

NOKTOWIZOR

Publication of PCO S.A.

No. 2 / 2018



MSPO

NEW
PRODUCTS
DURING
26TH MSPO



IV. KONFERENCJA
OPTOELEKTRONICZNA
14-15.11.2018



NEW
TECHNOLOGIES

Editorial Staff: Communication and PR Department, PCO S.A.
e-mail: nzk@pcosa.com.pl
www: 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 2018

INTRODUCTION

FOREWORD FROM THE PRESIDENT OF THE PCO S.A.



I am pleased to provide you with the next issue of the "Noktowizor" magazine published by PCO S.A. This issue is dedicated to the participation of PCO S.A. in the 26th International Defence Industry Exhibition in Kielce. Among many interesting products exhibited at the PCO S.A. stand, our latest product – the MU-3MS Night Vision Monocular, being showcased for the first time at this fair, deserves special attention.

In the further part of the publication, we present you with projects started as a result of the cooperation between PCO S.A. and universities and institutes. We encourage you to read the information on 4th Optoelectronic Conference prepared together with Employers Association of Polish Technological Platform on Photonics, Military University of Technology and Warsaw University of Technology. We also describe here the LUSTRO project, which is an initiative of students from the Warsaw University of Technology supported by the knowledge and experience of engineers from PCO S.A.

In the "Technologies" section, you will find information on recent modernizations in the Thin Layers, Photochemistry and Measurement Laboratory. You can read about the most important events of the last months participated by PCO S.A., as well as the latest developments in the Company in the "News" section. "Media about us" section gives an additional insight into activities of our Company.

You are warmly invited to read the current issue of the "Noktowizor" magazine. I also invite you to visit PCO S.A. stand during the 26th International Defence Industry Exhibition in Kielce.

Sincerely

Krzysztof Kluza Ph.D.
President of the Board at PCO S.A.

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MAIN TOPIC OF THIS ISSUE – 2018 INTERNATIONAL DEFENCE INDUSTRY EXHIBITION MSPO

26th International Defence Industry Exhibition will be held on 4-7th September 2018 at Kielce. As in previous years the exhibition will be held under the Honorary Patronage of the President of the Republic of Poland, Andrzej Duda, which additionally emphasizes their importance and rank. The International Defence Industry Exhibition is, along with the Paris Eurosatory and London DSEI, one of the largest military trade fairs in Europe and contributes significantly to the promotion of Poland and the national defence industry in

the world. It is also a place for presenting new products and ideas in the defence sector from all over the world.

The motto of this year MSPO is "100th Anniversary of Poland regaining its Independence 1918 – 2018".

From 8th to 9th September, directly after the MSPO closing the Open Days will be held, including, inter alia, the Exhibition of the Polish Armed Forces.

PRODUCTS MANUFACTURED BY PCO S.A. PRESENTED DURING THE 26TH MSPO:



MU-3MS Night Vision Monocular



KTVD-1M Day Camera



MU-3M Night Vision Monocular



SOD Situational Awareness System



PNL-2ADM Night Vision Goggles



GOD-1 Stabilized Commander Optoelectronic Head



NPL-1T Thermal Imaging Binoculars
Product participating in DEFENDER competition!



GOC-1 Stabilized Gunner Optoelectronic Head



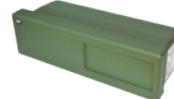
PNL-4 Air Night Vision Goggles
Product participating in DEFENDER competition!



PCT -72 Periscope Thermal Weapon Sight



SCT Thermal Imaging Sight



KDN-1T Reversing Camera
Product participating in DEFENDER competition!



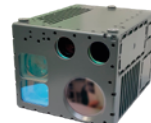
DCM-1 Modular Day Sight



KLW-1E Thermal Imaging Camera
Product participating in DEFENDER competition!



KLW-1 Thermal Imaging Camera



ZMO-3 Integrated Optoelectronic Module
Product participating in DEFENDER competition!



KMW-3 Thermal Imaging Camera

* The list of presented products may change

PREMIERES SHOWN DURING THE 26TH MSPO



NEW VERSION OF DCM-1 SZAFIR

A new version of the DCM-1 Modular Day Sight will make its debut at the 26th International Defence Industry Exhibition (MSPO) in Kielce. Its construction, design and manufacturing process at PCO S.A. is now being modified taking into account the remarks submitted by soldiers of the Territorial Defence testing this equipment. The minor modifications include, for example, design improvements of the thread and shape of the battery chamber screw, adding a ballistic reticle of MSBS assault rifle, or 180 degrees rotation flap on the LDK-4 scope.

DCM-1 Modular Day Sight is designed for aiming and observing of the battlefield under normal daylight conditions.

DCM-1 comprises of an LDK-4 rifle scope with mounted MK-1 miniature collimator. The LDK-4 scope enables precise aiming, when firing at medium and long distances (over 100 m) and is equipped with illumination of aiming crosshairs and ballistic, range-finding reticle, with adjustable brightness, which allows effective shooting at dawn and dusk. As standard the LDK-4 is equipped with a mesh screen for suppressing reflections to minimize the risk of detecting the shooter by the enemy. The LDK-4 scope may be used with other night vision and thermal imaging devices attached in front of the scope as add-on modules to use the scope at night or in limited visibility conditions.



The MK-1 miniature collimator allows the shooter to aim when firing at short distances, at about 100 meters. With a miniature collimator the shooter does not have to adjust scope eye relief, which enables quick selecting one target after another and thus increasing shooting efficiency. Mini Collimator MK-1 has adjustable illumination of aiming crosshairs.

The configuration of DCM-1 Modular Day Sight may be adapted to individual preferences or different operational needs, as the MK-1 collimator can be attached at the front or back of the scope. The compact design is resistant to mechanical and weather conditions with a low weight of about 540 g.

MU-3MS

MU-3MS Miniaturised Universal Monocular is a most modern night vision device destined for observation in night conditions to be used by the individual user. Currently it is one of the lightest night vision devices on the world.

FUNCTIONS AND QUALITIES

Efficiency

- Based on 16 mm INTENS intensifier with high FOM and outstanding detection, recognition and identification (DRI) parameters;
- it is available in version with green phosphor (P43) or white phosphor with high contrast (P45 - ONYX);
- auto-gating (ATG) providing protection of the equipment in case of sudden exposure to strong light source;
- fitted with automatic gain control – AGC;
- high durability in most difficult conditions (military standard).



Functionality

- Multi-function: Manual observation device mounted on a head or helmet, one-eye with one ocular or in form of the stereoscopic goggles for use without use of hands or mount on weapon with Picatinny rail;
- Water resistant up to 20 m;

- Compatible with wide array of most popular combat helmets and most optical sights;
- In-built 2 stage IR illuminator that enables operating in total darkness (cellars, caves etc.);
- IR Switch and low battery level gauge in monocular's field of view;
- Over 40 hours of continuous operation.

Project

- Durable, resilient and in fulfilling full military specification;

- Compact and ergonomic construction with use of modern aspherical optical elements;
- One of the lightest one-eye oculars weighing less than 260 grams
- Thanks to use of the highest class of aluminium alloys monocular is featured with high mechanical endurance;
- New IR switch prevents accidental activation;
- Monocular's construction and available accessories enable use of the thermovisual adapter (projection of the thermovisual image into night-vision image – combo).

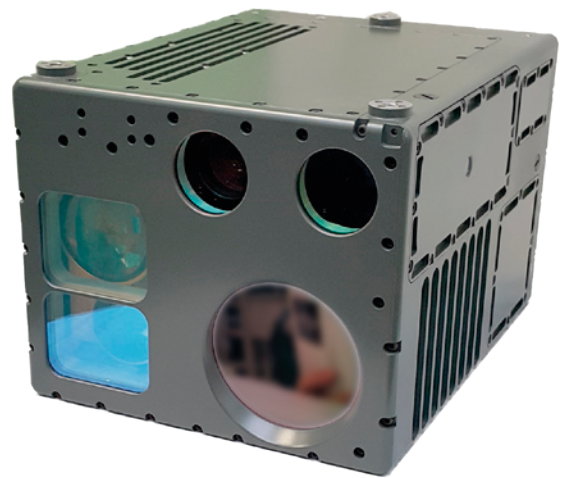
ZMO-3

ZMO-3 Integrated Optoelectronic Module is destined for use in remotely controlled armament module (ZSMU) being a part of equipment for the light armoured reconnaissance vehicle (LOTR).

Module includes:

- thermovisual camera (3–5 μm range);
- day cameras set;
- mono pulse laser rangefinder safe for the eye.

They enable detection, recognition, identification and measuring range to the target. Control of the module's functions is made through multi-purpose panels used in the system.



Basic technical data and parameters of ZMO-3

Day TV camera		
Detection	wide field of view: 3700	narrow field of view: 12000
Recognition	wide field of view: 1400	narrow field of view: 3600
Identification	wide field of view: 700	narrow field of view: 1800
Resolution of TV camera's detector	2048 × 1536 px	
Dynamic scope	71 dB	
Shutter type	Global shutter	
Cooled thermovisual camera		
Detection	wide field of view: 4000	narrow field of view: 12000
Recognition	wide field of view: 1400	narrow field of view: 3800
Identification	wide field of view: 700	narrow field of view: 1900
NETD sensitivity	< 50 mK	
Detector's resolution	640 × 512 px	
Power supply	18–32 V	
Operating temperature's range	from -40 to +65°C	

ASK A QUESTION...

PAWEŁ GLICA, COMMERCIAL DIRECTOR

PCO S.A. constantly develops its product range, so what new products will be presented at this year's edition of MSPO?

During this year's edition of MSPO, we will present both enhanced versions of products showcased during previous fair editions, as well as some new products. We will show a new version of the DCM-1 Modular Weapon Sight.

Our latest products at this year's MSPO will include the MU-3MS Night Vision Monocular and the ZMO-3 Integrated Optoelectronic Module. The MU-3MS was developed based on earlier MU-3 and MU-3M monoculars. The advantages of this product include very low weight and small size. The device is one of the smallest and lightest monoculars on the market. This new version is shorter compared to older monoculars manufactured by PCO S.A. It is very important feature in the modern battlefield conditions, especially when operations are carried out indoors in limited spaces. The MU-3MS monocular can successfully compete with similar products of leading foreign manufacturers.

ZMO-3 module, which expands our range of equipment for combat platforms, is a set of cameras. It can be used in a variety of observation systems, vehicles or anti-aircraft systems. Equipment for combat platforms is a very important part of our offer due to the announced by the Polish Armed Forces plans for development of anti-aircraft defence system and modernization of armoured vehicles.

PCO S.A. participates in the project of modernization of the Leopard 2PL tanks used by the Polish Army. What is the current stage of this project?

We participate in a technical modernization program involving the upgrading tanks used by the Polish Army

to the Leopard 2PL standard. This is a very important program for us, as after signing the annex to the modernization contract, it now covers 142 vehicles. As part of our offer, we have developed a version of KLW-1 thermal imaging camera that can be used in Leopard 2 tanks. This project is currently at an early stage of development, yet we have high hopes for it. Our modernization sets of thermal imaging camera have already proven themselves in the modernization of PT-91 tanks.



Aviator's night vision goggles have recently become an important product in the Company's offering. What products for helicopter crews PCO S.A. will present in Kielce?

In Kielce we are going to show PNL-4 goggles, reliable and comfortable equipment for conducting operations at night.

At this year's MSPO, a modernized version of the DCM-1 Modular Weapon Sight has been presented. Please tell me more about this product.

DCM-1 is a product that is already in use by the Polish Armed Forces. It was also tested by the Territorial Defence Forces. Its design has been modified based on suggestions from the users. Thus, we prove that PCO S.A. can adapt its products to the customer's needs and flexibly respond to reported comments.

Główny organizator



Współorganizatorzy:



IV KONFERENCJA OPTOELEKTRONICZNA

FOTONIKA WIODĄCĄ TECHNOLOGIĄ XXI WIEKU

WYBRANE TEMATY KONFERENCJI:

Fotonika wobec wyzwań współczesnego pola walki
Wyzwania wobec nowoczesnych systemów optoelektronicznych
Potencjał polskiej fotoniki w służbie bezpieczeństwa kraju i obywateli
Fotonika wobec wyzwań XXI w. i wiele innych

14-15.11.2018
Hotel Windsor w Jachrance

Już dziś zarezerwuj czas i zapisz się na konferencję
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Patronat:

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Ministerstwo Nauki
i Szkolnictwa Wyższego



Defence **24**



RESEARCH-SCIENTIFIC COOPERATION

ANNOUNCEMENT OF THE 4TH OPTOELECTRONIC CONFERENCE

On 14–15th November 2018, the 4th edition of the Optoelectronic Conference, organised by PCO S.A. in cooperation with the Polish Technological Platform on Photonics, the Military University of Technology and the Warsaw University of Technology will be held in the Windsor Hotel in Jachranka. The theme of this year's conference is: "Photonics as the key technology of the 21st century".

The annual Optoelectronic Conference gathers, inter alia, representatives of the senior management of the Ministry of National Defence, scientific staff (including the authorities of the major technical universities in Poland) and representatives from the numerous research institutes and industry.

The event is an excellent opportunity to establish contacts and share experiences, contributing to the dis-



**IV. KONFERENCJA
OPTOELEKTRONICZNA**
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semination of knowledge about the applications of optoelectronics in everyday life and to support better cooperation between science, the military and industry in the field of optoelectronics.

This year's edition of the Optoelectronic Conference is held under the patronage of the Minister of Science and Higher Education, Jarosław Gowin. "Polska Zbrojna" magazine, published by the Military Publishing Institute and the Defence24 portal are media patrons of the event.

COMMENT OF THE PRESIDENT OF PCO S.A. KRZYSZTOF KLUZA

This is the fourth edition of the Optoelectronic Conference and this year I am very happy to be hosting this event. The conference will cover presentations of the Polish photonic industry's offer as well as advancements in the field of photonics. The most important objective of this event is the dialogue between representatives of science, industry and the customer, allowing for finding common solutions for faster development of Polish photonics.

On the first day of the conference we will discuss challenges to modern optoelectronic systems and the response of Polish photonics to these changing requirements. The second day will be devoted for introduction of the latest optoelectronic technologies on the modern battlefield and the review of the most interesting ideas and innovative initiatives in the optoelectronic industry.

The event will be accompanied by an exhibition of products using photonic technology.

Previous editions of the Optoelectronic Conference enjoyed great interest, as evidenced by high attendance rate. I am convinced that this year's Conference will successfully continue this tradition.



HONORARY COMMITTEE

1. płk dr inż. Rafał Bazela [Colonel Ph.D. Eng.] – Director of the Military Institute of Armament Technology
2. dr Grzegorz Brona [Ph.D.] – President of the Polish Space Agency
3. Michał Jach – Member of the Polish Parliament, Chairman of the National Defence Committee
4. dr inż. Ryszard Kardasz [Ph.D. Eng.]
5. dr Krzysztof Kluza [Ph.D.] – President of the Management Board of PCO S.A.
6. dr n. pr. Paweł Olejnik – Head of the Inspectorate for Implementation of Innovative Defence Technologies
7. gen. bryg. dr inż. Ryszard Parafianowicz [BG Ph.D. Eng.] – Chancellor, War Studies Academy
8. płk Mariusz Pawluk [Colonel] – Commander of Military Unit GROM
9. Jakub Skiba – President of the PGZ S.A.
10. Paweł Soloch – Secretary of State, Head of the National Security Bureau
11. płk rez. prof. dr hab. inż. Ryszard Szczepanik [Col. Res. Prof. Ph.D. Eng.] – Director of Air Force Institute of Technology
12. płk dr hab. inż. Tadeusz Szczurek [Colonel Ph.D. Eng.] – Chancellor, Military University of Technology
13. prof. dr hab. inż. Jan Szmidt [Prof. Ph.D. Eng.] – Chancellor, Warsaw University of Technology

SCIENTIFIC COMMITTEE

1. prof. dr hab. inż. Krzysztof Chrzanowski [Prof. Ph.D. Eng.] – President of Inframet
2. dr Jacek Galas [Ph.D.] – Director of the Institute of Applied Optics
3. Krzysztof Gębarski – SMARTTECH sp. z o.o.
4. prof. dr hab. inż. Andrzej Jeleński [Prof. Ph.D. Eng.] – Scientific Council – Institute of Electronic Materials Technology
5. Zbigniew Karkuszewski – Instytut Fotonowy sp. z o.o.
6. Mariusz Krawczak – Business Development Director, PCO S.A.
7. płk dr inż. Krzysztof Kopczyński [Colonel Ph.D. Eng.] – Director of the Optoelectronics Institute at the Military University of Technology
8. płk dr Marek Kozłowski [Colonel Ph.D.] – Armament Inspectorate
9. prof. dr hab. inż. Małgorzata Kujawińska [Prof. Ph.D. Eng.] – Head of Photonics Engineering Institute IMiF, Warsaw University of Technology
10. dr inż. Tomasz Mirosław [Ph.D. Eng.] – business development specialist, PCO S.A. – Chairman of the Committee
11. dr Adam Piotrowski [Ph.D.] – President of VIGO System S.A.
12. prof. dr hab. inż. Ryszard Romaniuk [Prof. Ph.D. Eng.] – Electronic Systems Institute, Warsaw University of Technology
13. Karol Szyszkiewicz – PCO S.A. – Secretary of the Committee
14. Jerzy Wiśnioch – Chief Technology Officer, PCO S.A.
15. Bogumił Wodyński – Technical Director, PCO S.A.
16. prof. dr hab. inż. Tomasz Woliński [Prof. Ph.D. Eng.] – President of the Photonics Society of Poland

AGENDA FOR THE 4TH OPTOELECTRONIC CONFERENCE SCHEDULE

DAY 1

“PHOTONICS AGAINST THE CHALLENGES OF THE MODERN BATTLEFIELD.”

- | | |
|---------------------|--|
| 12:00 PM – 02:00 PM | Registration of participants |
| 12:30 PM – 02:00 PM | Lunch |
| 02:00 PM – 02:45 PM | Opening speeches (45 min.) |
| | <ul style="list-style-type: none"> • President of the Management Board of PCO S.A. • President of the Management Board of PGZ S.A. • Chairman of the Scientific Council of PCO S.A. |

02:45 PM – 04:05 PM	Session I: Challenges towards modern optoelectronic systems (1 hour 20 min) <ul style="list-style-type: none"> • Representative of the Armament Inspectorate (20 min.) • Representative of the Armed Forces (20 min.) • Representative of Military Unit Grom (20 min.) • Representative Department of Military Science and Education MOD / EDA (20 min.)
04:05 PM	Coffee break (15 min.)
04:20 PM	Session II: Potential of Polish photonics in the service of national security and citizens – a session dedicated to the memory of prof. dr inż. Zbigniew Puzewicz (1 hour 35 minutes) <ul style="list-style-type: none"> • Speech devoted to the memory of prof. dr inż. Zbigniew Puzewicz – płk dr inż. Krzysztof Kopczyński MUT (15 min.) • Photonics on the future battlefield – płk dr inż. Marek Zygmunt – MUT (20 min.) • Jerzy Wiśnioch – PCO S.A. (20 min.) • Marek Borejko – PGZ S.A. (optoelectronics in airborne platforms) (20 min.) • prof. nzw. dr hab. inż. Robert Głębocki – Warsaw University of Technology (20 min.)
05:55 PM	Coffee and technical break (30 min.)
06:25 PM	Discussion panel: “How to prepare the Polish photonics for the challenges of the 21 st century” (1 hour, 15 minutes) <p>The panel is initially run by a representative of the Mikromakro Foundation</p> <ul style="list-style-type: none"> • Initially, a representative of the Armament Inspectorate • Initially, a representative of the Inspectorate for Implementation of Innovative Defence Technologies • Initially, a representative of WB Electronics • Initially, a representative of AGH University of Science and Technology • Initially, a representative of the Association of Polish Electrical Engineers • Initially, a representative of PCO S.A.
08:00 PM	Official dinner

DAY 2

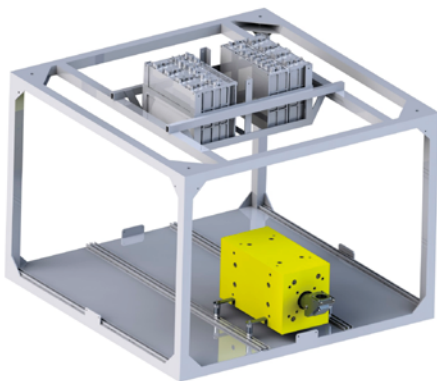
“PHOTONICS AGAINST THE CHALLENGES OF THE 21ST CENTURY”

07:00 AM – 09:00 AM	Breakfast
09:00 AM – 10:35 AM	“Optoelectronic technologies in modern warfare” (1 hour, 35 minutes) <ul style="list-style-type: none"> • Representative of Military Unit Grom • Representative of Military Unit in Lubliniec • Representative of the Land Forces Academy • ppłk dr Rafał Sieczka War Studies Academy • Representative of NCBiR • Representative of the Military University of Land Forces
10:35 AM	Coffee break (15 min)
10:50 AM	Thematic discussion sessions held simultaneously (1 hour 15 minutes) <ul style="list-style-type: none"> • 10:50 AM – 12:05 PM Flight Reconnaissance – moderated by Mariusz Krawczak PCO S.A. • 10:50 AM – 12:05 PM Photonics in cybersecurity and telecommunications – moderated by dr. Krzysztof Kopczyński MUT • 10:50 AM – 12:05 PM Photonics in imaging systems and sensors – moderated by Adam Piotrowski VIGO System S.A.
12:05 PM – 02:30 PM	“Modern photonic technologies – from the idea to an end product” (1 hour, 15 minutes)
12:05 PM – 12:50 PM	Overview of start-ups and innovative initiatives in the optoelectronic industry (combined with a coffee buffet)
12:50 PM – 02:05 PM	Presentations of the optoelectronic industry companies (1 hour, 15 minutes) <ul style="list-style-type: none"> • Presentation of an industry company • Presentation of an industry company • Presentation of an industry company • Comment from the Scientific Committee
02:30 PM	Official closing of the Conference

PCO SUPPORTS LUSTRO PROJECT



PCO S.A. has once again supported the student initiative in the field of optoelectronics, by engaging in the LUSTRO project prepared by members of the Student Astronaut Club operating at the Faculty of Power and Aeronautical Engineering at the Warsaw University of Technology. The abbreviation LUSTRO derives from Light- and Ultraviolet Strato- and Tropospheric Radiation Observer. This project is aimed to map a UV radiation in certain layers of the Earth's atmosphere and is implemented within the framework of the international REXUS/BEXUS programme supported by the European Space Agency. The project includes carrying out research work using stratospheric balloons and rockets to determine what modifications take place in the radiation when the weather conditions in the stratosphere change. First of all, how the effect of cloudiness and differences in atmospheric density affect the intensity of ultraviolet radiation reaching the Earth's surface.



Visualisation – LUSTRO experiment

The support of PCO S.A., which is the main sponsor of the LUSTRO project, consists in providing students the access to climate chambers and technical assistance of experts employed in the Company. Increase in the intensity of UV radiation with increase in altitude is danger-



ous for living cells and negatively affects the operation of electronic and optical equipment, therefore the data and experience on absorbing and reflecting radiation through various layers of the Earth's atmosphere, that will be gained as a result of this research will provide the knowledge necessary for further development of this field of science. More detailed information on distribution of UV radiation should help precisely determine the conditions of sun exposure being especially dangerous for people. PCO S.A., a member of the Polish Space Industry Association, became the main sponsor of the LUSTRO project to provide students with logistic and technical support.

"We are happy that we can help talented students who want to develop technologies and gain valuable knowledge. The support of LUSTRO project is in line with CSR activities of our company. We want to take an active part in the development of Polish science and entrepreneurship in cooperation with technical universities, which educate a new generation of engineers." says Krzysztof Kluza, the President of PCO S.A.

The experimental balloon flight as part of the LUSTRO project is planned for the autumn 2018. The complete system will be launched to an altitude of approx. 25–33 km and remain there for several hours.

TECHNOLOGIES

MODERNIZED THIN LAYERS LABORATORY

Due to participation of PCO S.A. in implementing Polish Armed Forces Technical Modernization Plan, the company keeps on investing in its laboratory and technical facilities. By increasing the quality of manufacturing processes, PCO may carry out advanced research and development programmes, including space applications.



One of the recent investments of the Company is modernization of the Thin Layers, Photochemistry and Measurement Laboratory, where the process of transferring thin optical films to optical elements is performed using a high-vacuum apparatus – AWP. In process of applying thin layers to optical elements all substrate surfaces shall be cleaned from any type of contamination, therefore it was necessary to establish within a laboratory a set of connected, sealed rooms with a high air purity class. Setting up the cleanrooms as a result of Laboratory modernization helped to eliminate uncontrolled movement of people and to establish internal transport of elements before and after vacuum coating operation. “Preparation of coating elements at higher air purity conditions contributes significantly to improving the quality of production processes of our equipment. It also means that PCO S.A. can carry out advanced research and development programmes, for example in the field of space applications or coating processes with purity and quality parameters much higher than standard specifications.” – explains Jerzy Wiśnioch, Chief Technology Officer at PCO S.A.

The company also purchased a new AWP vacuum apparatus, with functionalities and technologies complying with modern thermal imaging requirements. It will help to

improve the quality and characteristics of optical components. Moreover, a range of coated optical elements may be now extended with components made of zinc sulphide (ZnS), zinc selenide (ZnSe), germanium (Ge), silicon (Si) and AMTIR, IGR26 halide glasses, which are increasingly used in military systems. The thin film coatings obtained with the new equipment will feature long-term stability of optical functions in varying environmental conditions, increased mechanical and chemical resistance, and improved characteristics of individual coating layers in MWIR and LWIR spectral signatures.

The equipment of the Thin Layers and Measurement Laboratory will be used for developing evaporation technologies for new materials and for initial optimizing characteristics of new thin film coatings in the infrared spectral band in order to speed up the implementation process from concept phase to series production. “We could also increase the number of elements coated in one vacuum evaporation process run and increase the efficiency by shortening the cycle time of technological process. To further increase the process efficiency, we purchased a modern, fully automated ultrasonic cleaning line for optical elements” – explains Jerzy Wiśnioch, Chief Technology Officer at PCO S.A. Availability of such configured high vacuum apparatus is required for PCO S.A. to participate in modernization program for upgrading Leopard tanks from 2A4 to 2PL version.



Investments in technological infrastructure and technical facilities help to modernize technologies of manufacturing products for military and to compete more effectively on the market.

MODERNIZATION OF T-72 TANKS

PCO S.A. has developed an upgrade concept for modernization of the observation and sighting system in T-72M1 tanks used by the Polish Armed Forces. The concept is based on installing thermal imaging cameras in the sighting system and replacing the other active night vision systems with passive systems.

Modernization of the observation and sighting system would include the following:

- Replacement of the former TPN-1-23-1 Night Sight with a new PCT-72 Thermal Vision Sight, with KLW-1 Thermal Imaging Camera manufactured by PCO S.A.;
- Change of the active TKN-3B Commander Observation System into a passive solution, by installing the TKN-3Z version;
- Installation of a passive PNK-55/72 Driver's Periscope System, in place of active observation devices.

Modernization will ensure operational readiness of T-72 tanks during night operations and in limited visibility conditions. The changes are aimed to replace outdated active night vision systems, which were ineffective in total darkness. These systems required illumination of the observed area with the use of additional light sources, so-called infrared illuminators, which could be easily detected by the enemy's night vision devices, and thus revealing the tank position. The use of thermal imaging device considerably improves the night fighting capability, facilitates daytime combat, and system installation does not require performing advanced tank modernization, which reduces upgrading costs.

The solution has already been used in the modernization of optoelectronic systems in T-72 tanks of the Ukrainian Armed Forces. The system effectiveness has been proven by field tests conducted in Ukraine and system has been certified for use in the Ukrainian military.

PCT-72 Periscopic Thermal Vision Sight, as proposed by PCO S.A. for modernization of T-72 battle tanks, to replace TPN-1-23-11 sight is composed of:

- KLW-1 Thermal Imaging Camera,
- periscope head with a pantograph adapter,
- MD-1 gunner display with a support and head guard,
- MFM-2 multi-function display (commander's),
- cable harnesses,
- mounting rings.

System installation does not require any modifications of tank structure, and the image from the camera can be observed both by the gunner and the tank commander.

Adapted to PCT-72 tank, KLW-1 Thermal Imaging Camera was developed, inter alia, for Drawa-1T and Drawa-1M fire control systems of modernized PT-91 tanks. KLW-1 Thermal cameras are widely used in combat vehicles –

they are offered for installation in an armoured personnel carrier Rosomak (KLW-1R version) and will also be used in Leopard 2 tanks upgraded to the Leopard 2PL standard. The KLW-1 Thermal Imaging Camera operates in the long-wave LWIR infrared (at 8–12 μm wavelength). It is fitted with a cooled MCT III-gen matrix detector with a screen resolution of 640×512 pixels (pixel pitch of 15 μm × 15 μm). NETD factor (noise to signal ratio) is not greater than 30 mK.

The camera is enclosed in a specially designed housing, that provides a high degree of optical stability when the field of view or temperature changes, also meeting the military-grade mechanical and weather-proofing requirements. KLW-1 camera may be operated in the temperature range from -30°C to +52°C.

The detection and identification range depends on the field of view and is defined as follows:

- For the wide field of view (WFOV – 10.0° × 8.0° ± 10%) and a standard NATO target (2.3 m × 2.3 m): over 4700 metres for detection, over 1500 metres for recognition and over 750 metres for target identification;
- For the narrow field of view (NFOV – 3.0° × 2.5° ± 10%) and a standard NATO target (2.3 m × 2.3 m): over 5000 metres for detection and over 2500 metres for target identification.

KLW-1 set is equipped with manual and autofocus function, germanium-based aspherical lens element that allows the camera to record non-distorted thermal vision imagery. The KLW-1 functions include an ability to change image polarization and orientation, 2× digital zoom, as well as manual and automatic contrast and brightness adjustment. The set weight is 10.5 kg, dimensions: 377.2 × 150 × 165 mm.

The TKN-3B Binocular Day/Night Observation System for tank commander was also modernized by introducing a passive Gen-II image intensifier in the optical night observation path.

The modernized commander observation system (marked as TKN-3Z) features the same dioptr adjustment option and a new automatic adjustment control for image intensification and automatic safety system protecting the intensifier from bright light that could be emitted by flares, fire or a strong light source. The device was also equipped with a supply voltage stabilization system.

Replacement of active driver's night vision system with a passive solution is another modification. Adopted for this purpose PNK 55/72 Radomka Night Vision Driver's Periscope is a dual eye-piece night observation device designed for various types of armoured vehicles, including mainly T-55 and T-72 main battle tanks and their derivatives, as well as BMP-1 and BMP-2 infantry fighting

vehicles and their derivatives. The system allows the vehicle driver to observe the route and surrounding terrain while driving at night and in limited visibility conditions. The periscope features two separate optical channels with two XDR/XR5 image intensifiers.

The use of thermal imaging sight for a gunner and passive night vision sights for both tank commander

and driver is an important element of the modernization of Polish T-72 tanks. The implementation of these modifications does not require any changes in the tank structure and significantly enhances the tank's combat capacity. The KLW-1 thermal imaging system and the PNK-72 driver's device are also used in other vehicles on the armaments of the Polish Armed Forces, for example the PT-91 Twardy main battle tanks.



photo Modernized TKN-3Z
Commander's Observation Instrument. Photo: PCO S.A.



photo PNK-55/72 Radomka
Night Vision Driver Periscope Photo: PCO S.A.

ZSSW-30

Remotely Controlled Turret System with 30 mm gun (ZSSW-30) is designed for the Rosomak APC and new Borsuk IFW is one of the innovative development projects of the Polish defence industry. ZSSW-30 integrated with the APC is destined to destroy or disable lightly and heavy armoured targets including enemy's infrastructure, and fire support of the units during the combat missions in various weather conditions, regardless of the time of the day and night.

Project is realized by the consortium composed of HSW S.A. (leader) and WB Electronics S.A. on demand of the Arms Inspectorate. Consecutively with the agreement on development work, frame contract on production and supply of 208 ZSSW-30 turrets for the Rosomak APC, was signed. This program involves also activities of the PCO S.A. which is responsible for supply of the stabilized observation and aiming optoelectronic heads for the commander (GOD-1) and weapons operator (GOC-1).

GOD-1 and GOC-1 (photo below) stabilized observation and aiming optoelectronic heads produced by the PCO S.A. are an element of the fire control system for the ZSSW-30 and destined for detection, recognition, identification and tracking both air and ground targets.

They enable realization of the combat tasks during day and night regardless of the atmospheric conditions and climate. GOC-1 is a stabilized observation and aiming device for the weapons operator built on a base of the thermal imaging camera working in 3–5 m (MWIR) width, GOD-1 is built on a base of the camera working in 8–12 m (LWIR) width. It includes also a TV camera, laser range-finder and videotracker. In both devices drive and stabilization are correspondent.

These heads are a result of the domestic technical thought and use most advanced solutions for the observation and aiming devices. Construction enables integrating them not only with ZSSW-30 but other combat platforms, rising situational awareness and survivability of the crew on the modern battlefield.

STABILIZED OBSERVATION AND AIMING OPTOELECTRONIC HEADS



GOC-1 for the weapons operator



GOD-1 for the commander

PCO S.A. MAJOR EVENTS

FEBRUARY – AUGUST 2018

IN BRIEF

SERVICE AGREEMENT SIGNED BY PCO S.A.

On June 5th this year, in accordance with the agreement signed for the provision of repair services for night vision optical and sight devices, the scope of works to be undertaken under the agreement was contracted. The agreement was signed by the 2nd Regional Logistics Base in Warsaw and PCO S.A. The works are to be completed by the end of November 2018.

The procedure for selecting the service provider was a restricted call for tenders and was initiated on December 21st, 2017. PCO S.A. has met the tender requirements in terms of both price and completion date. The company is not only the main supplier of optoelectronic equipment for the Polish Armed Forces, but also provides the equipment service.

AWARDS FOR PCO S.A.

On 28th June 2018, PCO S.A. was granted an award in the State Security Leader Contest in two categories: Innovative Company for State Security and for the NPL-1T Thermal Imaging Binoculars. The company was also awarded by the Quality Certification Center for special achievements in implementation of the quality management system.

The Awards Ceremony Gala took place in Polish Armed Forces Conference Centre in Warsaw. The State Security leader is a contest organized by the Association of Suppliers for Uniformed Services. This year's Awards Ceremony Gala took place under the Honorary Patronage of the Head of the National Security Bureau at the Office of the President of the Republic of Poland – Minister Paweł Soloch.

MOST IMPORTANT VISITS AT PCO S.A.

In June, the Polish Ministry of National Defence hosted a delegation from Pakistan. The discussions primarily focused on closer military cooperation and that of the arms industries. The guests also got acquainted with several largest arms factories in Poland. Delegation led by gen. Qamar Javed Bajwa, Chief of Army Staff of the Pakistan Army, visited also PCO S.A. An exhibition of optoelectronic equipment, including thermal imaging cameras designed for battle platforms, was organized at the Company's headquarters. On 20th June, a show of products offered by companies from the Polska Grupa Zbrojeniowa S.A. was organized for Pakistani guests at the Biedrusko military training ground.

On 7th of August 2018 premises of PCO were visited by the delegation from the National Resilience Institute from Indonesia. Guests were acknowledged with most modern products of the Company and production processes. Talks on perspectives of cooperation between the Polish and Indonesian defence sectors were conducted. National Resilience Institute of the Republic of Indonesia is an institution educating cadres for the Indonesian state and conducting studies on defence and national security.

VISIT OF THE DEPUTY HEAD OF THE NATIONAL SECURITY BUREAU

On 19th of June 2018 premises of PCO S.A. were visited by Dariusz Gwizdała - Deputy Head of the National Security Bureau. During the meeting, the Company's offer and its

latest products were discussed. Guests were acknowledged with optoelectronic devices for military vehicles and aviator's night vision goggles.

OPTOELECTRONIC ENGINEER DAY

PCO S.A. is acutely aware of the fact that it is the employees who build the company's potential and therefore attaches great importance to employee personal development and rewarding. Appreciating human capital, the Company's Board of Directors rewards from many years especially meritorious employees with "Meritorious for PCO S.A." Honorary Awards.

On 23rd April during the celebration of Company's 42nd anniversary on Optoelectronic Engineer Day, the president of the Board, Krzysztof Kluza awarded twelve employees of the Company.

Granting the "Meritorious for PCO S.A." Honorary Awards has started since 2010, when the date of April 23rd was established as the Day of Optoelectronics. This internal company event is a unique form of employee recognition



and appreciating their contribution to the implementation of the Company's mission, strategy and operations.

PCO ON ASIAN MARKETS

PCO S.A. is constantly increasing its engagement on foreign markets, and this is reflected in company's participation in the largest fair events in the world. In April this year, the Company showcased its products at the Defence Services Asia (DSA) Exhibition & Conference 2018 in Kuala Lumpur, Malaysia. The exhibition was an opportunity to present the offering of optoelectronic products and start some business discussions. For many years PCO S.A. has been delivering optoelectronic products to end users from Southeast Asian countries. The company's products are supplied to the armed forces and police, including elite special forces and anti-terrorist units, and are highly valued by the customers.

"The presence at the DSA fair in Kuala Lumpur is another step towards increasing the company's export activity. By participating in this world's large and significant event for the arms industry, we want to emphasize our capabilities in production of modern optoelectronic equipment for military and other uniformed services in new markets." – comments Krzysztof Kluza, President of PCO S.A.

During the trade fairs in Malaysia, PCO S.A. showcased, among others, lightweight and durable MU-3M Night

Vision Monocular as well as multifunctional and ergonomic MU-3ADM Night Vision Goggles. The company also presented the latest PNL-4 Night Vision Goggles designed for military aircraft crews. The goggles design is based on the latest generation of INTENS image intensifiers, features a small weight and can be adapted to the pilot's individual visual perception.

The solutions presented at the Malaysia fair included also the DCM-1 Modular Weapon Sight and the SCT Thermal Weapon Sight designed for observation and shooting from firearms at daytime and at night, also in limited visibility conditions. PCO S.A. also showcased the NPL-1T Thermal Binoculars, incorporating advanced image processing solutions that help to achieve exceptional observation quality, while reducing weight and energy consumption.

All observation and sighting products manufactured by PCO S.A. are based on research and development projects carried out by the company.

PCO IS LOOKING FOR YOUNG ENGINEERS

Simultaneously to developing modern technologies, PCO S.A. attaches importance to expanding its personnel. The company is constantly looking for new employees interested in professional development in the field of optoelectronics. This year, the company for the first time took part in the Jobicon Job Festival.

For years, the company has been cooperating with the best Polish technical universities, on a currently basis acquainting students with new technologies used in the defence industry and encouraging them to take up internship and to work in the future for PCO S.A. Students may attend lectures and presentations, which take place on a regular basis at the company's headquarters to get familiar with thermal imaging, night vision and television technologies as well as the most important company achievements. The company offers internship and apprenticeship programmes. PCO S.A. also participates in selected job fairs and in scientific conferences as an expert.

"Our presence at the Jobicon Job Festival is another initiative that we undertake to promote our company as an attractive, innovative employer providing the career development opportunities. We hope that the modern formula of this event will attract young talents and help us to actively promote our company and to provide an opportunity to recruit electronic engineers and specialists with experience in the field of designing digital circuits, image recording and processing as well as satellite observation systems and optical systems." – says Maurycy Wojtak, Human Resources Manager at PCO S.A.

PCO S.A. offers a unique opportunity for students to gain experience from a leading Polish manufacturer of optoelectronic products and professional development in a creative and innovative environment.

AVIATOR'S GOGGLES FOR CIVILIAN USE ARE GAINING NEW CUSTOMERS

Implementing its strategy to expand the product offering for non-military services, PCO S.A. is in process of certifying the PNL-3M Aviator's Night Vision Goggles in accordance with requirements of the American FAA (Federal Aviation Administration). The certification process is expected to be completed by the end of this year. PNL-3M goggles have been already certified by the European Aviation Safety Agency and thus the product can be used, among others, in EC-135 Airbus Helicopters.

The innovative PNL-3M Aviation's Night Vision Goggles are designed for use in area surveillance and target detection during night flights by pilots and helicopter crew. Thanks to built-in modern design solutions, the goggles have low weight and can be perfectly adapted to the pilot's head size and individual visual perception. The product created by PCO S.A. is distinguished by: the highest military specifications, functionality comparable with the American equivalent, small size, low weight and competitive price.

"Realizing that at PCO S.A. we have created an innovative and competitive product that may be used not only in military applications, but also by the civilian users, which is confirmed the EASA certificate issued for PNL-3M goggles, we do expect to gain the interest of customers, both foreign and national. A development potential of this product is very promising. We are trying to take any chance to promote the product more widely, hence our presence at the HAI Heli Expo 2018, where we have a joint



stand with Sky Quest Aviation company." – says Krzysztof Kluza, President of PCO S.A.

Regulations aimed in increasing the aviation safety in Europe and the USA, to be passed in coming years, which impose the obligation of wearing night vision goggles during all night flights provide an opportunity for PCO S.A. to acquire new customers both in the US and on European markets. In Europe, potential customers interested in the PCO S.A. product include civil companies and flight training centres, inter alia, from Norway, the Czech Republic, Ukraine, Spain and Germany. Among the promising foreign and domestic buyers of PNL-3M Aviator's Night Vision Goggles, the PCO S.A. counts on local police, emergency services, forest and fire guards.

PCO AT MAJOR EXHIBITION EVENTS

PCO S.A. PRESENTS ITS PRODUCTS DURING THE BALT MILITARY EXPO IN GDAŃSK

25–27TH JUNE 2018

On June 25–27th this year the 15th edition of Baltic Military Fair took place in the AmberExpo Exhibition and Congress Centre in Gdańsk. During the fair, PCO S.A. presented, among others, its proposals for pilots, i.e. PNL-4 Aviator's Night Vision Goggles, designed for terrain observation and target detection during night flights by pilots and helicopter crews. The Company was awarded with Special Prize of the Międzynarodowe Targi Gdańskie S.A. for PNL-4 Aviator's Night Vision Goggles.



The exhibited products included also a miniaturized MU-3M Night Vision Monocular, which is one of the lightest night vision devices on the market and PNL-2ADM Night Vision Goggles equipped with two independent optical channels, intended primarily for drivers of military vehicles and modernized NPL-1T Thermal Binocular designed for terrain observation in limited visibility conditions.

Rifles produced by the Fabryka Broni Radom were shown with PCO's DCM-1 Modular Weapon Sight and SCT Thermal Weapon Sight.

The Baltic Military Fair is organized in close co-operation with the Ministry of National Defence and the Command of the Polish Navy.

The fair is dedicated to the issues of maritime safety, defence systems, sea and land rescue, i.e. the Polish Navy, special units, military police and logistic security services of the Polish Armed Forces, Border Guard, Police, State Fire Service, Customs Service and Prison Service.

EUROSATORY 2018

11–15TH JUNE 2018

On 11–15th June 2018, the Eurosatory Trade Fair took place in Paris. As usual, the fair was attended by PCO S.A., exhibiting, inter alia: SCT Thermal Weapon Sight, DCM-1 Modular Weapon Sight, MU-3M Night Vision Monocular (currently one of the lightest night vision devices in the world), MU-3ADM Night Vision Goggles, NPL-1T Thermal Binocular, PNL-2ADM Night Vision Goggles, PNL-4 Aviator's Night Vision Goggles and night vision goggles for civilian applications.

Eurosatory is one of the most important global defence industry fairs. The fair organized every two years gathers exhibitors from over 100 countries. During the last edition, the exhibition was visited by 54 thousand visitors from 94 countries, as well as representatives of the armed forces and formations responsible for security from around the world.

SOFIC 2018

22–24TH MAY 2018

On 22–24th May 2018 PCO S.A. presented its products at SOFIC 2018 (Special Operations Forces Industrial Conference), which took place in Tampa, Florida (USA). The company co-hosted the stand with Sky Quest Aviation company, distributor of PNL-3M goggles in the

USA. Apart from PNL-3M aviator's night vision goggles PCO S.A. also presented MU-3ADM Night Vision Goggles with a modified bridge mount. The showcased products enjoyed great interest of visitors, mainly users from South America.

PCO AT THE ENFORCE TAC AND IWA OUTDOOR CLASSICS FAIRS

7–8TH MARCH 2018, 9–12TH MARCH 2018

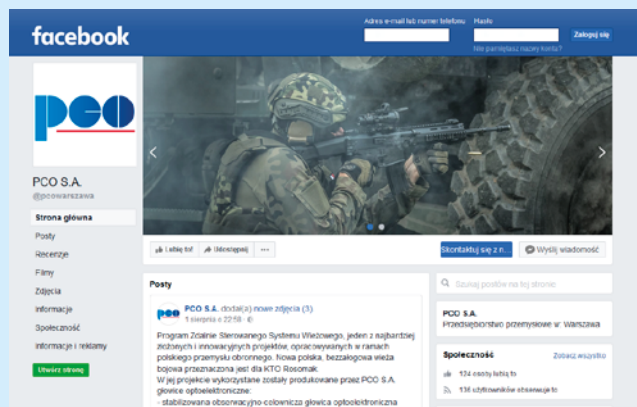
On 7–8th March this year PCO S.A. participated in the Enforce Tac exhibition, intended for uniformed services, which took place in Nuremberg. In the following days (March 9–12th), the Nuremberg Exhibition Centre hosted the IWA Outdoor Classics fair, an exhibition open to the public and dedicated to enthusiasts and owners of weapons, optical and optoelectronic equipment and everything related to military equipment.

At the PCO S.A. stand visitors could see the civil version of PNL-4 Aviator's Night Vision Goggles, i.e. the PNL-3M model. Due to the high demand from civil users for this type of aviator's goggles, this product enjoyed the greatest interest. PNL-3M Aviator's Night Vision Goggles are certified by the European Aviation Safety Agency (EASA). PCO S.A. also presented MU-3ADM goggles with a new bridge mount, weapon sights: SCT Thermal Imaging Sight and DCM-1 Modular Weapon Sight as well as NPL-1T Thermal Binocular.



PCO IN SOCIAL MEDIA

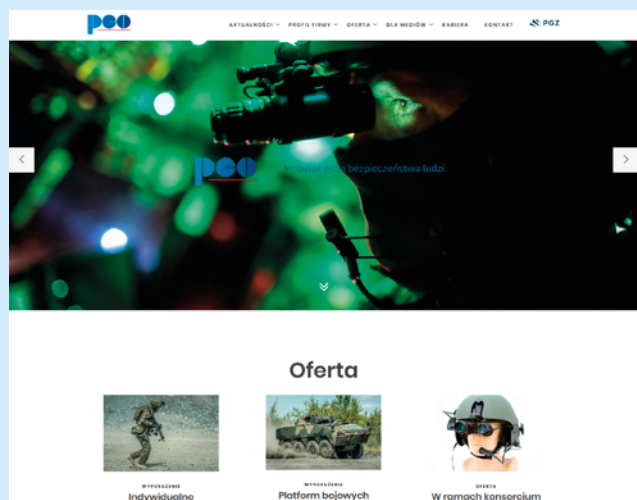
In January this year PCO S.A. has launched its Facebook company profile. Apart from information about the company the Facebook page includes articles on current events related to the activities of PCO S.A., description of products, as well as the offer of internships and apprenticeships. We invite you to: www.facebook.com/pcowarszawa/



NEW WEBSITE!

A new, refreshed PCO S.A. website has been launched since September. Check out the provided information about the Company.

The website address is as follows: www.pcosa.com.pl



MEDIA ABOUT US

FEBRUARY – AUGUST 2018

Space 24

ZPSK supports Polish students in the REXUS/BEXUS program

25th July 2018 Space24.pl portal

<https://www.space24.pl/zpsk-wspiera-polskich-studentow-w-programie-rexusbexus>

Information about PCO S.A.'s support for the LUSTRO project carried out by students from the Warsaw University of Technology. PCO S.A., as a member of the Polish Space Industry Association became involved in the preparation of the project.

niezależna

Aviator's night vision goggles. New technologies for the army.

29th June 2018 Niezalezna.pl

Article on one of the latest PCO S.A.'s products – PNL-4 Aviator's Night Vision Goggles, awarded with Special Prize of the Międzynarodowe Targi Gdańskie S.A. The PNL-4 goggles design is based on the latest generation of INTENS image intensifiers. Thanks to built-in modern design solutions, the goggles have low weight and can be perfectly adapted to the pilot's head size and individual visual perception.



Service agreement signed by PCO S.A.

27th June 2018 ZBiAM

Information about the agreement for provision of repair services for night vision optical and sight devices, which was signed by the 2nd Regional Logistics Base in Warsaw and PCO S.A.

The scope of work has been divided into twelve separate tasks. Works are to be completed by the end of November this year, and the procedure for selecting the service provider was a restricted call for tenders.

Defence24

Bezpieczeństwo Wojsko Przemysł

PCO with a new investment in technologies for production of optical elements

26th June 2018 Defence24.pl portal

The article describes the latest investments of PCO S.A., including mainly modernization of the laboratory and technical facilities. The equipment of the Laboratory of Thin Layers, Photochemistry and Measurement was significantly upgraded. This permitted PCO S.A. ensuring a higher quality of manufacturing processes, which is an important factor due to the company's participation in implementing Polish Armed Forces Technical Modernization Plan. With the new equipment PCO may now carry out advanced research and development programmes, including space applications.

Defence24

Bezpieczeństwo Wojsko Przemysł

BME 2018: Optoelectronic products from PCO

25th June 2018 Defence24.pl portal

Information describing the participation of PCO S.A. in the Balt Military Expo in Gdańsk and presented products, including: SCT Thermal Weapon Sight, DCM-1 Modular Weapon Sight, NPL-1T Thermal Binocular, PNL-2ADM Night Vision Goggles, PNL-4 Aviator's Night Vision Goggles and night vision goggles for civilian applications.

niezależna

Optoelectronics in military technology

25th June 2018 Niezalezna.pl portal

The article describing the recent investment of the Company – modernization of the Thin Layers, Photochemistry and Measurement Laboratory, where the process of transferring thin optical films to optical elements is performed using a high-vacuum apparatus – AWP. Setting up the cleanrooms as a result of Laboratory modernization helped to eliminate uncontrolled movement of people and to establish internal transport of elements before and after vacuum coating operation.

**Pakistani delegation in Poland.
Military and industrial cooperation**
21st June 2018 Defence24.pl portal

Information on the visit of Pakistani delegation led by general Qamar Javed, Chief of Army Staff of the Pakistan Army in Poland. The delegation met with the Minister of National Defence Mariusz Błaszczak and also visited several Polish defence industry plants, including PCO S.A.

**Eurosatory 2018: Polish military
optoelectronics in Paris**
13th June 2018 Defence24.pl portal

Information about the participation of PCO S.A. in the international fair Eurosatory 2018 in Paris. The Company presented its offering for individual soldiers and combat vehicles.

The exhibited PCO S.A. products included among others: SCT Thermal Weapon Sight, DCM-1 Modular Weapon Sight, MU-3M Night Vision Monocular (currently one of the lightest night vision devices in the world), MU-3ADM Night Vision Goggles, NPL-1T Thermal Binocular, PNL-2ADM Night Vision Goggles, PNL-4 Aviator's Night Vision Goggles and PNL-3M Aviator's Night Vision Goggles for civil applications.



Polish military optoelectronics go to Eurosatory 2018
11th June 2018 Special Ops Portal

Information describes the participation of PCO S.A. in international military fair in Paris. The Company had the opportunity to represent Poland with its offer of optoelectronic products among the most important representatives of the arms industry from Europe and the world. The fair offers an opportunity to show the products to a wide range of potential customers and to start some business discussions.

Polish thermal imaging for T-72
29th May 2018 Defence24.pl portal
Author: Maksymilian Dura

The author presents an upgrade concept prepared by PCO S.A. for modernization the observation and sighting system in T-72M1 tanks used by the Polish Armed Forces. The concept is based on installing thermal imaging cameras in the sighting system and replacing the other active night vision systems with more modern, passive counterparts. The changes are to replace the former TPN-1-23-1 Night Sight with a new PCT-72 Periscopic Thermal Sight, based on KLW-1 Thermal Imaging Camera manufactured by PCO S.A. Other changes include replacement of the active TKN-3B commander's observation system to a TKN-3Z version and installation of a passive PNK-55/72 Night Vision Driver's Periscope System in place of active observation devices.

**PCO to be a main sponsor
of the student LUSTRO project**
16th May 2018 Defence24.pl portal

PCO S.A. is looking for employees interested in professional development in the field of optoelectronics. The offer is also addressed to young people – students and graduates. The Company participates, among others, in the Jobicon Job Festival. A direct contact with PCO S.A. is an opportunity for visitors of the job fair to get acquainted with activities of a Company that creates the potential of the Polish defence industry in the field of optoelectronic devices, observation and sight devices based on laser, night vision and thermal imaging technologies.

PCO at the fair in Malaysia
24th April 2018 Defence24.pl portal

Information concerns the presence of PCO S.A. at the DSA exhibition in Kuala Lumpur. The Company presented at the fair its product offering for an individual soldier, including MU-3M Night Vision Monocular, MU-3ADM Night Vision Goggles, PNL-4 Aviator's Night Vision Goggles, DCM-1 Modular Weapon Sight and the SCT Thermal Weapon Sight designed for observation and shooting from hand weapons at daytime and at night, also in limited visibility conditions. PCO S.A. also presented the NPL-1T Thermal Binoculars.



The President of PGZ: we are looking for opportunities to establish a long-term partnership in Asia

17th April 2018 Dlapilota.pl portal

Author: Katarzyna Fiuk

The author describes the export strategy of Polska Grupa Zbrojeniowa (PGZ S.A.) company, focused on establishing a long-term partnership in Asia, that allow for establishing permanent dealerships and transfer of technologies and production capacities. An inherent part of this strategy is participation of PGZ S.A. (including PCO S.A.) at the Defence Services Asia 2018 Fair in Kuala Lumpur, where the company presents its product offering for Asian markets.



Polish military optoelectronics on top

9th March 2018 Polish Radio

A radio programme that focused on research and development activities of PCO S.A. In the interview the board member, PCO Commercial Director, Paweł Glica discussed the activities carried out by the Company in different fields, which mainly concerned the optimisation of night vision, thermal imaging and illuminated image parameters and enhancing functionalities of manufactured devices, among others by reducing their weight. Development and integration of special systems is an important aspect of research and development projects concerning equipment for the Polish Armed Forces. The Company is switching from offering individual sensors to offering complex products. A situational awareness system designed for combat vehicles, e.g. to be mounted on the turret of RAK 120 mm self-propelled mortar can serve as an example.



Bezpieczeństwo Wojsko Przemysł

PCO is looking for young engineers

6th March 2018 Defence24.pl portal

Information on PCO S.A. is looking for employees interested in professional development in the field of optoelectronics. The offer is also addressed to young people – students and graduates.

The Company develops contacts with the authorities and career offices of Polish technical universities in order to familiarize students with new technologies used in the defence industry and to encourage them to take up internship and to work in the future for PCO S.A.



Polish night vision goggles for pilots in Las Vegas

27th February 2018 "Rzeczpospolita" daily

Author: Zbigniew Lentowicz

The author describes the participation of PCO S.A. at the Heli Expo 2018 trade fair in USA, where the Company exhibited a civilian version of aviator's night vision goggles. The PNL-3M Aviator's Night Vision Goggles are designed for terrain observation and detection of obstacles by pilots and helicopter crews during night flights. Thanks to built-in modern design solutions, the goggles have low weight and can be individually adapted to pilot's head size. The presence of PCO S.A. at the Las Vegas trade fair is part of the strategy to offer dual-purpose technologies for civilian users.





PCO S.A.

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