



POLISH CHAMBER OF NATIONAL DEFENCE MANUFACTURERS

# POLISH DEFENCE INDUSTRY

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**> 26** UNMANNED HELICOPTER ROBOT  
FOR SPECIAL TASKS ILX27

**> 10** BALT MILITARY EXPO 2014



## AIR FORCE INSTITUTE OF TECHNOLOGY

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## Sławomir Kułakowski

Born on May 31st, 1952 in Jelenia Góra. Graduated from the Faculty of Law and Administration of the Nicolaus Copernicus University (1975), Reserve Officers School (1976) and Postgraduate Studies at the General Staff Academy (1989). Reserve colonel. Held many important functions in the institutions of the Ministry of National Defence (1976-1992 and 1996-98). Between 1992-1996 served as adviser of the head of the National Security Bureau at the President of Poland Office for Economy and Defence Affairs. President of the Polish Chamber of National Defence since 2001.

## Ladies and Gentlemen

Every company, especially operating in the armaments sector, is trying to cope with the dynamic changes and challenges brought by today's constant development.

One of the areas that the defence equipment manufacturers are currently focused on are new technologies allowing not only to cut costs, but also increase productivity. In a wider perspective, Polish producers create innovative solutions through research and new technologies – they introduce new products, services or even business collaboration models.

The wide range of possibilities offered by Polish manufacturers and the highest quality of their products provides customers with a full range of solutions and services tailored to the current and future needs of the dynamically growing army.

Polish defence industry products are still actively used. They meet the needs of our troops, not only in the country but also in different parts of the world where they serve. This is the best proof that the quality of equipment produced in Poland is very high.

In this edition of our Polish Chamber of National Defence Magazine, we wish to share examples of first-class solutions, characterized by excellent quality and durability.

I wish you an enjoyable read,

Sławomir Kułakowski

President of the Polish Chamber of National

## Polish Chamber of National Defence Manufacturers

On the 11th September of 1995 a constituent meeting was held, at which, a resolution to establish the chamber, initiated by the representatives of the Polish defence industry, has been adopted. A temporary management and an auditing committee has been elected by the representatives of the 67 founders, in the presence of General Henryk Mika from the Ministry of Defence and the Colonel. Sławomir Kułakowski from the National Security Bureau.

During the past 10 years, the Chamber has been initiating activities to advance the technical level and product quality for the national defence, promoted the cooperative relations, inspired projects which led to an increase in the production for the domestic and foreign markets, as well as has inspired and supported the restructuring and modernization of the Polish industry while preparing its integration with the European structures.

During that period, the organization of trainings for the representatives of the Polish industry and the facilitation of foreign contacts has been a significant element of the Chamber's activity. Besides the above, it has organized experience exchange within the areas of technical, organizational and trade solutions.

Since 1998, the Chamber has been a co-organizer of the BALT MILITARY EXPO exhibition in Gdansk, and has co-organized the "Cto i Granica" (Border and Customs) Fair in Warsaw since 2004. In 2000, the Chamber has initiated and coordinated the Polish Defence Industry Days in Lithuania, during which, the associated companies have handed over equipment worth approximately 4 million Zloty, including the Chamber's contribution of 700 000 Zloty, to the Lithuanian part of the LITPOLBAT battalion. In 1998, the Chamber has been assigned to represent the Polish defence industry at the NATO Industrial Advisory Group (NIAG), and since December of 2000 it has actively taken part in the meetings of the Group.

In 1999, the Chamber initiated an industrial cooperation within the Visegrad Group. Two editions of the Polish and Czech defence industries were organized (1999 and 2001), I Visegrad Group Defence Industries Forum (2001) in Warsaw, II Forum (2002) in Trenczyn and III Forum (2004) in Warsaw.

In Poland, in addition to the agreement on cooperation with the Ministry of National Defence (12.08.1999), the Chamber signed cooperation agreements with the Army Workers Trade Union (1997), "Solidarity" National Section of Defence Industry (1998), Polish-Arab Chamber of Commerce (2004), National Association of Equipment Manufacturers (1999) and the Employers' Association of Defence and Aviation Industry Enterprises (2003).

In 1999, the Chamber issued the only catalogue of the Polish defence industry. In 1996 the Chamber started issuing the BULLETIN OF THE CHAMBER. In 2003 the Chamber started publishing a bi-monthly POLISH DEFENCE INDUSTRY (in English), and a quarterly ECONOMIC – DEFENCE REVIEW in 2005.

Currently, the Chamber associates 147 public and private enterprises. These include market leaders such as BUMAR Sp. z o.o., the Polskie Zakłady Lotnicze Sp. z o.o. (Polish Aviation Works), Stalowa Wola S.A., MESKO S.A. and RADWAR as well as small businesses and private companies.



**DURING THE PAST 10 YEARS, THE CHAMBER HAS BEEN INITIATING ACTIVITIES TO ADVANCE THE TECHNICAL LEVEL AND PRODUCT QUALITY FOR THE NATIONAL DEFENCE**

# POLAND

POLAND IS THE LARGEST OF THE EAST EUROPEAN COUNTRIES WHICH JOINED THE EU IN MAY 2004. POLAND IS COMPARABLE IN SIZE TO ITALY OR GERMANY (IN USA LARGER THAN NEW MEXICO) AND WITH A POPULATION OF APPROXIMATELY 39 MILLION (E.G. MORE THAN CALIFORNIA) IT RANKS AMONG THE MOST INFLUENTIAL AND REMARKABLE COUNTRIES IN CENTRAL AND EASTERN EUROPE. POLAND IS A STABLE DEMOCRACY WITH A TRULY FASCINATING HISTORY, GREAT CULTURAL HERITAGE AND SEVERAL AREAS OF OUTSTANDING NATURAL BEAUTY.

## PARTICIPATION IN PEACEKEEPING MISSIONS

From the initiative of the United Nations and other international organizations, activities are carried out to maintain peace and prevent armed conflicts in the world. Poland has been participating in peacekeeping missions and operations since 1953.

Between 1953 and 2009, Polish soldiers and civilian employees of the army participated in 83 peacekeeping missions and operations, 35 of them were organized under the auspices of the United Nations. The total number of professional soldiers, compulsory military service soldiers, extended military service soldiers, and civilian employees of the army that took part in the missions and operations amounted to 90,234 thousand.

In 2009, Poland took part in 9 (continuing and new) peacekeeping missions and operations.

Of the 7,138 people delegated in 2009 to serve in peacekeeping missions, 6,606 professional soldiers, 362 – compulsory military service and extended military service soldiers and 170 – civilian employees of the army.

In addition, from 2003 to 31 October 2008, Poland was part of the International Stabilisation Force in Iraq. During this period, the Polish Military Contingent (a total of 10 shifts) amounted to 15,839 people, including 13,260 professional soldiers and 2,154 compulsory military service and extended military service soldiers and 425 civilian workers.

## POPULATION IN COMPARISON

RANK (IN THE WORLD)	EUROPEAN COUNTRY	POPULATION (mln)
1 [12]	Germany	82.1
2 [20]	France	58.9
3 [21]	Great Britain	58.7
4 [22]	Italy	57.3
5 [23]	Ukraine	50.7
6 [29]	Spain	39.6
7 [30]	Poland	38.7
8 [44]	Romania	22.4
9 [56]	Netherlands	15.7
10 [70]	Greece	10.4

## MEMBERSHIP IN MAJOR INTERNATIONAL ORGANIZATIONS

- European Union
- United Nations
- Council of Baltic Sea States
- Central European Free Trade Agreement
- International Monetary Fund
- United Nations Educational, Scientific and Cultural Organization
- United Nations Children's Fund
- World Health Organization
- World Trade Organization
- Central European Initiative
- Organisation for Economic Co-operation and Development
- North Atlantic Treaty Organization

## SIZE IN COMPARISON

RANK (IN THE WORLD)	EUROPEAN COUNTRY	POPULATION (km <sup>2</sup> )
1 [43]	Ukraine	603 700
2 [47]	France	543 958
3 [50]	Spain	505 992
4 [54]	Sweden	446 964
5 [61]	Germany	357 022
6 [63]	Finland	338 145
7 [66]	Norway	323 877
8 [67]	Poland	312 658
9 [69]	Italy	301 268
10 [76]	Great Britain	244 100

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# POLAND

## THE BATTLE OF GRUNWALD

The Battle of Grunwald is one of the greatest battles in the history of medieval Europe. It was fought on the 15th of July, 1410. The battle was a part of the great war between the forces of the Teutonic Knights, assisted by West European knights, under the command of the Grand Master Ulrich von Jungingen, and the combined Polish and Lithuanian forces, under the command of the Polish king Wladyslaw II Jagiello. The battle ended with the victory of the Polish-Lithuanian army and a crushing defeat of the Teutonic forces. The outcome of this battle had a major impact on political relations in Europe of that time. Not only did it break the power of the Teutonic Order, but also elevated Poland and the Jagiellonian dynasty to the rank of the most important ones in the continent.

## THE BATTLE OF VIENNA

The battle was fought at Vienna on the 12th of September, 1683 between joint Polish, Austrian and German forces under the command of king John III Sobieski, and the army of the Ottoman Empire under the leadership of Vizier Kara Mustafa. The Turkish army numbered close to 140 thousand people. It was the largest army that was mobilized in the seventeenth century. Austria has managed to gather 32 thousand soldiers. Jan III Sobieski called up about 27 thousand Crown troops, including 25 hussar regiments, and marched to the relief of Vienna. The battle ended with the defeat of the Ottomans. This battle is considered to be one of twenty groundbreaking battles in the history of the world.

## THE ROAD TO INDEPENDENCE

The Treaty of Versailles that ended World War I sanctioned Polish independence – before that Poland disappeared from the map of the world for 123 years as a result of partitions. The official date of the foundation of the Second Republic of Poland is the 11th of November, 1918, when Jozef Pilsudski took over the military authority in Warsaw. As a result of his actions the German troops withdrew from the city, and the Polish state institutions that were being formed conferred to him the title of the Chief of State.

## INDEPENDENT SELF-GOVERNING TRADE UNION "SOLIDARITY"

"Solidarity" was a national trade union formed in 1980 to defend the rights of workers. Until 1989 it was also one of the main centers of mass resistance against the rule of the Polish People's Republic. One of the leaders of the workers' strikes that led to changes in the whole Europe was Lech Walesa, who later became a Nobel Peace Prize laureate. He was elected President in a two-round general election held in November and December of 1990.

## THE POLISH POPE

John Paul II was the first Polish pope, as well as the first non-Italian Bishop of Rome in 455 years. The election of a person from a communist country for the head of the church had a significant influence on the events in Eastern Europe and Asia in the 80s of the 20th century.

# PEOPLE

## ARMED FORCES

The Polish Armed Forces are divided into: the Army, the Air Force, the Special Forces and the Navy. Their main task is the defence of the Polish borders against outside attacks and cooperation with NATO. The armed forces are an essential element of the national defence system, designed for the effective implementation of the security and defence policy. The Polish armed forces number nearly 100 000 troops. They have taken and are taking part in a number of foreign missions of the UN, NATO and the EU.

## LEGISLATURE

In Poland the legislature is a bicameral parliament consisting of the lower house – the Sejm and the upper house – the Senat. In direct, universal and secret elections, Polish citizens elect 460 members of the Parliament and 100 senators. Both MPs and senators are elected for a four-year term.

## CONSTITUTION

The Constitution of the Republic of Poland is the most important Polish legal act and the foundation of the Polish state. It guarantees the rights and freedoms of citizens, determines the relationships between the legislative, executive and judicial branches, decides on the form and way of appointing key national institutions such as the Parliament, the Senate, the President and the Council of Ministers. The Constitution has a direct influence on the form of the judicial system, local governments and state control bodies.

## SOCIETY

According to data from 2011, the territory of the Republic of Poland is inhabited by 38.5 million people. In terms of population Poland occupies the 29th place in the world and the 8th in Europe. The Polish population represents 5.3% of the European population and 0.65% of the population of the world.

# COUNTRY HISTORY



# NEWS

## The new composition of the Board of PDH

The Supervisory Board of Polish Defense Holding has selected the new composition of the Management Board for a joint three-year term.

Effective on 06.18.2014, the Supervisory Board appointed Marcin Idzik for the position of Chairman of the Board, Mariusz Andrzejczak for the position of Member of the Board responsible for development and Edward Mirosz for the position of Member of the Board responsible for finances.

Marcin Idzik served as Chairman of the Board since October last year. From 2012, he has been associated with the PDH, when he was Vice President of the Polish Defense Holding, earlier in the period 2009-2012 he was Undersecretary of State for Arms and Modernization in the Ministry of Defense responsible for the purchase of equipment and weapons for the Polish army.

Vice President Mariusz Andrzejczak, doctor of technical sciences in the field of automation and robotics (Faculty of Power and Aeronautical Engineering in Warsaw University of Technology). He is responsible for development in the Polish Defense Holding. Associated with the Company since 2011.

Vice President Edward Mirosz will be responsible for finances. He was a member of the Supervisory Board of Bumar, and later in the Polish Defense Holding.

## PZL-Swidnik and Maria Curie - Skłodowska University in Lublin signed a cooperation agreement

The agreement describes the cooperation between PZL-Świdnik and Maria Curie-Skłodowska University on many levels, which will allow for the use of their abilities, knowledge and experience in the economic development of the region based on their research activities.

The Agreement provides, among others, the exchange of personnel between the University and PZL-Świdnik for educational and training purposes, implementation of apprenticeships and internships for students and graduates of the University in PZL-Świdnik facilities, as well as employees from Świdnik at the University.

The agreement also provides for the preparation of BA, MA and dissertations closely associated with the aviation industry, as well as conducting joint research work.

With the signed agreement, not only the young generation of Polish students will benefit, but also the whole Lublin region and Poland as a country. Maria Curie - Skłodowska University can give students the knowledge and PZL-Świdnik can give them the skills and experience needed in the aviation sector to enable the development of their careers in the future.

Both parties are already thinking about specific research in the fields of chemical analysis, fiber optics, computer science and polymers that can be used in future production of helicopters.

Maria Curie - Skłodowska University is another Polish university after the University of Lublin, Rzeszów University of Technology, Warsaw University of Technology, Military University of Technology, Polish Air Force Academy and AGH University of Science and Technology Krakow, with which PZL-Świdnik started scientific and research cooperation. In addition, in April this year, PZL-Świdnik appointed together with the Lublin City Hall and the Marshall Office of Lubelskie Voivodeship the Lublin Advanced Aircraft Technology Cluster, which is a further confirmation of the involvement of

PZL-Świdnik in the development and promotion of new technologies and innovative air solutions in cooperation with partners from academia, industry and the government.

## PERAD from WB Electronics

A new hand-held programmable radio Perade 4010 from WB Electronics premiered in Paris. It complements the existing Radmor offering, based on a simpler 3501 device family.

The radio was developed by the Gliwice branch of the company, in the past three years, and at the cost of nearly 10 million PLN. It is based on HDR COFDM modulation (waveform) used by Wi-Fi, LTE etc. Similarly to other programmable radios, it works as a base station at the same time. It is therefore possible to establish communication with very remote points using several PERAD radios.

Compared to other hand-held radios, the one presented by WB Electronics offers a wide range - over 4 km long and several hundred meters in urban areas, with the ability to use the network of these devices to multiply these values. Longevity was also increased, based on internal battery. Like other modern systems, it has a built-in encryption module, GPS receiver and can work with most currently used computer devices.

PERAD is derived from the Personal Soldier Informer PSI-Ψ, designed for the Tytan system. It was found, however, that in order to obtain better results, the optimal solution would be the separation of functions: a hand-held radio and a more classic display.

## Maskpol for paratroopers

Maskpol will provide 5175 helmets for paratroopers. The new protection will replace paratrooper helmets type 1963.

Inspectorate of Armaments has opened a tender for the supply of 5175 combat helmets adapted to parachute jumps on December 13, 2013. After half a year of waiting for the outcome of the proceedings, the supplier was finally selected.

On May 27, 2014, the Inspectorate of Armaments announced the best offering - the new helmets will be provided by Przedsiębiorstwo Sprzętu Ochronnego Maskpol. The competing in this proceeding Lubawa company appealed against that decision. National Chamber of Appeals (KIO) upheld the decision of the Inspectorate of Armaments and thus confirmed that Maskpol will get the contract.

The contract which requires the supply of helmets, covers, and technical support amounts to approximately 5.15 million PLN gross. The term of the contract has not changed so far. In line with previous assumptions, the helmets are to be delivered between June 1 and November 30, 2014.

The contractor is going to prepare a completely new design for the paratroopers. So far PSO Maskpol offered two models of helmets for airborne troops: HA-02 and HA-03. These constructions have been known for at least four years and were shown on the International Defense Industry Exhibition in Kielce.

## Purchase of Rosomak-WRT

Inspectorate of Armament has signed a contract worth 233.5 million PLN for the supply of 34 Rosomak-WRT technical reconnaissance vehicles.

As part of the agreement, Military Mechanical Works in cooperation with WZM Poznań (responsible for specialized housing) and ZM Tarnów will provide a second prototype of Rosomak-WRT technical reconnaissance vehicle for qualification research, and after obtaining positive results, the remaining 33 vehicles from the series. It is worth noting that the agreement with the Inspectorate of Armaments we can also find the name of the Military Mechanical Works, and not Rosomak - Siemianowice Śląskie, which is the current name of the company.

This will be the first series of the Polish Army vehicles equipped with remote weapon control modules. Unmanned ZSMU-1276A3 turrets with 7.62-mm UKM-2000C tank machine gun will be provided by Mechanical Works from Tarnów. The requirement is to equip them with caliber 7.62 mm weapon position, but it is also suitable for mounting the structure for 12.7 mm x 99 ammunition.

The prototype of Rosomak-WRT was shown at the International Defense Industry Fair in 2011, and the modified vehicle was presented in Kielce a year later. The crew of technical reconnaissance vehicle amounts to 4-5 soldiers, and consists of a driver, commander, two mechanics and, depending on the needs, a paramedic.

The task of the Rosomak-WRT is to provide basic technical support to damaged and immobilized vehicles, therefore it is equipped with a HIAB crane with a lifting capacity of only 1 ton. Difficult repairs will be carried out by future Rosomak-WRT technical assistance vehicles with a boom with a lifting capacity of 4 tons, able to raise the drive unit of Rosomak-1. Towing of damaged armored personnel carriers will be performed by a heavy wheeled technical evacuation and rescue vehicle based on 8x8 truck chassis.

## Mesko SA nominated with the President's Economic Prize

In the twelfth edition of the President's Economic Prize, Mesko SA was nominated in the category of Corporate Governance and Corporate Social Responsibility.

During the ceremony at the International Fair in Poznań, in the presence of the President of Poland, the nomination was given by Chairman of the Award Committee of Commerce Wiesław Rozlucki to Waldemar Skowron, Chairman of the Board of Mesko S.A.

President's Economic Award, also known as the "Polish economic Nobel prize" is one of the most prestigious awards in the Polish business.

Employers of Poland is the institution that proposed the company for nomination. At this stage, Mesko's application was chosen from among others, and after the decision of the judges, it advanced to the stage of the office of the President. The judges, including prominent economists, scientists and media representatives, nominated 15 companies in five categories from among 115 applications. In one of them - Corporate Governance and Corporate Social Responsibility - the nomination went to Mesko, overtaking many established companies. The justification for the nomination indicated that Mesko is a "world-class manufacturer of products and components for all types of ammunition and missiles used by the Polish Armed Forces and those responsible for the security of the state. Within the framework of corporate governance, as the first company in Poland it successfully implemented a pioneering solution for the consolidation of companies with a similar offering profile. The amount of work and determination of the directors and managers of the Ammunition and Missile Group, with which they built a common structure in order to increase the competitiveness of Polish products and promote Polish technical thought is worthy of recognition".

- Economic success is the result of the work of those who made the decisions about the great reform, but in particular of those who developed freedom. It is essential for us to be aware that economic success is the result of a wise and responsible work of those who made decisions on the tops of the Polish state about the great system reform of the system, but most of all is the work of those who

built this freedom in practice - Bronisław Komorowski said while awarding the President's Economic Prize. He stressed that the award is a form of tribute to those who developed economic freedom. He also encouraged not only to celebrate the 25th anniversary of freedom, but to make the calculation to see whether the number of economic barriers increased, and whether we were able to eliminate at least some of them.

President's Economic Award was established by Aleksander Kwaśniewski in 1998 and was granted until 2005. Four years ago, President Bronisław Komorowski brought it back. The ceremony of awarding the prize takes place on the eve of the opening of the International Fair in Poznań.

## New drone in Wicko Morskie

Anti-aircraft military defense training finished in the Central Air Force Training Site in Ustka. For several days the soldiers from 11th Armored Cavalry Division, 12th Szczecin Mechanized Division and 6th Airborne Brigade practiced anti-aircraft and anti-missile combat using the latest equipment. The maneuvers were held during the day and night, using targets simulating enemy aircrafts and missiles. Both KUB and OSA missiles and ZUR-23 anti-aircraft sets were used along with GROM missile sets to defend against enemy attack. The vast majority of fired bullets reached their targets, and the commanders evaluated their soldiers as "very good".

Missile combat shooting on the training site in Wicko Morskie was also an opportunity to showcase the military and uniformed services the work of the Polish Defense Holding and the Eurotech - the E-310 unmanned short-range platform. During the seminar on unmanned systems, the participants were able to find out about the capabilities of such system, as well as what other areas they may be applied in. It's not only combat and typical military use - they can also be used to patrol forests and borders or to spray agricultural crops. The task depends on the equipment the drone will be equipped with. During field exercises, E-310 was presented in action. The participants could watch and also see through the drone's camera.

E-310 Unmanned Airborne System was designed to carry high-end optoelectronic reconnaissance and radar sensors as well as other specialized equipment. The platform is also infrastructure-independent, because it uses a launcher for takeoff; the launcher can be set in any area, it is easy to transport, and its open interface is prepared for integration with other systems.

## RADMOR with the award for radio

RADMOR S.A. received the amber medallion award at Balt Military Expo 2014 for "R3507 software-defined radio".

Considering the solution applied in the radio, the company deserved this award. It is a modern Polish Software-Defined Radio (SDR), which is able to provide interoperability between different types of troops. The device is equipped with an interface compatible with SCA (Software Communication architecture), allows easy implementation of various kinds of software (waveform) that defines the properties of the device.

R3507 is a broadband device (as opposed to the R3501 radio which is currently used by the army) providing short-range tactical communications (VHF / UHF) allowing the transmission of voice and data, reading and transfer of GPS position and in repeater sets - conversion of signal between radio networks.

So one device replaces a whole series of standard radio equipment intended to operate in a narrow band of frequencies, which reduces the amount of types of modes of communication, simplifies and reduces the costs of operation.

It is light (0.9 kg) and compact (measuring 220x86x44mm), capable of operating in the frequency bands from 20 - 520 MHz, with different channel width parameters.

# BALT MILITARY EXPO 2014



On 24-26 June 2014, BALT MILITARY EXPO 2014 took place in the AMBEREXPO Congress-Exhibition Centre in Gdansk. It is the largest event of this kind in the Baltic Sea region, presenting the latest solutions for the defense and security of maritime extraction industry and infrastructure objects.

The exhibition, organized under the auspices of the Ministry of Defense and the Naval Inspector, provided an excellent opportunity for establishing fruitful contacts by companies from the naval defense and maritime security industry, who offer various types of marine systems.

Challenges which are faced at the sea, are undergoing a fundamental transformation under the influence of new measures aimed at ensuring the safety, changes in the world of technology, new trade and energy concepts, and due to the increase of non-conventional threats. The growing importance of marine resources and the safety of sea routes, as well as the culmination of the expansion of coastal economic zones at an unprecedented extent changed the image of safety at sea. Current maritime governance is a crucial result of evolutionary changes occurring in response to regional and global changes in the balance of power. BLT-MILITARY-EXPO exhibition organizers want to build mutual understanding, which would indicate new, emerging trends, and show how to best predict the coming future, so as to take advantage of current and future opportunities to conduct successful transactions.

## The most important event for the industry

The current edition of the exhibition was a strategic event associated with the beginning of the Navy Modernization Program that is part of the "Development of the Polish Armed Forces in the years 2013-2022" program. In September, the government adopted a multi-annual "Priority tasks of technical modernization of the Armed Forces" program. The cost of the program for the years 2014-2022 amounts to 91.5 billion PLN, of which about 16 billion will be spent in 2014-2016.

The most important conference event accompanying the BALT MILITARY EXPO 2014 was the sixth edition of the International Conference on Science and Technology "NATCON Marine Technologies for Defense and Security", whose main motto theme was "Cybersecurity at sea". The joint initiative of the Naval Academy, Research and Development Centre for Marine Science and the International Gdańsk Exhibition was extended by two prestigious military academies - Academy of National Defense and the Military University of Technology, which ensured an even higher quality of the content of the conference.

Together with the Association of Medical Rescue Workers, another edition of the International Conference and Exhibition of Medical Rescue "Rescue Expo 2014" was organized, which is one of the most important industry events for paramedics.

BALT MILITARY EXPO 2014 participants were the most important manufacturers and suppliers of the latest generation of weapons, equipment, and equipment from Poland and other countries. National booths of France and Great Britain deserved special attention, presenting more than a dozen companies offering the latest military marine technologies. Polish Chamber of National Defense Manufacturers - co-organizers of BALT MILITARY EXPO - as part of the Defense Sector Industry Export Promotion Program funded by the Ministry of Economy, organized the Polish booth.

## Modernization of the Navy

The year 2013 has seen a breakthrough in the process of reconstruction and modernization of the Navy forces through the realization of the provisions of "Navy development concept for 2022 with the perspective for 2030". An operational program is now being implemented based on it - combating the risks at sea in 2013-2022/2030, which will take Polish navy to another technological level through the construction and purchase of modern marine weaponry.



One of the main projects of the Operational Programme is a new submarine codenamed ORKA, construction and equipment of which will be based on the latest trends and operational requirements. Its main advantage is not only the most modern weapons for fighting submarines, ships and land units, but also the ability to stay underwater for long periods of time.

Another important project of the Programme is the MIECZNIK coastal defense ship, which is a multipurpose unit designed to combat threats in coastal waters, as well as to perform the tasks in open waters as part of allied task forces. It is impossible to avoid the connotations of tasks of that ship with those laid down for the traditional multipurpose corvette, but the differences will be applied to both the task priorities and equipment of Miecznik.

CZAPLA patrol unit with anti-mine capabilities will be smaller than Miecznik, but both constructions will be based on the same type of hull, which will not only save resources in the construction phase of a total of 6 units of both types of ships, but will also reduce the maintenance costs in the future. Czaplą is part of the modern trends

of development of European fleets to increase the operational capacity of the units of this class by equipping them with the so-called mission modules. In addition to dedicated anti-mine module, Czaplą will be able to carry other types of modules, including reconnaissance, hydrographic and social modules.

Another type of patrol ship in the Navy is ORP ŚLĄZAK, which will be built on the basis of the unfinished hull of Gawron multipurpose corvette. Despite the change in configuration of the equipment of the originally planned unit, Ślązak will be a fully functional, fast patrol and escort ship. It will also meet the requirements designed for naval command units and will be used as a platform for carrying mission modules.

The planned construction of three modern KORMORAN mine destroyers by a consortium of Polish companies is important for the Polish defense, but also for Polish involvement in the allied operations. Hulls of these ships are made of non-magnetic steel, and its equipment will consist of systems which are a product of Polish designers.



MARLIN joint operation support ship constitutes a completely new category in the Polish Navy, and due to its displacement it is also the largest unit of the Polish Navy. Having this type of ship is important from the perspective of operational requirements of the Armed Forces and fits the NATO Sea Basing Concept, which describes the transportation of components for ground and special units, their operation and support from the deck of this ship. In addition to Marlin's military purposes, it was also designed for the evacuation of Polish citizens from endangered regions of the world and provision of humanitarian aid at any point on the globe. The unit will perform the role of a hospital and command ship.

Its hull will be the base for DELFIN reconnaissance ship and HYDROGRAF hydrographic ship. A rescue unit codenamed RATOWNIK will be slightly larger. It will mainly perform military tasks in relation to allied forces, but will also be included in the national and international system of sea rescue.

In addition, drones that are already used by modern navies, will constitute a new category of equipment in the Polish Navy. Operating in an underwater, surface and air environments, the drones ensure increased effectiveness and efficiency of operations at sea. These assets will be used both from the decks of ships, as well as shore positions.

It's hard to imagine the Navy functioning without naval aviation. Based on the operational program of the Air Force, 6 modern maritime helicopters for combating submarines and performing rescue tasks will be purchased. Introduction of three MPA aircrafts to the Navy is also planned.

Effective and timely implementation of the provisions of the Operational Programme for the years 2013-2022 will slow the progressive decline of the potential of the Polish Navy that has been advancing in the last years. This will also significantly increase combat capabilities and operational capabilities of the Navy forces.



# Unmanned Aircraft Systems Consortium **BS9** – consolidation of industry and science

Unmanned aircraft systems (UAS) are one of the fastest growing segments of military equipment. Although it is accepted that the leaders in this field are the U.S. and Israel, it is a fact that Polish companies, in collaboration with leading research centers, have the power and ability to meet the needs of the Polish Armed Forces, expressed in the plans for military equipment for the next 10 years. The developed technologies will also find application in the civil markets. The resulting Polish products are already competitive in the global market and are winning tender proceedings having recognized world champions in the field of UAS as rivals.



In mid-2012 the Inspectorate of Armaments of the Ministry of Defense developed and sent to stakeholders a set of inquiries (RFI) related to the complete family of unmanned aircraft systems. Inquiries were divided into the following types of systems:

- UAS mini class,
- UAS mini class for vertical take-off and landing VTOL,
- UAS short-range tactical class,
- UAS mid-range tactical class,
- UAS MALE class (Medium Altitude Long Endurance).

The content of the listed documents shows that an attempt was made for a very systematic approach to identifying market opportunities and realistic estimation of the costs of the purchase and use of unmanned systems. On the other hand, for potential suppliers, the RFI documents are a valuable source of information on the considered needs of the armed forces.

Polish Armed Forces are planning to purchase more than 90 sets of unmanned systems over the next 10 years. Due to the fact that the acquisition of UAS is treated in terms of ensuring national security, the fulfillment of a secure supply chain condition is necessary. This means that the order will probably be directed to the domestic industry operators with the possibility (if necessary) to obtain partial technical solutions from foreign partners. Taking this into account, WB Electronics S.A. undertook the task of consolidating Polish scientific and industrial entities in order to achieve technical and

BS9 Consortium has a wide range of competencies needed to design, test, manufacture and deploy unmanned aircraft systems for the Polish Armed Forces. The critical technologies include:

- composite airframe structures,
- on-board avionics,
- autonomous control systems - autopilots,
- mission computers,
- stabilized multi-sensor observational heads
- wireless data links,
- steering and control station software.

Taking into account the expected specific requirements of the military, a scenario is feasible in which it will be necessary to acquire some technology from a foreign partner. This process will be possible within the BS9 Consortium because of the large experience

can be offered to the customer. An example of this approach is the FlyEye mini-class system. This system has been developed based fully on WB Electronics SA's own funding. It is also the only Polish unmanned system implemented for use in the Armed Forces and also the only Polish product tested in real combat conditions as part of the Polish Military Contingent. This system has been in operation since 2010, providing invaluable experience for both the user and the supplier. The result of these experiments was the introduction of a number of improvements that have been implemented in the supply since 2013.

In addition to the mini UAS FlyEye, the consortium members are implementing the work related to other unmanned systems, which together form a complete UAS family. The smallest representative of this set is a miniature unmanned system for vertical take-off and landing (VTOL MiniUAS) VIRTUS. This system was developed

VTOL property of the system is achieved through the use of high-power electric motors. On the other hand, the electric drive offers lower endurance compared to liquid fuel supply. Therefore, the MANTA system uses an innovative solution in the form of hybrid drive. Relatively quiet and efficient electric motor drives a generator, which constantly recharges the buffer battery. Electricity is taken in depending on the needs of the starting rotors or traction motors. With the described solution a quiet drive was created that allows very sophisticated control over vertical and horizontal course, and allows longer flight.

Institute of Aviation, which is part of BS9 Consortium, is a co-author of the unmanned helicopter system based on ILX-27. It is a system whose properties fit between the mid-range tactical class and MALE tactical class (Medium Altitude Long Endurance). Helicopter enables taking up to 300 kg of payload. Such a large capacity makes it possible



organizational capabilities to deliver a complete family of unmanned systems for the Armed Forces. In August 2013 the BS9 Consortium was appointed, whose goal is to provide the said capacity of delivering the UAS solutions. The consortium brings together the following entities:

- WB Electronics S.A. - leader of the Consortium,
- Institute of Aviation,
- Military University of Technology,
- Military Electronic Works,
- Military Engineering Works,
- Silesian Science and Technology Centre of Aviation Industry Ltd.,
- AM Technologies Sp. z o.o.,
- Flytronic Sp. z o.o.

of the consortium members in the field of technology absorption and cooperation in many international technical projects. In the case of the use of foreign technologies, it will still be possible to produce components in Poland. This approach is part of a trend of ensuring security of supply, where the production of system components will take place in Poland, giving instant access to spare parts.

In Poland, projects related to UAS are implemented in many institutions, mostly academic. They are mainly funded by the National Center for Research and Development. Several projects received funding from the European Union. A pragmatic approach, however, draws special attention to the initiatives funded the businesses' own money. Business logic dictates that these particular projects are characterized by the highest degree of rationality in functional characteristics in relation to the incurred costs. Teams implementing these projects are the most determined to create a real product that

by WB Electronics SA and Warsaw University of Technology. The project was overseen by the representatives of the Ministry of Defense and has been tested in the field, according to the guidelines defined by the user's potential future military use scenarios. The product is characterized by a good quality data link dedicated to work in urban areas (beyond visible line of sight), dual-core (daily and infrared) observation head and a long - for this class of equipment - flight time.

Another example of a system developed in BS9 Consortium is short range tactical class unmanned aircraft system MANTA designed by Flytronic. A special feature of the flying platform that constitutes a part of this system is capability of vertical take-off and landing, while maintaining all the characteristics of a classic airframe. The result is an aircraft that does not require any pre-prepared runway, and still retains endurance unattainable by a rotorcraft.

to take not only sophisticated sensors observation, but also weapons on board.

It is also worth noting that Flytronic, which is part of BS9 Consortium, is the first Polish certified training center. The Civil Aviation Authority granted a certificate both to the center and its instructors and examiners. Certification Flytronic as a manufacturer of unmanned aircraft systems is now taking place.

For many years the members of BS9 Consortium have been involved in the legislative process to allow the use of unmanned aircraft systems in the civilian space. The problem is so significant that the systems manufactured by BS9 Consortium, with minor modifications, can be successfully used by civilians. Technical capabilities in this area have been around for a long time, the only limits are the legal conditions.

## Eurosatory 2014: exhibition of military equipment in Paris

From 16 to 20 June, the Eurosatory 2014 international exhibition armaments industry was held in Paris. This is one of the largest and most important exhibitions in the world. More than 1.5 thousand companies from 58 countries showed up, offering security and defense equipment. According to preliminary estimates, nearly sixty thousand people attended the event.

For five days, on almost one hundred and seventy thousand square meters of exhibition space, all major arms companies in the world presented their latest weapons and army equipment.

The event was definitely dominated by vehicles, in particular, the MRAP-class mine resistant vehicles. The smallest and lightest

constructions in this class were presented, that is, Mine Resistant Utility Vehicles (MRUV) weighing no more than 10 tons.

As previously announced, robots and drones were also presented at the Eurosatory. Every third stand presented an unmanned aircraft, an autonomous ground vehicle or a pyrotechnic robot.

The biggest defense industry event in the world was attended by ten Polish defense companies - WB Electronics, Flytronics, Radmor, Cenrex, Dezamet, Mesko, Nitro-Chem, Pioneer Arms Corp from Radom, Agregaty Pex-Pool Plus and Radiotechnika Marketing.

Ministry of Defense had its debut at the exhibition. Deputy Minister Czesław Mroczek, who is responsible for the purchase of new equipment and armaments, participated in more than twenty meetings with representatives of other armies and industrialists from around the world during the two days of his stay in Paris.

The Minister, who was accompanied by the Armament Policy Department director - Brigadier General Włodzimierz Nowak

- and Director of Strategy and Planning Department of Defense - Brigadier General Stawomir Wojciechowski - met with the French delegation, chaired by the Minister of Defense of France, Jean-Yves Le Drian, with a delegation of the Ministry of Defense of Lithuania, chaired by the Director General for military capabilities and armaments Brigadier General Gintautas Zenkevicius, as well as with representatives of the ministries of defense of Finland, Israel, Spain and Slovakia.





# PIAP GRYF<sup>®</sup> robot

PIAP GRYF<sup>®</sup> is a robot used for reconnaissance of terrain and hard to reach places. The manipulator with 5 degrees of freedom allows lifting loads weighing up to 15 kg. The robot's wheels can be easily removed, which reduces the dimensions of the robot and thus facilitates operation in tight spaces.

Owing to the applied drives, the robot smoothly overcomes uneven terrain and obstacles up to an angle of 45°. The robot is characterised by excellent manoeuvrability. Low weight makes it easy

to transport and carry the robot, and its modular design allows for quick and easy change of additional equipment.

PIAP GRYF<sup>®</sup> mobile robot is designed to work with a variety of accessories, which include: disrupters (e.g., RE 70M3 Plus - Chemring, Proparms Recoilless 12.5 mm and 20 mm), shotgun (e.g., Benelli), X-ray (e.g., Vision-X MK-5), explosives trace detector (e.g., M0-2M), active winder with fibre optic cable, main for remote detonation of explosives.



Signing of contracts for

**TYTAN** system



On 26 June 2014, at the headquarters of PCO S.A. in Warsaw, an agreement for the implementation of development work and a framework agreement for future delivery of TYTAN system for Armed Forces were signed. The ceremony was attended, among others, by Czesław Mroczek - Secretary of State in the Ministry of Defense, Col. Dr. Adam Duda - 1st Deputy Head of the Inspectorate of Armaments and Division Gen. Janusz Bronowicz - Inspector of Land Forces.

Inspectorate of Armament concluded negotiations with the consortium made up of 13 organizations representing Polish defense potential, with PCO S.A. as the leader of the Consortium, for the implementation of development work entitled "Advanced Individual Fighting Systems codename TYTAN", and negotiations related to the signing of a framework agreement for the supply of the above-mentioned military equipment. In addition to the Polish defense industry plants, the consortium also includes research and development institutes as well as Military University of Technology.

Signing of both the agreement for the development work and a framework agreement for the supply is a prerequisite for the continuation of the process of obtaining Advanced Individual Fighting System codename "TYTAN".

On February 12, 2013 an invitation to negotiations was sent, and from 19 April 2013, negotiations with the participants of the consortium were held. Because of the complex architecture of the system (integrating 27 elements), issues related to intellectual property rights resulting from the work of AIFS TYTAN and various sources of funding (MON, MSP, NCBiR own contributions), negotiations lasted until May 2014.

The Contractor shall provide the Buyer with full intellectual property rights to the results, financed from the budget of the Treasury and license for products included in the complete set of AIFS code-name TYTAN, developed from the Contractor's own funds.

**The result of the implementation of the TYTAN system will be the improvement of the effectiveness of dismounted soldiers in combat environment in the following key capabilities:**

- providing him with weapons and the ability to observe the battlefield, in order to make the enemy unable to fight or eliminated;
- survival of the soldier on the battlefield despite the various types of threats;
- extending the effective time of operation of the soldier on the battlefield;
- enabling the growth of pace of operations, expanding the space on which they are conducted, increasing situational awareness, obtaining visual, audible and sensory information;
- allowing the extension of the geographical area of operations of the soldier and increasing the speed of reaction to threats occurring on the modern battlefield;
- co-operation with higher-level BMS command system.

**AIFS TYTAN includes:**

- C4I subsystem - operation management subsystem;
- subsystem for surveillance and reconnaissance (including sights);
- weapon subsystem, including ammunition;
- equipment transport subsystem;
- subsystem of uniforms, ballistic protection and defense against WMD.

**A coherent system of soldier equipment will:**

- use digital technologies, advanced instruments of observation and means of communication;
- have modular weapons, ballistic shields and sensors for enhanced security and the combat capabilities of the soldiers;
- provide optimal integration of modern weapon and equipment elements, coupled with professional preparation and management of combat operations
- work with communication and IT systems installed in land vehicles and aircrafts (helicopters, drones);
- allow inclusion in command, reconnaissance and tactical information flow systems, including collaboration with BMS system;
- be an open system that is prepared for the expansion and modernization in the future, taking advantage of the progress in the development of new technologies, the experience gained during the training combat operations in peacekeeping and stabilization missions.

**Within the TYTAN program:**

- first TYTAN sets will be delivered in 2018, after the successful completion of the development work undertaken in the years 2014-2017;
- testing of prototypes of AIFS TYTAN involving soldiers (17 BZ);

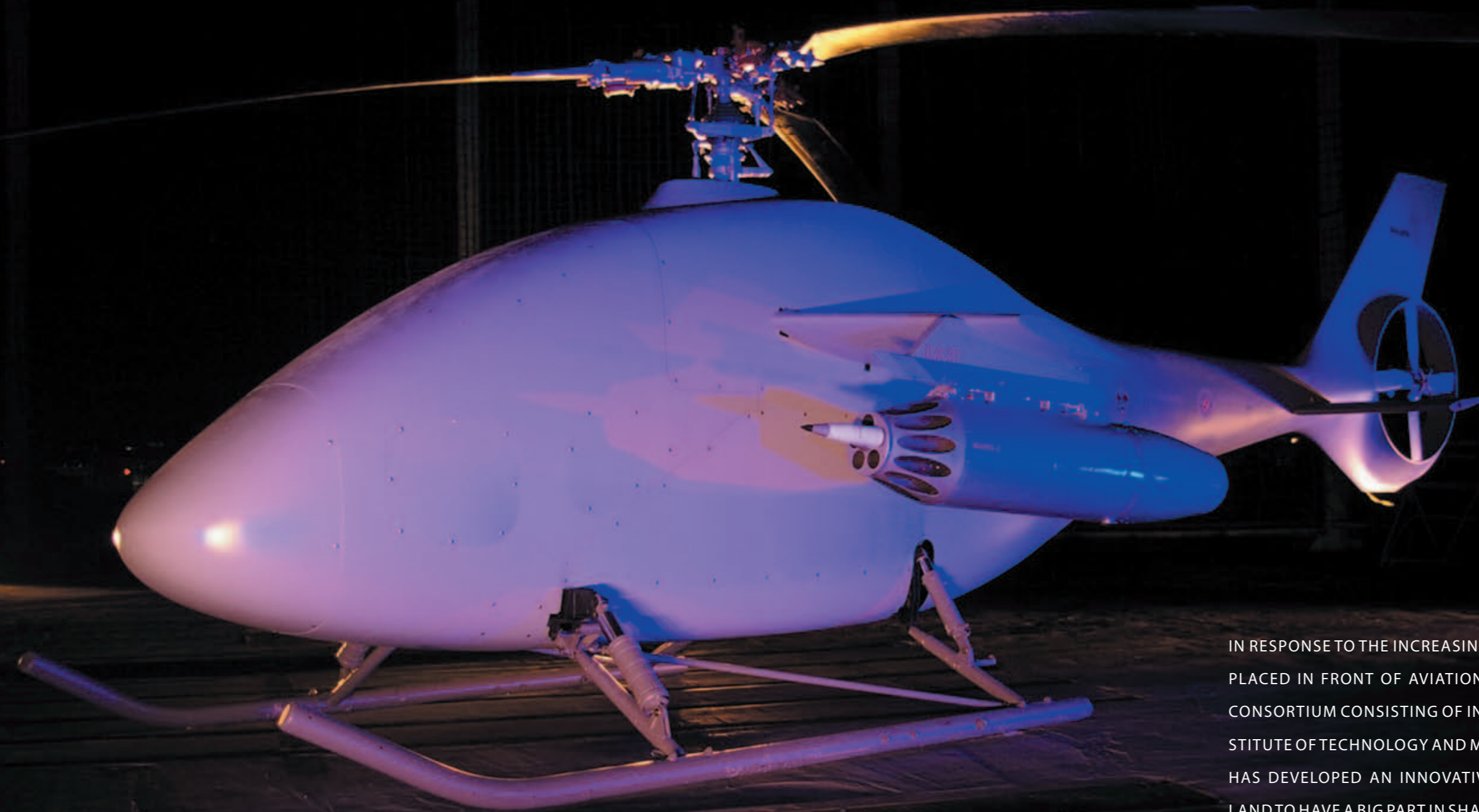
**Inspectorate of Armaments concluded negotiations with the consortium made up of 13 organizations representing Polish defense potential, ie:**

**PCO S.A.**,  
ul. Jana Nowaka – Jeziorańskiego, 03-982 Warszawa  
– leader of the consortium,  
**Polski Holding Obronny Sp. z o.o.**,  
Al. Jana Pawła II nr 11, 00-828 Warszawa,  
**PIT-RADWAR SA.**,  
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**Fabryka Broni „ŁUCZNIK” – Radom Sp. z o.o.**,  
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**Przedsiębiorstwo Sprzętu Ochronnego „MASKPOL” S.A.**,  
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**Wojskowa Akademia Techniczna**,  
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**MESKO S.A.**,  
Legionów 122, 26-111 Skarżysko Kamienna,  
**Zakłady Metalowe „DEZAMET” S.A.**,  
ul. Szyrowskiego 1, 39-460 Nowa Dęba,  
**Wojskowy Instytut Medycyny Lotniczej**,  
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**Wojskowy Instytut Higieny i Epidemiologii**,  
ul. Kozielska 4, 01-163 Warszawa,  
**RADMOR S.A.**,  
ul. Hutnicza 3, 81-212 Gdynia,  
**Zakłady Mechaniczne „Tarnów” S.A.**,  
ul. Kochanowskiego 30, 33-100 Tarnów,



## UNMANNED HELICOPTER ROBOT FOR SPECIAL TASKS

# ILX27



IN RESPONSE TO THE INCREASINGLY MODERN CHALLENGES THAT ARE PLACED IN FRONT OF AVIATION IN POLAND AND IN THE WORLD, A CONSORTIUM CONSISTING OF INSTITUTE OF AVIATION, AIR FORCE INSTITUTE OF TECHNOLOGY AND MILITARY AVIATION WORKS NO. 1 J.S.C. HAS DEVELOPED AN INNOVATIVE DESIGN WHICH WILL ALLOW POLAND TO HAVE A BIG PART IN SHAPING NOT ONLY NATIONAL, BUT ALSO INTERNATIONAL TRENDS IN THE DESIGN OF A NEW GENERATION OF HELICOPTERS AND RELATED TECHNOLOGIES.

At its world premiere during the ILA2012 exhibition in Berlin, the helicopter aroused great interest and admiration from viewers. Similarly, during its Polish premiere at the Kielce International Defense Industry Exhibition in September 2013 it has been appreciated not only by the visitors, but also by the Minister of National Defense, who awarded the ILX with a special distinction. Unmanned helicopters, like unmanned aircrafts, can be used in many different ways. ILX-27 will effectively perform civilian as well as military tasks:

■ **Military use:** supporting the activities of the armed forces, special operations carried out in difficult conditions (mountainous and forested, urban, contaminated or at risk of attack) as an alternative to the use of manned resources.

■ **Civilian use:** Police, Border Guard, Fire Brigade, Emergency Response Service, sea rescue, detection of contamination, fishing, forestry, cartography, etc.

Rapidly developed design (3 years passed from conception to the construction of a prototype tested in flight, cost: 18 million PLN) is a collaboration of three Polish companies with the financial support of the National Research and Development Centre. Due to the use of composite materials in the construction of the helicopter, high payload (load limit) was reached, which amounts to 300 kg with a maximum takeoff weight of 1100 kg. This means that ILX-27 will be able to carry out evacuation, take on a wounded soldier from the battlefield along with his equipment and transport him to the combat-free zone, where the relevant services will be able to provide immediate assistance. The installation of advanced observation equipment, supplies transport, or putting precision weapons on suspensions are examples of the use of the helicopter, which can be freely developed or modified to suit the user's needs. The helicopter of this type will deliver necessary cargo (this may be ammunition, equipment, weapons, medical supplies) to the combat areas, precisely lowering it in a low hover. After delivering the cargo, it becomes an accurate and dangerous direct support weapon.

Costs of the loss of such a helicopter on the battlefield are incomparably lower than the costs that occur with conventional helicopters – manned vessels. Innovative solutions used during the development of the helicopter have a huge impact on its maneuverability and high performance, which are necessary for the proper and safe completion of the hardest missions.

The most fundamental specifications that should be noted include: maximum velocity – 215km/h, range – approx. 450 km and rate of climb – 10m/s. Its innovative features include: a tunneled tail rotor, whose tunnel becomes a vertical stabilizer at the top part (the first, completely Polish construction of this type); a modular design; light-weight composite structure which is resistant to deformation; skid chassis withstanding touchdowns up to 5 G and the fact that most of the main components of the helicopter (main rotor head, rotor blades, steering wheel, support structure, main transmission, tail rotor, chassis and control system components) were designed and built from scratch.

The design also includes proper settings of individual characteristics of the automatic control system. The first prototype has undertaken ground tests. In September 2012, successful flight tests were carried out; it turned out that ILX-27 performs very well in a low hover and during vertical takeoff. It is always one of the most difficult steps in testing new helicopter, because there is always a risk of excessive vibration and resonance. The structure of the helicopter consists of a lattice of small diameter tubes. The whole system gives the impression of being light, with perfectly matched joint angles. The construction evenly distributes the load and the static and dynamic stresses throughout the structure of the hull, making it durable and resistant to deformation.

ILX-27 is a highly specialized, new generation tool that meets the needs faced by the development of technology in the service of the country for the near future. It is the only European construction of unmanned helicopter of this type that uses only Polish technologies.





# M28

Best In Class Safety & STOL performance  
utility aircraft to support your needs

Polskie Zakłady Lotnicze Sp. z o.o. – PZL Mielec A Sikorsky Aircraft Company is the biggest Polish manufacturer of aircraft currently expanding its production profile to include aerostructures and helicopters. On March 16, 2007, 100% of the shares of Polskie Zakłady Lotnicze Sp. z o.o. were purchased from ARP SA by United Technologies Holdings SA (UTH), a subsidiary of United Technologies

Corporation (UTC). The new era was initiated not only in the history of Mielec aviation industry but also in history of the company itself. As a part of UTC.PZL initiated cooperation with Sikorsky Aircraft Corporation – a world leader in helicopter production, including the UH-60 BLACK HAWK S-76\* and S-92\* models.

**pzlmielec**

A Sikorsky Company

**M28® AS UNIVERSAL PLATFORM**

The high performance STOL M28® family airplanes are a twin-engine high-wing cantilever monoplanes of allmetal structure, with twin vertical tails and a tricycle non-retractable landing gear featuring a steerable nose wheel.

**The airplane characteristics include:**

- short takeoff & landing (STOLL capability, • high useful load, mission versatility,
- unpaved airstrip operating capability,
- easy access through rear cargo door, fitted with a hoist for cargo loading and relocation inside the cabin,
- high-wing arrangement for protection of engines and propellers against damage when operating from unpaved airstrips,
- easy and quick conversion of the cabin interior configuration,
- low operating cost,
- PT6A-65B engines allows best in class STOL aircraft performance and provide high safety margin of operation,
- Inverted engine configuration for efficient protection against foreign object ingestion owing to inertial separators installed inside air inlet ducts,
- Very quiet and effective 5 blades Hartzell propellers.

Depending on the equipment installed, the airplane can be operated in various mission versions:

- passenger transport (19 seats or 18 seats plus toilet),
- cargo transport (2300 kg payload),
- passenger/cargo transport mix,
- paradrop (17 seats),
- ambulance /medevac (6 stretchers, 8 seats, 2 medical attendant's seats including observers' seat)
- search and rescue SAR
- Patrol/ Reconnaissance

Aircraft reconfiguration is very quick due to universal mount standard (ANCRA Rails) M28®05 airplane holds the many civil international certificates.

**M28® B/PT: STATE OF THE ART AVIONICS FOR ALL MISSION PROFILES**

M28® B/PT Glass Cockpit airplane allow to use unique platform performance to perform a flights into both: civil and military environment and is dedicated to support every missions where typical commercial transport airplane cannot be used.

**M28® 05: PERFORMANCE FOR CIVIL OPERATORS**

Operations from difficult areas with no advance infrastructure, unpaved runways, high mountains, coast are not problem when M28® capabilities are used. You can safely transport passengers up to 19 passengers, cargo drop paratroopers or pallets in non-reachable areas wherever you need and whenever you need. In the cargo transport version, the airplane is suited for carriage of cargo boxes, loose or, when liquid, in special container inside the fuselage or in barrels. In a passenger version you can transport. Best in class airplane performance in connection with CNS/ATM compliant night and radio/navigation equipment provides for VFR and IFR flying capability, day and night, including TAWS A and TCAS II systems required by the most of authorities for passenger transport.

**M28® 05 as a basic platform airplane holds the following certificates:**

- U.S.(FAA A56CE). EASA /European Aviation safety Agency)
- EASA .A058 TCs
- Indonesian A054.

**M28® 05-SG: BEST COMPROMISE OF COST AND PERFORMANCE FOR PATROL AIRCRAFTS**

M28® performance and high payload in connection with high range of operation about 1500 km and more than 6 hours flight duration make a M28® cost effective and high performance platform for every medium range patrol missions.

To realize SAR/MPA or ISR missions aircraft can be equipped in various systems:

**Multifunctional Patrol Radar of Polish manufacture**

- Thermovision Camera
- Direction finder system Chelton
- Crew & SAR rafts - option
- up to four operator stations
- TRON 30S beacons (external & internal)
- Spectrolab SX- 16P Nightsun searchlight
- Flares carriage/release system - option
- Pollution IR/UV scanner- option

**M28® B/B1R**

As all M28® airplanes from the family Bryza's offers the same performance and because is used for military purpose M28® B airplanes holds polish military TC and are successfully used by polish AF and NAVY in various configurations.

To realize SAR/MPA or ISR missions aircraft can be equipped in various systems:

**Multifunctional Patrol Radar of Polish manufacture**

- Thermovision Camera
- Direction finder system Chelton
- Crew & SAR rafts - option
- up to four operator stations
- TRON 30S beacons (external& internal)
- Flares carriage/release system- option
- Pollution IR/UV scanner- option

For NAVY configuration airplane can be equipped also in:

- Hydroacoustic I magnetometric
- submarine detection equipment
- Transmtss1 ondata link(s)
- RWR/ESM self protection

Intelligence Surveillance Reconnaissance/Search and Rescue co M28 equipped in maritime patrol airplane is successfully used by Polish Border Guard and MPA/ ISR platform in various configurations is used by the Polish navy.

**MILITARY OPERATIONS BENEFITS:**

- Digital military VHF/UHF (HO I. II)
- High power military HF rad10 {ALE capable} Double mode TACAN
- IFF mod 4 transponder with mod 5 provision
- NVIS Cockpit and navigational lights
- Dual EGis allows precise navigation in all conditions
- Special mission software and hardware provisions
- Civil equipments (TSO qualified) needed for VFR/IFR airspace for current CNS/ATM requirements
- Performance and systems requirement (RNP <0.3NM) EHS/ELS Transponder
- TCAS II/ TAWS A safety surveillance equipment
- wx radar with Turbulence detection
- 4 LCD d1sprays with dual FMS (CDUs)
- 3 axis AFCS



## PCO S.A.

### CONTACT

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PCO S.A. became and still is not only the biggest but also nearly the only producer of optoelectronic devices with use of laser technology. Optoelectronics and laser technology are developing dynamically from the late 60's and early 70's of the previous century.

Until today optoelectronic and laser systems are an indispensable element of nearly every type of military equipment.

PCO S.A. was established in 1976 under the name of "Przemysłowe Centrum Optyki w budowie". In 1994 the company was transformed into joint - stock company under the name of "Przemysłowe Centrum Optyki S.A."

In 2002 Minister of State Treasury transferred 80% of PCO's equity to Bumar Sp z o. o. PCO S.A. from the beginning of its existence had a status of defence industry company and realized defence tasks for the needs of state defence and security as a single Polish manufacturer of optoelectronic equipment.

Applying and constantly improving the system compatible with requirements of ISO 9001:2008 and AQAP-2110:2009, we strive to increase customers' satisfaction, recognizing and fulfilling their requirements and expectations regarding offered products. Quality Assurance Policy, established and realized, is a part of strategic goal delineating mission and vision of Bumar PCO S.A.

The company has won many awards. On 25th of January 2014 in President of the Board of PCO S.A. Ryszard Kardasz has received Diamond to the Statuette of the Leader of Polish Business. It is the third Diamond given to President of the Board of PCO S.A. and the Company.

Diamond is an award given to dynamically developing Polish companies. Companies that had received Golden Statuette of the Leader of Polish Business may apply for the award.



## PIAP

### CONTACT

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Industrial Research Institute for Automation and Measurements - PIAP (Pol: Przemysłowy Instytut Automatyki i Pomiarów - PIAP) is a leading Polish research institute, active in the fields of robotics, automation, vision and measurements systems. PIAP was established as a government-owned research institute in 1965. For over 15 years we've been performing innovative works developing mobile robotics applications for security and defense. Our long-term experience and vast network of partners allows us to create and implement complex security system solutions. We are one of the main suppliers for:

- Army,
- Police,
- Fire Brigades,
- Other forces Responsible for public security, crisis management and civil protection.

We are the only producer of the high quality mobile robots for counter-terrorism applications in Eastern Europe. From the very beginning of the development works, both on these and other PIAP's mobile constructions, the future end users of the devices have been taking an active part in the process, which ensures the best quality of our products and their perfect tailoring to the needs and tasks they will be faced with. Currently, PIAP's family of robots includes seven different constructions for C-IED and reconnaissance purposes.

All PIAP's robots have been designed to work with a range of equipment used by the uniformed services. They can be equipped with devices such as a pyrotechnical disrupter, RTG device, command wire for remote detonation of explosives, fiber optic cable roller and many more.

PIAP is focused on creating a wide spectrum of devices and systems dedicated to various applications, including:

- C-IED and EOD operations
- Border and infrastructure protection
- Convoys and patrols escort
- Reconnaissance and remote observation
- Surveillance and patrolling
- Crisis management
- SAR operations



## PZL Mielec A Sikorsky Company

### CONTACT

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Polskie Zakłady Lotnicze Sp. z o.o. - PZL Mielec A Sikorsky Aircraft Company is the biggest Polish manufacturer of aircraft, currently expanding its production profile to include aerostructures and helicopters. On March 16, 2007, 100% of the shares of Polskie Zakłady Lotnicze Sp. z o.o. were purchased from ARP S.A. by United Technologies Holdings S.A. (UTH), a subsidiary of United Technologies Corporation (UTC). The new era was initiated not only in the history of Mielec aviation industry but also in the history of the company itself. As a part of UTC, PZL initiated cooperation with Sikorsky Aircraft Corporation - a world leader in helicopter production, including the UH-60 BLACK HAWK, S-76 and S-92 models.

### Our current product line includes:

S-70i BLACK HAWK - multitask helicopter for international markets.

M28 - a turbo-prop, twin-engine, STOL class (short takeoff & landing) aircraft designed for passenger and/or cargo transportation, paradrop, medical evacuation, marine reconnaissance and patrol flights, and Search & Rescue missions.

M28B Bryza - the military version of the M28 model, designed for special operations (depending on configuration).

M18 Dromader - a single-engine aircraft used in agricultural, fire fighting and forest protection operations.

UH-60M BLACK HAWK™ Cabins, the major structural assembly used to build the Sikorsky UH-60M BLACK HAWK™ Helicopter.

Following the free market rules and operating in accordance with Polish Commercial Code, we pursue manufacturing and commercial activities in the field of PZL designed aviation products and introducing them to international markets. We also cooperate with such aviation industry leaders as: Sikorsky Aircraft, Spirit Aerosystem, Pratt & Whitney Canada and SAAB Aerostructures.



Air Force Institute  
of Technology

## AIR FORCE INSTITUTE OF TECHNOLOGY

### CONTACT

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The Air Force Institute of Technology is a research institute supervised by the Minister of National Defence. The Institute's mission is to support the aviation technology in the field of scientific research.

The contribution of the Institute in the development of the Polish Air Force results mainly from the activities in the field of reliability and flight safety in a broad sense. The significant achievements, valued both in the country and abroad, include hundreds of scientific-research, experimental and construction studies which have been applied by the Polish Air Force

### The institute conducts the following innovation activities

- The design and integration of airborne systems
- Systems for logistics
- Reliability and safety
- Unmanned aircrafts
- Training systems, including e-learning
- Aircraft armament
- Airport and road infrastructure
- Substitute fuels, working liquids and lubricants
- The use of bio-components in oil and lubricant products for the air industry

AFIT provides a wide variety of complex ground and in-flight tests, including aircraft and helicopters certificate tests. It also tests pilot's individual equipment, airborne high-altitude and rescue systems, airborne and ground systems to transmit or display flight parameters, and it designs and develops of flight-test dedicated measuring and recording systems.

It also provides certification tests of aeronautical products introduced into service with the Polish Air Force, including air armament, as well as simulation tests based on models of aircraft flight dynamics. AFIT additionally develops and tests aerial rocket targets used for air defence forces training.

AFIT can upgrade weapon systems for aircraft, as well as develop new designs of air weapons and aerial targets (bombs, airborne rocket launchers and bomb fuses), and new ground-based and flying testing systems for air forces. It also tests air weapons after warranty periods guaranteed by deliverers/OEMs to extend service-life, upgrades the onboard attack avionics systems for aircraft and helicopters. Aircraft simulation, training and modeling.



**WB Electronics S.A.**

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WB Electronics, a private company of Ożarów Mazowiecki, with entirely Polish capital, is one of the major companies of the Polish arms market.

The company, as one of the major supplier for the Armed Forces of the Republic of Poland, has been actively contributing to improving the defence capabilities of the Polish army for more than twenty years. This contribution consists in creation of new technologies as well as modernisation of military equipment.

Compared to large world corporations, WB Electronics is a small company, but with a comparable range of product offerings. WB ELECTRONICS for years has consequently been conquering new areas of electronics and IT applications in the military technology.

Proprietary solutions in new technology make it possible to develop innovatory products with unique utility properties. The offerings of WB Electronics include mainly military electronics, software as well as services associated with integration of military vehicles. The primary client of WB Electronics are the Armed Forces of the Republic of Poland. The company is also actively involved in overseas trading.

The technology offered by WB Electronics is based on long – term experience resulting from the use of the company’s solutions implemented in the Polish army as well as from participation of WB Electronics in international tenders and long – term cooperation with the most demanding customers from around the world.

WB Electronics is a resilient and rapidly growing company, which undertakes new challenges in the field of development and modernization programs for security and defence. Consistency, perseverance, commitment and the belief in continuing development makes company one of the best participants in the Polish and foreign arms markets.

**The strategic directions of development of the offer of WB ELECTRONICS S.A. include:**

C4ISR systems – integrated command support systems and battle-field visualisation systems,

Software – integration of platforms and systems

Military Electronics – gun and cannon automation, communication systems, sensors, computers and terminals,

Integration of Military Vehicle Electronics – in combat vehicles, command vehicles, reconnaissance vehicles, specialist vehicles as well as gun and cannon automation.



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**Polish defence industry**  
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