests
- Research works on flows



Space Technologies Division

- Designing power systems of rocket engines
- Modeling injection and mixture formation
- Analyses of combustion processes
- Numerical simulations of rocket flight
- Development of software which facilitating the design process



Avionics Division

- Development and production of avionics devices and systems
- Design of measuring and diagnostic systems
- Installation of electrical systems on aircraft



Remote Sensing Division

- Collecting, development and processing of data from Earth observation systems
- Planning and implementation of both unmanned and manned aircraft flights for remote sensing
- Development and installation of aircraft equipment for remote sensing

MATERIALS & STRUCTURES RESEARCH CENTER

The mission of the Materials and Structures Research Center is to provide the highest quality material, structural and non-destructive testing services to our customers, as well as to be the leader in material, structural and non-destructive testing in Poland and all over the world.



Material Test Laboratory

- Material tests
- Material properties tests
- Preparation of specimens



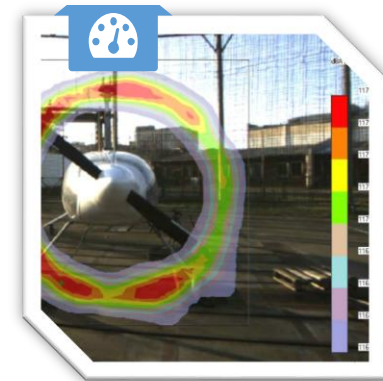
Non-destructive Test Laboratory

- Non-destructive tests
- Material properties tests



Structural Test Laboratory

- Tests of construction elements
- Measurement and computation support and services
- Operating condition tests



Vibrations Tests Laboratory

- Measurement and analysis of structural vibration
- Resonance research
- Acoustic measurements
- Aircraft flutter tests



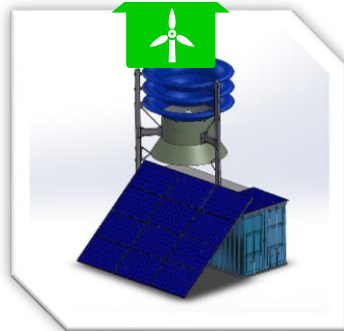
CENTER OF TRANSPORTATION AND ENERGY CONVERSION

The mission of the Transport and Energy Conversion Center is to provide R&D services in the area of energy conversion and energy accumulation technologies as well as R&D services in the field of transportation with special consideration to air transport.



Transportation Department

- Next generation vehicles
- Local vehicle management systems
- Landing gears and shock absorbers
- Energy efficiency of transport
- System and vehicle energy management
- Testing in the areas of consumption, static strength, dynamic strength and fatigue strength of landing gears, brakes and other structure elements.



Energy Conversion Department

- Conversion of renewable energy
- Conversion and accumulation of energy in aircraft
- Conversion and accumulation of energy in buildings
- Protection of electronic circuits against thermal overload
- Protection of objects against laser impulse strike



Landing Gear Laboratory

- Landing gear tests
- Brake tests
- Tests of other structural elements in terms of energy consumption, static strength, dynamic strength and fatigue strength, as well as functional and dynamic characteristics, and resistance to shock load



Unmanned Aerial Vehicle Laboratory

- SUDIL – antidrone platform



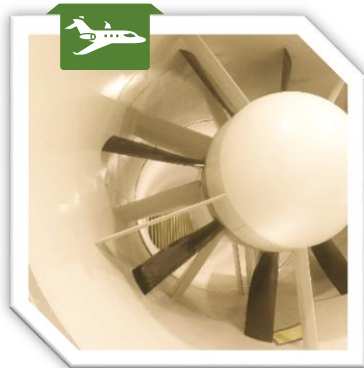
Medical-Support Devices Laboratory

- Medical devices for supporting rehabilitation
- Verticalizator for children



CENTER OF NEW TECHNOLOGIES

The mission of the Center of New Technologies is to provide R&D services to Polish and foreign companies to help their competitiveness.



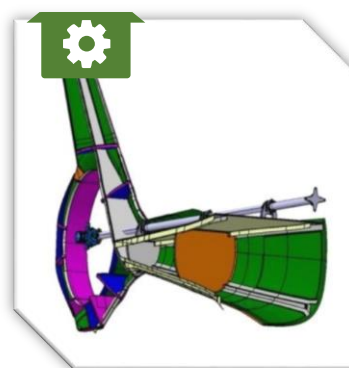
Aerodynamics Research Laboratory

- The largest low-speed wind tunnel in Central & Eastern Europe
- Unique power supply system with additional sources of compressed air
- Aerodynamic experimental studies of airplanes models, helicopters, turbo-ventilators, wind turbines
- State-of-the-art data collection and flow visualization system



Computational Fluid Dynamics and Flight Mechanics Group

- Computational systems for aerodynamic design, optimization and flow simulation



Aviation Structures Design Department

- Metal structures
- Composite structures
- Technological equipment
- Additional equipment for airplanes and helicopters



Transport Systems Department

- Strategies and market research
- System design
- Safety and security
- Design process management
- Technical and economic analysis
- Performance and endurance calculations
- In-flight testing programs
- Aircraft certification



ENGINEERING DESIGN CENTER

An engineering alliance between the Institute of Aviation and General Electric.



GE Aviation
(Aircraft Engines
& Aviation Systems)



GE Power



GE Oil&Gas



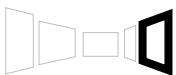
GE Transportation



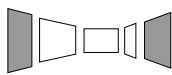
GE Additive



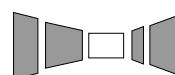
GE Digital



LPT Component
design support



LPT & Booster
Module ownership



Core Engine
IP ownership

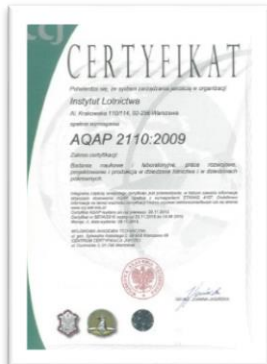
- from simple support through product life cycle to building Gas Turbine Center; to take over advanced tasks connected with Gas Turbines and Gas Engines – Jenbacher & Waukesha
- from easy tasks to entire engineering ownership to deliver trees, as well as manifolds and connections in the Lianzi project; Ghana project, NovaLT16
- new optimal soldering parameters in electric machines; new generators and engines, new analytical methods for design verification

QUALITY SYSTEM

The implementation of the Quality Management System guarantees that all the fulfilled work are planned, supervised and documented and that all the requirements agreed on under contracts are fulfilled and fully correspond with the client's demands.



ISO 9001:2008



AQAP 2110:2009

- AB 129 Aerodynamic Laboratory
- AB 131 Landing Gear Laboratory
- AB 132 Environmental Laboratory
- AB 792 Materials And Structures Research Laboratories
- AB 1489 Materials Technology Laboratory
- AB 1490 Composites Testing Laboratory
- AB 1491 Test Lab
- Alternative Procedures to Design Organisation Approval (ADOA)
- Production Organization Approval Certificate No. PL.21G.034 (Part 21)
- Maintenance Organization Approval Certificate No. PL.21G.034 (Part-145)
- Certificate of Quality Management System No. W-311/3/2016
- B – 003/2010 Concession of the Ministry of the Interior and Administration
- Achieving Competitive Excellence (Silver) United Technologies Corporation
- GE S-400 General Electric

LABORATORIES



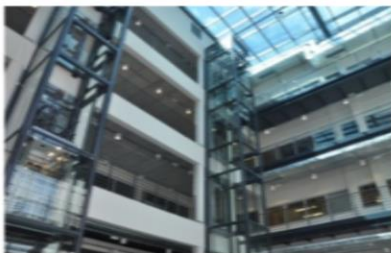
State-of-the-Art Equipment – Highly Qualified Research and Engineering Staff – Accreditation and Certificates – Customer-Oriented Environment – Knowledge-Based Methods – Quality of Research – Solving Customer Problems – Technological and Research Experience – Support – Innovative Solutions – Certified Laboratories – Knowledge - International Research Networks

INFRASTRUCTURE



- 12,52 ha – surface area of the Institute of Aviation
- 45 laboratory-office buildings
- The biggest company bicycle storage shed in Poland for 450 bikes
- 100 roofed places for bikes and motorbikes
- 2 parking areas for 2.000 cars
- 2 cafeterias
- Café

INFRASTRUCTURE



CORPORATE SOCIAL RESPONSIBILITY

Educational programmes

- The Diversity Charter
- The Justyna Moniuszko Scholarship
 - Support for student science circles
 - A Night at the Institute of Aviation
- Science Picnic of Polish Radio and the Copernicus Science Centre
 - Women in Engineering: EDC Academy
 - Fun Science
 - Young Explorers' Club

EDC Development and recruitment programmes

- Mentoring
 - Edison Engineering Development Program
- Talent Development Program
 - Licence to Lead



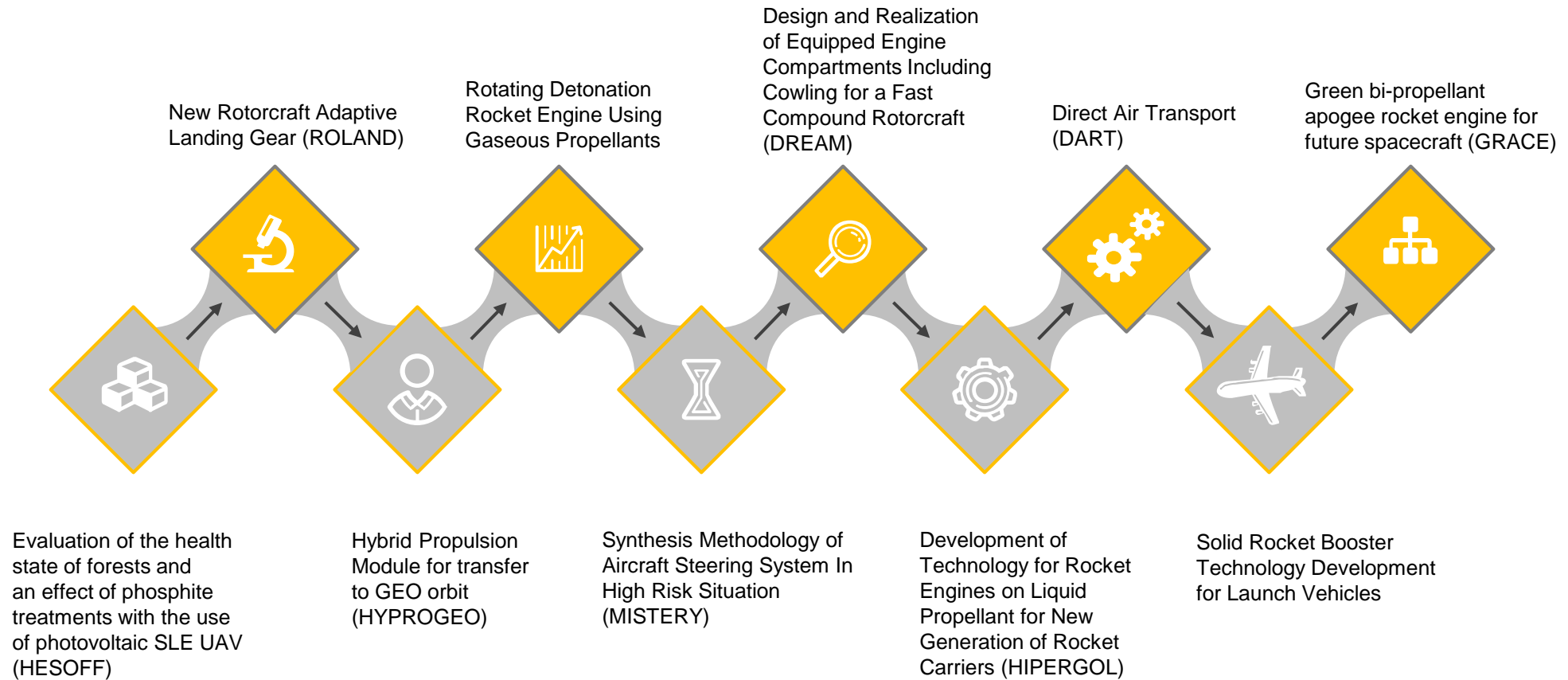
Integration programmes

- Institute of Aviation Run
- Aircraft Model Shop
- Family Picnic
- Charity actions: Donate by eating waffles, Reaching the clouds
- Free off-site tutoring
- Supporting the Social Welfare Center
- Meetings for seniors
- Aviation volunteering

EDC Employee initiatives

- GE Women's Network
- GE Volunteers
- GE Health Ahead: EDC Runners, EDC Bikers, EDC Volleyball, EDC Climbers, EDC Football, EDC Calisthenics, EDC Tennis, EDC Badminton, EDC Swimmers, EDC Squash

SELECTED RESEARCH PROJECTS



AWARDS AND DISTINCTIONS

- Gold medal with honors in EUREKA contest at the Brussels Innova Fair
- Silver Laurel of Innovation
- Polish Masters of Business
- Rear Admiral Xawery Czernicki Grand Prix
- First prize for the STARLET project at the Clean Sky Forum in Brussels
- Prize for achievements in inventions at the XXII Inventions Market
- “Pro Masovia” commemorative medal
- “Merited for Masovian voivodeship” badge of honor
- Medal of the Association of Polish Mechanical Engineers and Technicians
- “Fair Play Enterprise” title



ORGANIZATIONS MEMBERSHIP

International organizations

- European Research Establishment in Aeronautics (EREA)
- International Forum for Aeronautical Research (IFAR)
- European Science Society of Powertrain and Transport (KONES)
- Association of Industrial Hydraulics and Pneumatics
- International Committee on Aeronautical Fatigue and Structural Integrity (ICAF)
- Council of European Aerospace Societies - Aeroacoustics Specialist Committee (CEAS-ASC)
- The United Nations Organization (UN COPUOS)
- Institute for Dynamics of Explosions and Reactive Systems
- European Aeronautics Science Network
- North Atlantic Treaty Organization (NATO)
- International Space Science Institute
- Chinese Society of Astronautics
- American Helicopter Society International



Domestic organizations

- Polish Chamber of National Defence Manufacturers
- Polish Association of Aeronautics and Astronautics
- Association of Polish Aviation Industry
- Association of Polish Mechanical Engineers and Technicians
- State Commission on Aircraft Accidents Investigation
- Committee on Space Research of the Polish Academy of Sciences
- International Academy of Astronautics
- Centre of Advanced Technology "AERONET - Aviation Valley"
- Polish Society for Theoretical and Applied Mechanics
- Polish Solar Energy Society
- Warsaw Scientific Society
- Power Engineering Problems Committee, Polish Academy of Sciences



SCIENTIFIC PUBLICATIONS DIVISION



91 years of the Scientific Publications Division of the Institute of Aviation

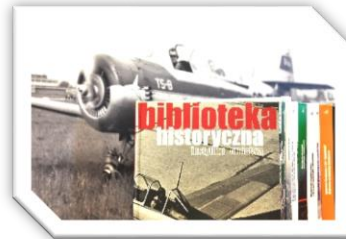
- International publications
- Indexation of scientific articles
- 7 publishing series
- Scientific & technical information
- Trade catalogues
- Technical library



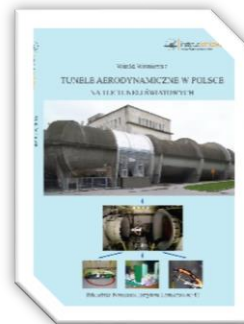
Aviation walk around Warsaw



*Scientific Library
of the Institute of Aviation*



*Historical Library
of the Institute of Aviation*



Wind tunnels in Poland



*Polish Plane and Color.
1943-2016*



*Sketches made before the
start. Drawings by Jan Sęk*

SCIENTIFIC JOURNALS

The Scientific Publications Division of the Institute of Aviation publish 5 scientific journals, including 3 on the list of journals scored by the Ministry of Science and Higher Education.



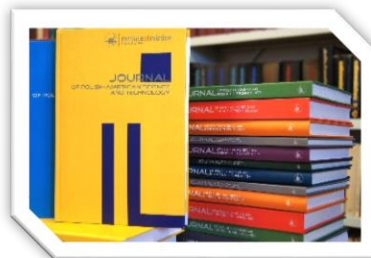
Transactions of the Institute of Aviation
9 points



Fatigue of Aircraft Structures
9 points



Marketing of Scientific
and Research Organizations
9 points



Journal of Polish-American
Science and Technology



Journal of Polish-Brazilian
Science and Technology



Thank you

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