




POLISH CHAMBER OF NATIONAL DEFENSE MANUFACTURERS

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POLISH DEFENCE INDUSTRY

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PROMOTION
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- MILITARY
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PAGE NO 26



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- Substitute Fuels, Working Liquids and Lubricating Oils
- Biocomponents in POL's Engineering Products



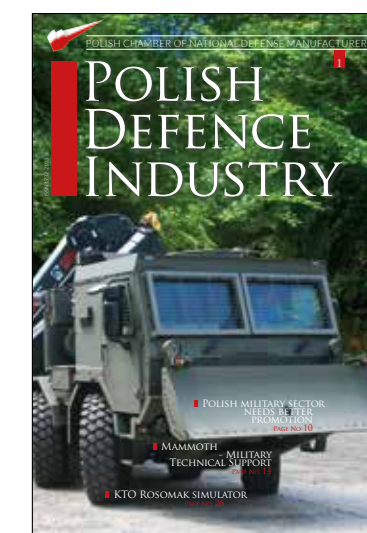
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LADIES AND GENTLEMEN

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 Defense (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 Defense Affairs. President of the Polish Chamber of National Defense since 2001.

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

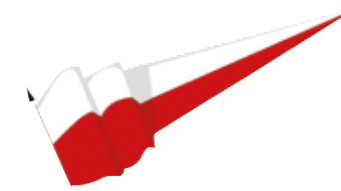
One of the areas that the defense equipment manufacturers are currently focused on are new technologies allowing not only to cut costs, but also increase productivity. In a wider perspective, Polish producers create innovative solutions through research and new technologies – they introduce new products,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

In this edition of our Polish Chamber of National Defense 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
Defense Manufacturers



POLISH CHAMBER OF NATIONAL DEFENSE 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 defense 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 Defense 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 defense, 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 "Cło i Granica" (Border and Customs) Fair in Warsaw since 2004. In 2000, the Chamber has initiated and coordinated the Polish Defense Industry Days in Lithuania, during which, the associated companies have handed over equipment worth approximately 4 mil-

lion 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 defense 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 defense industries were organized (1999 and 2001), I Visegrad Group Defense 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 Defense (12.08.1999), the Chamber signed cooperation agreements with the Army Workers Trade Union (1997), "Solidarity" National Section of Defense Industry (1998), Polish-Arab Chamber of Commerce (2004), National Association of Equipment Manufacturers (1999) and the Employers' Association of Defense and Aviation Industry Enterprises (2003).

In 1999, the Chamber issued the only catalogue of the Polish defense industry. In 1996 the Chamber started issuing the BULLETIN OF THE CHAMBER. In 2003 the Chamber started publishing a bimonthly 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), the Stalowa Wola S.A., MESKO S.A. and RADWAR as well as small businesses and private companies.

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.

**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



POPULATION IN COMPARISON

Rank	European country	Population (mln)	Rank (in the world)
1	Germany	82.1	12
2	France	58.9	20
3	Great Britain	58.7	21
4	Italy	57.3	22
5	Ukraine	50.7	23
6	Spain	39.6	29
7	Poland	38.7	30
8	Romania	22.4	44
9	Netherlands	15.7	56
10	Greece	10.4	70

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SIZE IN COMPARISON

Rank	European country	Size (in km²)	Rank (in the world)
1	Ukraine	603700	43
2	France	543958	47
3	Spain	505992	50
4	Sweden	446964	54
5	Germany	357022	61
6	Finland	338145	63
7	Norway	323877	66
8	Poland	312658W	67
9	Italy	301268	69
10	Great Britain	244100	76

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POLAND PEOPLE, COUNTRY & HISTORY

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 defense of the Polish borders against outside attacks and cooperation with NATO. The armed forces are an essential element of the national defense system, designed for the effective implementation of the security and defense 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.

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.

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.

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 crashing 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.

BUMAR ŻOŁNIERZ - THE BEST EMPLOYER

Bumar Żołnierz (Bumar Soldier) has been distinguished for its solutions in the human resources management. Aon Hewitt, the company which awarded the title, investigated the involvement and the tools used by the human resources department and evaluated the management in the context of plans concerning facing the challenges of the market. The minimal involvement index required to enter the List of the Best Employers amounted to 65%. The employer's brand credibility and their stability has also affected the employer's position in the ranking.

A total of 90 companies, representing more than 51 000 respondents, took part in the study that led to the selection of the best employers. Bumar Żołnierz S.A. ranked sixth in the category of large companies, the highest position among companies involved in production.

THE "LAUR INNOWACYJNOŚCI" PRIZE FOR BUMAR ŻOŁNIERZ

Bumar Żołnierz was among the winners of the Stanisław Staszic "Laur Innowacyjności" Contest.

The prizes have been awarded to companies and institutions which successfully implemented innovative designs and inventions in 2012, while generating measurable results and economic success. The competition has been organized by the Polish Federation of Engineering Associations, The Technical Services Team in Warsaw.

In the 2012 competition, the jury has recognized 23 projects in 12 categories. In the first category - Building Industry, Construction, Safety and Fire Prevention, the Silver "Laur Innowacji" has been awarded to Bumar Żołnierz S.A. in cooperation with the Air Forces Institute of Aviation (ITWL) in Warsaw and The Military Aviation Works No. 1 in Lodz for the "Flight Parameters Display System" project.

LM-60D MORTARS UNDER MODERNIZATION

A contract for the maintenance and repair of the MPM-44/4 mortar sights has been signed.

The District Logistics Base has published information on concluding a contract for the maintenance and repair of the MPM-44/4 mortar sights used in the light LM-60D mortars. The contract has been signed on November 19th of the previous year with the Etronika Sp. z o.o. company from Warsaw. The contract value is 106 thousand Polish Zloty.

ZMT TO BECOME A PART OF BUMAR ŁĄD

The changes in Bumar as an opportunity to increase the number of orders for the Tarnow Mechanical Works (ZMT).

ZMT has so far been a division of the Bumar Żołnierz involved in the production of small arms and individual equipment for soldiers. In the nearest future, it is to be incorporated into Bumar Łąd (Land) division, which specializes in the production of armored vehicles. ZMT, based in Tarnow, has recently concluded a cooperation agreement with OBRUM - the Research and Development Center for Mechanical Equipment in Gliwice, which is also part of the group.

The subject of cooperation will include the development and application of new models of combat, engineering, and training equipment manufactured for the national armed forces. The experts will jointly develop an armor-piercing and anti-aircraft module to be mounted on combat vehicles. The agreement also covers the work on an unmanned turret system equipped with a 30 mm cannon and a SPIKE antitank rocket launcher for the latest version of the KTO Rosomak vehicle.

The agreement significantly increases the construction capacities of both the companies. More than seventy employees are responsible for the research and development in the Tarnow Company. In OBRUM, that number is nearly one hundred and twenty. In cooperation, the companies will have the potential which allows the development of designs and prototypes of modern weapon componentry. According to the management boards of both companies, this will present new export opportunities. In addition to supplying the Polish army, The Bumar Group has customers in over 40 countries in Europe, Africa, Asia, South America and the United States.

BUMAR AMUNICJA HAS MANUFACTURED 2000 GROM PORTABLE ANTI-AIRCRAFT SETS

2000 portable anti-aircraft GROM sets have been manufactured in the Bumar Amunicja (ammunition) Missile Factory.

Bumar Amunicja has manufactured 2,000 units of GROM for the Polish Army. It is one of the key products manufactured in the Bumar Amunicja Factory. GROM, the portable anti-aircraft missile kit is dedicated to target aerial targets, including planes, helicopters and other objects that emit infrared radiation, while at heading and pursuit courses, located within the striking distance.

THE PRESENTATION OF THE ALEX-338 SNIPER RIFLE AND THE RGP-40 GRENADE LAUNCHER

The Tarnow Mechanical Plant has provided a presentation of the weaponry to the Armored and Mechanized Army.

At the testing ground of the Bumar Amunicja S.A. in Skarżysko-Kamienna, a dynamic presentation of the Tarnow Mechanical Plant took place for the representatives of the Polish Armed Forces. The main purpose was to present the operation of two innovative products, which are to be included in the Polish Army equipment - the 8.6 mm Alex-338 sniper rifle and the 40 mm RGP-40 grenade launcher.

Despite the difficult weather conditions the arms presented by the ZMT has done very well. The ALEX-338 rifle has proved its effectiveness - the round pierced an armor plate located 300 meters from the shooting point. The guests had to possibility to learn the advantages of the ALEX-338 rifle, as at the same time, rounds from 7.62 mm kbw, ALEX and 12.7 WKW were shot. The impressive presentation of shooting the WLKM 12.7 multi-barrel machine gun has found a great interest. The effectiveness and versatility are the main, although not the only advantages of the RGP-40 grenade launcher. The presentation in Skarżysko-Kamienna became a good occasion to demonstrate the wide tactical spectrum of the weapon. The RGP-40 can effectively destroy targets using high explosive and cumulative fragmentation shells supplied by the WORKS 11 company. The rate comparison of the RGP-40 and the single-shot PALLAD grenade launchers turned out to be interesting. The presentation of parallel operation has shown a crushing prevalence of the RGP-40 - it is characterized by nearly 30-fold higher rate than its single shot counterpart.

BUMAR SHARES TO GO PUBLIC

In 2015, a minority interest of the Bumar Group will enter the stock exchange.

In the years 2013-2018, Bumar plans to double their scale of operation and reach the sales of \$ 2 billion USD. The Bumar Group President Krzysztof Krystowski explains that the offered minority interest will help to obtain capital for the acquisition of competitors on the Polish market and in the countries of Central and Eastern Europe.

The new strategy provides that in 2018, the positive financial result will amount to 300 million Polish Zloty, while its implementation will cost Bumar no less than 1.5 billion Polish Zloty for the planned research programs.

BUMAR TO PROVIDE AMMUNITION FOR THE POLISH ARMY

Based on the contract, till the end of 2015, the Bumar Group will supply products of its member companies to the Army.

Under the contract, the following products shall be supplied: 5.56 mm caliber cartridges (blind, tracer, with steel core), 9 mm Parabellum cartridges (lead core), wz. 43 7.62 mm cartridges, 7.62 x 51 mm cartridges (tracer and lead core), 12.7 mm caliber cartridges (sniper and steel core), 30 mm Bushmaster cannon shells for the MP-T/SD II (the total quantity of 135,753 pieces), 30 mm Bushmaster II cannon shells for the Bushmaster II APFSDS-T cannon (the total quantity of 48,588 pieces), PG-15W anti-tank rocket cartridges (10,000 units) and 120 mm HE projectiles (1500 units). The ammunition will be used, among others, by the Leopard 2A4 tank crews, KTO Rosomak vehicles and in infantry weapons.

INCREASED DEFENSE BUDGET

The Senate Defense Committee has approved the draft budget act for the defense ministry in 2013. As the new act becomes binding, the budget of the Ministry of Defense will increase next year, by almost 2 billion Polish Zloty, reaching 31.447 billion Polish Zloty.

The draft act assumes that the Ministry of Defense will spend more than 700 million Polish Zloty more for the technical modernization program and nearly 300 million Polish Zloty more for investments, including the infrastructure. Also, the expenditure for the purchase of ammunition of different calibers and types shall increase by half.

The Polish defense budget for 2013 will be more than 7 percent higher than the last year's. The Defense Deputy Minister Waldemar Skrzypczak representing the ministry at the meeting of the commission, emphasized that more than half of the 2 billion Polish Zloty, which will increase the Defense budget, will be spent on capital expenditures, including especially the purchase of new weapons and military equipment. "A significant increase of the expenditures for the modernization of the Polish army and the strategic programs such as the anti-aircraft and anti-missile defense programs, unmanned systems and the Polish Navy has been planned in the 2013 budget," said General Skrzypczak.

POLISH MILITARY SECTOR NEEDS BETTER PROMOTION

How do promotional activities for the Polish defense sector look like on foreign markets?

Are they effective? Are foreign investors interested in working with Poland?

Dariusz Bogdan - deputy minister of economy - answers our questions.

Ministry of Economy initiated the Polish Economy Brand program aimed at strengthening the position of Polish companies and their products and services abroad. It involves promotional activities for the defense industry. How do these activities look like?

Polish Economy Brand is only one part of a larger whole, which is the Ministry of Economy system project "Promotion of Polish economy on the international market," Sub-measure 6.5.1. OPIE. This project primarily involves supporting our exporters, including the defense industry, and their expansion into foreign markets.

We are committed to the promotion of the Polish defense industry, including the support of specific business activities. Detailed information on this topic is available on the website of the Ministry of Economy and Export Promotion Portal, which will ultimately serve as a platform for business contacts with foreign partners, as well as the platform to make offers to buy and sell.

Promotion program for defense products will be implemented in 2013-2014, we have more than 15 million PLN available. The program consists of two parts. The first concerns the promotional activities undertaken directly by the entrepreneurs. It is a participation in foreign exhibitions, trade missions, shows, meetings with clients, etc. Assistance includes counseling, participation in trainings and production of advertising materials. The second part of the promotion of the Polish defense industry are actions that affect the industry as a whole. Contractors for the program are the consortium of Polish Chamber of National Defense Manufacturers and Bumar Żołnierz S.A.

The promotional activities will also actively involve our institutions abroad: Trade and Investment Promotion Sections of Polish Embassies. Their tasks include monitoring the developments in the local weapon markets, including planned tenders for the supply of arms and military equipment.

Who the project is going to promote and how?

Polish Economy Brand promotes Polish products and entrepreneurs abroad through specific marketing activities. We want Polish products and services to become recognizable as brands that are distinguished by high quality, favorable price and professional delivery. This way we can make the Polish Economy Brand become valued and recognized globally. Currently our products and companies are valued highly by foreign clients. The problem is, most of them do not know that they are dealing with a Polish product. Our extensive promotion programs are going to change it.

We chose 15 industries relevant to the Polish export. For each of them we are preparing an individual promotion program. In a few years we want these industries to become the flagship brands that are clearly and positively associated with Poland.

Based on image studies results, we have also developed a visualization of Polish economy promotion and created the Polish Economy Brand Book. The new logo uses Polish national colors, and the designed logo refers to the network of connected figures, arranged in the letter P, which refers to one of our powerful national qualities - the human capital.

How do the Polish promotion activities on foreign markets look like from the point of view of the Polish Economy Brand program?

Currently we are carrying out 15 industry promotion programs in Europe, Asia, North America, South America and Africa. In the coming months, we will also run programs for the promotion of a general nature in priority countries, such as Brazil, Canada, Turkey, Algeria and Kazakhstan.

Industry and general programs assume, among others: entrepreneur participation in trade fairs, exhibitions and trade mis-

DARIUSZ
BOGDAN

deputy minister of economy

sions to the countries concerned.

In addition, we want to reach out to a wide audience by conducting information and advertisement campaigns in newspapers, television and electronic media. We organize industry conferences, visits of foreign journalists in Poland and meetings for contractors, businesses and institutions. We also prepare informational and promotional campaign, which will be conducted in the markets covered by the promotion programs. One of its objectives is to inform the audience about Polish products and services and increasing awareness of the Polish Economy Brand.

Steps to promote the defense market, organized under the program are carried out particularly in Asia and Africa. Does it mean that Polish products are not very well known there?

Poland has been present in the Asian arms market for a very long time. This is particularly true for India, Malaysia and Vietnam. It's similar in the case of North African countries, Algeria and Egypt. Many Asian countries - including India - implement comprehensive technical modernization programs for their armed forces.

But we must remember that these markets are in the area of interest of many renowned companies from the defense industry. As a result, Polish exporters have to contend with strong competition. Both in terms of price and quality of products, as well as the delivery conditions. I mean the ability to start a licensed production of the product or its components in the importing country, availability of credit, delivery dates,

warranty and post-warranty service. That is why promotional activities are so important. They can increase the chance of selling military equipment that is produced in Poland.

The industry program will last until December 2014. How does the Ministry of Economy evaluate the effectiveness of its actions?

Implementation of the defense industry promotion program only began in the fourth quarter of 2012 and will continue until the end of 2014, so it is too early to assess the effectiveness of our actions.

Are foreign investors interested in working with Poland?

Foreign entrepreneurs are open to start business relations with Poland. The biggest interest can be observed in the countries cooperating closely with Poland, i.e. Ukraine, Russia, Czech Republic, Germany and Italy, but also more distant regions - Vietnam, Kazakhstan and Jordan. Americans are also relatively open to establish business relationship with us.

Our advantages are stability and economic predictability, large and absorptive internal market and well-educated people. We can also offer a lot of places where you can locate a large investment - including 16 cities with over 200 thousand inhabitants. Moreover, to the entrepreneurs who start operating in special economic zones, we offer aid in the form of exemption from income tax.



We are also changing the law to improve the functioning of companies and reduce administrative barriers. Thanks to the efforts of the Ministry of Economy, from 1 July 2011 anyone can register their business through the Internet, free of charge. We also prepared two deregulation bills.

The first is the law on the reduction of administrative barriers for citizens and businesses, in force since July 1st, 2011. The second one reduces certain citizen and business obligations and has been in effect since September 16th, 2011.

And this is not all. The next step in the simplification of the provisions is the project for an act that would reduce some of the administrative burdens in the economy.

What is the Polish defense industry associated with abroad? Except for Bumar, is there any knowledge about other Polish manufacturers?

Bumar sp. z o.o. has been present in the industry for many years and is recognized around the world. However, we can see new players who are doing increasingly good on national and international defense market. It's a growing group of private entrepreneurs, including companies with foreign capital. The companies include: WB Electronic S.A. from Ożarów Mazowiecki, AMZ-Kutno sp. z o.o. and Lubawa S.A. from Ostrów Wielkopolski.

What are the recommendations for the Polish economy to become a leading brand in Europe and in the world?

Achieving the project objectives requires the commitment of entrepreneurs, their associations, professional organizations, experts, local governments and central institutions responsible for the promotion of the country. All these groups should also participate in consultations on business promotion strategy.

In addition, it is worth considering the use of a positive image of Polish human capital, to a certain extent already recognizable in international markets. We should also focus on overcoming negative stereotypes about Poland. Brand image studies commissioned by Ministry of Economy show that the most important asset is our people, their knowledge and skills, as well as their willingness to cooperate. Poles, as skilled professionals, are perceived positively and valued very highly.



MAMMOTH - MILITARY TECHNICAL SUPPORT

The KWZT-1 Mammoth Heavy Wheeled Recovery and Technical Support Vehicle provides technical support for mechanized units in battlefield conditions.

The vehicle has been manufactured by POJAZDY SPECJALISTYCZNE ZBIGNIEW SZCZĘŚNIAK Sp. z o.o. from Bielsko-Biala, one of the most experienced specialized vehicle manufacturers in the country.

The main task of KWZT-1 is to provide servicing or towing of damaged and immobilized combat vehicles. Two winches equipped with 100-meter cables and the capacity of 30 tons allow to recover a vehicle buried in sand, or even devoid of wheels. The Mammoth is capable of clearing blocked roads, unloading containers, and replacing a faulty engine in field conditions.

KWZT-1 is based on a Tatra chassis. The modified independent pneumatic and mechanical suspension, however, allows it to carry loads unattainable for conventional trucks. The qualities in field operation, the special tires and the inflation system for all wheels allow the operation even after a wheel is shot through and the engine power of nearly 500 hp, makes the vehicle virtually impossible

to stop. The lowered cab has been adjusted for the railway and air transportation. The highly-resistant STANAG 4569 armor class ensures the survival of the crew in the event of fire and explosion of a 6 kg load directly below the vehicle.

The equipment of the vehicle is equally impressive. Among other things, it includes: a crane with a lifting capacity of 12 tons and a 4-meter reach, a 1 ton blade and rear supports, locking the vehicle position while operating or raising the rear part of the vehicle. Of course, the most significant part of the construction is the extended jib system used to lift and tow vehicles of a total weight up to 26 tons, with a speed of 35 km/h on paved roads and 15 km/h in the field, as long as the tow hook of the damaged vehicle remains functional. The hydraulic jib consists of two vertical columns jointed with a subframe. In the upper part, the columns are locked together with



GRZEGORZ SZCZESNIAK

The Vice President
of the
Pojazdy Specjalistyczne
Zbigniew Szczęśniak
Sp. z o.o.,

Where is the "Mammoth" currently used?

Presently, the Heavy Wheeled Recovery and Technical Support Vehicle named Mammoth is ready for operation. The vehicle has passed many tests in Poland and the Czech Republic, and is now undergoing trials in the United Arab Emirates, where this type of construction finds great interest.

The vehicle was originally intended for the Polish Armed Forces, yet the increasing involvement of other countries in peace-keeping missions and the replacement of tracked equipment with wheeled vehicles causes the demand for this type of designs to grow continuously beyond the borders of our country.

In what types of operations is the vehicle used?

This type of vehicles are characterized by high flexibility. The main purpose of the vehicle is the recovery of damaged wheeled equipment for repair and restoration of its operational capabilities. Currently, no country in the world can afford to abandon the damaged operation vehicles on the battlefield. Mammoth is capable to perform emergency repairs in the field (e.g. the replacement of the KTO's power-pack), unload deliveries (containers, supplies), tow bemired vehicles with winches, clear the way (for example, when a patrol came across a landslide in mountainous terrain). In other words, the vehicle is to ensure full reliability and the arrival of all the vehicles to the destination point.

What are its advantages in the field?

It is now the world's only tow vehicle with independent suspension, with no frame torsion while the axles cross.

The approach angle is 42 degrees, and an adjustable suspension clearance enables to overcome the most difficult terrain obstacles. The wading capability of 1.5 m makes it the most maneuverable heavy tow vehicle, performing very well in various field conditions.

The vehicle is prepared to move as a set (damaged vehicle + tow vehicle) of a total weight of 79 tons, which is an unique record while considering this type of vehicle.

How is the equipment promoted externally?

For several years, the company has participated in international fairs of the defense industry such as, for example, MSPO, IDEX and EUROSATORY. Not everywhere can we physically show our vehicles, but we try to actively present our defense vehicles where possible. From 2013 we plan to commence dynamic demonstrations of our products, which would represent their character, quality and reliability in the most accurate way. Times when products were purchased based on images have ended and our company understands this perfectly, which is why more and more often we attempt to introduce the potential customer to the product in its simulated operating environment.

a special bracket with embedded supporting reels which serve to support the lines of the main capstans. Inside the fixed columns, hydraulic actuators have been placed. Also, floating columns have been applied. These, using special brackets, serve to mount the jib of the towing and lifting equipment. The whole structure allows to lower the jib and gradually lift it under 90 degrees angle. The Mammoth is able to tow a variety of vehicles with a rigid tow without the application of adapters. While using the "tractor" type equipment, however, the vehicle can replace a truck-tractor for low loading semitrailers. Behind the engine and before the body, the design engineers have placed a "Hiaba" hydraulic crane, the jib of which can rotate 360 degrees. The two-part arm can extend to a maximum of 8.4 meters. In this position, the lifting capacity is 5.2 tons, allowing for example, to lift the KTO ROSOMAK turret. When the arm is extended only to 3.5 meters, the loading capacity is increased to 12 tons. The crane provides limited handling of 20ft containers, using lifting slings. The vehicle stability during operation, both of the crane and capstans, is provided by the hydraulic supports and anchors.

The Mammoth has been equipped with two main "Sepson H350PX" capstans of a towing power of 20 tons each. Another unique solution, not present in other designs, is the possibility to use them to operate both at the front and rear parts of the vehicle. The capstans have been equipped with a line holder and layer, which prevent the tangling of the line on the drum. Each of the capstans is equipped with a 100 m long line of 22, 24 or 26 mm diameter. Auxiliary capstan line is used for the efficient operation. The device has a towing power of 2 tons, but the line is 200 meters long. The main capstans serve the purpose of self-recovery, thereby increasing the versatility of the vehicle. The multiplication of the towing power using the tackle block is of high importance. An useful device the MAMMOTH is also equipped with is the hydraulically operated blade that can be used to carry out trenches in soft ground, fill gaps in road surfaces or to push the obstacles blocking the way. The vehicle is equipped with a hydraulically extendable rear lugs ending with toothed spades. This allows to lift the vehicle and is useful when changing wheels or during servicing works. All the main func-

tions of the MAMMOTH, including the towing and lifting equipment, the crane and capstans, can be controlled manually or using a single wireless radio control panel. The control of these elements is performed remotely using a wireless panel. The vehicle is also equipped with an additional power supply - a special unit run in the event of a failure of the main engine. The low center of gravity, combined with independent suspension, allows to overcome difficult obstacles in all weather and climatic conditions (from -30 to +50 °C) and field conditions (40-degree inclines and tilts as well as 1.2 m deep obstacles). The KWZT-1 made its debut at the defense industry fair in Paris in 2010 as a demonstrative version,

and was presented at successive industry events, among others at the 18th MSPO Kielce. Currently, after a series of improvements and field tests the Mammoth has already reached the form of a fully functional prototype.



TACTICAL TERMINALS

- THE TOP WORLD SOLUTIONS FOR LAND, SPECIAL FORCES & CIVILIAN EMERGENCY SERVICES

Network Centric Data Communication Platform JASMINE tactical terminals family
- the newest TELDAT solution, currently the only product of its kind in Poland and only
one of few in the world. They meet all military standards in terms of climatic and
environmental conditions

TELDAT as the only Polish manufacturer of IT equipment in 2012 joined a small group of the top world manufacturers of computer terminals meeting all military requirements and standards. In the Tactical Terminals the best features of COTS computers and meeting of criteria for mobile military computer equipment have been combined. In the result of design and development the terminals meeting requirements of conditions of work in all climatic and environmental zones, rugged, moistureproof and resistant to dust have been produced. Moreover they are waterproof terminals, as the only in the world are able to work 1 m under water for two hours. The functions of accelerometer and magnetometer are implemented. Software implemented in terminals allows to transfer information from battlefield to commanders in a real time.

Tactical Terminals offered by TELDAT company are components of complex IT solutions: Network Centric Data Communication Platform JASMINE and Crisis Management System JASMINE dedicated to: land, special forces and civilian emergency services. These solutions support command and management as well as real battlefield imaging processes in military, crisis / emergency operations.



JASMINE TACTICAL TERMINALS ARE DEDICATED TO:

- land forces (including: command vehicles, battle vehicles, armored personal carriers, tracked vehicles and tanks - other vehicles, flying objects and dismounted soldiers)
- Fire Brigade, Police, Forest Service
- civilian emergency services (Emergency Medical Service, Chemical Rescue)
- private security agencies
- emergency organizations (mountain, water, rescue) and commercial emergency companies

TELDAT TERMINALS ARE AVAILABLE IN TWO VERSIONS:

- Tactical Terminal Tablet (12.1")
- Personal Tactical Terminal (7")

Tactical Terminal Tablet - mobile tactical computer, part of on-board or manpack equipment for end-users dedicated to: land, special forces (Network Centric Data Communication Platform JASMINE) and civilian emergency services (Crisis Management System JASMINE).

TACTICAL TERMINAL TABLET CAN BE USED AS:

- clip-in kit with the BMS JASMINE (Battlefield Management System) connected to the on-board network of the battle vehicle
- standalone manpack for DSS JASMINE (Dismounted Soldier System)

Tactical Terminal Tablet is dedicated mainly to effective use of the C3IS JASMINE (Command Support System) software in BMS and DSS versions.

PARAMETERS:

- CPU: X86 architecture, 1.66 GHz, Dual-Core
- RAM: 4 GB DDR2
- Storage: 2 x SSD SATA 128 GB, RAID0/1 (replaceable)
- Display: LCD 12.1" touchscreen
- Operating system: Windows XP, Windows 7
- Basic equipment: two video cameras, accelerometer, magnetometer, GPS receiver and cryptographic card reader
- Additional equipment: HMD (Helmet Mounted Display), dedicated adapter for installation in the vehicle and additional replaceable batteries

INTERFACES:

- 1 x VGA
- 2 x USB 2.0
- 1 x Gigabit Ethernet
- 1 x CONSOLA (1 x USB 2.0 and 1 x RS-232)
- 1 x Audio
- 1 x WiFi (802.11 b/g/n)
- 1 x Bluetooth
- 1 x GSM or CDMA (optional)

Personal Tactical Terminal - mobile tactical computer, an element of manpack or on-board equipment for end-users dedicated to: land special forces (Network Centric Data Communication Platform JASMINE) and civilian emergency services (Crisis Management System JASMINE).





PERSONAL TACTICAL TERMINAL CAN BE USED AS:

- standalone manpack for DSS JASMINE (Dismounted Soldier System)
- clip-in kit with the BMS JASMINE (Battlefield Management System) connected to the on-board network of the battle vehicle

Personal Tactical Terminal is dedicated to effective use of the C3IS JASMINE (Command Support System) software in DSS and BMS versions.

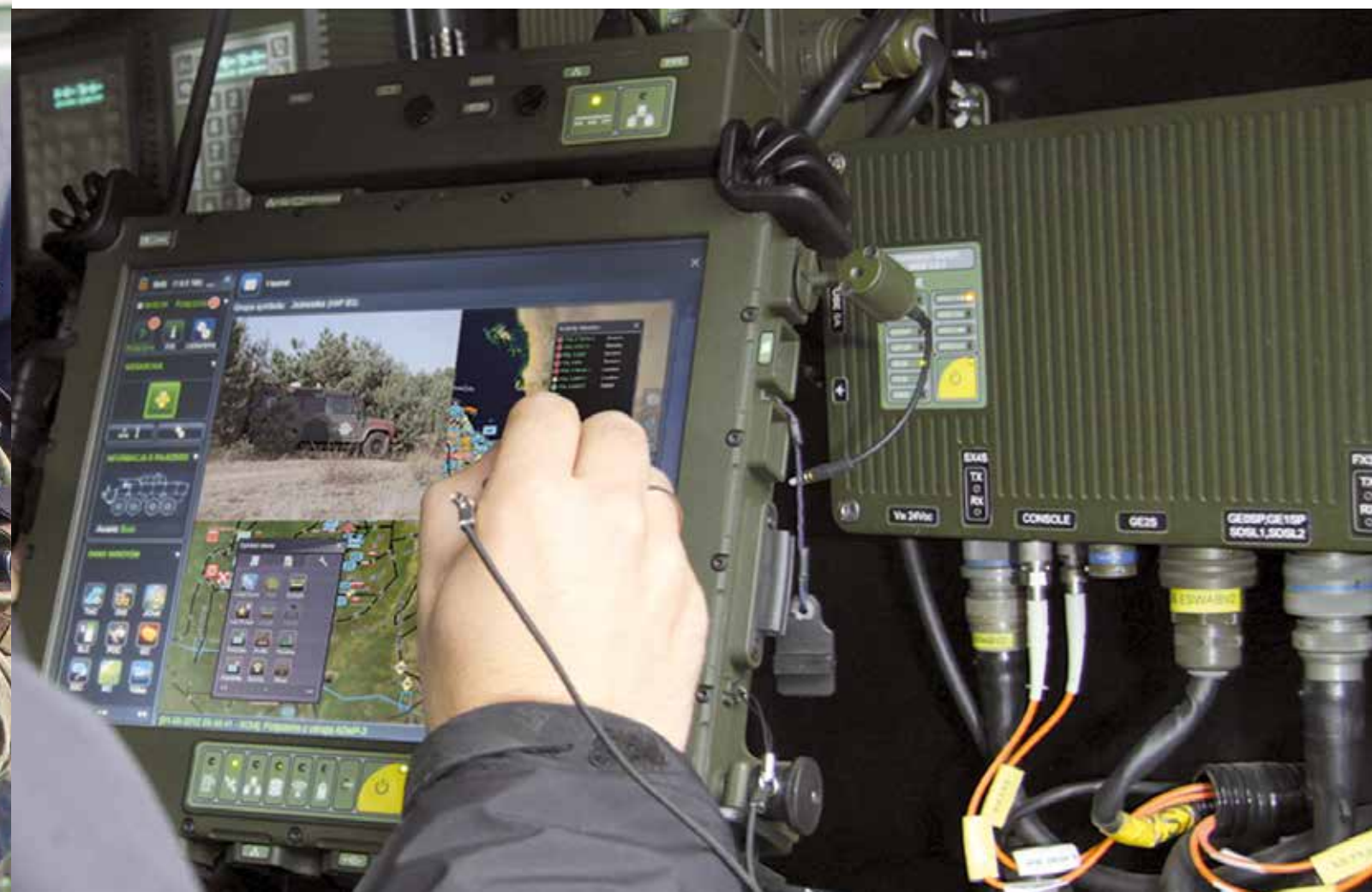


PARAMETERS:

- CPU: ARM architecture, 1.2 GHz, Dual or Quad-Core
- RAM: 2 GB DDR2
- Storage: 2 x SD cards (replaceable)
- Display: LCD 7" touchscreen
- Operating system: Android, Windows Embedded CE, Windows Mobile
- Basic equipment: two video cameras, accelerometer, magnetometer, GPS receiver and cryptographic card reader
- Additional equipment: HMD (Helmet Mounted Display) and dedicated adapter for installation in vehicles

INTERFACES:

- 1 x VGA
- 2 x USB 2.0
- 1 x Gigabit Ethernet
- 1 x Audio
- 1 x WiFi (802.11 b/g/n)
- 1 x Bluetooth
- 1 x GSM or CDMA (optional)



120 MM HSW MORTAR TURRET – ONE PRODUCT FOR MULTIPLE APPLICATIONS

120 mm Self-propelled Mortar is a short prepare time to start the firing: it needs only two minutes in this case. And it can even quicker run away from the enemy counterattack- the firing position can be left and changed as fast as after fifteen seconds from firing of the last grenade.

By the half of 2013 Huta Stalowa Wola S.A. intends to complete the research - development and implementation part of the RAK Company Fire Unit Program. The key element of this unit, 120 mm Self-propelled Mortars come in two chassis versions - wheeled and tracked. The first orders are expected to be placed also this year. So it figures that starting from 2014 Polish Army Land Forces will be gradually equipped with these products. Above mentioned wheeled and tracked chassis versions, which are used in RAK, are not the only possible carriers that can be applied for this fully autonomous turret. During the 20th edition of the International Defense Industry Exhibition (MSPO), Huta Stalowa Wola S.A. presented the 120 mm Mortar Turret's "naval" version, adapted to be mounted on vessels. The product arouses much interest abroad. The set of parameters and equipment opulence make it unique also on the international scale. As the only one of its kind, the HSW Mortar has the possibility of an automatic loading no matter what the barrel position is in. Its other advantage is the capability to fire ten grenades in one minute time. Thanks to the modern navigation and Fire Command System, the mortar hits the target from the distance of 12 kilometers.

Another important advantage of the HSW Mortar is a short prepare time to start the firing: it needs only two minutes in this case. And it can even quicker run away from the enemy counterattack- the firing position can be left and changed as fast as after fifteen seconds from firing of the last grenade. At the same time, it has to be remembered that only two people crew is enough to operate the mortar (driver included). Simultaneous minimization of the reaction times and crew manpower is possible to achieve thanks to the full automation of the equipment. All characteristics and advantages of its automation are also kept in the case of HSW Turret's "naval" application. All firing functions can be executed despite the difficulties resulting from the characteristics of the harsh sea conditions, that is, constant leaning and rotations. To sum up, one can say that in the case of the 120 mm HSW Mortar, only the concepts and needs of potential customers set the limit of its applications.



EXEMPLARY 120 MM MORTAR TURRET'S CARRIERS

Parameter	All-purpose tracked chassis	All-purpose wheeled chassis
negotiated obstacles – gradient	60%	60%
side slope	30%	35%
vertical	0,4	0,5
trenches	2	2,1
fords	1,2 m	1,5 m
max speed on surfaced roads	60 km/h	80 km/h
travel range with full fuel tanks	Min 500	Min 500
carrier's length	7370	7700
width	2870	2800
ballistic protection	Level I, STANAG 4569	Level I, STANAG 4569 *
Engine	MTU 6V199 TE20	SCANIA DI1249A03P
Engine power	260 kW	294 kW
NBC contamination detection and diagnosis system	TAFIOS B	CHERDES

* modular ballistic protection system as per client's requirements.

FULLY AUTONOMOUS TURRET

- integrated communication, command and Fire Control System (C4I) based on TOPAZ,
- imaging tactical situation on digital map at commander workstation,
- automatic cooperation with external command and Fire Control Systems of the C4I class,
- inertial navigation system TALIN 5000 + GPS + odometer,
- ballistic computer.

PARAMETERS

mortar caliber / barrel length 120 mm / 3000 mm
arc of fire - traverse n x 360°
arc of fire – depression / elevation -3° ÷ +80° min.
rate of fire 7 ÷ 10 shootings/min.
short firing reaction time:
into - action < 120 s,
out of action < 15 s;
maximum range 8 km to 12km
crew 2 ÷ 3 people
Multiple Rounds Simultaneous Impact / MRSI / capability not less than 3 rounds
Direct fire capability

EQUIPMENT

- optoelectronic direct fire sight with thermal imaging camera and laser range finder,
- aiming mechanisms : automatic or (back-up) hand-operated in elevation and traverse,
- loading system – automatic in any elevation position,
- laser warning system OBRA,
- ballistic computer,
- digital intercom system – FONET,
- day and night observation devices for commander,
- 360 ° battlefield surveillance systems,
- inertial navigation system TALIN 5000 + GPS + odometer,
- external communication system – digital radio station RRC 9311 AP,
- secondary armament: 7,62 UKM 2000 D with day and night gun-sight BAZALT,
- 81 mm caliber smoke grenade launchers.

TECHNICAL MODERNIZATION OF THE ARMED FORCES 2013-2022

Signed on December 11, "Technical Modernization Plan" and approved earlier "Development of the Armed Forces of the Republic of Poland in the years 2013-2022 Program" marked a new phase of modernization of the Polish army.

The documents based on the assumption that threats to Poland, in particular the risks associated with breach of its borders, will be relatively unlikely, assuming at the same time the increasing possibility of asymmetric threats. The main objective of technical modernization is the development of the operational capacity of the Polish Armed Forces, including strengthening of the military potential to fulfil national and allied commitments, in accordance with Article. 5 of the Washington Treaty. As stated by the Minister of National Defense, Tomasz Siemoniak - "We focus on modern and effective armed forces that will always be able to protect the sovereignty of our country, support our allies and provide help in crisis situations. The share of funds allocated to buy the most cutting-edge weaponry and operational capabilities is rising." Planned defense expenditure between 2013 and 2016 will amount to about 135.5 billion PLN, including expenditure on technical modernization that will amount to about 37.8 billion PLN, or 27.8% of the total budget. Between 2017 and 2022, planned defense spendings will amount to around 273.2 billion PLN, including 102.1 billion PLN for technical modernization, which gives yet another 10% increase in spending on modern technology, to a very good rate - 37.3% of the total budget. The program assumes that the size of the Armed Forces of the Republic of Poland will amount to 120 000 soldiers (including up to 20 000 soldiers of the National Reserve Force).

While designing the "Development of the Armed Forces of the Republic of Poland in the years 2013-2022 Program", priority was given to command, reconnaissance, striking power and support. Mobility, survival and protection of troops and the ability to support non-military units in crisis situations, including natural and humanitarian disasters, will be developed harmoniously and improved to a sufficiently high level. The program provides funds for the development of all capabilities, including air defense, which is feasible thanks to the of the legislative initiative of the head of the Armed Forces, supported by the government. The program also provides for the development and maintenance of mobility and combat capability of the Navy forces. Different types of forces will be developed along with effective and efficient logistics. Investments in computerization and robotics are increasing significantly, which will support the troops providing them with security and increase the success ratio of the missions. In the context of the priorities of the Polish Armed Forces, the modernization includes the following operational programs:

- air defense and anti-aircraft defense system;
- combat support, security and VIP helicopters;
- integrated command support and battlefield imaging systems;
- unmanned reconnaissance and reconnaissance-strike systems;
- individual soldier equipment and weapons;
- training simulators;
- transport aircrafts;
- modernization of missile and artillery units;
- wheeled armored personnel carriers;



- guided anti-tank missiles;
- combating the threats at sea;
- training aircraft;
- modernization of armored and mechanized units.

Technical modernization of the Armed Forces will also include tasks not covered by the Operational Programs that are important for the individual functional systems and secure the functioning of the forces. Among them, the modernization of Leopard tanks, multi-purpose Special Forces vehicle Pegasus, the acquisition of other vessels included in the concept of the development of the Navy, such as the electronic reconnaissance ship and operational support ship, individual soldier equipment, engineering equipment, defense against weapons of mass destruction, non-combat transport vehicles, spare parts, equipment repairs and ammunition purchases (within the current expenditure).



Land

The modernization program assigned most tasks to land forces. They include: the modernization of air and missile defense, continuation of implementation of the Tytan system, the development of C4ISR command support systems, purchasing Rosomak wheeled armored personnel carriers, purchasing new trucks, modernizing the Leopard 2A4 basic tanks, purchasing Spike anti-armor sets.

The main priority of the modernization is anti-aircraft and missile defense. Therefore, by 2022 the Polish Army will receive five new missile systems: Wisła (mid-range), Narew (short-range), Poprad (self-propelled short-range set), Piorun (portable kit, modernization of Grom) and Pilica (artillery-rocket short-range set).

In the first quarter of 2013, an agreement will be signed for purchasing Tytan system for soldiers.

Between 2013-2016 it is expected that the purchase of an integrated command support and battlefield imaging system C4ISR will be completed, where Teldat company with its Jaśmin system have a very high chance of obtaining a contract.

Within one year, purchases of KTO Rosomak vehicles and Spike anti-armor sets should be completed. Last task is the modernization of Leopard 2A4 basic tanks.

Air

The program highlights four main tasks - buying helicopters, unmanned aerial vehicles, advanced training jet aircrafts and new equipment for the multi-purpose Jastrząb aircrafts.

The first task includes the purchase of 70 machines - 48 multi-purpose nad transport; 10 CSARs; 6 SAR rescue ships and 6 anti-submarine ships. The fourth task involves fitting F-16 Jastrząb with AGM-158 JASSM maneuvering missiles. Their delivery is planned after 2015 upon agreements from the U.S. administration.

Sea

The Polish Navy is to receive three submarines to be delivered by 2030, 2 of them by 2022. The Navy will also receive a Cormorant II destroyer minesweeper - its prototype is to be completed in 2016. At the same time, the construction of the ORP Ślązak patrol ship will be completed.

KTO ROSOMAK SIMULATOR

Wojskowe Zakłady Mechaniczne S.A. developed a unique teaching aid in the form of KTO Rosomak driving simulator. What is more important, Jaskier simulator is the only device of this type in the world.

The development of technology and modernity of the currently operated military equipment forces hardware manufacturers to develop teaching aids to implement high-level training using animations and physical models, which in are difficult to reproduce while using the equipment in real conditions.

In order to fulfil these needs, Wojskowe Zakłady Mechaniczne S.A. established a consortium with AUTOCOMP MANAGEMENT Spółka z o.o. and TRINITY INTERACTIVE Sp. z o.o. to develop a JASKIER - a complex training simulator of KTO Rosomak armored vehicle.

The designers wanted to recreate the the interior of the driver's compartment as closely as possible, while maintaining full functionality of all its elements and used a platform with 6 degrees of freedom to simulate the actual behavior of the interior of the vehicle in real operating conditions. This allowed them to create a simulator which is currently the most advanced training equipment for the users of ROSOMAK wheeled armored vehicle.

The simulator is designed to train mechanics-drivers and improve their driving skills in difficult and dangerous conditions. It can be used to perform trainings in the following areas:

- construction and operation of mechanisms in the mechanic-driver's compartment;
- starting the engine in various conditions;
- starting and stopping the vehicle on a flat terrain and on a slope;
- driving on a route with an average degree of difficulty;
- driving in various terrain conditions;
- driving in various atmospheric and lighting conditions;
- overcoming obstacles (water, limited passages, bridges, anti-tank trenches);

- developing the habit of observing engine and power transmission system parameters.
- driving in close formations
- driving on the battlefield while firing
- behavior in dangerous situations on the road and on the battlefield

Solutions and technologies employed allow the simulator to be configured in two basic variants with the cabin on wheels or in its most advanced version where the simulator cabin is mounted on a mobile platform that simulates the movements of the vehicle when driving in different terrain conditions. JASKIER simulators can be combined together to form platoon or company structure, depending on the needs. What is more, every JASKIER simulator can be connected with a firearm training system.

Aside from the driver cabin, the simulator is equipped with instructor cabin containing repetition of indicators and indicator lights, camera view of the interior, maps of the area and repetition of the view seen by the trainee. The device is also equipped with a communication system that allows direct audio contact during the entire process of simulator training. The most important advantage of the device is the ability to simulate emergency situations regarding the use of equipment that we can not create using the actual vehicle during the training. An example of such an emergency situation can be a simulation of high temperature of the engine oil, forcing the driver to take measures to prevent damage to vehicle components.

The camera installed in the interior allows the instructor at all times observe the trainee driver to determine the correctness of the actions he is performing in the emergency situation simulated by the instructor. Image seen by the driver is displayed on three screens, which gives the opportunity to conduct a full angle of view through the periscope and windshield when simulating driving in normal conditions, when combat hardware configuration is not required.



As previously mentioned, the interior of the simulator is based on actual pieces of equipment from the driver's compartment of the vehicle which assures full realism and durability of interior elements similar to the actual vehicle.

The interior of the simulator includes:

- mechanics-driver board with indicators and controls,
- rear maneuvering camera desktop,
- navigation system desktop,
- control panel for heating, air conditioning and ventilation systems,
- panel with buttons for switching on the main power supply of the vehicle,
- driver seat (complete seat with electric actuator controlling the position of the seat, brake pedal, gas pedal along with the devices that read their positions),
- complete steering column with hand brake,
- gear lever,
- basic internal communications equipment,
- interior lighting of the vehicle,

JASKIER simulator had its premiere at the International Defense Industry Exhibition in Kielce, Poland, in September of this year where it has been rated very positively by both existing users of Rosomak vehicles and instructors from military training centers. The simulator was given the "Defender" award as a special distinction in the training equipment category, which proves the validity of the concept.

After receiving the award, the consortium decided to start working on another device that we hope will live up to the functionality of JASKIER and get the same positive feedback from users.





**TOMASZ
NIKISZ**

Head of Customer Support
and Training

What training variants are available

JASKIER simulator was designed as an element of the basic training. The first stage acquaints the user with a functional interior, the location of the components and how they work. Then, after "mastering" the interior elements of the driver compartment, participants are trained to notice emergency situations and follow the procedures laid down in the operational documentation for each situation.

Who participates in the trainings

In general, trainings are organized by WZMS.A. for soldiers sent by the Armed Forces Command.

How did the technical works look like

When it comes to design work, we used the experience of Polish companies specializing in the development of simulators. Autocomp from Szczecin deserves the most recognition here. The company created the design and built the simulator under the supervision of WZMS.A.

What are the advantages

The price is much lower than the actual vehicle. It can simulate various environments, such as mountains, deserts or cities. The most important advantage is the option to simulate emergency situations, such as: low fuel level, damaged tire or engine overheating - situations that we are able to train for on real equipment.

What causes most problems and what is trained most frequently

Acquainting participants with the functional interior of the vehicle and teaching them how to use it and its features. It is difficult to present and explain all the elements of the interior on the actual vehicle. The simulator gives this possibility and that is what it was designed for.

How does the simulator work? Can it be compared to flight simulators where participants are taught to start and land?

The simulator consists of a fully functional interior placed on a platform with 6 degrees of freedom. It fully reflects the actual conditions of the vehicle and allows training in near-real conditions.

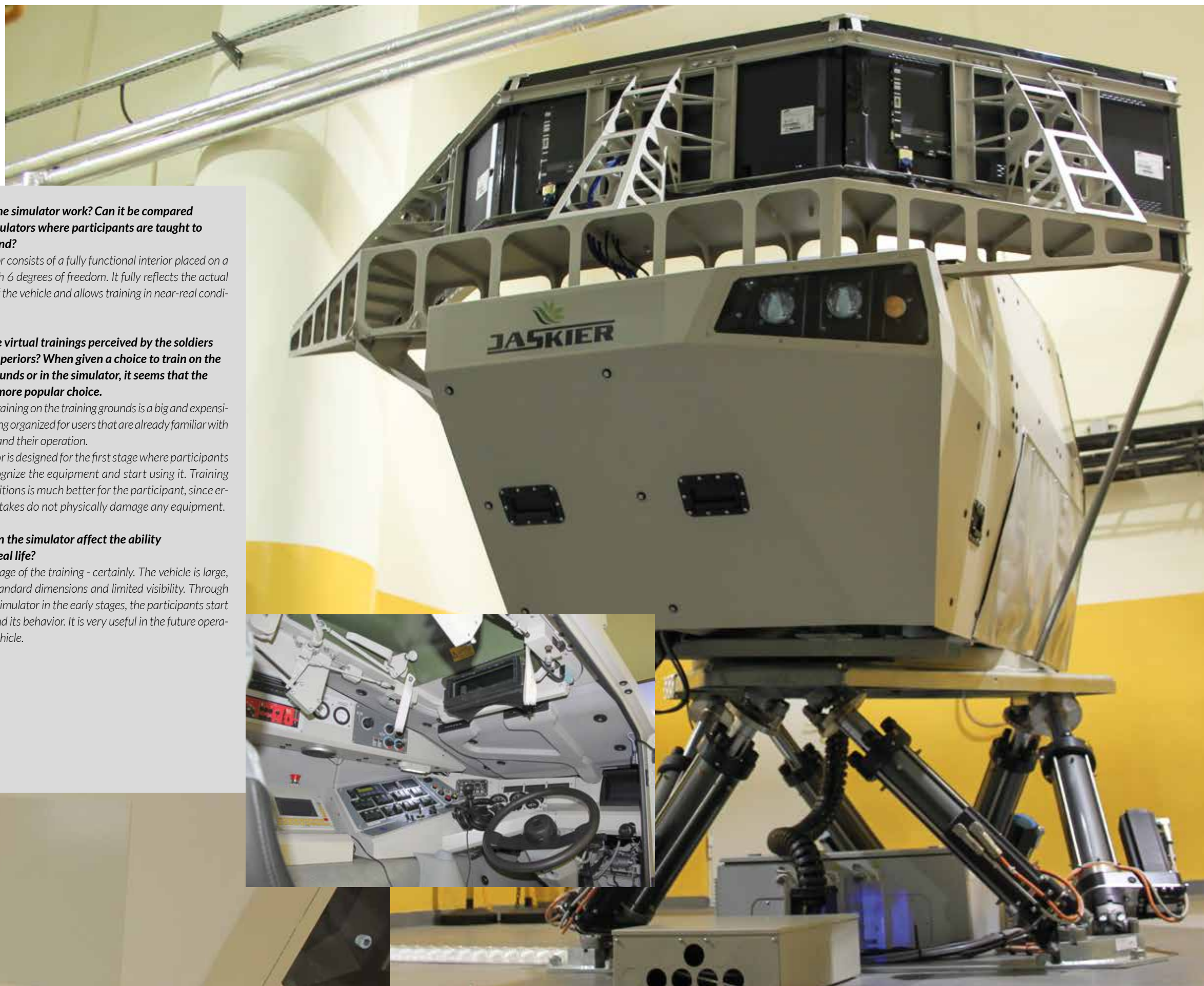
How are the virtual trainings perceived by the soldiers and their superiors? When given a choice to train on the training grounds or in the simulator, it seems that the former is a more popular choice.

Organizing training on the training grounds is a big and expensive undertaking organized for users that are already familiar with the vehicles and their operation.

The simulator is designed for the first stage where participants learn to recognize the equipment and start using it. Training in such conditions is much better for the participant, since errors and mistakes do not physically damage any equipment.

Will hours in the simulator affect the ability to drive in real life?

In the first stage of the training - certainly. The vehicle is large, has a non-standard dimensions and limited visibility. Through the use of a simulator in the early stages, the participants start "feeling" it and its behavior. It is very useful in the future operation of the vehicle.



TOPAZ

FIRE CONTROL SYSTEM

TOPAZ is a system that supports artillery command, using the latest information and communication technology.

Its application includes fire mission management and management of information necessary for coordination and optimization of the use of artillery fire.

Implementation of ZZKO TOPAZ - Automated Fire Control System within the framework of artillery modernisation initiated the implementation of network-centric warfare systems on the Armed Forces of the Republic of Poland. TOPAZ is a C4I / BMS class system, with functions dedicated for application in artillery.

TOPAZ allows for coordination of activities at the level

of battalion, ensuring operation with higher levels of command in accordance with the principle of interoperability TOPAZ allows to gain advantage on the battlefield through effective sourcing, distribution and processing of information in a dispersed command centres model in the theatre of war (TW).

The use of TOPAZ provides the opportunity to optimise the utilisation of available artillery fire resources to ensure adequate firepower at the right time and the right place.

The Topaz project has been initiated in 1994. This year



marked the beginning of the research and development of the command and artillery fire control, using communication vehicles in the Missile Forces and Artillery. The solution utilized the artillery battalion command transport vehicle SKOT R-2AM, the ADK-11 switching and transmission equipment on the chassis of the Star 266 of the squadron staff chief, the WD-43 battery command vehicle, the WD-43 deputy battery commander vehicle. At the time, the frame of the squadron command system of the self-propelled artillery, equipped with a 122-mm self-propelled 2S1 Goździk howitzers have been constructed based on these vehicles.

By the year 2011, at least ten Goździk howitzer squadrons, three Dana gun-howitzer squadrons and three Langusta rocket launcher squadrons have been equipped with the Topaz system. Elements of the system are also operating within the Polish contingent in Afghanistan.

The task of automated command and fire control system Topaz is to support the operation of the self-propelled artillery battalion commander in the scope of command and fire control. Although the system is dedicated for the gun artillery, most of the tasks it performs are typical to other types of troops. This means that each tactically functional element of the system may operate independently from the higher command. As a result, Topaz may gradually cover higher levels of command, leading to the creation of a comprehensive fire support system at a battalion level. Each command post has been equipped with a computer terminal and dedicated software allowing to command and collect data with no need of voice communication. The system architecture is based on independent network nodes: the squadron command network, the battery command network and the command network of the reconnaissance subsystem.

Each operational segment of the structure equipped with suitable number of guns can be operated autonomously. Due to its versatility, the individual combat posts can undertake other functionality upon software reconfiguration, which can be done by an authorized user even in field conditions. Moreover, during combat readiness, the system is able to connect a new subunit. Topaz - as the manufacturer declares - is modular and may be adapted to fit a variety of artillery systems. In such case, it is only necessary to change the software. The Topaz may be installed on any carrier, in any functional layout. The Topaz can be installed both in new vehicles and during the modernization of those already in use.

During the fire control of an artillery sub-unit the time of information circulation is one of the most important factors which determine the efficient impact of fire. Topaz is designed to collect radio information from different levels of command and is equipped with artillery observation and measurement instrument interfaces of the forward observer of the artillery. The basic reconnaissance data is received from the section of forward observers operating as a group of armored and mechanized sub-units whose task is to detect, monitor and determine the target coordinates. The observers are equipped with portable computer sets (PCJ9650 and PCJ9610), optical observation devices (PAB-2A) or optoelectronic devices (PZA-1, APDR, which allows the automatic reconnaissance data entry into the system) and GPS receivers. The platoons and sections of the forward observers cooperate with the military reconnaissance subunits. It is also possible to connect the Bar meteorological reconnaissance station, the station for automatic entry of meteorological data and a radio-location station to the Topaz system (e.g. RZRA-201 Liwiec), which automatically trans-

INDIVIDUAL FEATURES:

- - effective execution of the Call For Fire [CFF] procedure in artillery;
- - enhanced safety of own armed forces during warfare operations and military exercises (avoidance of "blue on blue" incidents);
- - direction of adequate firepower toward high priority targets;
- - optimal utilisation of available sensors, communication means and ammunition
- - implementation of coordinated fire support from diverse artillery fire sources available to a commanding officer
- - availability of integrated information on operational activities in command posts (Common Operational Picture – COP);
- - directing firepower towards multiple targets simultaneously;
- - reduction of reaction time for all types of fire missions;
- - reduction in the number of field artillery crew members necessary for effective execution of fire missions;
- - reduction in time necessary for redeployment of forces and preparation for missions;

fers the information on the discovered enemy artillery posts, the location of shell hits and the data for the fire correction to the Automated Command and Fire Control System.

TOPAZ software suggests, in an automated manner, the adequate fire mission based on analysis of the effectiveness of available resources and tactical decisions made by a commanding officer.

Due to modular design of the system, it can be configured and adapted to the command structure indicated by a system user.

The functions of the Topaz Automated Command and Fire Control System:

- The presentation of the tactical situation using a digital map (own forces, enemy forces, the types of targets and their location, secured areas, fire zone, va-



rious ranges of ammunition, minefields and contaminated areas - the data is transferred to the system from the internal reconnaissance subsystem or external sources)

- The preparation of the reconnaissance data (the location and movement of the enemy units),
- The presentation of the forward observers' tasks,
- Objectives database analysis and the determination of the risk level,
- The commander assistance during the decision-making process in the fire mission (fire mission mode selection depending on the type of the target, control of the secured zones and screening angles, distribution of fire on the target depending on its size and the amount of ammunition),
- The automatic calculation of the fire settings and the transfer of the settings to the guns,
- Automatic execution of commands associated with the fire mission (simultaneous execution of multiple fire missions by individual batteries or platoons)
- The control of fire mission (the introduction of corrections based on the places of shell hits, calculated following the observation done by the forward observers), optional interruption of the fire mission in emergency situations, fire synchronization in "fire-storm" missions, MRSI sequential fire,
- Fire support tasks coordination with own troops,
- Continuous control of the logistic situation of the subunit (ammunition, mps)
- Maneuvering the subunits,

- The correctness control of the data circulation in the system, data storage, automatic updates, distribution of documents and tactical data (texts, orders, reports, replies, coordinates).

The system enables utilisation of the Unmanned Aerial Vehicle Fly Eye as an airborne target acquisition device for determination of target coordinates and fire correction.

The experience learned with ZZKO TOPAZ - Automated Fire Control System was utilised during implementation of the Mortar Fire Control System SKO-M

TOPAZ as integrated element is installed for example in 155mm howitzer KRAB, rocket launcher Langusta WR-40.





Wojskowe Zakłady Mechaniczne SA

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Military Mechanical Works was established in Siemianowice Śląskie in 1952 and since then is strongly involved in overhauls, modernization and special Production for necessity of Armed Forces.

Military Mechanical Works developed in scope of documentation and production following equipment

- T-72 /SKZ-T-72/ tanks field control stands
- Tracked vehicles SKS – G engines' field Control stands
- Maintenance and lubrication equipment,
- Compressor installation
- Power generation

Factory started repairs in scope of following engines: Henschel, Ikarus, Star 200, Leyland, Jelcz.

In 1996 upgrading works of the BRDM-2 armoured reconnaissance care began. As a result of this work the whole family of upgraded armoured reconnaissance vehicles was generated: from the BRDM-2M96i model through the BRDM-2B, BRDM-2A and BRDM-2M96iK "Szakal".

A number of vehicles were produced, which have been successfully exploited in the Polish Army, especially during peace keeping missions. Now the persisting construction works tend to follow upgrading of these vehicles, for the purpose of upgrading their reliability and battle possibilities.

The most popular product Military Mechanical Works is Armored modular vehicle 8x8 "Rosomak". The design of the Rosomak vehicles provides mobility, large remaining capacity, ability to swim and wade, overcome significant obstacles and inclinations, as well as a buoyancy reserve for the installation of special equipment. This makes the Rosomak an ideal vehicle for the army and soldiers.

The vehicles are capable of carrying 11 soldiers, including the driver, and the turret operators in the combat version. The design of the chassis and suspension of the Rosomak vehicles allow for a fast repair and replacement in case of a failure. The design of the integrated suspension arm proved itself to be more resistant to booby-trap explosions and more effective in case of repairs in the field conditions. An important condition for the introduction of the Armored Modular Vehicle to the Polish Army equipment is the gradual transfer of the production to Poland.

In the year 2001, Ministry of National Defense invited Military Mechanical Works, among other companies, to participate in a tender for the delivery of Wheeled Armoured Transporters (KTO) for the Polish Army. In this tender, WZM offered a fourth generation armoured modular vehicle AMV 8x8 designed by Finnish concern Patria, armed in combat version with HIFTIST 30mm weapon system of Italian concern OTO Melara.



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Huta Stalowa Wola S.A. specializes in designing, manufacturing and sales of the following types of military equipment::

- Artillery equipment: Self-propelled, hauled or mounted on other objects. Fully autonomic and / or automated. Integrated with battlefield digital command systems.
- Special armored carriers: Wheeled and tracked chassis. Multipurpose or specialist. Amphibious.
- Engineering equipment.

Huta Stalowa Wola S.A. worked out its' own strategy of offering newly designed and modernized products by delivering them composed into complete Military Units.

Making the best of our know-how we offer cooperative services too: We produce ready-made products and supply technical services – based both on our own as well as client's documentation.

The HSW S.A.'s experience in the field of special production dates back to 1938, when the first products have been shipped from the Zakłady Południowe (Southern Plant).

The professionalism that has been confirmed throughout more than 70 years of effective operation within the field of special production has an impact on our cooperative activities - we manufacture products and deliver technical services based on documentation created for or supplied by the customer.

The Stalowa Wola S.A. has been able find their proper place in the market during the transition period. The company continues the excellent tradition of military production in the Central Industrial District. In the recent years we have maintained a steady growth in our organization and product range. The HSW's separate Military Production Center division has provided a greater mobility in new construction developments and increased the rate of production deployments. This may be illustrated by the complete delivery of the VVR-40 "Langusta" rocket launcher fire unit, the implementation activities for the fire module (codename Regina) as well as the innovative technical solution for the 12mm caliber, automatically loaded mortar implemented within the 120 mm self-propelled mortar Company Fire Unit "RAK" program.



The Bumar Group

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Bumar sp. z o.o. is a leading supplier and exporter of armaments and military equipment manufactured in the Polish defense industry.

For over 40 years the company has been a leader in the domestic and international market of weaponry, construction plant, mining and handling equipment. Its extensive experience, world-recognized and distinguishable brand, achievements in implementing new technologies in the Polish industry and in initiating relationships with renowned producers all over the world, professional and skilful personnel are company's main assets. Bumar has been supplying and selling its equipment and services to the Polish Army and in over 40 countries in Europe, Africa, Asia, South America and the U.S., winning many international bids.

The Bumar Group was formed in 2002 as a result of adoption of Strategy for Structural Transformation of the Defense Sector Capacity 2002-2005 by the Polish Government.

Bumar sp. z o.o. was appointed the integrator of the newly formed Bumar Group, with the responsibility for exercising owners supervision. The Bumar Group consists of 22 manufacturing companies from the Polish defense industry (PPO) specializing in munitions radars, rockets, armour and vehicles including 2 trade companies. Some of the dependent companies form capital groups. Bumar also holds shares in other companies, including foreign ones. More than 50 entities belong to the Bumar Group.

The internal structure of the Bumar Group form Bumar Electronics SA, two capital subgroups Bumar Ammunition SA and Bumar Soldier SA and the product division Bumar Land.

Market activities of the Bumar Group are concentrated around four product groups constituting the subject matter of production and service divisions respectively:

- BUMARAMMUNITION: ammunitions and missiles (shooting ammunition, artillery and missiles, SPIKE, GROM, FENIKS missiles);
- BUMAR SOLDIER: the soldier and the official (individual equipment and armament of the soldiers including: pistols, guns, optoelectronic equipment, protective measures: gas masks, helmets, bullet-proof jackets);
- BUMAR ELECTRONICS: electronics and IT (commandment systems, radars, sensors, anticraft and anti-missiles systems);
- BUMAR LAND: land platforms (wheel, caterpillar platforms, military vehicles, tanks, special vehicles, technical backup vehicles, bridges).



WB Electronics SA

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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 suppliers for the Armed Forces of the Republic of Poland, has been actively contributing to improving the defense 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 innovative 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 defense.

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 battlefield 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

POJAZDY SPECJALISTYCZNE®
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SZCZĘŚNIAK

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Vehicle bearing the Szczęśniak logo have many characteristic features distinguishing them against the backdrop of the competition. Above all, they are produced using the highest quality materials and components supplied by leading global producers. The product concept, and the production system itself, is based on a patented system of modular structures, these enabling vehicle configuration freely as early as the initial design phase, with the application of existing solutions.

The firm employs over 100 highly qualified specialists in a variety of fields, guaranteeing the high standard of the products manufactured. The construction department has at its disposal modern technical solutions supporting the design and computation stage. Each new product comes into being in the form of a spatial model, allowing a thorough analysis of all sub-assemblies and far-reaching optimization of the solutions applied. This formula for action permits the active participation of the user in the design process and the creation of a structure entirely in conformity with requirements.

Zbigniew Szczęśniak Specialist Vehicles is a leader in the production of specialist vehicles in Central and Eastern Europe, having commenced operation in 1992 in Poland. Since the beginning, the firm has focused on the automotive trade and, more precisely, specialist productions for uniformed services, including the fire brigade, army and police.

The high quality products and the manner in which the enterprise is managed together provide the firm with market success, and are reflected in the numerous awards received by Zbigniew Szczęśniak Specialist Vehicles, both domestic and international:

- Highest Quality – Quality International 2011
- Title of Winner and Silver Emblem in the QI Product category
- Innovation Certificate, from the Polish Academy of Sciences
- Responsible Employer and HR Leader 2011
- EDURA Fair Prize 2011 – EDURA International Rescue and Fire Technology Exhibition
- Polish Export Leader 2011

TEL DAT

TEL DAT

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TEL DAT is a Polish business entity, which has been dynamically operating in the defense market for sixteen years. It is the leading constructor and producer of the world's most innovative data communications solutions, which are dedicated mostly to security and national defense.

The solutions has been awarded by Buyers and Users (also from NATO). TEL DAT solutions in many cases are unique in international scale and reference to the systems of other countries. Their advantages and reliability have been confirmed by the following certificates and awards signed by NATO Communications and Information Agency / NATO C3 Agency.

The company has the all necessary capabilities to meet requirements and standards imposed to the companies participating in bid projects and research and development in the area of C4ISR systems. It comprises: research and development, production capacity and service, lessons learned drawn from the participation in NATO and USEUCOM exercises, certificates, awards and honors. These attributes locate the company closely to the top of producers of the specialized military data communication solutions.

Since the beginning of its operation the company has been involved in: research & development, designing, development and production, implementation and maintenance (including remote supervision) of specialized electronic, data communication, IT, telecommunication and alarm systems and devices dedicated mostly to security and national defense.

In this field company has collaborated with many national and international institutions which develop for security and defense. TEL DAT has provided for them with research and development, supplies, technical support of implementation and maintenance of specialized data communication systems (including mobile and stationary versions), which are implemented into the Polish Armed Forces (in accordance with required procedures).

All of above mentioned activities have been performed with the highest accuracy, faultlessly and always on time what is confirmed by awarded certificates, prizes, numerous references.

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