



Engineering Design Center

Engineering Design Center (EDC) is an engineering alliance between General Electric Company Polska Sp. z o.o. and Institute of Aviation



Digital (r)evolutions, or let's digit-all

Social report 2016

Introduction

The Engineering Design Centre (EDC) is a joint initiative of GE and the Institute of Aviation. As the largest engineering design centre in Europe, we provide state-of-the-art solutions for the modern industry, combining the technological potential of our organisation with cutting-edge digital technologies. They are present in almost all the aspects of our activities and contribute to the transformation of business processes. There is no doubt that the use of such technologies requires changes not only in the technical realm but also in organisation, communication with employees and clients, as well as in education and competence acquisition.

By cooperating with GE and drawing inspiration from its activities and experience, we make use of tools that support the collection and analysis of data sets, or the so-called Internet of Things. We facilitate the flow of data between devices and develop software for data processing, analysis and presentation. Taking a leaf out of GE's book, we are committed to transforming our activities based on machines and solutions incorporating intelligent software, thereby allowing for better and more reliable communication. We are active in various areas, for instance in aviation (GE Aviation), including activities related to aviation systems (Aviation Systems) and software (Aviation Digital), in transportation (GE Transportation), in the oil industry (GE Oil & Gas) and in the power industry (GE Power).

Using the Predix digital platform (which is dedicated to industry and the industrial Internet of Things), GE Aviation delivers tools concerning technical issues of GE aero-engines. In GE Aviation Systems, we not only carry out projects related to cockpit software and systems, but also deal with the control systems of aero-engines, undercarriages and flight control surfaces. In GE Transportation, we are responsible for the automation of reliability modelling processes for locomotives worldwide. In GE power, on the other hand, like in GE Oil & Gas, we create software, statistical analyses and advanced event prediction algorithms that prevent failures of equipment. Because of the fact that the aviation industry is booming and cutting-edge solutions open up a large number of possibilities in the industrial sector, we have also appointed an independent

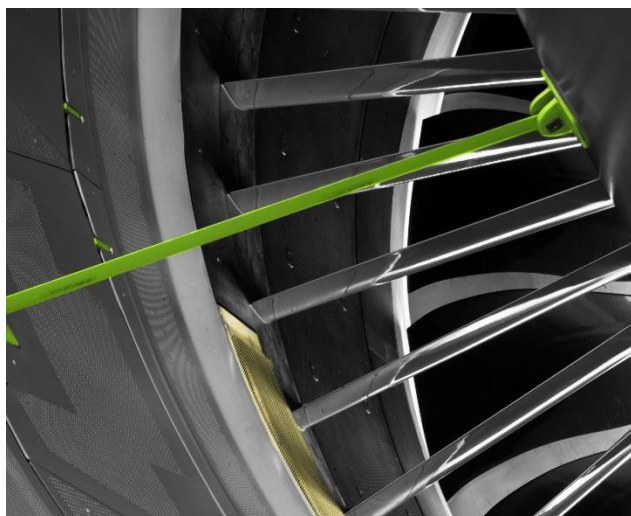
department, known as Aviation Digital, which concentrates on innovative solutions for the aviation industry.

Our Warsaw-based office is also focused on the development of 3D printing technologies. We have equipment for three-dimensional printing of components used in the aviation industry as well as in the energy and extractive industries. This technology facilitates and accelerates our operations related to the designing and manufacturing of prototypes. Moreover, it helps us integrate the hardware, dedicated software and high-quality materials. Thanks to the Additive technology, we have improved the precision and enhanced the quality of numerous time-consuming processes.

With the changing approach to designing machines and through the use of the latest digital trends in engineering, we are meeting the demands of this revolution and transforming our organisation internally. In 2016, we implemented new solutions not only in the engineering areas but also in the Support Departments (Administration, Finance, HR, Security, Business Trips). The streamlined flow of information makes it possible for us to more efficiently manage our documents – both those created within our organisation and the external ones. We have increased our performance level in such areas as registration and organisation of documents, their classification, sharing and archiving, as well as document workflow.

We treat digitisation as one of the ways to ensure reliability of our actions. Through our services, we would like to contribute to the common digital future and influence the technological paths of the world. Having sound groundwork and using our technological capabilities, we know that we are able to change reality.

Areas of the Engineering Design Centre's (EDC) activities



One of the areas present in the Warsaw-based Engineering Design Centre (EDC) is **GE Aviation**. Its activities involve designing, improving and supervising the production of components for jet engines used in civil and military aviation throughout the world. The engineers employed at GE Aviation work on advanced designs related to energy turbines used both in power plants and on ships.

Moreover, by using digital solutions such as special software from the Predix digital platform, the experienced specialists of GE Aviation solve technical problems of airlines using GE engines. Currently, GE Aviation produces nearly 40 types of engines (including GENx, LEAP, Passport 20, and Honda), which drive approximately 91 types of airplanes worldwide. In 2016, there was a reorganisation of the Warsaw-based GE Aviation involving a change of the business model. The new model proposed was intended to streamline such aspects as design supervision, management across the entire area and internal communication.

Additionally, in 2016, the engineers from the Warsaw-based GE Aviation continued their design works commenced in 2015 on the advanced turboprop engine, known as the ATP (Advanced Turboprop).

In quantitative terms, the EDC is the largest centre where this breakthrough engine is being developed. The innovativeness of ATP manifests itself in the cooled high-pressure turbine blades, the first in this class of engines, and many other parts, including critical load-bearing elements of the engine, produced by the incremental method (3D printing in metal). It is a major step forward in the field of turboprop engines. The total compression of 16:1 and the application of new technologies make it possible to lower the level of fuel consumption by 15-20% compared to the engines currently on the market. ATP will be the single drive of the newly manufactured Cessna Denali aircraft. As part of the ATP design process, engineers made use of the opportunity to create 3D drawings. As a consequence, the applicable engine model is the automatically updated

3D model, the so-called Digital Engine, where each engineer can keep track of how the existing parts combine with others as well as analyse the issues of assembly, tool access or inspections.

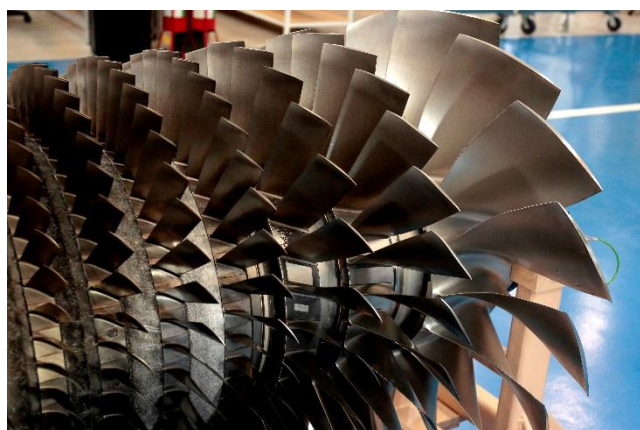
GE Aviation Systems has been part of the Engineering Design Centre for over ten years. It consists of Aviation Systems Mechanical and Aviation Digital. The former is involved in designing generators and electric power distribution systems, heat exchangers and de-icing systems. Moreover, engineers carry out design works on composite and metal aircraft construction components, propeller systems and engine nacelles, amongst others, for Airbus and Bombardier.

In the age of digitisation, the Warsaw-based area of Aviation Digital gained more prestige thanks to its experienced staff and unique solutions. It is mainly used by experts who carry out design works on systems and software – the development of technologies related to cockpit equipment (displays), but also on the control systems of aero-engines, undercarriages and flight control surfaces.

One of the key engineering projects in the area of Aviation Digital in 2016 was the commencement of works on the development of an open avionics platform, or the so-called technologically open cockpit. This platform will make it possible for producers of aviation instruments to create their own applications allowing to extend aircraft functions to hard-to-predict scenarios. Moreover, an open cockpit will significantly reduce the design costs of new aircraft and helicopters, lower the price of modernising aircraft electronics and allow for frequent updates to the platform's software. The avionics platform currently under development consists of numerous elements, including large-format touch screens, controls (e.g. keyboard, touchpad), data concentrators providing pilots with data from the entire aircraft, as well as the flight management system. An important role in this context is played by flight recorders, or the so-called black boxes, which record the aircraft's flight data and are designed to withstand crashes. The open nature of the solution which is being created by our engineers makes it possible to extend the list of component parts. It is planned that a modern cockpit of the 21st century will

make use of cutting-edge technologies based on pilot eye-tracking systems, gestures and voice commands.

Apart from advanced projects pertaining to the avionics platform, the Warsaw-based office is also involved in the development of technologies for transferring design documentation from 2D to 3D drawings as well as for using 3D printing techniques for prototyping and production of finished parts. These technologies lead to a significant increase in the amount of data generated in the production process, which are subjected to advanced numerical analysis. In order to develop state-of-the-art solutions, GE Aviation Systems combines its technological capabilities with new digital technologies. The future architectures of the processes of designing, manufacturing and using mechanical components will feature a fully digital flow of information, from the research and development phase, through design and manufacture, to the use phase. Such digital flow path, referred to as the Digital Thread, will consist of mechanical component models that transfer information – in a cascade-like manner – through the various phases of the development cycle. Such system will make it possible to analyse data throughout the process in order to find the reason behind specific behaviours of components triggered by causes in other phases. The construction and operation of such systems require the involvement of highly qualified personnel working in the area of software engineering, data analysis and mechanics with the use of cutting-edge, up-to-date and the most effective technologies, such as safe cloud-based data storage.



GE Power has been operating in the Warsaw-based establishment for ten years. It is made up of two areas, namely Distributed Power, specialising in piston engines, and the Gas Turbine Centre, concentrating on comprehensive design and service of all gas turbines present in GE's portfolio. On a global scale, GE Power is one of the biggest suppliers

of technologies and equipment for electricity production. The portfolio of its products

encompasses gas and gas-steam turbo units, the technologies for generating energy from renewable and nuclear sources, combined heat and power solutions for municipal and industrial applications, as well as coal gasification systems.

The Gas Turbine Centre combines, in a manner which is unique on a global scale, teams responsible for designing and servicing all gas turbines found in the GE portfolio. It supports Polish and international clients in the area of preparation and subsequent operation of whole turbo units (gas turbine, steam turbine, and generator). Within the Centre's infrastructure, there are laboratories for testing tools and developing new repair technologies, which – combined with the permanent cooperation with turbine design teams – allows to continuously prolong the service life of GE turbines and reduce the time needed to make necessary repairs. Presently, the Gas Turbine Centre is one of the most dynamically developing groups within the EDC, thus becoming a well-recognised brand name in the Polish power industry. This results in a constantly growing cooperation with leading technical universities, scientific institutes and clients, for the development of the entire sector. An excellent example of close cooperation between design and service teams is the design of the 9E.04 turbine. This offer by General Electric is aimed at both new clients and those wishing to improve their fleet of 9E turbines. The engineers at the Gas Turbine Centre were fully responsible for designing and supporting the production of the turbine module components, as well as for developing the service tools and repair processes. The design was all the more demanding due to the fact that a completely new concept of the four-degree turbine was developed in record time. The professionalism of the engineers from the Gas Turbine Centre has been appreciated by GE's priority client from Japan, who is already successfully generating energy on the first of the seven turbines ordered.

In the coming year, the Gas Turbine Centre will concentrate on one of the latest projects – the digital power plant – a series of solutions based on the GE Predix system, which are supposed to facilitate comprehensive inspection of all the operational parameters of a turbo unit, remote diagnosis of faults, and even safe control of its devices' operation from various platforms.

Within the Distributed Power business, there is a team of data analysts and programmers who create software, statistical analyses and advanced event prediction algorithms. By minimising the number of faults and forecasting their occurrence as well as maximising the lifetime of mechanical, electrical and electronic components, the engineers increase the reliability of the GE engine fleet, particularly the piston engines, and, as a consequence, improve the productiveness of our clients. Staying abreast of the digital revolution, the GE Power engineers hold meetings with clients from the local market in order to understand their needs in the context of the Internet of Things and develop actions aimed at addressing these needs. Through the use of cutting-edge solutions, we strive to digitally collect and process data from the sensors (e.g. piston engines) in order to form the basis for the necessary actions. The majority of the projects fulfilled in 2016 by the Distributed Power engineers originated from the Digital Thread initiative, based on the automation of processes and activities in the engineering portfolio. One of the key projects was the programme for developing analytical algorithms for Waukesha engines. This programme offers a wide range of configuration options for this engine line with the possibility of monitoring and registering oil durability, as well as mapping exhaust gas temperature and inlet air pressure. Moreover, it helps to optimise the work of compressor stations and predict events on the engine. Another task undertaken by the engineers in 2016 was the project for optimising the preliminary combustion chambers in the Jenbacher type 6 engines. This was a pioneering project in the area of three-dimensional printing technologies and automation of tools for component optimisation. As a result of the actions completed, the components were tested in the fourth quarter of 2016 directly on the engine at the client's site, thereby considerably improving the performance and durability of the individual engine parts. Our plans for 2017 include the digitisation of activities using the GE Predix operating system, the expansion of product-related knowledge and exposure to clients both in Poland and abroad.



The Engineering Design Centre is also one of the key branches of **GE Oil & Gas** in the world, and our engineers participate in the company's most significant global projects. GE Oil & Gas is the world leader in advanced production and service technologies in all segments of the oil industry, providing integrated solutions in the area of products and services for oil and gas exploration and production, the fuel and energy sector, as well as the chemical sector.

Moreover, in the age of industrial digitisation, GE Oil & Gas introduces innovative solutions in the control systems and software of its devices, creating state-of-the art equipment – monitored, analysed and adjusted in real time. The activities related to digitisation are focused on the automation of design and manufacture processes, the optimisation of structures by predicting the behaviour of machines in operation, as well as the optimisation in the area of necessary overhauls in the lifetime of the devices based on the analysis of a given machine's operating history. The EDC engineers from the field of GE Oil & Gas promote the trend of replacing 2D drawings with 3D models in the device design process, producing parts by means of state-of-the-art technologies, including 3D printing techniques, and using software – including that on the Predix platform – for even better data analysis. In 2016, they continued their work on the development of the innovative NOVA LT gas turbines. The innovativeness of these drives manifests itself in the application of aviation-derived low-emission combustion chambers and their compact design allowing for quick assembly and start-up. The additional advantage of these gas turbines is the unique combination of operational reliability and flexibility typical of industrial machines with the high efficiency of aircraft turbines. The gas turbines designed by the O&G team of constructors are manufactured in an international environment and with the use of state-of-the-art tools and design processes. Our engineers participate in the entire design process: from the conceptual work, through the modelling process, calculations of strength, flow and heat

exchange, to the preparation of final technical documentation along with participation in the testing phase. Moreover, they significantly support the production and supply chain processes, as well as take active part in talks with clients who represent the markets of energy, transportation as well as oil and gas product processing in Poland and neighbouring countries. This way, they support the commercial processes, sharing with the clients their subject-related knowledge on installation and maintenance service of the machines from our portfolio, while implementing the clients' expectations in the continuous process of product improvement. In 2016, GE Oil & Gas provided services to clients in more than 140 countries worldwide. The commitment of EDC engineers to this multidimensional cooperation results in the expansion of prospects and enhancement of cooperation efficiency between the business and science worlds.



Energy Connections has been part of the EDC since 2014. The engineers from the Power Conversion Rotating Machines team cooperate with numerous engineering offices and factories worldwide, especially from England, France, Brazil and Canada. They deal with designs concerning the transmission, distribution and conversion of electricity by ensuring secure, reliable and effective solutions for the energy, maritime, extractive and mining industries. Moreover, building on their knowledge and extensive experience, they design synchronous and induction electric motors as well as power generators.

In 2016, the engineers from Energy Connections worked on the design of a prototype generator, Jenbacher B170V6, with a power of 10.5 MW, operating on a common frame with the GE J920 diesel engine. The design was created for the purposes of the GE Power business in cooperation with GE Energy Connection in Rugby (Great Britain). The engineers designed a new generator with complete technical documentation encompassing 2D documents (engineering drawings) and 3D models. A series of mechanical analyses were conducted to verify the strength

requirements (static and dynamic analyses), accompanied by flow analyses. The design involved the work of 22 engineers, with ten of them being responsible for the design documentation, another ten focusing on mechanical analyses and the remaining two conducting flow analyses. The prototype design was developed within 7 months. Batch production is estimated to amount to 50 generators per year.



The EDC and **GE Transportation** began cooperation in 2007, while the independent Transportation business was established within the Warsaw-based EDC in 2016. GE Transportation is the leader in the field of technology and the supplier of equipment, services and solutions for the railway, mining, maritime and drilling industries. Its engineers provide support in the area of locomotive reliability modelling for the purposes of long-

term service contracts. Furthermore, they provide IT tools and automate reliability modelling processes. The GE Transportation team within the Engineering Design Centre is also in charge of implementing designs in the area of prediction algorithms for preventing locomotive failures and facilitating preventive measures in order to increase the fleet working time. The combination of engineering knowledge and the analytical skills of experienced engineers contributes to the creation of an efficient, productive and reliable rail ecosystem worldwide. In 2016, GE Transportation took the initiative to expand and transfer analytical tools to the Predix platform. The purpose of this idea is to deliver up-to-date analyses concerning reliability modelling in a more precise and quicker manner. At the same time, the team is creating a system for supporting early detection of unexpected trends, which will make it possible to enhance the quality of our product and maintenance services. The ability of early detection of risks not only enhances client satisfaction but also helps both the client and GE to reduce the fleet maintenance costs. The applications built in the Predix environment allow for more agile optimisation of the planned

replacements of key components, which is aimed at ensuring the availability (continuity of operation) of our products.

The laboratories of the Engineering Design Centre

The cooperation between the Institute of Aviation and General Electric manifests itself in the creation of the most modern plants and laboratories in the world for the needs of the EDC. Our R&D infrastructure, qualified personnel and broad portfolio place us amongst the top research institutes in Poland and Europe alike.

The **Pressure Test Laboratory** specialises in pressure and temperature tests of GE Oil & Gas products (particularly for underwater technologies), participating in the launching of new products, supporting the product lines launched and offering sales support. It is one of the three facilities in the world where engineers – using professional equipment – are able to conduct the tests for the aviation and energy industries as well as carry out approvals of devices and products used in the extractive industry and in the oil and gas processing industry.

The **Materials Technology Laboratory**, with its seat in the Warsaw-based EDC, is one of the best-equipped research facilities in Poland and the European Union. The laboratory primarily specialises in damage-oriented analyses of commercial engines, gas turbines, steam turbines, reciprocating compressors, wind turbines and coating elements (for GE Aviation, GE Oil & Gas and GE Power). It is equipped with modern high-end devices which not only ensure optimum parameters needed for its analyses but also comply with all Health and Safety requirements (in terms of both employee and environmental safety). The laboratory has a complete set of equipment necessary for the entire process of analysis, from preparation of test samples, through a whole series of microscope-based analyses, to hardness analyses. Additionally, it is equipped with devices for non-destructive testing. The laboratory has been accredited by the Polish Centre for Accreditation (Accreditation Certificate of Testing Laboratory No. AB 1489) according to the requirements of PN-EN ISO/IEC 17025:2005 for selected test methods.

The **Avionics and Digital Systems Laboratory** was founded in 2015. It specialises in functional research on avionics equipment and systems, as well as their testing, verification and validation. Detailed tests are performed with the use of modern oscilloscopes, multimetres, generators, interface cards for data communication protocols and signal amplifiers.

The **Educational Engine Laboratory** is equipped with the CF6-80C2 and CFM56-7 turbojet engines used for propelling large passenger aircrafts, the CT7 turboprop engine for propelling civil and military helicopters and short range passenger aircrafts, as well as the GE J85 and PZL K-15 for combat aircrafts. It is the venue for numerous theoretical and practical training workshops, which make it possible for engineers to develop their skills and knowledge in the field of aviation. Moreover, employees have access to display cabinets with miscellaneous aero-engine components, audio-visual equipment with didactic materials for engineers, and special instruments for the technical inspection of engines, their disassembly and operation.

The equipment of the **Bearing Test Laboratory** makes it possible for our engineers to test not only aviation bearings, but also gear boxes, oil-air separators, mechanical seals, as well as non-aviation parts and systems. Moreover, the laboratory is used for conducting endurance and functional tests on objects rotating at a speed of up to 22,000 r.p.m. A highly-advanced data acquisition and steering system makes it possible for the engineers to conduct tests in manual or fully automatic mode, at the same time registering such parameters as temperature, speed, pressure, vibration, flow rates and tension, at a sampling rate of up to 25 kHz.

The **Heat Transfer and Fluid Mechanics Laboratory** was established at the end of 2016. It is the only place in Poland and one of few of its kind in Europe which, using cutting-edge measurement methods, carries out comprehensive research work focused on the development of technologies related to the cooling of turbine engine components designed for both aircraft and industrial applications. It houses a state-of-the-art test and measurement base, which is unique on a national scale, with two measurement stations that can work in manual control and fully-automatic modes, ensuring multiple-stream power supply to the measurement stations. The

high-class equipment of the laboratory makes it possible for our engineers to register the precise measurements of numerous parameters, such as temperature, humidity, pressure, flow rate, speed and three-dimensional level of turbulence. The laboratory carries out research, amongst others, in the areas related to the so-called Film Cooling and Impingement Cooling. Since the beginning of its operation, the laboratory has been active in establishing contacts and cooperating with other laboratories both nationally and internationally, including laboratories from Italy, Germany and the United States.

The **Control Systems Laboratory** launched its activities in the Engineering Design Centre as a test centre for the Subsea Controls departments in GE Oil & Gas. It subsequently expanded its services to other areas of the sector as well. The laboratory is equipped with several test stations for the development of software and performing compliance tests, often in the presence of clients. The engineers in the laboratory also deal with measurements and development of equipment for the production of oil and gas from the ocean bottom – such as the Subsea Electronics Modules (SEM), communication modems, supply devices, etc.

The **Controls Laboratory for Gas Turbines** was formed to meet the needs of the Distributed Power department from the Power business. It contains both controllers designed for gas turbines and standard industrial controllers adapted to these types of applications. The laboratory is mainly used for the simulation, development and technical support of applications, communication interfaces and control sequences implemented in the software of gas turbines. The simulation stations are based on engine software models and on the particular subsystems supporting its operation. Therefore, I/O modules are not required.

Vacuum chamber in the EDC

The vacuum chamber used in the Pressure Test Laboratory has a diameter of 6 metres, a length of 11 metres and its total weight is 177 tonnes. The testing station is also equipped with an electric motor with a peak power of 6.3 MW and vacuum pumps that reduce the internal pressure below 1 mBar. These parameters make the chamber a unique facility not only in Poland, but also

on a European scale. The chamber serves as a simulator for verifying a wide range of rotors for civil aircraft engines. It is used by our engineers to test their solutions concerning aero-engines, including larger ones currently produced by aviation companies.

Thanks to the constantly expanding infrastructure of the Engineering Design Centre and the increasing portfolio of services, the engineering teams of the Warsaw-based EDC office cannot only get involved and fulfil global ventures in various sectors of the heavy industry, but also gain the necessary professional experience, enhance their own skills and develop the Polish engineering concepts.

Gas Turbine Centre

The Gas Turbine Centre is a modern research and design centre at both the European and global level, which specialises in repairing all types of gas turbines. With its total cubic volume of 51,288 m³, the building consists of many rooms. The Assembly Hall (400 m²), equipped with two double-gantry cranes with a lifting capacity of 50 tonnes each, houses a gas turbine simulator which is used for verifying a wide range of instruments and developing repair methods related to cold pressure welding. Next to this hall, there is also the Repairs Hall, equipped with processing machines, cutters and a coordinate measuring machine (CMM). In the Innovation Workshop, our engineers have access to a 3D printer, which allows them to quickly and inexpensively create any prototypes, mock-ups and component parts. The building has been designed to provide all specialists and experts working in the centre with their own offices and allow them to easily use all the equipment available.

General Electric (GE)

General Electric is a company of a long-standing tradition, dating as far back as the 19th century. It was founded in 1892, following a merger of two enterprises, namely the Edison Electric Light Company, managed by Thomas A. Edison, and the Thomson-Houston Electric Company, run by

Charles A. Coffin. General Electric was created to meet the most important global needs in the field of energy, medical and transportation infrastructure, consumer technologies and financial services. GE's creative approach to business and its organisational culture makes it a world leader in numerous sectors, catering to the specific requirements of clients worldwide.

Thanks to specialised employees, services and top-shelf technologies, GE speaks the industrial language, shapes new rules of competition for companies worldwide and shows other organisations – irrespective of their size, complexity or history – how to make progress.

The Institute of Aviation (ILOT)

The history of the Institute of Aviation dates back to the early days of Poland's independence. However, it officially commenced its activities on 1st August 1926. Since its beginnings, the Institute of Aviation has established contacts, which have helped to develop and export Polish technological concepts abroad. It has continued in this spirit for more than 90 years, participating in the research of nearly all Polish aero-structures.

The Institute of Aviation is currently an institution specialising in the performance of top-quality research that provides solutions to the problems of contemporary aviation and the space industry, not only in Poland but also worldwide. The Institute stays in close cooperation with the world's leading players in the aviation industry, such as General Electric, Airbus, Boeing, and Pratt and Whitney. Thanks to over 16 years of cooperation with General Electric – one of the world's largest corporations, under the name of Engineering Design Centre, the Institute carries out research for other sectors of the economy as well.

By cooperating with technical universities, scientific institutes, R&D units, knowledge transfer centres and industrial organisations, both in Poland and abroad, the Institute of Aviation also makes it possible to utilise the achievements of top-class scientists and participate in international projects not only in the field of aviation.

By investing in the development of its staff and scientific-research infrastructure, the Institute of Aviation is consistently committed to achieving the position of one of the best research institutes in Europe and maintaining competitiveness on the global research market. The Institute of Aviation encompasses six professional sections, as well as over 30 well-equipped and specialised laboratories.

CSR at General Electric – an address by Marian Lubieniecki – President of the Management Board at General Electric Company Polska Sp. z o.o.



Ladies and gentlemen!

Since the very beginning, the EDC was a unique place, combining the energy for engineering explorations with loads of scientific creativity. Over the last fifteen years, we have transformed it from a small-sized organisation with all the features of a start-up into a large technological centre encompassing numerous experts, recognised both in Europe and within the global network of technological centres. The year 2016 brought us to a stage we have been bracing ourselves for since the early days of the EDC – it is high time to share

what we have created.

The EDC of 2016 is a local organisation in all aspects. We have strengthened our cooperation with Polish technical universities to jointly build the potential of our national engineering. We have opened ourselves up for broader cooperation within Poland and the region, with both science-research institutions and industry-based organisations. We are lucky to have the Institute of Aviation as our partner, supporting us in those activities and giving us access to its unquestionable scientific potential.

The achievements and experience of our engineers since 2000 have created a unique base for the development of state-of-the-art technologies and involvement in innovative engineering areas. The EDC develops incremental technologies both conceptually and in designs for specific applications. This is where the advanced turboprop engine is produced, innovative solutions for low-emission combustion chambers of gas turbines are developed, repair and maintenance methods for heavy-duty turbines are improved, and the open avionics platform is being created.

The year 2017 will surely be a challenging time for us. One of our ambitions is to combine the continuous development of our centre with the support for technological innovativeness of Poland and the region. We believe that the strength of Polish engineering will be our strength.

Marian Lubieniecki

EDC Site Leader

President of the Management Board at General Electric Company Polska Sp. z o.o.

CSR at the Institute of Aviation – an address by Witold Wiśniowski – Director of the Institute of Aviation



Ladies and gentlemen!

In 2016 the Institute of Aviation celebrated its 90th anniversary. We are the first research institute in Poland to have celebrated its jubilee under the honorary auspices of the President. This is an important and honourable distinction for our multigenerational community, which has served the country with its knowledge and skills since the very beginning. In this special year for us all, we have proudly supported scientific, historical, social, educational and sporting activities.

The jubilee year has been inaugurated by launching one of our key investments in recent years, namely the Gas Turbine Centre. The Institute of Aviation has obtained a unique research and development (R&D) centre – not only on a national but also on a European scale – in terms of new repair technologies for all types of gas turbines.

The crowning event of the jubilee celebrations was an exhibition and presentation of the achievements of the Institute of Aviation, accompanied by a Gala and Grand Jubilee Ball. Together with our Polish and international guests, we celebrated our contribution to Polish and global

aviation. During our joint celebration, special state awards were presented to the Institute of Aviation's employees who have special merits and outstanding scientific achievements.

This year was full of many other events for all of us. We hosted a meeting of the directors of European research institutions, with whom we have jointly debated on the future of research and innovation in the area of aviation and cosmonautics. We once again had many distinguished guests at our two flagship international conferences – the Polish-American and the Polish-Brazilian Conference on Science and Technology. We have also organised highly popular meetings for women, thus encouraging them to study and take up work in engineering professions.

We have also presented our achievements in the form of historical exhibitions and numerous publications. In addition, our promotional activities included creating a special jubilee calendar, co-organising a charity campaign for children from indigent families, fun and games with science for children and teenagers, meetings for aviation seniors, occasional aviation postcards issued by Poczta Polska (the Polish Post) and designed by children from all over the country, classes for students of the aviation class, and many more. Our popular science event known as "Night at the Institute of Aviation" was once again visited by a record number of participants, amounting to 30,000. For the third time, we invited runners from all over the country to participate in the "Run of the Institute of Aviation", which every year offers new attractions for both young and older participants.

We have concluded the 90th jubilee celebrations with a sense of great legacy created by our multigenerational achievements in science and research. I hope that we will continue in this spirit for decades to come.

Associate Professor Witold Wiśniowski Eng.

Director of the Institute of Aviation

General financial data for General Electric Company Polska Sp. z o. o. and the Institute of Aviation

Data in PLN '000 for General Electric Company Polska Sp. z o.o.

Specification	Year 2016	Year 2015
Balance sheet total	202,832.5	165,731.8
Equity	135,156.2	126,513.2
Revenue on sales	250,730.8	295,375.7
Gross profit	11,175.5	32,782.3
Net profit	8,642.9	26,107.5
Employee costs	173,959.4	192,564.5
Number of employees	1,065	1,069

Data in PLN '000 for the Institute of Aviation

Specification	Year 2016	Year 2015
Balance sheet total	462,271.1	426,531.4
Equity	152,447.5	113,360.5
Revenue on sales	244,907.4	263,533.1
Gross profit	51,358.2	40,034.8
Net profit	50,501.1	39,359.3
Employee costs (payroll and supplementary payroll with mark-ups as well as employee funds)	139,908.1	135,103.8
Number of employees	1,256	1,213

The execution of CSR projects in the EDC in 2015

Business ethics in the EDC

Current legislation is presenting us with increasingly more challenges. The constant maintenance and strengthening of the corporate system and the Compliance culture in the EDC constitutes an integral part of the policy in force at all the GE entities worldwide. It is based on the requirement for compliance with legal provisions, as well as GE's internal regulations and rules. Clearly specified rules support our employees in their daily duties, thereby helping them increase global and local awareness and responsibility. The rules of conduct in the EDC are treated as an integral part of our organisational culture and as a guide on which our decision-making processes are based.

The scope of the business ethics in the EDC encompasses the issues regulated by the GE code of ethics, namely "The Spirit & The Letter". They include, in particular:

- protection of information and intellectual property;
- export control;
- counteracting conflicts of interest;
- business ethics;
- equal employment opportunities;
- vouchering.

Since 2015, compliance with procedures in the EDC has been supported by the EDC Compliance Community – a team of specialists dedicated to particular areas and issues. They perform their tasks by using the support and knowledge of their colleagues from other teams operating within GE organisations worldwide.

Another key pillar of the EDC's business ethics is the open reporting policy implemented across all GE entities. It involves providing employees with access to a series of channels for internal reporting of violations observed, as well as any comments and questions regarding compliance with the law and GE corporate requirements.

The solutions adopted under the EDC business ethics are communicated to employees mainly through training sessions, the weekly news bulletin, posters, the EDC TV, dedicated intranet websites, including the “EDC Compliance & Export”, as well as meetings with the above-mentioned team of specialists.

The team of experts in business ethics also conducts thematic reviews of individual areas, aimed at streamlining the processes occurring in our organisation. The efficiency of the EDC’s business ethics additionally involves regular corporate inspections performed by external GE auditors.

Opportunities for talent – recruitment and employment in the EDC

Talented and experienced people are our key to success – they bring their extraordinary skills and commitments to the company, drive the growth of innovation, and provide creative solutions.

The recruitment and employment processes in the Engineering Design Center are carried out responsibly, in accordance with clearly specified procedures. We focus on ensuring a pleasant atmosphere during our recruitment meetings and providing post-recruitment feedback. We guarantee confidentiality and security of the data of all candidates applying for work in our Warsaw-based design centre.

We carry out two types of recruitment, internal and external. The former encompasses all the employees of our organisation, irrespective of their position. Through internal recruitment, we strive to present to our employees all the available forms of professional development and the possibilities of changing their career paths (horizontal and vertical promotions). The job offers within our internal recruitment process can be found in the weekly news bulletin, as well as on the intranet websites, available to all interested parties.

External recruitment, on the other hand, is addressed to candidates from outside of our organisation. By participating in job fairs, publishing adverts on our website at www.edc.pl and

the largest job portals, as well as directly contacting individuals inactive on the job market, we try to reach the widest and most diversified group of talented people with unique qualifications. We actively participate in job fairs, which allows us to meet job-seekers face to face. It is also a great opportunity to observe the current trends and needs of potential employees in the aviation, extraction and energy sectors. Moreover, we participate in meetings organised by higher education institutions. In 2016, we were present at the Kraków University of Technology, the AGH University of Science and Technology in Kraków, as well as the Mechanical Faculty of Energy and Aviation of the Warsaw University of Technology. Such meetings are for informational and recruitment purposes only, and allow candidates to become familiar with the expectations of their future employers. Moreover, they offer students an opportunity to learn about current internship offers or vocational training programmes. While attending the events at the universities we encouraged students to take part in our recruitment projects:

- Edison – intended for young and talented people, who are just starting their engineering career;
- Electrician Engineer – due to the need of one of our companies to employ engineers with experience in the electrical industry.

In 2016 we participated in three nationwide conferences:

- Problems in Operating Machines and Electrical Drives, organised by the Institute of Electrical Machines and Drives KOMEL;
- AngularJS, where we presented the Aviation Digital team and the latest technological solutions – the Predix digital platform;
- CodeEurope – the largest programming conference in Poland, where we promoted our brand amongst programmers and presented a wide range of programming jobs, both in our Aviation Digital department and in other business areas.

Depending on the type of job, our cooperation with candidates is based on strictly specified criteria and consists of several stages. The recruitment model we use makes it possible for us to select a person that fully satisfies our expectations. During the recruitment process we evaluate

the level of substantive knowledge, competences and potential of the candidates. Our qualified staff thoroughly analyses each candidate's profile, using dedicated tools designed according to the specific tasks required by a given position.

Support for new employees

The last stage of our employee selection process involves assimilating new employees into the company. We place great emphasis on making sure all new employees feel part of the company, build relationships with their colleagues, and are able to work in a friendly atmosphere. We would like our new employees to become independent as soon as possible so that their work could bring benefits for the organisation. The employees who are embarking on their professional career in the Engineering Design Center are entitled to a series of employment-related benefits.

At the beginning of employment, all workers are enrolled in a special programme, which helps them better assimilate into our organisation. Right from the start we strive to build employee value by providing a series of training courses that will help them become familiar with the general processes within the EDC, the rules, corporate culture, professional opportunities, and our fringe benefits. These training sessions are conducted by employees specialised in these particular areas, who are available both during and after the meetings to answer any potential questions. Another benefit for new employees is a tour of the campus site and classes in selected laboratories of the Engineering Design Center.

In order to ensure that new employees adapt well to their new surroundings, they are assigned an assistant from among their colleagues who will help them in any situation. This assistant will introduce the new employee to his/her tasks and colleagues, as well as answer all their work-related questions. We do our best to make new employees feel at ease from the very first day in order to help them smoothly settle into their new professional role.

At the EDC, we provide each new employee with a welcome package containing company information, a map of the campus, and our company's business ethics code.

Engagement Team Meetings

Cooperation as well as receptiveness to dialogue and opinions of our employees are the foundation of the Engineering Design Center's culture. Since 2014 we have organised regular meetings of employees from various management levels (a dozen or so people), whose aim was to address the needs and strive to improve the working conditions of our staff. We actively involved our employees in discussions on the development of our company and jointly solved related problems. Moreover, the employees were able to share their opinions by talking with their immediate supervisors on a daily basis. In 2016 we implemented numerous projects aimed at improving our employees' working environment and our company image. At the end of March we opened a modern canteen for our employees, offering a wide range of food, ranging from traditional breakfasts to lunch sets. Furthermore, our employees have access to a cafe, where they can buy healthy sandwiches and salads, as well as desserts.

With the help of our dedicated staff, we redesigned the green areas on our premises by planting new shrubs and perennial plants, and care for them to ensure proper irrigation.

Our plans for 2017 include holding more of these types of meetings in order to improve all key areas, while simultaneously meeting the business objectives of our organisation.

Training and development in the EDC

At the Engineering Design Center we strive to ensure that all our employees have access growth opportunities. Training is an inseparable part of our corporate reality. Continuous improvement is a priority for us. Our ambition is to build a strong organisation with the participation of fully-fledged managers and thoroughly committed employees. Our employees at the Warsaw-based design centre are offered flexible training courses adapted to their position and developmental goals. We provide them with a set of tools that support their development and help them find themselves as professionals.

In 2016 there were:

- 348 preliminary training sessions for new employees;
- 24 language courses;
- 316 technical training sessions;
- 734 training sessions on work standards, entitlements and provisions in force;
- 35 training sessions developing leadership skills;
- 68 training sessions provided by the Center of Skills Excellence (CoSE).

“Soft” training

Our training courses on soft competences are designed, in particular, to help our employees acquire and improve their interpersonal, communication and presentation skills. The meetings take the form of workshops – carried out in medium-sized groups (around a dozen or so participants) by a trainer who is an expert in a given field. During the training sessions, our employees learn new behaviours, have an opportunity to practice and discuss them with the group, as well as plan how they want to utilise this knowledge in the future.

Soft training courses are selected by our employees themselves, depending on their needs. Alternatively, they can be referred to such training courses by their supervisors. The participation in our workshops generates a series of practical benefits that can be used in everyday life and constitutes an excellent source of inspiration for managing one’s work, projects and the team.

Technical training

In order to enhance their professional qualifications and gain more opportunities for development, employees, with the consent of their manager, are enrolled in training sessions dedicated to technical issues. Each employee's development path includes both mandatory training and courses which can be attended in one’s own free time.

Technical training is divided into:

- stationary – conducted on site, at the EDC premises, by our qualified and experienced specialists;
- global – conducted in English via an online messenger or by tele-presentation.

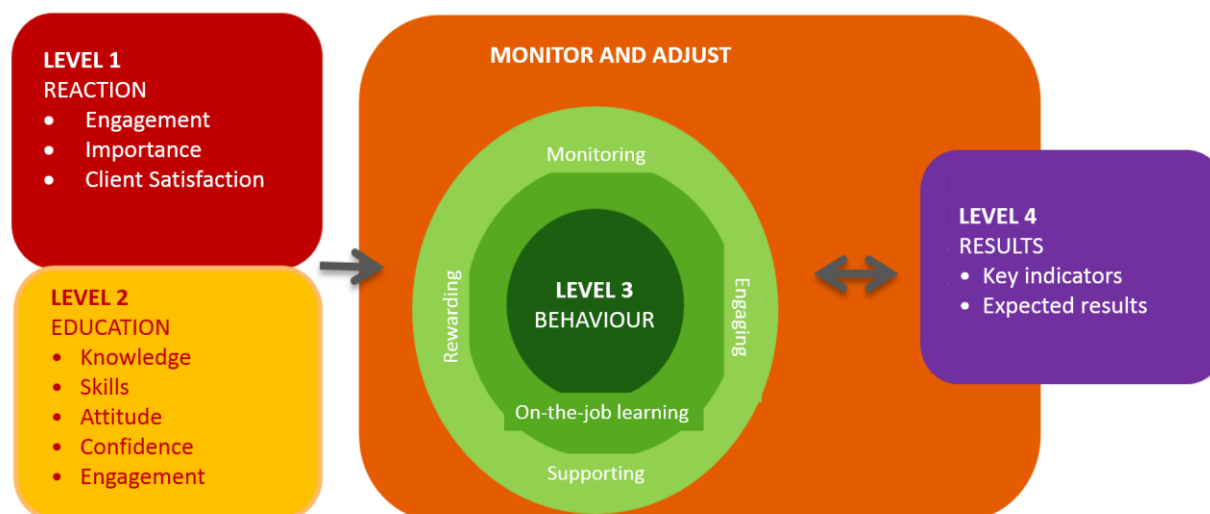
CoSE (Center of Skills Excellence) Training

As part of the improvement process, we also provide our employees with training courses that develop their non-technical skills. Thanks to the workshops conducted by internal trainers, the participants expand their knowledge and improve the skills helping them achieve greater efficiency at work and in private life. These training sessions are available to all employees and are held outside of working hours.

Planning project evaluation based on Kirk Patrick's methodology

In 2016, as part of our activities in GE Transportation, we carried out a project based on Kirk Patrick's methodology, aimed at assessing the effectiveness of our training courses. The project involved senior managers and supervisors. Our intention was to plan the training programmes in such a manner as to combine them with the business goals of our employees and have them support the employees in their professional activities. Moreover, our priority was to plan long-term post-training activities so that the knowledge and skills acquired could be continuously strengthened and improved.

Planning project evaluation using Kirk Patrick's method



Source: own materials

Development and recruitment programmes for employees

Edison Engineering Development Program (EEDP)

The programme is implemented in two EDC areas, Power and Aviation. It is intended for young, gifted engineers who are just beginning their professional career. The daily work is combined with learning and dedicated training sessions. The programme is primarily focused on increasing technical skills, learning problem solving methods in engineering projects, as well as enhancing effective teamwork skills.

Due to the digitisation of industry, the programme and the technical training sessions it offers have been designed to cover the thematic scope related to digital programming of processes and defining procedures, cyber security, data analysis techniques, machine learning and cloud data processing, as well as modern production methods based on digital technologies, such as spatial printing and additive manufacturing methods. Moreover, engineers can participate in classes pertaining to the assembly and dismantling of a turboprop engine, a turbofan engine and an industrial gas turbine.

Throughout the programme, engineers rotate through 3 or 4 different teams. Such rotation makes it possible for them to better familiarise themselves with the organisation and the various areas of engineering work. At the same time, the programme's participants receive a large dose of knowledge.

In practice we have seen that young people take an active part in all the classes and do their best to take full advantage of them.

In 2016, within the framework of the Edison Engineering Development Program, we offered internships at the EDC to nine contest winners, who gained experience in the areas of GE Aviation and GE Power.

Industry-based training

The priority for each employee is to become a professional in his/her field. As an employee-friendly organisation supporting the professional goals of our employees, we make it possible for our specialists to utilise various development opportunities.

Various areas of our organisation offer different types of opportunities. We mostly offer goal-oriented programmes so that our employees can concentrate on the objectives they have set to be completed at a specific time. These programmes are diverse and dependent on numerous factors, including experience. Employees use a tool based on functional models, allowing them to assess their level of knowledge and plan their own technical development. A useful tool for planning their professional career are matrices with templates of technical and soft competences, specified at individual levels of employment. Using such matrices, our employees analyse their specific skills and predispositions, and then, based on the observation, receive a dedicated development path in a selected area. The matrices stimulate employees to learn and allow them, despite the rush of daily activities, to focus on prospects and their own development. They are also useful to the management of our organisation in their daily managerial activities,

in assigning tasks or planning the workload. Our competence matrices help us discern and monitor the path leading to an ideal state in which we have a fully-flexible cross-trained team.

Furthermore, our organisation has implemented the process of “exchange”, which makes it possible for employees to acquire knowledge about projects executed in other departments. The benefit of this includes the possibility of exchanging views and experiences between employees in the same business area, receptiveness to new solutions, and attempts to diversify the work performed. The criteria for this exchange vary – the employees migrate between departments within specific programmes, or due to available resources in a particular department. This process is strengthened by the employees’ participation in technical discussion groups, where engineers at all levels can exchange information about state-of-the-art methods, technologies and processes on a broader forum,, as well as share their ideas and newly-developed solutions, thus stimulating innovation. Additionally, from 2016 onwards, we are planning to organise internal thematic fairs, open to all employees, thus helping them to become familiar with the full scope of projects executed within the company as well as with the people who execute them, with particular attention being paid to digital technologies in industry, spatial printing techniques and additive manufacturing methods.

In 2017 we are planning to launch a special edition of the Talent Development Program, giving engineers a chance to develop in the area of systemic thinking. The participants selected will be able to strengthen their skills in the areas of examining systems in terms of their complexity, sensitivity to a change of a single variable, or tendency to deepen or attenuate a given system parameter in time. This way, the organisation will facilitate simultaneous achievement of professional goals and development of future technical leaders within the organisation.

Power Talent Development Program (Power TDP)

Power TDP, implemented in 2015, is a 1.5-year-long programme for talented engineers of GE Power, designed to enable them to professionally develop their leadership skills. The programme is primarily focused on learning problem solving methods in engineering projects, as well as

enhancing effective teamwork skills. Meetings are held once a month and cover such areas as: entrepreneurship, ownership and accountability, communication and cooperation in various teams, as well as leadership.

Mentoring

Mentoring at the EDC was developed to address the specific needs of our staff, as a form of support for the employees to help them become who they want to be. Cooperation based on knowledge sharing as well as receptiveness to dialogue and employees' opinions are the foundation of our organisational culture. We can safely state that all our employees are involved in mentoring activities. The activities involve mutual inspiration, stimulation and counselling by experts specialising in specific fields, as well as supporting our talented staff in reaching success. We place great emphasis on the partner-based nature of the mentor-employee relationship. Therefore, mentoring at the EDC is primarily informal. It offers much freedom – employees may choose their own mentors or ask their supervisors for assistance in this regard. The role of a mentor is entrusted to experienced employees of the company, who have extensive experience and knowledge in a given area, as well as highly developed personal and social skills. As a supervisor of the employee's professional development, a mentor supports his/her mentees in solving any emerging problems, and provides them with specialist knowledge about the work performed. Furthermore, a mentor helps mentees to follow their individual career paths adapted to their needs and expectations. An unquestionable advantage of mentoring in our organisation is the growing commitment of employees to the work they perform, strengthening of internal communication, and a good atmosphere both within individual teams and across the entire EDC.

Vocational training and internships at the EDC

The Engineering Design Center is meeting the needs and expectations of students and graduates of higher education institutions not only as an attractive employer but also as an expert in the field of breakthrough solutions in aviation, energy, oil industry and state-of-the-art digital technologies.

Students who would like to gain engineering experience by participating in real-world engineering projects, as well as become familiar with the organisational business culture while continuing their studies may take advantage of our internship programme, which usually lasts 1 or 2 months. This internship programme usually results in employment contracts signed with talented students in order to support them in their professional development. In 2016, for the first time ever, graduates of higher education institutions were offered access to paid internship programmes lasting no more than 6 months. The individuals who gained professional experience at the EDC through vocational training and internship programmes are very much welcome to continue their professional collaboration with our organisation.

Since 2013 we have participated in the nationwide competition known as “Grasz o staż” (Play for your internship), which has been organised by Gazeta Wyborcza and PwC for 22 years. The initiative produces benefits for both the participating students and us, as the employer. Winners are offered the possibility to apply their knowledge and use their engineering and soft skills in practice during paid internship programmes. We benefit by attracting talented potential future employees, whom we can introduce to our company and the industry early on. In 2016, we invited three competition winners to participate in our internship programme, offering them the opportunity to gain experience in the area of GE Power.

Cooperation with technical universities

The Engineering Design Center, as a socially responsible company, works closely with scientific units and top Polish technical universities, thereby making it possible for students and graduates to gain professional experience during numerous vocational training courses, technical training sessions or internship programmes. Our intention is to retain talented, promising and ambitious young people in Poland to work in engineering positions. By giving them a chance to gain experience in the best engineering design centre in Europe, we co-create the future of the young generation. Moreover, we want to inspire young people to continuously broaden their horizons and fulfil their potential, by providing them with the necessary skills.

In 2016, we got involved in a series of meetings with students to give them an opportunity to get to know EDC as an employer open to cooperation with universities and willing to help young people launch their careers. During these meetings, our engineers talked about the projects we had completed, the work in our organisation and the prospects of development, as well as answered participants' questions.

Moreover, as each year, we selected two of the most gifted students from the Mechanical Faculty of Energy and Aviation at the Warsaw University of Technology to be awarded the Justyna Moniuszko scholarship for a period of three semesters of graduate studies. It is awarded under the scholarship programme funded by GE and the Institute of Aviation to commemorate Justyna Moniuszko, an aviation enthusiast, a student of the Mechanical Faculty of Energy and Aviation and a trainee at the Engineering Design Center, who tragically died in a plane crash in Smoleńsk.

We also held the 2015/2016 edition of the EDC Ambassador Program dedicated to students of higher education institutions, trainees and interns of our Engineering Design Center. This initiative helped us maintain permanent contact with the world of science and stay abreast of all new student activities. In 2016, the EDC had 7 ambassadors who represented 5 leading higher education institutions in Poland:

- the AGH University of Science and Technology in Kraków;
- the Gdańsk University of Technology;
- the Kraków University of Technology;
- the Warsaw University of Technology (the Mechanical Faculty of Energy and Aviation, the Faculty of Material Engineering, and the Faculty of Cars and Machinery);
- the Military University of Technology.

Flexible working hours

The employees at the Engineering Design Center may benefit from flexible working hours, thus being able to adjust the start and finish times to their individual needs. As a result, they will be able to better reconcile various lifestyles or family situations.

Medical care

Each employee on an employment contract may benefit from private healthcare, encompassing health programmes, disease prevention, as well as daily support in case of any health problems. Healthcare plans guarantees unlimited access to specialist consultations during illnesses, upon exacerbation of chronic diseases, as well as emergency services.

The services available to our employees and their families include:

- comprehensive specialist consultations
- psychological consultations (including sexologist/andrologist) and psychiatrist
- professor consultations with referral
- comprehensive diagnostic tests (laboratory and imaging diagnostics)
- out-patient consultation procedures
- skin allergy tests
- pregnancy management
- flu/tetanus vaccinations
- dental consultations
- the preventive “Healthy Woman” and “Healthy Man” Medical Check-Up
- rehabilitation, etc.

Life insurance

All our employees, irrespective of their working time, are offered basic group health and life insurance under favourable conditions. Employees who wishes to obtain insurance coverage needs to complete a relevant form. The insurance covers the life and health of each subscribed employee and, to the extent specified, his/her closest family members. Insured employees are entitled to benefit payments, for example, in the event of an illness or accident leading to their hospitalisation or incapacity for work.

Multisport card

For our employees' benefit we have negotiated attractive conditions for joining the Multisport Programme, which allows participants to choose from a variety of options available for spending their free time actively. Employees who declare their willingness to participate in the Multisport Programme receive a special Sports Card that provides them with unlimited access to over 2441 sports facilities throughout Poland, and to a variety of recreational and sporting activities. Moreover, it is possible to purchase additional individual Multisport cards for family members. Each of our employees can enrol one person over 15, as well as three children up to the age of 15.

Subsidies

For the benefit of our employees and their families, as part of the Corporate Social Benefits Fund available in our organisation, we provide a series of additional benefits, i.e. additional funds before Easter and Christmas, as well as before summer holidays, housing loans and special assistance grants, as well as maternity leaves for young mothers and paternity leaves.

Moreover, employees who need to wear glasses while working with computer screens may apply for additional funding to purchase them.

We develop and build the competences of our employees. Thanks to the commitment of our staff, we are able to fulfil international projects. We finance or co-finance employees' training courses, workshops, seminars, post-graduate studies and language courses. Moreover, our employees can use the BrilliantU e-learning platform through which they complete courses and training sessions. Besides thematic training courses, employees of the Warsaw-based engineering design centre are provided with the possibility to learn such foreign languages as English, Italian, Russian and Polish (for foreigners) at four different levels: beginner, elementary, intermediate and advanced. In the event where a given language course is fully financed by the company, the classes are held on company premises. Employees can also choose a language

school they would like to attend and, upon presentation of a relevant certificate confirming the completion of a language course, we refund part of the costs incurred by the employee for professional development.

We invest in people

People are the unique capital of our organisation. Investing in human resources is therefore of utmost importance for us. Based on our many years of experience, we have noticed that employees are more eager to use their potential if they are offered suitable conditions by the employer and a pleasant work atmosphere.

Wishing to provide our engineers with a friendly working environment, we have implemented, in all the areas of our activities, the GE Performance Development system based on an individual approach to every single employee. It is used by employees at all levels of our organisation. The system allows each employee individually to work on their efficiency, manage their own career, and create their professional development path. Employees receive feedback on their performance not only from the immediate supervisor but also from their colleagues. By setting priorities and collaborating with others allows us to continuously work on improving ourselves, our professional development and create our professional future.

Employee groups at the EDC

HealthAhead (HA) – we live a healthy and sporty lifestyle



One of the Engineering Design Center's objectives is to encourage employees to lead a healthy lifestyle. This has led to the formation of the HealthAhead initiative – let's live a healthy lifestyle! This programme revolves around certain areas of a healthy life, such as healthy eating, coping with stress, physical activity, promotion of

preventive examinations and fighting the tobacco addiction. The HA's mission is to inspire employees and their family members to improve their health and well-being. Moreover, HealthAhead helps to achieve a work-life balance, especially by organising stress coping campaigns, meditation classes and support groups related to problems at home.

In 2016, EDC employees were able to participate in numerous events organised by the HA team to promote a healthy lifestyle. It is particularly worth to mention the "HealthAhead Day", which was held in September 2016. *The employees had an opportunity to try their hand at ergometer competition, consult a dietician about healthy eating habits, and take advantage of free eye examinations and physiotherapy consultations. Additionally, all participants were able to attend a first-aid course and have their blood pressure checked. In the spirit of a healthy lifestyle, there was also time for learning how to extinguish fires during a training course carried out by a licensed firefighter,* said Jarosław Mysza, leader at HA.

HealthAhead was also present at the 2016 Family Picnic, an annual event organised for our employees and their families. The HA's stand, full of healthy food, attracted a lot of attention and drew many visitors. Furthermore, the event's participants had an opportunity to have their eyes tested, consult a dietician and a dermatologist, as well as register as potential bone marrow donors. During the Picnic, we encouraged participants to attend a first aid course and promoted a healthy lifestyle through wholesome meals termed as "Healthy Choice".

The 2016 event, which also deserves a mention, was the open training session of Grom Combat for all EDC employees. Based on a specially prepared training programme, modelled on those of the Military Unit GROM, the training session was carried out by the unit's instructors at the Institute of Aviation. The participants had an opportunity to practice various self-defence techniques and learn the secrets of martial arts.

In November 2016, we also celebrated the World Addiction Day at the EDC. On this occasion, in cooperation with the Provincial Sanitary and Epidemiological Station (SANEPID), EDC employees had an opportunity to measure the amount of carbon monoxide exhaled. Moreover, a dedicated

stand distributed brochures with information on what an addiction is, how to quit smoking, and where to seek help for addictions.

One of the campaigns that have become a permanent part of our organisation is “Fruit Wednesday”. On this day, our company provides various types of fruit for our employees.

Apart from organising events, HealthAhead also provides year-round education to EDC employees on various health issues through promotional campaigns via internal EDC television or posts in the weekly news bulletin.

Engineers working at the Institute of Aviation can choose from 12 physical activity groups operating within the HealthAhead organisation. Some are typically seasonal in nature, for instance hockey or canoeing, while others can be practiced all year round, whatever the weather.

Sports enthusiasts meet periodically, on scheduled days of the week, to work out and develop their interests together. We try to create the best conditions possible for our employees so that they could develop their sport-related passions, also by co-financing their participation in competitions or purchasing professional sportswear.

Groups within HealthAhead

EDC Bikers	EDC Runners	EDC Climbers	EDC Calisthenics
EDC Volleyball	EDC Soccer	EDC Hockey	EDC Swimmers
EDC Squash	EDC Kayakers	EDC Triathlon	EDC Basketball

One of the longest existing and most numerous groups in our organisation is EDC Runners. Every year its members participate in numerous marathons in Poland and across the world. One of the most important events in 2016 for our runners was the 3rd Run of the Institute of Aviation.

It was an event open to all, including those from outside the Institute of Aviation. Last year's competition featured a new event, the relay race, which was entered into the competition's programme alongside the 5-kilometre run and the children's run. The competition attracted over 400 runners, including 50 from EDC Runners. The running route took the participants on the paths of the Institute of Aviation, otherwise closed to visitors, along which one can admire vintage planes.

EDC Bikers is another HA group worth mentioning that is actively marking its presence. Currently, over 400 employees of the Institute of Aviation cycle to work, which constitutes as much as 20% of all employees. As a response to the needs expressed by our employees, in March 2016, on the premises of the Institute of Aviation, we opened the largest bicycle storage facility in Poland. The extended and refurbished building was created to satisfy the needs of the constantly growing

group of bikers at the EDC. The bicycle storage facility features 450 lockers (100 for women, 350 for men), 100 new, roofed sites for bikes, a drying room, additional changing rooms, as well as shower amenities. Moreover, bikers can use a self-service bike repair station, which allows them to carry out basic repairs on their own, as well as a bike washer kit.

In 2017, our intention is to demonstrate how much we are changing and growing. We are going to present a new face of the Healthy Lifestyle by promoting a new image of the organisation (a series of new mobile HA applications) and offering new classes and physical activities. We are working on the idea for next May's HealthAhead Week, which will feature our regular events, such as massage sessions, dietary consultations and first aid classes. The event will also include new sports competitions, training courses and shows."

Jarosław Mysza

Section Manager, Advanced Technology, GE Aviation

Leader of HealthAhead at the EDC

The plan for the following months also encompasses a series of pro-health activities, training courses and thematic information sessions concerning safe holidays, as well as skin care and protection against the flu.

The highlight of 2017 will be the campaign entitled "A Healthy Spine" – a series of classes of both preventive and therapeutic nature, intended for all employees, irrespective of the level of their physical activity.

GE Women's Network

One of the most important objectives of the Engineering Design Center's organisational culture is to provide a workplace for all employees having the knowledge, abilities and skills in their selected field, irrespective of sex, cultural differences, political or religious beliefs, and sexual orientation.

GE Women's Network is an initiative created to address the above-mentioned issues. It shows that diversity, manifested through the presence of female engineers in the business, is positive, and even expected. This initiative promotes the engineering profession amongst women and encourages them to choose technical areas of study. The activities of GE Women's Network are concentrated on improving the managerial and technical skills of women, career planning and integration with other women. GE Women's Network fulfils its goals through training courses and workshops, dedicated developmental programmes, as well as meetings with senior managerial staff and those who have become successful in both corporation and business.

In 2016, the GE Women's Network organised numerous events, including technical training, courses for improving soft skills, as well as meetings within myConnections groups, i.e. teams whose members have common interests. At these regular meetings group members share their experiences, gain contacts and expand their knowledge in a number of areas.

The most significant event organised by the GE Women's Network in 2016 was the developmental programme entitled "For me and for the company: I am spreading my wings", for 15 selected female engineers. It consisted of several 3-day training sessions and a series of networking meetings dedicated, in particular, to effective communication, team discussions, adaptation to changes skills, and workshops on self-confidence building. Throughout the programme, the participants could count on mentoring support from their supervisors.

Particular attention should also be paid to the periodic event organised by the GE Women's Network entitled "Female Engineer at work". The invited female students and graduates of technical faculties learned about career possibilities in various EDC business areas. Moreover, they participated in a workshop on building one's technical and managerial development path, and visited several laboratories, including the newest Gas Turbine Centre, which employs many women with a technical background.

Additionally, the female engineers-to-be had an opportunity to participate in a meeting entitled “Female pilots, engineers, aviators. Passion, talent, courage”, which featured a presentation by Ms Dorota Dorn-Okóń, a female engineer at the EDC in the GE Aviation area. She shared her knowledge on what it means to be a female engineer, how to find work-life balance and what competences are of essence in science and business. She implements projects related to materials used in aviation, as well as conducts destruction analyses of damaged aero-engine parts. Her experience shows that our engineering design centre provides female engineers with ideal conditions to take up work in sectors which had so far been male-dominated. Within the EDC, women occupy both technical and managerial positions. They have flexible working hours, access to a wide offer of training courses, and opportunities to participate in various interest groups (from parachuting to language courses).

In 2016, members of the GE Women’s Network initiative organised a charity concert together with the GE Volunteers group. As it turns out, the EDC engineers are passionate not only about science, but various music genres as well. The EDC Talent Show was a great opportunity for talented amateur musicians to demonstrate their artistic skills in front of their colleagues, as well as a chance to raise funds for charity.

In retrospect, we can see that over the years the GE Women’s Network has gained much strength and popularity among employees. In 2016, its presence could already be seen in all the areas of General Electric. Its female leaders visited the companies of GE in various locations across the world, conducting mentorship programmes and promoting the development of female engineers. The seminars and training courses organised by specialists in aviation, energy and oil extraction were aimed not only at increasing technical knowledge, but also at sharing unique experiences. The plans of GE Women’s Network for 2017 include further training courses involving regular visits to the Educational Engine Laboratory, the Materials Technology Laboratory and the Tests Laboratory. The subjects of the workshops and mentoring programmes, besides technical issues, will also encompass aspects related to the creation of power entities, such as the gas-steam CHP plant in Włocławek.

GE Volunteers – employee volunteering programme at the EDC



GE Volunteers is an initiative established by General Electric, which was incorporated into the EDC in 2010. Our voluntary service supports local communities in such areas as education, ecology, assistance for the homeless and promotion of a healthy lifestyle. *We are not afraid of helping. Helping is cool. It brings happiness not only to the beneficiaries but also to those who help. The smile on our beneficiaries' faces, the gleam in their eyes and the simple word 'thank you' – all this makes us very happy, lifts our mood and gives meaning to our lives,* the volunteers declare unanimously. The principal motto of GE Volunteers is to provide direct support for people in need who are chosen by the employees involved in charity initiatives.

In our opinion, involvement in employee volunteering programmes is beneficial to both the company and its employees. These benefits include creating the image of a responsible and socially involved organisation, as well as employee integration, and raising their job satisfaction level. Our employees take conscious decisions about helping others, in accordance with their own needs and potential. We support all those who participate in joint charitable projects and inspire them to take further actions.

The charitable campaigns that have become part of the EDC's tradition include:

Catch a waffle

For several consecutive Tuesdays in 2016 between May and October, GE Volunteers prepared waffles with miscellaneous topping options on our premises. The campaign received extensive support, especially given the noble aim of this initiative. The funds raised in 2016 were allocated to support the mothers and children from the Single Mother's Home in Chylce.

Baking cakes and the Noble Parcel [*Szlachetna Paczka*] Project

December 2016 was a very busy time for GE Volunteers. Along with GE Women's Network, the volunteers organised a cake baking campaign. The event was joined by all the managers at the Engineering Design Center and turned out to be a huge success. Thanks to the commitment of our employees, we were able to organise classes to introduce children to automatics and robotics.

Additionally, as every year, we joined the nationwide charity initiative known as the "Noble Parcel" ("*Szlachetna Paczka*").

The openness and enthusiasm of our volunteers, the permanent smile on their faces and the joy they bring into this sometimes-hard job is immensely appreciated. Thanks to the involvement of GE Volunteers and benefactors, we succeeded in collecting the basic necessities and financial means for three large families from the Mazovia Province. We believe that such activities will make it possible, year by year, for a growing number of people to spend a truly joyous Christmas, cherishing hope for a better future.

Aleksander Dąbrowski

Section Manager, Turbo Machinery Solution, GE Oil & Gas

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By helping others, we support the development of science through:

Tutorials and sporting activities

Our volunteers selflessly help youngsters from the Janusz Korczak Children's Home No. 2 and the Children's Home No. 9 in Warsaw with their learning struggles. Most of our employees are people with scientific minds. Therefore, they treat tutorials in mathematics, chemistry, physics and foreign languages as a pleasant time for sharing their knowledge. The classes were held in our facilities, depending on the children's needs – from 1 to 5 times a week. In addition to tutoring,

during the summer and winter sport seasons, our volunteers organised periodical training sessions for children in outdoor team games and ice-skating.

Family Picnic at Children's Home No. 9

In May 2016, GE Volunteers helped to organise a Family Picnic at Children's Home No. 9 in Warsaw. The organisers arranged for a series of attractions for the participants, with the greatest popularity enjoyed by a glider flight simulator and a special "Children CSI" zone, where participants could search for crime clues. During the event, the children were raising money for their summer holidays by selling their own artistic handiwork.

The Young Explorer's Club

In cooperation with the Academy of the Future, GE Volunteers organise regular classes for children and youth of the Young Explorer's Club. On the premises of the Institute of Aviation, under the watchful eye of volunteers, the young club members carry out scientific experiments, for example in physics, chemistry or natural sciences. The relationships amongst participants based on mutual trust and inspiration, joint determination to solve fascinating puzzles of nature, the involvement and passion of both sides are more than just slogans. The meetings shape the social and personal skills of the caregivers and children alike. Moreover, they help the youngest participants develop a number of competences and skills, trigger their creativity, as well as show them how to solve problems. In 2016, under the careful supervision of volunteers, the club members built their own rockets, bird shelters, kennels and colourful kites.

Polish Sudoku and Puzzle Championships

The Engineering Design Center actively promotes interest in science. Therefore, in 2016, for the fourth time we took part in organising the 11th Polish Sudoku Championships and the 20th Polish Puzzle Championships. In cooperation with the SFINKS Foundation for the Development of Recreational Mathematics and the Domaniowski Palace, where both contests were held, the EDC employees took active part in preparing and running the event, as well as scoring the participants' results.

Other campaigns

Moreover, in 2016, volunteers from the Engineering Design Center organised a clothing drive amongst their colleagues to support the needy and the homeless. Every bit helped. Thanks to the involvement of many people, we managed to collect four 120-kilogram sacks full of clothes and help nearly 40 people in need.

It is also important to mention the organisation of special campaigns aimed at helping children residing in the children's homes we have been cooperating with for many years. Youngsters had an opportunity to visit the hangars of the Frederic Chopin airport in Warsaw, present their artistic works at a charity exhibition, as well as pit themselves against EDC employees in a game of football.

In conclusion, EDC volunteers took part in a total of 26 events in 2016.

The EDC during the Night at the Institute of Aviation



In 2016, the Engineering Design Center presented its achievements for the fifth time, during "The Night at the Institute of Aviation". The event was co-organised by engineers from all EDC companies. The employees of the Warsaw-based design centre presented their activities not only in the aviation sector, but also in the mining, energy and transportation sectors. In addition to the rich interactive exhibition presenting the behind-the-scenes aspects of designing and using devices created by the EDC engineers, visitors were also given access to the largest vacuum chamber in the world used for testing aero-engines, which can house the largest aero-engine produced in the world – the GE90.

Furthermore, our guests had the opportunity of visiting six laboratories:

- the Materials Technology Laboratory;
- the Tests Laboratory;
- the Bearing Test Laboratory;

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- the Research Laboratory for Blade Pitch Changes;
 - the Educational Engine Laboratory;
 - the Repairs Laboratory.

Inside, they could admire miscellaneous attractions, such as a power generation mock-up, 3D printers and printing elements, an exhibition of aero-engines, a simulator of the remotely-controlled robot for underwater operations (ROV), models of locomotives, a cross-section of a locomotive cylinder, a photographic exhibition of planes, as well as technical presentations and videos. It was quite an attraction for all aviation and technology enthusiasts to see the huge CF6 bypass turbofan engine presented in the Educational Engine Laboratory, which was meticulously described by specialised engineers.

Summary

The digitisation and distribution of content, the possibilities for data collection and application, the 3D printing technology and intelligent solutions based on sensor networks, the automation of processes, the creation of complicated algorithms for event prediction, are just some of the factors related to the technological development of the Engineering Design Center.

Full of changes and decisions in the area of implementing new technologies, the year 2016 expanded the scope of our actions planned for the following year. Following the path of GE, our business partner, we want to expand more dynamically and develop new digital technologies. By modernising our software, modifying interfaces and automating existing processes, we show that we are at the centre of cutting-edge digital solutions. New technologies help us build competitive advantage. We are committed to understanding and addressing all the needs of our customers. It is our intention to provide our modern solutions to as many of them as possible, helping them derive satisfaction from their use. Our priority is the continuous development of both technological processes and the competences of our engineering staff. Additionally, we are planning to further develop our laboratory facilities to make it possible for our employees to use state-of-the-art technological equipment.

Moreover, our intention is to ensure greater access to tools for developing digital solutions for the industry, through the Predix platform. It will facilitate the collection and analysis of large data sets related to the maintenance of machines and devices – ranging from those concerning predictive maintenance to information and failures and recommended corrective actions. Thanks to our employees, services, digital technologies and scale impact, following in GE's footsteps, we would like to speak the modern industrial language.

We continue to add to the list of areas in which we intend to follow the revolutionary digital trend. Our long-term plan is to continue the changes concerning information flow, as well as to introduce tools, i.e. databases, which will make information analysis easier, faster and more

efficient. Our plan for 2017 is to create a laboratory equipment depot available to our employees, as well as introduce changes to order processing, i.e. through an electronic system.

In the following year, we would like to be perceived not only as the producer of cutting-edge digital solutions for customers, but also as an organisation which uses these trends in practice.