

# NOKTOWIZOR

Publication of PCO S.A.

No. 2 / 2017



## SOD

Situational Awareness System



MSPO

25<sup>th</sup> International Defence Industry Exhibition



III. KONFERENCJA  
OPTOELEKTRONICZNA

8-9.11.2017

Editorial Staff: Communication and PR Department, PCO S.A.  
e-mail: [nzk@pcosa.com.pl](mailto:nzk@pcosa.com.pl)  
www: [www.pcosa.com.pl](http://www.pcosa.com.pl)  
tel.: + 48 22 515 75 07

PCO S.A.  
28 Jana Nowaka-Jeziorańskiego St.  
PL 03-982 Warsaw, Poland

Graphic design and print: LUMIKANTO Piotr Wideryński  
Publication: August 2017

# INTRODUCTION

## FOREWORD FROM THE PRESIDENT OF THE PCO S.A.



Ladies and Gentlemen!

I am pleased to provide you with the next issue of the "Noktowizor" magazine. The latest issue is dedicated to the jubilee 25<sup>th</sup> International Defence Industry Exhibition (Międzynarodowy Salon Przemysłu Obronnego MSPO) in Kielce. As in previous years, now PCO S.A. will be exhibiting at the stand of Polska Grupa Zbrojeniowa S.A. In this issue you will find a list of products put on display at the MSPO exhibition as well as more information on one of the products competing for the Defender award.

The issue includes also announcement of the third Optoelectronic Conference: „Optoelectronics as an important element of the State's sustainable development strategy". This year's edition of the conference will be organized at a new location, namely the Windsor Hotel in Jachranka on 8–9<sup>th</sup> November 2017. The intention of the conference is to bring together academic scientists, representatives of research institutes, industry and the military. The event will showcase the latest scientific developments and achievements in widely understood optoelectronics.

This issue includes accounts of events which took place at PCO S.A. and news about company's participation in trade fairs in Poland and over the world. You will also find an overview of media accounts relating to the Company and information about the Family Picnic, organized annually for families of PCO S.A.'s employees.

You are warmly invited to read the current issue of the "Noktowizor" magazine. I also encourage you to visit PCO S.A. stand during the 25<sup>th</sup> International Defence Industry Exhibition in Kielce.

Yours faithfully  
Ryszard Kardasz  
President of the Board at PCO S.A.

## IN THIS EDITION

|   |    |
|---|----|
| Introduction  | 3  |
| Main topic  | 4  |
| Ask a question...   | 6  |
| Announcement of the 3 <sup>rd</sup> Optoelectronic Conference | 7  |
| Our products  | 12 |
| Development and innovations                                   | 13 |
| Management policy   | 16 |
| Important events overview                                     | 17 |
| Media about us  | 24 |
| PCO after hours   | 27 |

# MAIN TOPIC – MSPO 2017 EXHIBITION

## 25<sup>TH</sup> INTERNATIONAL DEFENCE INDUSTRY EXHIBITION



25<sup>th</sup> International Defence Industry Exhibition will be held on 5-8<sup>th</sup> September 2017 at Kielce Trade Fairs.

The jubilee edition of the largest arms fair in Poland and the third largest in Europe will cover a number of exhibitions, conferences and shows. As every year, Kielce will host exhibitors from all over the world, providing a good opportunity to learn about the latest technical innovations and achievements in the defence industry, as well as to conclude agreements and contracts.

This year's edition of the MSPO will be held under the auspices of the President of the Republic of Poland, Andrzej Duda.

Exhibitors from all over the world including Poland, Germany, France, Norway, United Kingdom and the United States have already confirmed their participation in the event. The subsequent MSPO editions are accompanied by the exhibitions of national defence industry of different countries. This year's International Defence Industry Exhibition will host the exhibition of national defence industry of South Korea.

At the final gala closing the 25<sup>th</sup> International Defence Industry Exhibition the Polish President's Awards, DEFENDER awards and special mentions will be granted.

## PRODUCTS SHOWCASED BY PCO S.A. AT 25<sup>TH</sup> MSPO:\*



DCM-1 "SZAFIR"  
Modular Day Sight



SCT "RUBIN"  
Thermal Imaging Sight



PNL-4  
Aviator Night Vision Goggles



TSO-1 "AGAT"  
Thermal Observation System



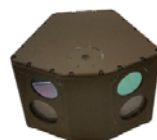
PNL-2ADM "SZPAK"  
Night Vision Goggles



MU-3ADM  
Night Vision Goggles



MU-3M "KOLIBER"  
Universal Monocular



SOD  
Situational Awareness System



OBRA-3  
Laser radiation warning system



KLW-1 "ASTERIA"  
Thermal Imaging Camera



KMW-3 "TEMIDA"  
Thermal Imaging Camera



PCT-72  
Periscopic Thermal Vision Sight

\* List of presented items may change



## PCO S.A.'S PRODUCTS NOMINATED FOR THIS YEAR'S DEFENDER AWARD:



SOD Situational Awareness System



Modular day sight DCM-1 "Szafrir"



## LAYOUT OF THE EXHIBITION STAND



# ASK A QUESTION...

**PAWEŁ GLICA, SALES DIRECTOR**

## ON PARTICIPATION OF PCO S.A. IN THE 25<sup>TH</sup> MSPO

**What products will be presented by PCO S.A. during the jubilee edition of the MSPO?**

*During this year's International Defence Industry Exhibition, we are going to present a fairly wide range of products, both of the combat soldier equipment as well as products for combat platforms. As for the first group, we will certainly be presenting our offer for the Territorial Defence Forces, Operational Forces and Special Forces. This offer includes different types of night vision monoculars and goggles, inter alia a model with a new bridge mount, which allows folding the optics completely flat along the helmet surface while not in use. The solution ensures minimal protrusion of goggles beyond the helmet outline, making it easier for soldiers to move in the field and to move by transport means.*

*Apart from these goggles, we are going to show enhanced versions of our night vision and thermal imaging products, such as binoculars and sights, as well as a new product in our offering: DCM-1 "Szafir" collimator sight. This is a day sight for firing at short and medium distances, which was designed as the primary sight for MSBS and Beryl assault rifles, but it may also be configured for any similar type of weapons.*

*Of course we do not forget about the solutions for helicopter pilots, and this year we want to show miniaturized PNL-4 goggles for military applications and PNL-3M goggles for civilian applications, which has recently been certified by the European Aviation Safety Agency. This device is very popular not only in Poland but also in foreign markets.*

*The second group of products we want to show includes solutions mainly used on combat vehicles. It includes different types of thermal imaging cameras, SOD Situational Awareness System and the OBRA laser warning system. All of them have already been implemented in combat vehicles used by our army, but we want to present them to our potential foreign partners as reliable and proved solutions.*

*We will also demonstrate this year combat systems, which will be mounted on vehicles exhibited by our*

*suppliers in the PGZ Group.*

*I am thinking here primarily of retrofit kits for T-72 battle tanks based on the PCT-72 periscopic thermal vision sight and night vision equipment for observation (TKN-3z) and vehicle steering (PNK-72). The latter is a cost-efficient and quick solution for modernization of tank optoelectronics and in this regard we are counting on modernization programs being executed not only in Poland but also in other countries using armaments that had been produced in the former USSR.*



**What are the expectations of PCO S.A. towards these fairs?**

*MSPO is the largest arms fair in Poland and one of the largest in Europe. We are counting primarily on the broad presentation of our offering to representatives of the Polish Army and the Ministry of National Defence, who are interested in information on new designs and achievements in the defence industry as well as options for modernization of equipment currently used by the army. We also want to take this event as an opportunity to meet with our current and potential customers interested in optoelectronic instrumentation for newly designed combat vehicles and other vehicles developed by Polish and foreign companies. Technologies and solutions proposed by PCO are not fundamentally different from most modern designs of other international companies and can successfully compete with them also in the global market. Increases in defence expenditures not only in Poland, but also in many parts of the world, boost export potential and we hope that the International Defence Industry Exhibition will be an opportunity for mutual meetings and presentations of our products to customers, who have already expressed interest in our offer, and for establishing new contacts in the growing arms market.*

# ANNOUNCEMENT OF THE 3<sup>RD</sup> OPTOELECTRONIC CONFERENCE

On 8–9<sup>th</sup> November 2017, the 3<sup>rd</sup> edition of Optoelectronic Conference will be held in the Windsor Hotel in Jachranka. The basic intention of the conference is to promote cooperation between representatives of science, industry and end-users. The theme of this year's conference is: "Optoelectronics as an important element of the State's sustainable development strategy".

The conference consists of two panels::

Day 1 – "Expectations and opportunities for the development of optoelectronic systems for defence and security", involving presentations by representatives of the Ministry of National Defence, Government Agencies and industry.  
Day 2 – "Optoelectronics as creator of a new reality", involving lectures on new photonic technologies and opportunities of their applications.



## III. KONFERENCJA OPTOELEKTRONICZNA 8-9.11.2017

The conference will cover presentations of the Polish photonic industry's offer as well as solutions and advancements in the field of photonics.

Previous editions of the Optoelectronic Conference enjoyed great interest, as evidenced by high attendance rate. The event is usually attended, among others, by representatives of the military, scientific research institutes and industry, as well as academics of technical universities across Poland. The conference enables sharing of experience and finding a common path for faster development of Polish photonics through synergy of competences and resources.

## STATEMENT BY THE PRESIDENT OF PCO S.A. RYSZARD KARDASZ

**What is the purpose of organizing the 3<sup>rd</sup> Optoelectronic Conference?**

*I hope that this year's conference, as in previous years, will provide an excellent opportunity to establish relationships, share experiences and expand knowledge in the field of optoelectronics, which is an extremely important field of science and technology.*

*Previous editions of this event enjoyed great interest, as evidenced by high attendance rate. The previous conference participants included senior management of the Ministry of National Defence, scientific staff (including the authorities of the major technical universities in Poland) and representatives of industry and numerous research institutes. One of the key goals of the conference is to find a common path for faster development of Polish photonics through synergy of competences and resources.*

**What do you consider the most important factor in cooperation between the scientific communities, Polish army and the defence industry?**

*The most important factor is the cooperation between industry, science and our main customer, namely the Polish Army, which will yield the greatest possible effect. Such efficiency should be measured in terms of number of technologies implemented in industry. And technologies expected by our most important customer.*

**What will be the focus of this year's conference??**

*The conference is devoted to the presentation of the most important achievements in the field of optoelectronics. Presentations and discussions on the speeches should contribute to increasing the knowledge of engineers who design the most modern optoelectronic solutions.*

*One of the most important objectives of the conference is the dialogue between representatives of science, industry, and the customer, i.e. the military forces and other uniformed services. The conference will also include a discussion panel: "Challenges for optoelectronics against today's threats to Poland's and global security." I believe that this discussion will be very interesting and fruitful.*

*The second day of the Conference is devoted to the penetration of optoelectronics into all areas of life, including photonic applications for space technology.*

*The conference will be accompanied by a thematic exhibition and a poster session during which optoelectronic products will be presented.*





## STATEMENT BY THE CHAIRMAN OF THE SCIENTIFIC COMMITTEE, TOMASZ MIROŚLAW

*This is already the third Optoelectronic Conference. Polish optoelectronic companies, and photonic industry companies to be more specific, especially those offering special purpose systems definitely need such a conference. The conference facilitates contacts with end-users, not only the Ministry of National Defence being the main one at our conferences, but also with other services, such as the police, border guard and fire service.*

*This year, due to modernization plans of the Polish Army as well as plans for increasing European defence funds, a number of new entities have expressed willingness to participate in the conference. Participation in the event, as the previous editions already proved, provides an opportunity to recognize the needs of the Ministry of National Defence and opportunities to participate in projects executed by other larger market players such as PCO S.A. The conference also provides an opportunity to present own ideas and even product offerings. That is usually true on the second day of the event, which traditionally is devoted also to establishing relationships between representatives of science and industry.*

*This form of conference has proven effective in previous years, which is confirmed by the number of new contacts*

*and post conference meetings that resulted in joint projects. PCO S.A. also established new relationships that led to new research and development projects.*

*This year, we are expanding the scope and form of product presentation with the "poster session" in order to enable presentations of own projects and ideas. This session will be accompanied by a usual exhibition of companies' portfolio.*

*It should be noted that the main effort of the conference organization relies mainly on PCO S.A. However, hosting the conference is far more than just a matter of prestige, but it can also translate into business benefits. In fact, PCO S.A. is the primary supplier of modern optoelectronic equipment for the MOD and in order to maintain, and perhaps to strengthen our position, we should act as system integrator in Polish photonic industry, who implements the latest and the best solutions in equipment for the Polish Army.*

*The Optoelectronic Conference offers us excellent opportunities to recognize both the needs of the MND, the structure of subsidies for research and development, as well as the potential of Polish science and small and medium-sized enterprises.*

## HONORARY COMMITTEE\*

1. płk dr hab. inż. Sławomir Augustyn [Colonel Ph.D. Eng.] (Inspectorate for Implementation of Innovative Defence Technologies)
2. płk dr inż. Karol Dymanowski [Colonel Ph.D. Eng.] (Armament Policy Department)
3. płk dr hab. inż. Tadeusz Szczurek [Colonel Ph.D. Eng.] (Military University of Technology)
4. prof. dr hab. inż. Jan Szmidt [Prof. Ph.D. Eng.] (Warsaw University of Technology)
5. Błażej Wojnicz (PGZ S.A.)

## SCIENTIFIC COMMITTEE\*

1. prof. dr hab. inż. Krzysztof Chrzanowski [Prof. Ph.D. Eng.] (Inframet)
2. dr hab. inż. Łukasz Dziuda [Ph.D. Eng.] (WIML)
3. dr Jacek Galas [Ph.D.] (Professor Maksymilian Pluta Institute of Applied Optics)
4. mgr inż. Krzysztof Gębarski [MSc. Eng.] (Smarttech sp. z o.o.)
5. prof. dr hab. inż. Andrzej Jeleński [Prof. Ph.D. Eng.] (Institute of Electronic Materials Technology, ITME)
6. dr Zbigniew Karkuszewski [Ph.D.] (Instytut Fotonowy sp. z o.o.)
7. płk dr inż. Krzysztof Kopczyński [Colonel Ph.D. Eng.] (Military University of Technology)
8. płk dr Marek Kozłowski [Colonel Ph.D.] (Armament Inspectorate)
9. Mariusz Krawczak (PCO S.A.)
10. prof. dr hab. inż. Małgorzata Kujawińska [Prof. Ph.D. Eng.] (Warsaw University of Technology)
11. dr inż. Tomasz Mirosław [Ph.D. Eng.] (PCO S.A.)
12. Stanisław Natkański (PCO S.A.)
13. dr Adam Piotrowski [Ph.D.] (VIGO System S.A.)



14. dr hab. inż. Roman Polak [Ph.D. Eng.] (PCO S.A.)
15. prof. dr hab. inż. Ryszard Romaniuk [Prof. Ph.D. Eng.] (Warsaw University of Technology)
16. Jerzy Wiśnioch (PCO S.A.)
17. prof. dr hab. inż. Tomasz Woliński [Prof. Ph.D. Eng.] (Photonics Society of Poland)

\*The membership of Committees as of 08/18/2017

## AGENDA FOR THE 3<sup>RD</sup> OPTOELECTRONIC CONFERENCE

### “OPTOELECTRONICS AS AN IMPORTANT ELEMENT OF THE STATE’S SUSTAINABLE DEVELOPMENT STRATEGY”

8-9<sup>TH</sup> NOVEMBER 2017 WINDSOR HOTEL JACHRANKA, SEROCK

#### DAY 1

#### “EXPECTATIONS AND OPPORTUNITIES FOR THE DEVELOPMENT OF OPTOELECTRONIC SYSTEMS FOR DEFENCE AND SECURITY”

|                     |  |
|---------------------|--|
| 12:00 PM – 02:00 PM | Registration of participants   |
| 12:30 PM – 02:00 PM | Lunch  |
| 02:00 PM – 02:15 PM | Opening speeches (15 min) <ul style="list-style-type: none"> <li>• dr inż. Ryszard Kardasz [Ph.D. Eng.] – President of the Management Board of PCO S.A. Member of the Management Board of ZP PPTF – 3 min</li> <li>• prof. dr hab. inż. Jan Szmidt [Prof. Ph.D. Eng.] Warsaw University of Technology, Chairman of the Scientific Council of PCO S.A. – 3 min</li> <li>• płk. dr hab. inż. Tadeusz Szczurek [Colonel Ph.D. Eng.], professor of Military University of Technology – 3 min</li> <li>• dr Adam Piotrowski [Ph.D.] President of ZP PPTF, VIGO System S.A. – 3 min</li> </ul> |
| 02:15 PM – 03:15 PM | Session I: Expectations of the MOD toward the Polish optoelectronic industry (1 hour) <ul style="list-style-type: none"> <li>• Representative of the Polish MOD Armament Policy Department* – 10 min</li> <li>• Questions – 2 min</li> <li>• Representative of the Armament Inspectorate* – 10 min</li> <li>• Questions – 2 min</li> <li>• Representative of PGZ S.A.* – 10 min</li> <li>• Questions – 2 min</li> <li>• Representative of I3TO* – 10 min</li> <li>• Questions – 2 min</li> </ul>   |
| 03:15 PM – 03:45 PM | Coffee break (30 min)  |
| 03:45 PM – 04:45 PM | Session II: Opportunities for the Polish optoelectronic industry (1 hour) <ul style="list-style-type: none"> <li>• Representative of Polska Grupa Zbrojeniowa S.A.* – 10 min</li> <li>• Questions – 2 min</li> <li>• Representative of PCO S.A.* – 10 min</li> <li>• Questions – 2 min</li> <li>• Representative of Military University of Technology* – 10 min</li> <li>• Questions – 2 min</li> <li>• Representative of WITU* – 10 min</li> <li>• Questions – 2 min</li> </ul>   |
| 04:45 PM – 05:15 PM | Presentation of the offer of Polish industry and science in the field of optoelectronics (30 min)  |
| 05:15 PM – 06:30 PM | Discussion panel: “Challenges for optoelectronics against today’s threats to Poland’s and global security.” (1 hour 15 min)  |

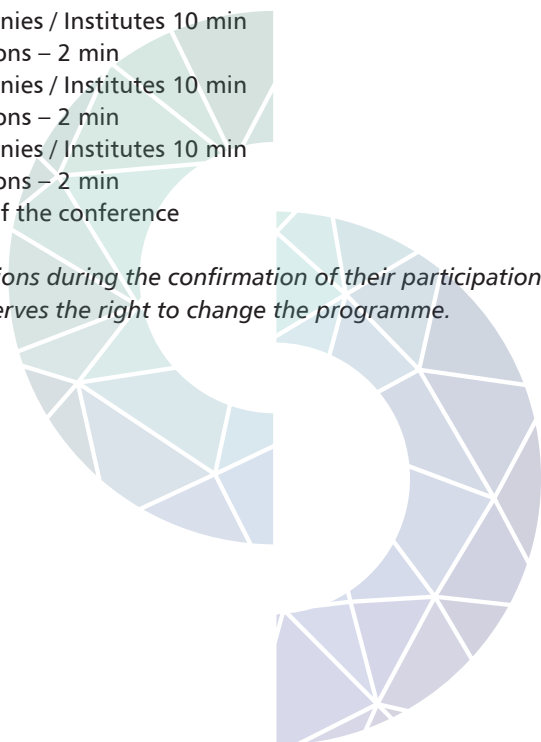
\*Invited individuals and institutions during the confirmation of their participation in the 3<sup>rd</sup> Optoelectronic Conference. The organiser reserves the right to change the programme.

## DAY 2

## “OPTOELECTRONICS AS CREATOR OF A NEW REALITY”

|               |  |
|---------------|--|
| 7:00 – 8:30   | Breakfast  |
| 8:30 – 9:30   | Session I Challenges of space exploration to Polish optoelectronics. (1 hour) <ul style="list-style-type: none"> <li>• Representative of PGZ* 10 min</li> <li>• Questions – 2 min*</li> <li>• Representative of the Polish Space Research Centre* 10 min</li> <li>• Questions – 2 min*</li> <li>• Representative of Creotech Instruments S.A.* 10 min</li> <li>• Questions – 2 min*</li> <li>• Representative of ARP* / Representative of PCO S.A.* / Representative of POLSA* 10 min</li> <li>• Questions – 2 min*</li> </ul>   |
| 9:30 – 9:45   | Coffee break (15 min)  |
| 9:45 – 10:00  | Employers Association of Polish Technological Platform on Photonics – a new opening, a new form of activity, plans for the future. (15 min) <ul style="list-style-type: none"> <li>• dr Adam Piotrowski [Ph.D], President of the Management Board of VIGO System S.A., President of ZP PPTF</li> <li>• prof. dr hab. inż. Tomasz Woliński [Prof. Ph.D. Eng.], President of the Photonics Society of Poland, Member of the Management Board of ZP PPTF</li> <li>• prof. dr hab. inż. Małgorzata Kujawińska [Prof. Ph.D. Eng.] Warsaw University of Technology, EPT Photonics21, ZP PPTF 10 min</li> </ul> |
| 10:00 – 11:00 | Session III Optoelectronics touches every area of life, part 1; (1 hour) <ul style="list-style-type: none"> <li>• Offer of implementation, monitoring and supervising critical infrastructure – Representative of INOS, 10 min</li> <li>• Questions – 2 min</li> <li>• Companies / Institutes 10 min</li> <li>• Questions – 2 min</li> <li>• Companies / Institutes 10 min</li> <li>• Questions – 2 min</li> <li>• Companies / Institutes 10 min</li> <li>• Questions – 2 min</li> </ul>   |
| 11:00 – 11:15 | Coffee break (15 min)  |
| 11:15 – 12:15 | Session III Optoelectronics touches every area of life, part 2; (1 hour) <ul style="list-style-type: none"> <li>• Companies / Institutes 10 min</li> <li>• Questions – 2 min</li> <li>• Companies / Institutes 10 min</li> <li>• Questions – 2 min</li> <li>• Companies / Institutes 10 min</li> <li>• Questions – 2 min</li> <li>• Companies / Institutes 10 min</li> <li>• Questions – 2 min</li> </ul>  |
| 12:15 – 12:20 | Closing of the conference  |

\* Invited individuals and institutions during the confirmation of their participation in the 3<sup>rd</sup> Optoelectronic Conference. The organiser reserves the right to change the programme.





PCO S.A., Wojskowa Akademia Techniczna,  
Politechnika Warszawska oraz Polska Platforma  
Technologiczna Fotoniki zapraszają na:



## III. KONFERENCJĘ OPTOELEKTRONICZNĄ

pt. Optoelektronika ważnym elementem  
strategii zrównoważonego rozwoju Państwa

Celem Konferencji jest poszukiwanie form i zakresu współpracy pomiędzy nauką, przemysłem i końcowym użytkownikiem. Wydarzenie to jest okazją do nawiązania kontaktów, wymiany doświadczeń oraz poszerzenia wiedzy w niezwykle ważnej i obecnej we wszystkich obszarach życia dziedzinie nauki i techniki jaką jest optoelektronika.

Konferencja ma charakter naukowo-techniczny, otwarty i składa się z dwóch osobnych bloków tematycznych. Pierwszego dnia hasłem przewodnim jest „Oczekiwania i możliwości rozwoju optoelektronicznych systemów dla bezpieczeństwa Państwa”. Drugi dzień poświęcony zostanie tematowi „Optoelektronika kreatorem nowej rzeczywistości”.

**8-9.11.2017**  
**Hotel Windsor**  
w Jachrance

Już dziś zarezerwuj czas i zapisz się na konferencję:  
**[www.optoelektroniczna.pl](http://www.optoelektroniczna.pl)**

# OUR PRODUCTS

## PNL-3M GOGGLES, FOR CIVIL APPLICATIONS

Author: Radosław Pochylski, Product Manager at PCO S.A.

PNL-3M night vision goggles are the latest proposal of PCO S.A. for aviation. These goggles based on PNL-4 military, aviation's night vision goggles, were designed to be dual-use, i.e. may be sold to civil entities such as the police, border guards, rescue services, companies guarding important objects, etc. PNL-3M night vision goggles feature a modern, ultra-lightweight, passive stereoscopic design using the latest generation of image amplifiers based on INTENS<sub>c</sub> technology. The goggles have been certified by the European Aviation Safety Agency (EASA) and thus can be offered and sold to any non-military services. During the certification process, the goggles underwent a series of tests to confirm compliance with the requirements of US standards for civil aviation (even stricter than the requirements for military aviation!). Due to the compatibility of American and European standards, we are also planning to apply for approval by the US civil aviation authority (FAA), which would open the goggles before a huge potential market.



The main advantages of the goggles include, apart from excellent performance during night observation, a large field of view, built-in minus blue filters (Class A and Class B), perfectly balanced fixing on the pilot's helmet, compatibility with majority of currently used helmets, long battery life and user-friendly operation. The PNL-3M goggles represent now the forefront of similar equipment offered by leading foreign companies. PCO S.A. has already received first orders from foreign buyers for dozens of PNL-3M goggles.

The version of PNL-3 goggles designed for military applications is designated as PNL-4. Its most noticeable features include the integrated INTENS<sub>c</sub> image intensifiers with high performance characteristics, possibility of powering from the on-board helicopter electric network and a fixing compatible with a standard THL 5NV aircraft helmet used by the Polish aviation forces. Its fixing is also compatible with other types of military aircraft helmets. Moreover, the PNL-4 goggles in comparison to PNL-3M goggles also allow the pilot to perform missions by night at light level 5 (according to NATO classification), i.e. 0.5 mlx, which means virtually a total darkness.





# DEVELOPMENT AND INNOVATIONS

## SOD SYSTEM AFTER MODIFICATIONS

Author: Department of Chief Constructor at PCO S.A.

The Stalowa Wola Steelworks has received an order for 120mm RAK mortars, which must include among other instrumentation systems a situational awareness system that ensures a vehicle commander the possibility to observe the area around the vehicle and facilitates detection and identification of potential risks. PCO S.A. has undertaken to develop such a system because the company made it a priority to establish a development and production potential that will meet all the expectations of the Ordering Party as regards supplying modern observation systems.

PCO S.A. has now a strong scientific and research base with a team of highly qualified electronics engineers, opticians, technicians and IT specialists with extensive experience in the design of thermal imaging cameras, television cameras, image processing and transmission.

The aim of the project was to design a system that would allow the vehicle commander to carry out wide angle observation during day and night and in limited visibility conditions without having to control optical instruments. The situational awareness system consists of four TV-thermal imaging modules (heads), a touch screen display, switch-mode power supply, computer and wire set.

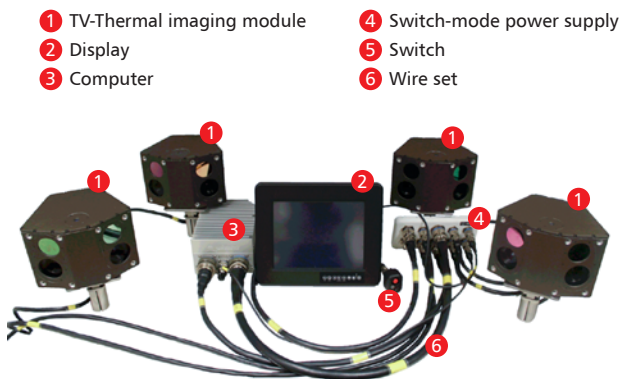


Figure 1. SOD Situational Awareness System

Simultaneously to the development of a new system, PCO S.A. adapted its production facilities for commencing the mass production of devices under development.

Situational Awareness System (SOD) ensures the vehicle commander to carry out wide angle observation of the area around the vehicle during day and night and in limited visibility conditions (with 0 to 360 degree azimuth and 0 to 40 degree in elevation). A panoramic view of the vehicle's surroundings, daylight or thermal, is displayed on the screen as a continuous image that can be freely manipulated - with zooming and panning the selected area of interest. This feature facilitates detection and identification

of targets that may represent a potential threat. The system increases situational awareness, enables the efficient performance of combat missions and improves battlefield survival rates for the crew and equipment.

The current SOD version is dedicated to the 120mm RAK self-propelled mortar. The system may be configured for use on other combat platforms after adjusting its mechanical interface.

SOD uses technologies that integrate two sensors operating in different spectra – a TV camera in the visible spectrum and a thermal imaging camera in the long-wave infrared (8 to 12  $\mu\text{m}$ ).



Figure 2. SOD Situational Awareness System mounted on a self-propelled 120mm RAK mortar.

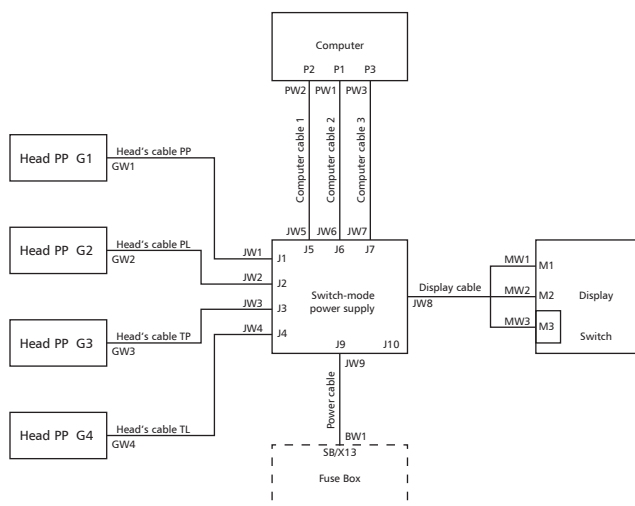


Figure 3. Block diagram of a SOD system.

The SOD situational awareness system consists of the following basic functional elements:

1. Four TV-thermal imaging modules – each TV-thermal imaging module has two TV and two thermal imaging tracks, and the signals they transmit are combined with the signals from the other three camera modules.

2. Computer – that simultaneously concentrates vision signals from all TV-thermal imaging modules and displays the image on the display.
3. Display – touch screen makes it possible to control the SOD system and displays the image generated by the computer. The system displays the image in different operational modes.
4. Wire set – provides electric connections between SOD system elements and is equipped with an ON/OFF switch.

The SOD system allows to simultaneously collect images from four TV-thermal imaging modules as evidenced on the diagram (Fig. 3).

The system acquires simultaneously data from the 8 cameras (TV daytime or thermal imaging) and processes these data in real time with the refresh rate of 25 fps. This is a complex issue as regards the selection of hardware and software components capable of processing and transferring such a huge amount of data.

### 1. TV-thermal imaging module



Figure 4. Photo of TV-thermal imaging module.

During the project implementation, PCO S.A. capitalized on the previous experience with technology of infrared bolometric detectors acquired during launching the production of SCT "RUBIN" thermal weapon sight. The module comprises thermal imaging cameras with a resolution of  $640 \times 480$  pixels. The advanced electronic control units, which were specifically designed for cameras, ensure precise detector control, input of digital signals from thermal sensors, image processing to compensate for the detector's signal distortions, image filtering, automatic adjustments of brightness/contrast and generation of standardized digital video signals.

The electronic module of TV camera is designed in a multi-board layout. It adopts a global shutter sensor with a resolution of  $1280 \times 960$  pixels.

The main challenge was to develop an electronic system that would allow merging imagery from four cameras and transferring it to the central computer via an Ethernet interface with the least possible delay.

The observation modules use the advanced System on Chip (SoC). This is a complex, integrated system specially designed for processing video streams. The SoC compris-

es components responsible for converting video signals into different formats, image scaling and compressing video streams. The system in combination with FPGA circuits enables real-time transmission of the imagery over Ethernet interface. The adopted solution allows adjustment of transmitted video stream parameters to the current demands.

High-resolution digital images in a simplified form are transmitted to the central module via gigabit Ethernet network. That ensures minimum delays in the observed imagery. The Ethernet link is also used to send control commands between observation modules and the central module. This reduces the amount and simplifies connections between system components (ensuring the versatility of this solution).

### 2. Computer

The computer is a main unit of the SOD system responsible for acquiring images from all TV-thermal imaging modules, image processing and displaying as well as user interface control.



Figure 5. Photo of computer.

The model adopted in the system is equipped with 4 gigabit Ethernet ports and thus capable of simultaneously receiving live images from all modules. Moreover, it provides parallel processing of images.

Creating panoramic images is a challenging issue as regards digital image processing (image stitching) and includes the following steps: image recording, calibration, geometric and perspective transformations, blending and more.

A strong emphasis was placed on designing a simple user-friendly interface that would allow fast and easy locating and zooming images of the area under observation. The system operation is intuitive and fast thanks to the touch screen.

The SOD system has several operating modes: PANORAMIC, MODULAR, DIRECTIONAL, VIEW and SINGLE CAMERA.

In "PANORAMIC" mode the monitor displays the panoramic image of vehicle surroundings (from TV daytime or thermal imaging cameras). It is possible to enlarge the selected area of the panorama imagery by using the zoom function.



Figure 6. SOD graphical user interface.

In "MODULAR" mode the monitor displays a number of views from the modules, arranged in line with the physical layout of the modules in the vehicle.

In "DIRECTIONAL" mode the monitor displays camera views corresponding to the vehicle's turret position. This means that "FRONT" view is created as a fusion of imagery provided by the front-left and front-right module cameras.

In "VIEW" mode monitor displays a view from two adjacent cameras (installed within an individual module or the adjacent modules).

"SINGLE CAMERA" mode enables observation via a single camera selected from the VIEW mode.

The pop-up menu consists of the following functions:

- TV – shows the imagery from the TV cameras;
- IR – shows the imagery from the thermal cameras;
- ZOOM – allows changing the magnification of a selected imagery part (x2);
- NUC – enables calibration of IR cameras;
- POLARIZATION – allows changing the polarity of the IR camera display;
- SELECT – allows selection of an individual module and switching to "VIEW" mode (available in "MODULE", "DIRECTIONAL" and "VIEW" modes);
- RETURN – allows selection of "VIEW" mode (available in "SINGLE CAMERA" mode).

The SOD system is equipped with an on-board diagnostic system. By selecting UTILITIES tab and tapping START TEST button, the system performs self-diagnostics and displays an on-screen report to the user.

The system provides an image registration function. The imagery acquired from all the modules is stored in the

system internal memory. Image recording is triggered by tapping START RECORDING button in UTILITIES tab. The system starts recording and a message appears on the status bar informing that the system is recording an image to the internal memory. The button START RECORDING changes to END RECORDING. To stop the recording process tap END RECORDING button.

Recorded images may be copied from the internal memory to an external medium. To do this, connect an external storage device to the USB port, which is located on the rear panel of the monitor, and then specify the path to the movie clip you want to copy.

The SOD system underwent testing conducted by WITPiS (Military Institute of Armour and Automotive Technology), which confirmed the system's compliance with all the requirements for use in the combat vehicle.

The development and implementation process of Situational Awareness System was financed entirely with PCO S.A. own funds.

In February 2017, PCO S.A. delivered eight units of SOD system for the Stalowa Wola Steelworks. Further deliveries are expected to be completed this year and in subsequent years.

#### Basic parameters

| Working conditions  |                   |
|---|-------------------|
| Operating temperature   | -30°C ÷ +55°C     |
| Storage temperature   | -40°C ÷ +65°C     |
| Output data   |                   |
| Field of view (azimuth)   | 360°              |
| Detection/recognition/identification ranges for human target <sup>1</sup>       | ≥ 250/100/50 [m]  |
| Detection/recognition/identification ranges for battle tank target <sup>2</sup> | ≥ 500/250/120 [m] |
| Automatic fault finding   |                   |
| Zooming of the selected area of observation                                     |                   |
| Disassembly and reassembly time to bring to combat readiness                    |                   |
| Readiness time (in normal conditions)   | less than 120 s   |
| Power supply  | 18V ÷ 28V         |

1 Target detection parameters refer to a human size target with dimensions of 1.7 m × 0.75 m at night and during the day (IAW the Johnson criteria for a day light camera, STANAG 4347 for a thermal imaging camera) in normal climate conditions;

2 Target detection parameters refer to a human size target with dimensions of 2.3 m × 2.3 m at night and during the day (IAW the Johnson criteria for a day light camera, STANAG 4347 for a thermal imaging camera) in normal climate conditions.

# MANAGEMENT POLICY

## ETHICS IN PCO S.A.

On 17<sup>th</sup> March 2017, anti-corruption and anti-mobbing procedures were introduced in PCO S.A. by orders of the President of Management Board. The procedures are an integral part of the previously introduced principles of Business Ethics with the "PGZ S.A. Code of Ethics".

The intention of the anti-corruption procedure is to reduce the risk of corruption. The procedure defines types of corruption and other frauds, as well as rules of conduct and responsibility of employees. Annexes attached to the procedure include: description of corruption risk areas, a declaration form that the employee has become acquainted with the procedure, a declaration of family relationships, a declaration form confirming that the employee has no actual or potential conflict of interest in connection with joining PCO S.A. and a declaration form confirming that the employee has no actual or potential conflict of interest in connection with the implementation of relevant project.

The intention of the anti-mobbing procedure is to build awareness of the phenomenon of mobbing and to help eliminate adverse phenomena. Its purpose is also to create positive relationships between the employees. In accordance with the procedure, the employer is obliged to take all measures to eliminate the phenomenon of mobbing. The procedure contains among others information on operating procedures for handling complaints.

Anti-corruption and anti-mobbing procedures apply to all employees of the Company. The heads of individual organizational departments are responsible for compliance with the procedures.

Incidents of non-compliance may be reported by means of newly launched communication channel PCO S.A. Ethics Line: [liniaetyki@pcosa.com.pl](mailto:liniaetyki@pcosa.com.pl). Reported incidents are passed to the Ethics Committee in PCO S.A., which begins the respective proceedings in accordance with the procedures. The Committee consists of 5 persons.





# IMPORTANT EVENTS OVERVIEW (FEBRUARY – AUGUST 2017)

## SIGNING CONTRACTS WITH UKRAINE, 26<sup>TH</sup> JUNE 2017

On 26<sup>th</sup> June 2017, PCO S.A. signed two contracts with Ukrainian company Ukrinmasz belonging to UkrOboronProm Group. The first contract is on delivery of optical elements produced by Zhytomyr Armour Company to PCO S.A. and the second one on delivery of optoelectronic sets for modernisation of combat vehicles.

The signed contracts constitute the first stage of modernization of optoelectronic equipment in the Ukrainian army's combat vehicles. The next stage that PCO S.A. will actively pursue is establishing in Ukraine a modernization centre for optoelectronics with the help of the Company's achievements in this field.

The contract with Ukrinmasz was signed on behalf of PCO S.A. by Stanisław Natkański, Technical Director, and Paweł Glica, Sales Director. The Secretary of State in the Ministry of National Defence, Bartosz Kownacki, was present during signing of the contracts.



## FOUNDING MEETING OF THE EMPLOYERS ASSOCIATION OF PPTF, 23<sup>RD</sup> MAY 2017



On 23<sup>rd</sup> May, a meeting of the Employers Association of "Polish Technology Platform on Photonics" (ZP PPTF) was held at PCO S.A. ZP PPTF is an association gathering the members of PPTF. The members include representatives of companies operating in the optoelectronic and photonics industry, research institutes and universities. The founding meeting of the Employers Association of "Polish Technology Platform on Photonics" was attended by 23 companies. At the meeting, the Management Board of ZP "PPTF" was elected: President –

Adam Piotrowski, President of VIGO System S.A. and members of the management board: Ryszard Kardasz, President of PCO S.A., Krzysztof Węgrzyn, President of TopGaN sp. z o.o., and Tomasz Woliński, representing the Polish Photonics Society. The main activities of the Employers Association of "Polish Technology Platform on Photonics" include further improvement of innovation capabilities of Polish photonic industry, active participation in coordination and development of new optoelectronic products and technology, human resources development and increasing the range of application of photonic technologies in Poland.

## OPTOELECTRONIC ENGINEER DAY, 24<sup>TH</sup> APRIL 2017

On 24<sup>th</sup> April 2017, PCO S.A. celebrated the Optoelectronic Engineer Day. The company also celebrated its 41<sup>st</sup> anniversary. During the celebration distinguished employees were awarded "Meritorious for PCO S.A." Honorary Awards.

The "Meritorious for PCO S.A." Honorary Awards were created for people whose work contributed to the development and consolidation of the company's position. The Honorary Awards are granted on the Company's anniversary day, which by order of the president of the Board was established as the Optoelectronic Engineer Day.



## VISIT OF THE MINISTER OF NATIONAL DEFENCE, 9<sup>TH</sup> FEBRUARY 2017

On 9<sup>th</sup> February 2017, the premises of PCO S.A. were visited by the Minister of National Defence Antoni Macierewicz and the Commander of the Territorial Defence Forces Brig. Gen. Wiesław Kukuła.

The visit was connected with a demonstration of equipment for the Territorial Defence Force. Companies of Polska Grupa Zbrojeniowa S.A. were exhibiting their products. PCO S.A. presented inter alia MU-3M "KOLIBER" night vision monocular and SCT "RUBIN" thermal weapon sight.

During the press conference, the minister announced that the Polish Armed Forces should buy Polish equipment that is offered by defence companies. He mentioned equipment of the individual soldier among the most important commissions.

President of the Board of PCO S.A. Ryszard Kardasz announced that the company is ready to deliver products for the armed forces.

A multimedia presentation of production's capabilities and offerings of several companies were shown during the meeting. The minister also spoke with representatives of PGZ and the management of its affiliate companies.





## FAIRS AND CONFERENCES ATTENDED BY PCO S.A.

### PCO S.A. AT THE PRO DEFENSE TRADE FAIR, 1–4<sup>TH</sup> JUNE 2017

On 1–4<sup>th</sup> June 2017, the Pro Defense Trade Fair took place in Ostróda. PCO S.A. presented there its most modern products. The Company exhibited inter alia: SCT-1M thermal imaging sight, PNL-4 aviator's night vision goggles and MU-3AD night vision goggles. Equipment for the Ter-



ritorial Defence infantry team, including optoelectronic devices, was presented.

PCO S.A. stand was visited by the Minister of National Defence, Antoni Macierewicz.



### AIR FAIR BYDGOSZCZ, 26–27<sup>TH</sup> MAY 2017

On 26–27<sup>th</sup> May, Bydgoszcz hosted the 11<sup>th</sup> international Air Fair exhibition. The exhibition was attended by about 100 exhibitors, including companies of the Polish defence

industry. PCO S.A. presented inter alia civil and military versions of aviator's night vision goggles.

### IDEF, 9–12<sup>TH</sup> MAY 2017

On 9–12<sup>th</sup> May, the International Defence Industry Fair IDEF was held in Istanbul, Turkey. The fair is one of the biggest events in the defence industry in the Mediterranean. PCO S.A. presented its offer at the stand of Polska

Grupa Zbrojeniowa S.A. The visitors could see inter alia SCT-1M thermal imaging sight, DCM-1 modular day sight and MU-3AD night vision goggles.

### EUROPOLTECH FAIR, 26–28<sup>TH</sup> APRIL 2017

On 26–28<sup>th</sup> April 2017, the International Fair of Technology and Equipment for the Police and National Security Services was held in Gdansk. The event is Poland's most important trade fair dedicated to law enforcement and special services.

PCO S.A. joined this year's edition and presented, among other things: SCT-1M thermal imaging sight, NPL-1T thermal imaging binoculars, DCM-1 modular day sight, MU-3AD night vision goggles, MU-3M night vision monocular, PNL-2ADM night vision goggles and PNL-3M night vision goggles.



## LADD EXHIBITION, 4–7<sup>TH</sup> APRIL 2017

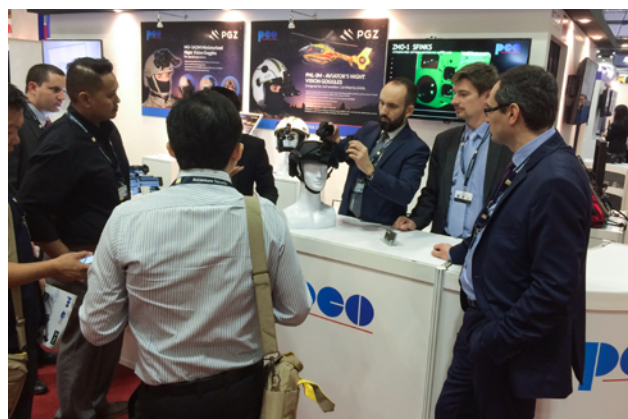
On 4–7<sup>th</sup> April 2017, LAAD Defence & Security exhibition took place in Rio de Janeiro (Brazil). There were over 600 exhibitors from dozens of countries. It is one of the biggest events in the defence industry in South America. The exhibition was attended by representatives of PCO S.A., who held a series of meetings in order to present the Company's offer.



## MILIPOL ASIA-PACIFIC EXHIBITION, 4–6<sup>TH</sup> APRIL 2017

On 4–6<sup>th</sup> April 2017, Milipol Asia-Pacific exhibition, one of the biggest events in the defence industry in Asia, took place in Singapore.

PCO S.A. presented PNL-3M aviator's night vision goggle, TSO-1 thermal imaging system, SCT-1M thermal imaging sight, MU-3AD night vision goggles and DCM-1 modular day sight.



## SOFINS EXHIBITION, 28–30<sup>TH</sup> MARCH 2017

On 28–30<sup>th</sup> March 2017, a conference and an exhibition were held in Bordeaux (France), which were dedicated to equipment for Special Forces troops. The exhibition was accompanied by live demonstration of French Special Forces.

Plenary sessions focused, among others, on international cooperation between different special services. PCO S.A. were among the exhibitors, presenting SCT1M thermal imaging sight and MU-3ADM night vision goggles.

## PRESENTATION OF PCO PRODUCTS IN UKRAINE, 28–30<sup>TH</sup> MARCH 2017

On 28–30<sup>th</sup> March 2017, the representatives of PCO S.A. carried out a product demonstration for the National Guard of Ukraine. The presented products included PNL-4 aviator's night vision goggles, MU-3AM/ADM night vision

goggles, PCS-5 sight, NPL-1M night vision goggles, NPL-2 night vision goggles, SCT-1M thermal imaging sight, NPL-1T thermal imaging goggles and PNK-72 and POD-55/72 periscopes.

## “INNOVATIONS FOR THE POLISH ARMED FORCES” COMPETITION, 22<sup>ND</sup> MARCH 2017

On 22<sup>nd</sup> March 2017, the Final Gala was held closing the “Innovations for the Polish Armed Forces” competition organized by the Inspectorate for Implementation of Innovative Defence Technologies of the Ministry of National Defence. A joint project of PCO S.A. and Military Univer-

sity of Technology called “Stratospheric platform as an element of the recognition and protection system of the Armed Forces and infrastructure of the Republic of Poland” qualified to the final round of the competition and was among six awarded concepts.



## WORKSHOP AT THE WARSAW UNIVERSITY OF TECHNOLOGY ON OPTOELECTRONICS IN AGRICULTURE, 9<sup>TH</sup> MARCH 2017

On 9<sup>th</sup> March 2017, a workshop was held at the Faculty of Physics, Warsaw University of Technology, dedicated to the applications of photonics in modern agriculture and forestry. The workshop was organized by the Polish Technological Platform on Photonics in cooperation with PCO S.A.

It was attended by lecturers and students of universities, representatives of industry and scientific research institutes. The discussion involved, among other things, civilian applications of thermal imaging and night vision technology for evaluation of forest and crops nutrient status.

The workshop involved also granting awards of the Photonics Society of Poland, sponsored by PCO S.A., for the best thesis in the field of photonics.



Awards for young scientists were granted by the President of PCO S.A. Ryszard Kardasz.

## HAI HELI-EXPO EXHIBITION, 7–9<sup>TH</sup> MARCH 2017

On 7–9<sup>th</sup> March 2017, HAI Heli-Expo Exhibition dedicated to helicopter industry, took place in Dallas (USA). Several dozen types of helicopters as well as equipment and ar-

mament were exhibited there. PCO S.A. joined this year's edition and presented the PNL-3M aviator's night vision goggles, certified for use in civil helicopters.

## IWA OUTDOOR CLASSICS TRADE FAIR, 3–6<sup>TH</sup> MARCH 2017

On 3–6<sup>th</sup> March 2017, IWA Outdoor Classics trade fair for hunting, shooting sports, equipment for outdoor activities and for civilian and official security applications were

held in Nuremberg (Germany). Over 1500 exhibitors presented their products during this year's edition. PCO S.A. was also there, presenting the latest shooting sights.

## PRESENTATION OF EQUIPMENT FOR THE TERRITORIAL DEFENCE FORCES, 1<sup>ST</sup> MARCH 2017

On 1<sup>st</sup> March 2017, a presentation of equipment for the Territorial Defence Forces, organized by the Ministry of National Defence, took place in Bydgoszcz. The companies affiliated with PGZ S.A. presented their offering there. PCO S.A. showed a range of thermal imaging and night vision products, e.g. sights, goggles and monocu-

lars offered as equipment for infantry squads of the Territorial Defence Forces. The presentation was attended by Błażej Wojnicz, president of PGZ S.A., who said that the Group was able to provide nearly 95 percent of personal equipment and armaments for the Territorial Defence Force soldiers.

## PCO S.A. AT THE INTERNATIONAL SCIENTIFIC CONFERENCE, 11–12<sup>TH</sup> JANUARY 2017

On 11–12<sup>th</sup> January 2017, PCO S.A. exhibited its products at the international scientific conference held in Jasionka near Rzeszów. The conference was organized by the Inspectorate for Implementation of Innovative Defence Technologies and the 21<sup>st</sup> Podhale Rifles Brigade under the auspices of the Secretary of State in the MND. PCO S.A.'s offer was presented during one of the discussion panels.



## SELECTED VISITS AT THE COMPANY'S SEAT

### VISIT OF DELEGATION FROM BRAZIL AT PCO S.A., 28<sup>TH</sup> JUNE 2017

On 28<sup>th</sup> June 2017, the headquarters of PCO S.A. were visited by a delegation from Brazil.

The delegation was headed by Ribeiro Vieira da Silva Aureo, Defence Attaché of the Brazilian embassy in Warsaw. Among the guests were Leonardo Clea ver de Athayde, Minister Counselor, and representatives of one of the Brazilian defence industry companies.

The guests were acknowledged with most modern products of the company such as aviator night vision goggles and thermal imaging sight. They were also introduced to the activities of the Company.



### VISIT OF DELEGATION FROM INDIA, 31<sup>ST</sup> MAY 2017

On 31<sup>st</sup> May 2017, PCO S.A. hosted a delegation from the National Defence College (India).

The delegation included representatives of the armed forces of India, Japan, Malaysia and Fiji. The guests were

acquainted with a presentation of PGZ S.A.'s activities as well as the offering of the latest products of the company dedicated to military vehicles and the individual soldier. They also visited the Company's production facilities.



### VISIT OF SENATOR ANDERS, 26<sup>TH</sup> MAY 2017

On 26<sup>th</sup> May 2017, the premises of PCO S.A. were visited by senator Anna Maria Anders.

Talks took place on prospects of the Polish defence industry. Mrs. Senator watched a multimedia presentation of the Company's activity and was acknowledged with most modern night vision and thermal imaging products manufactured by PCO S.A.





## VISIT OF STUDENTS OF POSTGRADUATE STUDIES OF THE MILITARY FOREIGN SERVICE, 28<sup>TH</sup> MARCH 2017

On 28<sup>th</sup> March 2017, the premises of PCO S.A. were visited by students of Postgraduate Studies of the Military Foreign Service. Future military attachés watched a mul-

timedia presentation of the Company and were acknowledged with most modern products.

## VISIT OF MILITARY ATTACHES, 14<sup>TH</sup> FEBRUARY 2017

On 14<sup>th</sup> February 2017, the premises of PCO S.A. were visited by military attaches of several embassies. The guests were acquainted with the Company's product offering and its activities. They also visited PCO S.A.'s production facilities.



## AWARDS AND DISTINCTIONS

### LEADER OF THE STATE SECURITY, 28<sup>TH</sup> JUNE 2017

On 28<sup>th</sup> June 2017, PCO S.A. was granted a diamond award in Leader of the State Security competition for the Observation System for 120mm RAK mortar. The award, funded by the Association of Uniform Manufacturers and Distributors, was collected during a gala ceremony by Paweł Glica, Member of the Management Board of PCO S.A. During the ceremony the latest products of the Company were also presented.



### EUROPEAN MEDAL, 7<sup>TH</sup> JUNE 2017

On 7<sup>th</sup> June 2017, PCO S.A. was awarded the European Medal granted by the Business Center Club for the retrofitting kit for thermal imaging camera. The European medal is awarded for products and services that meet European standards. A nominated service (or product) must

meet the standards required by law and have proper licences, patents, etc. Dynamics of the company, received awards and certificates are also of importance.

### BCC AWARD FOR PCO S.A., 21<sup>ST</sup> JANUARY 2017

The 24<sup>th</sup> Great Gala of Polish Business Leaders took place at Teatr Wielki (Grand Theatre) on 21<sup>st</sup> January 2017. PCO S.A. received the sixth Diamond to the Golden Statuette of the Polish Business Leader. This is a prestigious Business Center Club award for rapidly developing Polish companies, engaged in the active pursuit of entrepreneurship activities and contributing to Poland's economic growth.



# MEDIA ABOUT US (FEBRUARY – AUGUST 2017)



**"The deputy head of the MND: We want to establish a cooperative armament programme with Ukraine"**

Wirtualny Nowy Przemysł, 26<sup>th</sup> June 2017

Press releases on signing contracts between PCO S.A. and Ukrinmasz (Ukraine). The contract was signed at the headquarters of PCO S.A. in the presence of the deputy head of the MND, Mr Bartosz Kownacki. The contract provides for the delivery of optical observing and sighting instruments for Ukrainian combat vehicles. Paweł Glica, Sales Director at PCO S.A., expressed a hope that "the contract is a starting point for the modernization of the Ukrainian army's combat vehicle optoelectronic equipment". He announced that PCO S.A. will strive to establish an optoelectronics modernization centre in Ukraine.



RZECZPOSPOLITA

**"Warsaw equipment for Ukraine's armoured forces"**

„Rzeczpospolita” daily, 26<sup>th</sup> June 2017

Author: Zbigniew Lentowicz

The author informs the readers about the contract concluded between PCO S.A. and Ukrinmasz for optical observation and sighting equipment for the Ukrainian infantry combat vehicles and armoured vehicles.

PCO S.A. tested for two years their sights and military optics on the Ukrainian military training grounds to get the appropriate certificates. The PGZ S.A. plans to establish an authorized modernization centre of military optoelectronics in Ukraine.



**"Ukraine will buy optoelectronic systems from the Polish armaments company"**

Wirtualny Nowy Przemysł, 26<sup>th</sup> June 2017

Author: Katarzyna Walterska

Information on contracts signed between PCO S.A. and Ukrainian company Ukrinmash belonging to the UkrOboronProm Group. According to the deputy head of the MND, Bartosz Kownacki, Ukraine is to be a strategic partner for Poland, but the partnership must be based on business and industrial cooperation, which gives benefits to both parties.

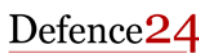
The first contract is on delivery of optical elements produced by Zhytomyr Armour Company to PCO S.A. and the second one on delivery of optoelectronic set for modernisation of the combat vehicles.



**"Air Force Institute of Technology: aviation technology from A to Z"**

Polski Przemysł, 13<sup>th</sup> June 2017

The article presents activities of the Air Force Institute of Technology, including the cooperation with PCO S.A. It describes the on-helmet SWPL-1 "Cyklop" flight parameters display system designed and manufactured by consortium of ITWL and PCO S.A. The system was implemented on the Polish Mi-17 helicopters and enables the pilot to control the flight in day and night time conditions without looking at the on-board gauges and instruments, which significantly increases flight safety. The device has been manufactured by PCO S.A. in cooperation with ITWL.



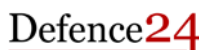
Bezpieczeństwo Wojsko Przemysł

**"Pro Defense 2017: Polish equipment for light infantry squad"**

Defence24.pl portal, 8<sup>th</sup> June 2017

Author: Jakub Palowski

Information about the Pro Defense Fair, which took place at the beginning of June this year in Ostróda. During the fair, the company Polska Grupa Zbrojeniowa, including PCO S.A., presented armaments and equipment for the infantry troops. PCO S.A. presented the equipment kit designed for the Territorial Defence Forces to be formed in nearest future.



Bezpieczeństwo Wojsko Przemysł

**MSBS rifle contract to be signed during the MSPO event? President Wojnicz on equipping the Territorial Defence Force**

Defence24.pl portal, 5<sup>th</sup> June 2017

Interview with Błażej Wojnicz, President of Polska Grupa Zbrojeniowa during the Pro Defense Fair in Ostróda, who points out that PGZ S.A. is able to comprehensively equip the soldiers of the Territorial Defence Force. As an example, he mentioned modular firearms system manufactured at the Radom Arms Factory, optoelectronics delivered by PCO S.A. and Maskpol's helmets and bulletproof vests.



**"Two Hours for the Family" Social Campaign with the participation of company from the defence sector**  
Onet.pl portal, 12<sup>th</sup> May 2017

Press information on the participation of PCO S.A. in the "Two Hours for the Family" Campaign. PCO S.A. undertakes a number of activities within Corporate Social Responsibility projects. Participation in the "Two Hours for the Family" campaign, being the part of the International Day of Families, is an opportunity for employees to spend extra time with family and loved ones and strengthen the sense of connectedness with the company among employees.

**Pistols, Bulletproof Vests, Radars. PGZ's Offer for Uniformed Services Showcased at Europoltech,**  
Defence24.pl portal, 28<sup>th</sup> April 2017

The text informs about the participation of Polska Grupa Zbrojeniowa in Europoltech 2017 trade fair. Also PCO S.A. showcased its products, i.a. DCM-1 "SZAFIR" modular day sight, SCT-2 thermal imaging sight, NPL-1T "AGAT" thermal imaging goggles and several types of night vision goggles and monoculars. The visitors could also see PNL-3M aviator's night vision goggles for civilian applications.

**Trade fairs and exhibitions with participation of PCO S.A.**  
Manager24.pl, 28<sup>th</sup> April 2017

A press release on PCO S.A.'s participation in April events on technology and safety, which took place in Poland and abroad. The Company presented its product portfolio, among others, at the Milipol 2017 Asia-Pacific exhibition in Singapore, Europoltech in Gdansk, at the exhibition accompanying the briefing of senior executives of the MND and the armed forces in the Polish Army Conference Center as well as at the International Long-distance Shooting Competition LONGSHOT 2017 in Międzyrzecze.

**Optoelectronic Engineer Day at PCO S.A.**  
„Fakty”, 26<sup>th</sup> April 2017

Information on celebration of Optoelectronic Engineer Day at PCO S.A. During the celebration, a group of distinguished employees were awarded "Meritorious for PCO S.A." Honorary Awards. The "Meritorious for PCO S.A." Honorary Award has been granted since 2011.

**PCO's employees awarded**  
Defence24.pl portal, 25<sup>th</sup> April 2017

A press release on PCO S.A.'s annual Optoelectronic Engineer Day, during which a group of distinguished employees were awarded "Meritorious for PCO S.A." Honorary Awards. Foreword on the company's history and tradition of Optoelectronic Engineer Day was delivered by President Ryszard Kardasz. Head of the Award Chapter, Stanisław Kaniak, also spoke out. After granting awards, the 2017 merit table was unveiled.



**PCO puts on thermal imaging and is a leader**  
„Rzecz o Innowacjach”, 24<sup>th</sup> April 2017  
Author: Michał Wiechoczek

The author presents the profile of PCO S.A. He draws attention to the Company's recent achievements, mainly in the field of thermal imaging technology, and points out the direction of further development. The next stage in the Company's development would be entering the space industry. PCO S.A. plans to develop a thermal imaging camera designed for terrestrial satellites.

**Awards for science and industry. The MND announces the results of "Innovations for the Polish Armed Forces" competition**  
Defence24.pl portal, 23<sup>rd</sup> March 2017

Information on the results of the 3<sup>rd</sup> edition of the "Innovations for the Polish Armed Forces" competition organized by the Inspectorate for Implementation of Innovative Defence Technologies under the auspices of the Minister of National Defence, Antoni Macierewicz. Among awarded distinctions there was a joint scientific work of the Military University of Technology, POLSY and PCO S.A. called "Stratospheric platform as an element of the recognition and protection system of the Armed Forces and infrastructure of the Republic of Poland".



**Innovation is a key to success**  
„Gazeta Polska Codziennie”, 9<sup>th</sup> March 2017

The article presents the achievements of PCO S.A. and indicates the most modern technology and production equipment, world-class products and innovative designs. The Company's innovativeness is a result of, inter alia, close cooperation with universities. PCO S.A. cooperates with i.a. Military University of Technology, Warsaw University of Technology, Wrocław University of Technology, War Studies University, Institute of Electronic Materials Technology, Institute of Electron Technology and Institute of Applied Optics.



### **Inventions and Projects Show. Virtuosos of thermal imaging**

„Przegląd Techniczny” magazine, 26<sup>th</sup> February 2017

The article presents PCO S.A.'s scope of activity, lists the latest products, including the SOD situational awareness system, designed for mounting on the turret of 120 mm “RAK” mortar and the KLV-1 “ASTERIA” camera designed for equipping PT-91 “TWARDY” battle tanks, modernization of sighting system in “Rosomak” Wheeled Armoured Vehicle and in modernized Leopard battle tanks. The text also describes PNL-2ADM night vision goggles and retrofit kit for the thermal imaging camera designed for PT-91 battle tanks equipped with DRAWAT fire control systems.



RZECZPOSPOLITA

### **Territorial Defence to boost the defence industry**

„Rzeczpospolita” daily, 15<sup>th</sup> February 2017

Author: Zbigniew Lentowicz

The author describes the plans to expand PCO S.A.'s headquarters, which is caused by expanding its production due to recent orders for the Territorial Defence Forces. The company is also a leader of the consortium TYTAN, so the headquarters expansion is also related to the construction of assembly lines for manufacturing equipment for the Polish “21<sup>st</sup> century soldier”.



### **Minister of National Defence: equipment for the Territorial Defence Forces from Polish factories; helicopters in March**

Forsal.pl, 9<sup>th</sup> February 2017

Information about the visit of the Minister of National Defence, Antoni Macierewicz, and the Commander of the Territorial Defence Force, Brig. Gen. Wiesław Kukuła in PCO S.A. The meeting was also attended by representatives of PGZ's companies that offer equipment for the Territorial Defence Forces.



### **Helicopters for the Polish army. Macierewicz talks about the next deadline**

TVN24bis, 9<sup>th</sup> February 2017

This article describes the visit of the Minister of National Defence, Antoni Macierewicz, and the Commander of the Territorial Defence Forces, Brig. Gen. Wiesław Kukuła. The meeting included a press conference during which the president of PCO S.A. Ryszard Kardasz noted that the company was ready to equip territorial defence battalions in necessary equipment. He added that as far as he knew, also other companies affiliated with Polska Grupa Zbrojeniowa are ready to supply.



### **New bridge mount for Koliber monocular**

„Special OPS” magazine, 2<sup>nd</sup> February 2017

Author: Mateusz J. Multarzyński

The author informs about a modification of the bridge mount for MU-3M “KOLIBER” night vision monoculars implemented by PCO S.A. With the new bridge mount, the night vision optics, while not in use, may be flipped up to a very low position, and in fact to be folded completely flat along the helmet surface. The new system enables one or two devices to be installed, which may be used either as a monocular or as goggles. The bridge mount features a low weight and a small size. It is entirely designed by PCO S.A.'s designers team.



### **EASA Certificate for goggles manufactured by PCO**

Altair.com.pl, 2<sup>nd</sup> February 2017

The press release informs on the EASA certificate obtained by PCO S.A. in December 2016 for the PNL-3M aviator's night vision goggles. Thanks to this certificate the goggles may now be used in different versions of Airbus EC135 helicopters. PCO S.A. is one of the few manufacturers in the world having a civilian certificate permitting the use of night vision goggles on non-military helicopters. The Company decided to apply for this certification after announcement of the modernization programme for 23 pieces of EC-135 helicopters used by the Polish Medical Air Rescue and plans for retrofitting the helicopters with night vision goggles.

# PCO AFTER HOURS

## FAMILY PICNIC PCO S.A., 27<sup>TH</sup> MAY 2017

On 27<sup>th</sup> May 2017, a Family Picnic for PCO S.A.'s employees took place in the Royal Łazienki Park in Warsaw.

Numerous attractions awaited all participants, including a climbing wall, darts and archery. Kids played on inflatable slides and trampolines. They could also take part in a big board game, in which players became pawns. As every year, children enjoyed immensely the Eurobungy.

There were numerous games and competitions awaiting for children. Adults could try their hand at boules games and a volleyball tournament with participation of five competing teams. The event was accompanied by a concert of Lemonite music band.

During the picnic the main prize was awarded to the winner in a photo competition announced in connection with participation of PCO S.A. in the "Two hours for the Family" campaign.

The event was attended by over 1000 people.



## TOURS WITH PARTICIPATION OF PCO S.A.'S EMPLOYEES

In June and July 2017, the employees of PCO S.A. participated in several tours organized by "Aktywni+" group.

On 3–4<sup>th</sup> June, a kayaking trip along the Krutynia River took place, which was attended by dozens of people, including the employees of the Company. On 9<sup>th</sup> July, a kayaking trip



along the Rospuda River was organized. On 11<sup>th</sup> June, a cycling trip to Czersk was held, which involved sightseeing of monuments and a campfire event. The participants travelled about 65 kilometres.



**PCO S.A.**

28 Jana Nowaka-Jeziorańskiego St  
PL 03-982 Warsaw, POLAND