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MILMAG

D E F E N S E & S P A C E

**POLAND BECOMING THE
FIRST ABRAMS USER
IN EUROPE?**



**MIECZNIK
COAST DEFENSE
SHIP PROGRAM**

**FT-5 FOR ORLIK
PROJECT?**

SILENT NETWORK

WITH US TO



VIS 100...



... & VIS 100

THE GOAL!



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FABRYKA BRONI



PGZ

- 006 WB Group priority is the Polish Armed Forces modernization process. Interview with the CEO, Piotr Wojciechowski
- 016 Silent Network
- 022 Poland becoming the first Abrams user in Europe?
- 032 Elements Of German tank guns produced in HSW
- 034 Miecznik Program: Spain Offers Poland F-100
- 036 Miecznik Program: Germany offers Poland MEKO A-300 PL
- 038 FT-5 for Orlik Project?
- 040 Wisła: Offset Negotiations With Raytheon And Northrop Grumman Finished
- 042 Can M-346FA replace Su-22?
- 050 Bayraktar TB2 Surprise



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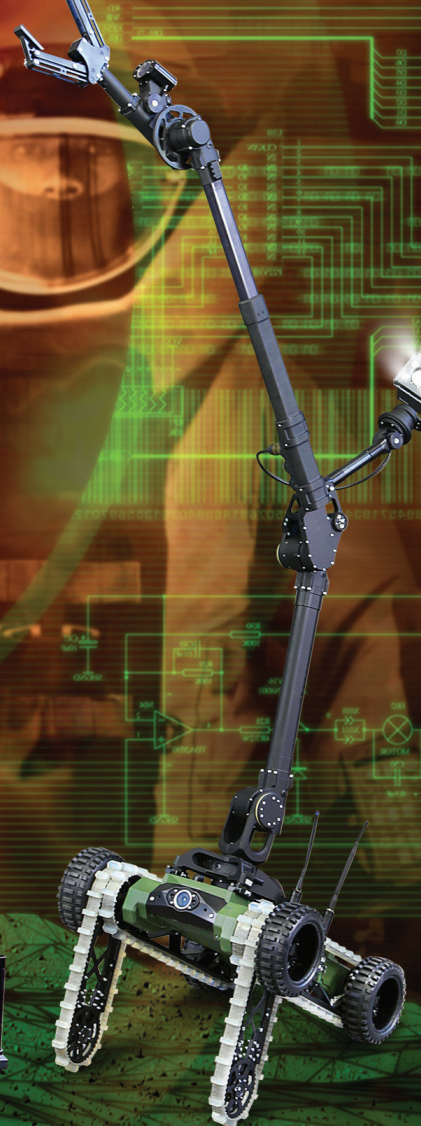
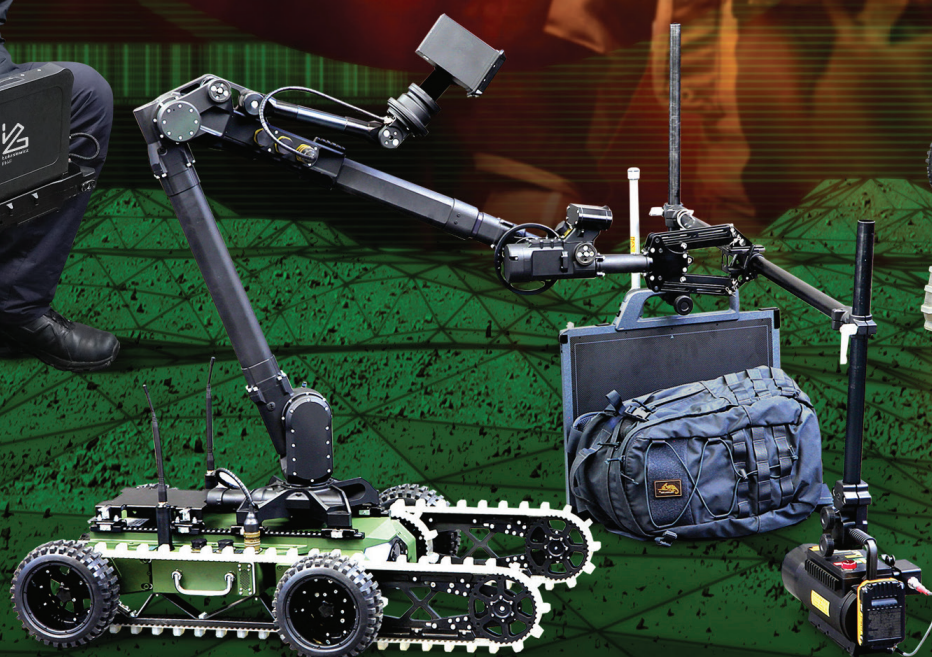
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WB GROUP PRIORITY IS THE POLISH ARMED FORCES MODERNIZATION PROCESS

INTERVIEW WITH THE CEO,
PIOTR WOJCIECHOWSKI



© JAKUB LINK-LENCZOWSKI,
GRZEGORZ SOBCZAK

Mr president, WB Group is the largest private entity engaging in production of military equipment in Poland. What are your expectations for the Group's local growth? Which fields would you consider to be the key ones? Which has the biggest potential for further development?

In the beginning, it is worth noting that the WB GROUP is an entity with a significant influence and supervision of the State Treasury, owning twenty six percent of the shares. The WB GROUP has adopted a development strategy known as "related diversification". Its core idea is to create an array of products tied to each other forming a comprehensive offer for the potential customers. It is also reflected in the organization and structure of the Group. Our constituent companies form the largest interconnected research and development structure in the Polish defense industry. It helps us react flexibly to the demands of the market, and offer new, innovative solutions.

At the moment, our key goal is to stabilize WB GROUP's participation in modernization programs run by the Polish Armed Forces, and including our companies in new projects. The Narew program, which we want to co-create together with the Polish Armament Group can be an example. It

isn't all of it of course, we want to be engaged in other Polish Armed Forces modernization programs as well.

There are two main directions of the WB GROUP's development. The first one is diversification of our products and expanding to civilian security markets. We participate in many projects that require implementation of complex technical tasks within that context. Most often, new security system solutions are created in conjunction with our products already used by the Polish Armed Forces. The second direction of development is, of course, export. The WB GROUP is becoming more and more involved in long term defense programs abroad. It is happening slowly, but the number of retrofit projects in other countries we are involved with steadily grows.

What will the WB Group's operations on foreign markets look like in the near future? Currently, you have your representatives in the USA, Malaysia, and Ukraine. Should we expect more such offices to appear soon?

We want to expand where opportunities for long term cooperation with local governments, their defense ministries and their local industry will appear. In all those places we will be creating our offices or companies tied to us, either as entities fully owned by us or in partnership with local companies that will cooperate with us to create products for our customers.

WB GROUP has its own solutions and technologies. In other words, we have enormous capacity for building joint defense projects in cooperation with foreign partners. What's

more, we think that building shared structures will increase capabilities of the whole Group. It will allow us to use the resources of local markets when it comes to engineering staff, academic centers, and financing of development in given countries.

Products of WB GROUP are used in various countries in actual combat. Do the customers share with you their experience in using your systems? How do they rate the efficiency of your solutions, and to what extent their experiences are reflected in the modernization of your existing products and development of new ones?

It is a continuous process. Our gear has been used by military forces for two decades now, we stay in touch with its users, utilizing their experience for the benefit of the WB GROUP. All the comments reported by the Polish Armed Forces are taken into account during the modernization processes.

Sometimes the users share operational observations, sometimes they deliver their proposals for new solutions to their combat needs, sometimes we are offering our ideas that we think might help improve use of a particular piece of gear.

On the one hand, users share their operational comments. On the other hand, they submit ideas on new concepts for solutions that are necessary for them to carry out combat tasks. From our point of view, we give them all kinds of ideas that can help better develop the equipment.

With the large engineering staff kept by WB GROUP it is a continuous process. It constantly advances and makes

our products better and better. What's more, due to such an approach we are building better relationships and interactivity with the users. They know they can count on our support regarding both the servicing and future development.

You offer not only the individual products but whole systems based on those products. Let's just recall the TOPAZ system which is one of the undisputed

successes of WB Group. What is the reaction (including abroad) of customers seeking weapon and communication systems to your new designs, such as Silent Network or W2MPIR? Are they open to such complex proposals or do they prefer their own solutions based on your individual products?

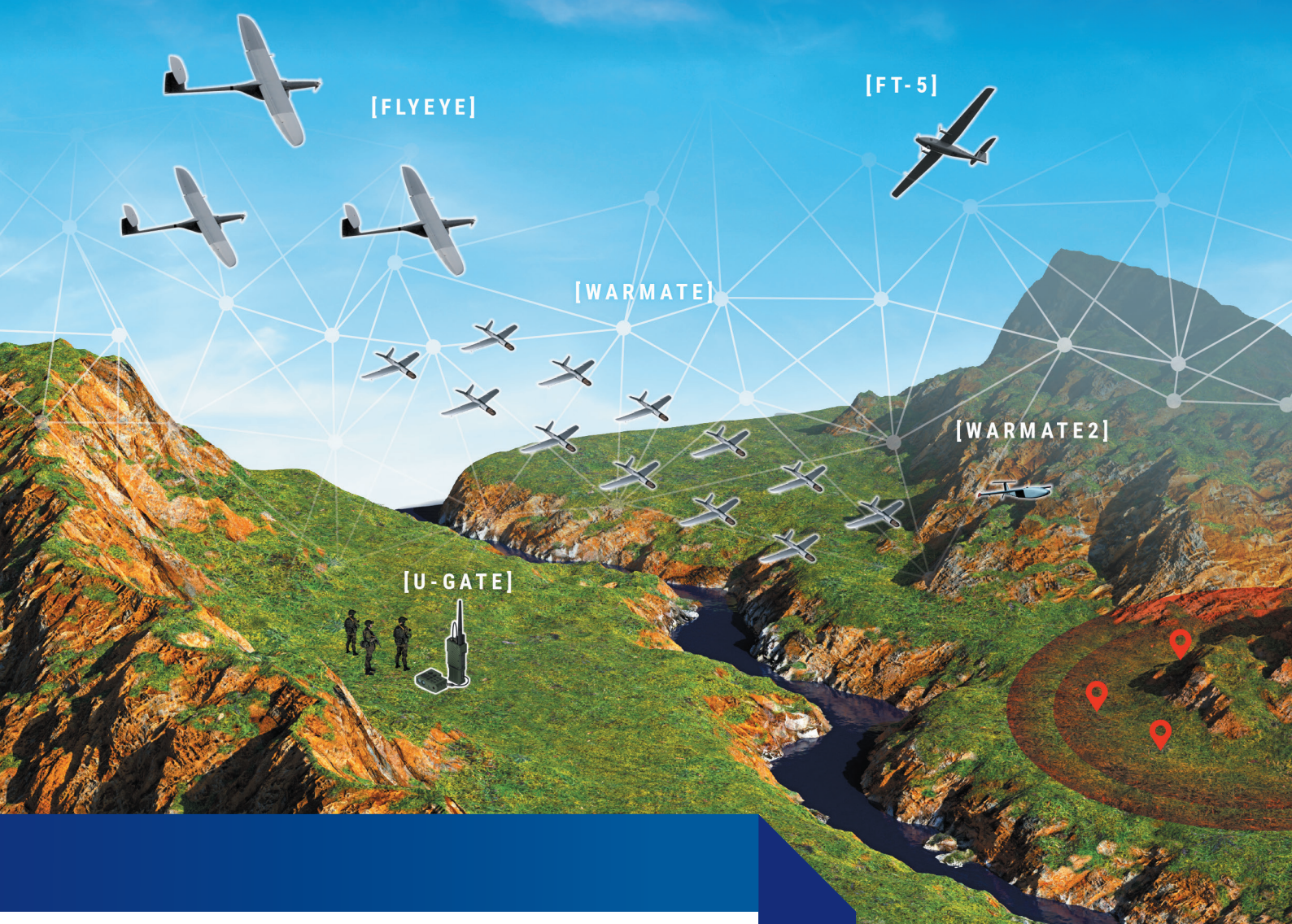
It needs to be stressed that systems such as W2MPIR or SILENT NETWORK, and others,

are conceptual ideas of sorts. They show what capabilities can be achieved using WB GROUP's solutions. We can offer the customer complex solutions based on our products. If the customer already has or intends to acquire some elements of their own system, he can match and adapt his own ideas to products from our offers. WB GROUP can deliver modules that will fit into the customer's ideas and help him create a complete



W2MPIR

Wielowarstwowy Wielozadaniowy Misyjny Powietrzny Inteligentny Rój



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solution. This is the modularity of our systems.

On one hand we offer products that fit within existing conceptual ideas, on the other hand we are giving suggestions on how such a system can be built. W2MPIR and SILENT NETWORK are proposals which we present.

The customer gets information about the capability of our products being used to create more complex combat systems serving to acquire advantage over potential enemies.

Poland bought HIMARS long range missile launchers for

the Homar program. Missile divisions are going to be enhanced with locally produced components. Can you reveal if there are works on integrating American missiles with the TOPAZ system? Are there plans of installing FONET in the vehicles?



When HIMARS was purchased, the Ministry Of National Defense announced its integration with the TOPAZ system. That integration process, as decided by the Minister Of National Defense, is in progress. The American system installed in the missile launchers will be working with

solutions introduced and utilized by the Polish artillery. HIMARS was purchased as an “off-shelf” product, in the identical configuration as the American one. It is not a problem, because WB GROUP has experience, competence, and knowledge how to integrate it with the

developed over years by us TOPAZ system.

The Remotely Controlled Turret System (ZSSW-30) project is almost finished practically speaking. Will WB Group utilize the acquired experience in creation of other similar systems? Do you





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plan to integrate your solution with different platforms than KTO Rosomak (wheeled ACP “Wolverine”) and BWP Borsuk (IFV “Badger”)?

For starters, ZSSW-30 is an excellent export product. That is a world class solution. It is one of the best unmanned turrets currently available on the market. Because it was entirely designed locally, based on Polish technical thought, certain universal solutions were utilized in its construction. We can construct almost any automated weapon system on its basis, equipped with advanced fire controls and integration of varied combat measures, such as guided anti-armor missiles. Please, remember that WB GROUP long ago developed competence in construction of turrets. They didn’t appear suddenly with the ZSSW-30 project. We had them earlier while designing turrets for Krab gun-howitzer and Rak automated mortar. We have harnessed our prior artillery-related experience while designing the new system.

Our comprehensive knowledge acquired while designing fire control systems and settings for mortar helped us quickly create necessary modules for a lower-caliber system. It is a continuous process, solutions developed while designing ZSSW-30 can be used in any turret that will demand very high precision of fire, from small 5.56 mm machine gun stations to 155 mm tank or artillery cannons.

What is the future of the WARMATE TL system? Current prospects for modernization of Mi-24 or purchase of new attack helicopters seem distant. Is it possible to use WARMATE TL

to partially fill this gap? Can the loitering munitions be utilized by aircrafts currently used by the Polish Air Force (especially the newly purchased unmanned Bayraktar TB-2)? If so, how serious would be the integration process?

At this year’s International Defense Industry Exhibition, we will show the possibility of installing a reusable launcher of WARMATE-TL loitering munition. The system was intentionally designed to be mounted on any aircraft. Its type doesn’t matter – helicopter, plane, or unmanned aerial vehicle. It could be our FT-5. The aircraft doesn’t matter, though full integration of WARMATE-TL with the vehicle – be it Black Hawk or even TB-2 – requires cooperation with the vehicle’s maker. Of course, our loitering munition is suitable for being fired from vehicles moving with certain speed. WB GROUP is working on integration of WARMATE-TL with helicopters and unmanned drones.

Arming Polish helicopters with locally produced loitering munitions is an excellent idea because of multiple reasons. First, firing a WARMATE-TL unlike firing traditional missiles doesn’t reveal the helicopter’s location. Second, it has much greater range than a missile. The helicopter drops the munitions from afar, and then either passes the control to ground forces, creating sufficiently large munitions “stockpile” in the air, or it can increase distance and direct WARMATE-TL from safety. What’s more, the WB GROUP’s system can be used for reconnaissance purposes at the same time. It can be used for detection and identification of enemy units.



Range of purposes for which it can be utilized is very wide thanks to replaceable warheads. We can't reveal all the ideas being currently developed but we can imagine the capacity to take down flying targets.

The WB Group intensifies its work regarding electric vehicles and renewable sources of energy. Are any of WB Group companies currently adapting such technologies

for military use (like hybrid military engines or electric powered tracked vehicles)?

It's worth noting that programs announced by the European Defense Fund (EDF) directly point out certain military needs. There is a need for military vehicles becoming more ecological, in other words, hybrid engines are promoted. Usage of electric engines for vehicles has a major advantage of greater

maneuverability and capability to deal with terrain.

It's good to understand why we are using 1500 horsepower engines for heavy vehicles. All that power is primarily needed to accelerate the vehicle to high speeds. Once the vehicle is moving, keeping the momentum requires a mere 200 horsepower engine. Those fifteen hundred horsepower is only utilized for putting the colossus into motion. However,



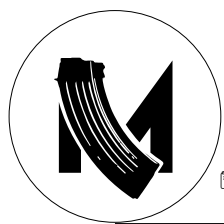
electric engines always have a huge torque. We do not need to install big and fuel-guzzling units with high power. An electric engine with its high torque can get the armored vehicle moving, leaving its emplacement, and acceleration to 30-something kilometers per hour, which is the tank's primary maneuverability parameter. Other benefits of such a solution include lower power consumption, higher efficiency,

and much lower thermal and acoustic signatures.

All those qualities are noted in European Defense Fund programs. They also emphasize other purposes of developing electromobility. It's a matter of constructing silent power sources for command centers. Those are very sought after solutions. They rely on the creation of huge capacity energy storages which need to be charged. EDF ideas also point to hybrid solutions

in that matter – combining generators with energy storage. That would give other benefits that I already mentioned – lowered thermal, acoustic, and electromagnetic signatures. It's easier to connect a small crate than dig a large hole for a generator alone. There are many solutions in that area and WB GROUP with our partners fully intends to develop both the hybrid engines and the military energy storage.

Silent network



GRZEGORZ SOBCZAK
GRUPA WB

WB Group presented a new military communication system with a work name of “Silent Network”, designed to operate at a battalion-level. It was based on a system developed for the Polish TYTAN individual warfare system program. Because the new system is a scalable solution, there are no obstacles for future creation of analogous systems for larger units.

Electromagnetic signature

As noted by Adam Bartosiewicz, WB Group CEO, modern reconnaissance and electronic warfare systems can identify electromagnetic signatures, allowing not only for detection of the enemy location but also its size. In favorable circumstances they can even determine the number of enemy vehicles. It's a key step to destruction of the detected unit.



Handheld set for the Silent Network

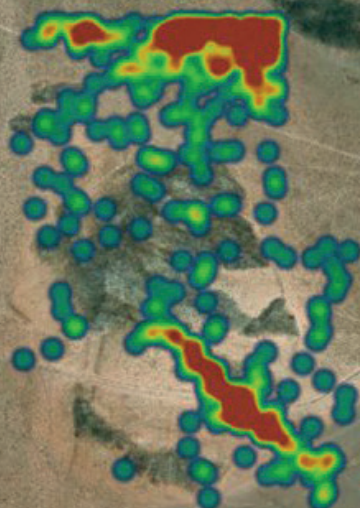
The new solution presented by WB Group allows for communication, including transfer of data and images, without exposing oneself to detection. The Silent Network system is based on low-emission radio stations. Handheld radios work below 1 W, and can be installed in vehicular adapters. Average power consumption of the network node remains below 7 W, and can be additionally reduced while maintaining radio silence.

Radio Repeating

Such low power combined with network nodes rapidly change their frequency (frequency-hopping) for a very short period of time (impulses last around 1 millisecond) significantly reduces the possibility of locating the transmitter. Those two qualities make the communication system much harder to detect, locate, and jam by modern electronic warfare measures.

Low power normally would result in a shortened range of the transmitters, but that problem is solved by placing one or more network nodes on board of large or small unmanned aerial vehicles, spreading further the data packets sent by ground network nodes and acting as mobile radio repeaters.

According to tests conducted by WB Group, a single drone flying at an altitude of 20 to 200 meters can extend effective range between nodes to 20 kilometers,



Electromagnetic signature of the active communication system of 11th Armored Cavalry Regiment US Army illustrates how electromagnetic signals can help localize units regardless of the camouflage

and provide radio coverage for a whole battalion. The system can also use more drones and connect multiple battalions with each other. In this way we receive a quasi-satellite communication system that is operating fully under local control, can be developed at any place and time, and can be immediately switched off only

to be turned back on in less than 5 to 7 seconds.

The new system works in any terrain allowing traditional radio communication, conferences, communication between multiple groups, selective contact with individual receivers, transmission of static images and video signals. Ground network nodes

can provide reference signals for drones, which are much more vulnerable to GPS signal jamming.

Used frequencies are changed dynamically by the system. It analyzes available bands and detects enemy jamming attempts, excluding those bands from the frequencies used for communication.

The Silent Network communication system elements



Zestaw pojazdowy



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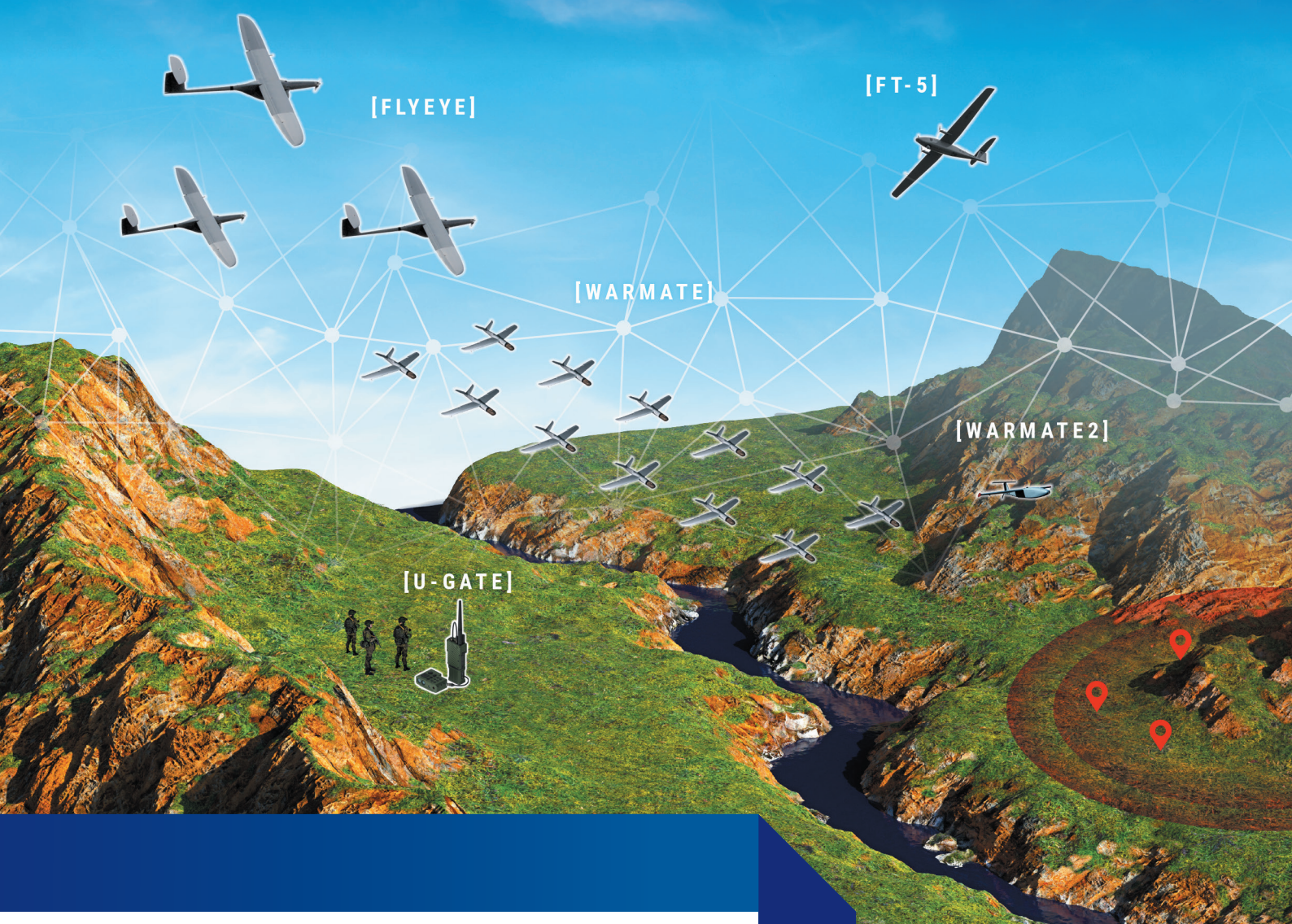


Zestaw doręczny

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								12952	DELTA		100%	100%	100%	WYŁ.	100%	WŁ.	WŁ.	WYŁ.
Procedura przedstartowa	IAS [km/h]	area AGL [m]	AMSL [m]	GS [km/h]	VSI [m/s]	Czyść ślad	Wyśrodkuj na Radio	ID	Alias	Patrz na radio	Volume	Bluetooth	Headphone	MIC	MIC Volume	Ultragate Video	FlyEye Video	Radio Power

[illegible]

Upper left:
A sample screen of user
interface with imaging of
radio repeaters

Lower left:
Screen presenting
localization of drones and
the pictures they send

Silent Network's Potential

The Silent Network connected with a device called U-Gate can be used to provide an individual soldier with an augmented reality based on localization data of all the network nodes and access to C2 systems. Each connected soldier receives access to information provided by reconnaissance

systems, such as recon drones and sensory systems of linked vehicles (such as FlyEye UAV or ZSSW 30 sensors mounted on Rosomak wheeled armored personnel carriers).

The network can be used to link reconnaissance drones with TOPAZ automated fire control, allowing for target selection and judging the effects of artillery fire, or directing guided munitions. The communication is obviously encrypted by a dedicated module that is surrounded by additional security measures. The whole system was developed with the assumption that customers using the provided documentation will be capable of designing their own encrypting modules or rely on the producer's support to implement national encryption algorithms.

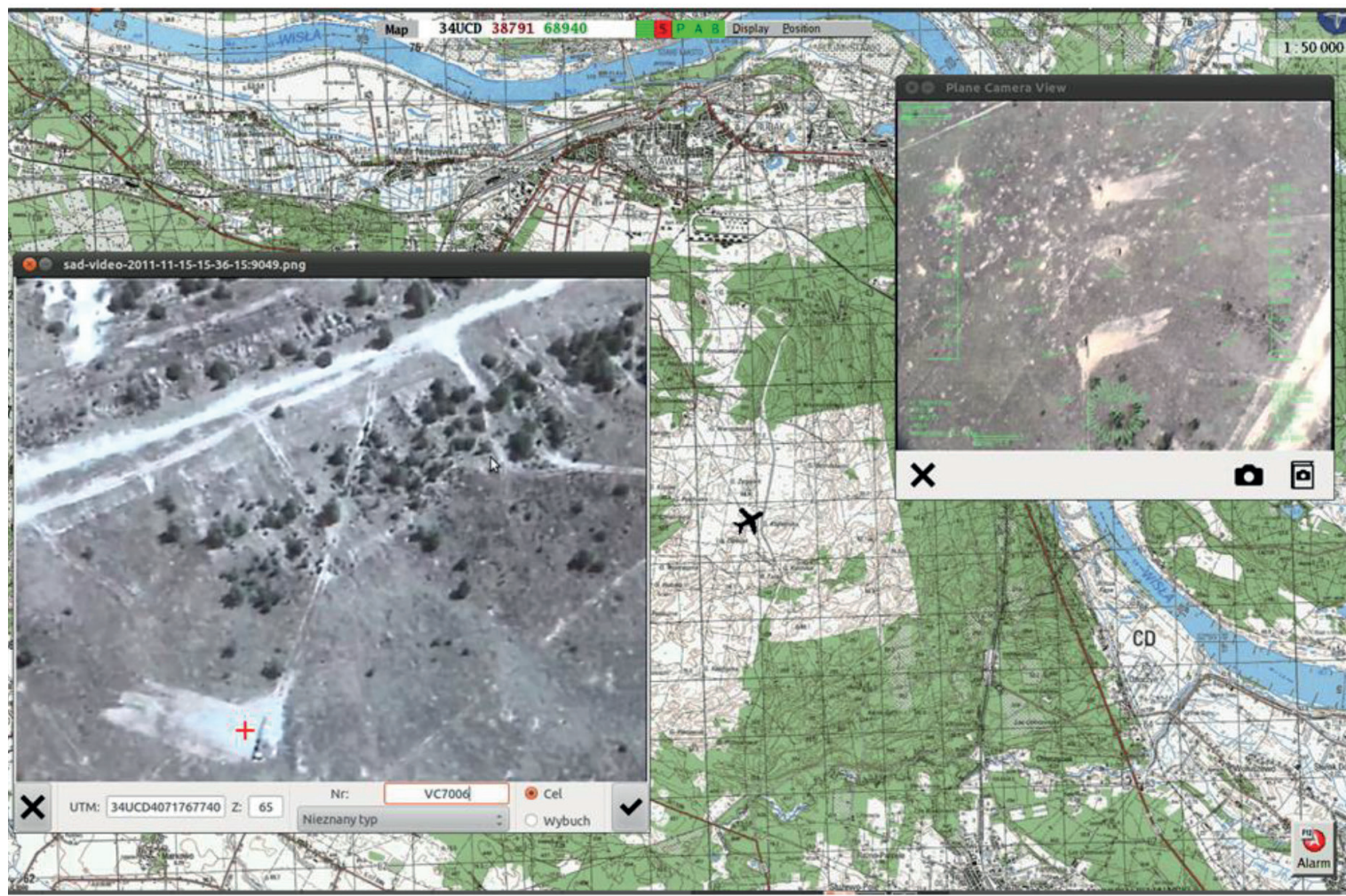
We are aware that the safety of encryption is vital for any military force, so we enable use of

encryption devices requested by our customers – noted Adam Bartosiewicz.

In addition to already noted merits, The Silent Network system has also another advantage that will be appreciated by the soldiers using it – its small mass, and low power and energy saving capabilities allow the transmitter to work for up to 48 hours using a single battery.

Vehicle-mounted version of the network node can be easily integrated with the vehicle-based network using Ethernet connection, and supports VoIP protocols. Thanks to its small size and mass (150 × 110 × 180 mm and approximately 3 kilograms), and low energy consumption (6–12 W) it can be easily installed in a variety of vehicles, from small 4×4 off-road cars to main battle tanks.

Screen showing the Silent Network interface integrated with TOPAZ integrated battlefield control system

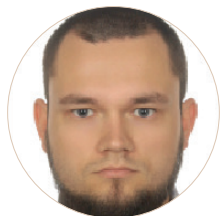


POLAND BECOMING THE ABRAMS USER



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Deliveries of M1A2 Abrams SEPv3 for four battalions of Polish Armed Forces should start next year.

An announcement regarding purchase of M1A2SEPv3 Abrams tanks for at least four battalions was made during a press conference that took place on July 14 in barracks of 1st Warsaw Armoured Brigade “Tadeusz Kościuszko”, with Minister of National Defence, Mariusz Błaszczak, Deputy Prime Minister and chairman of National Defence And Security Committee Jarosław Kaczyński, and General Commander Of Branches Of The Armed Forces Jarosław Mika.

Four battalions

In 2022 first tanks will be delivered to 1st Warsaw Armoured Brigade (1. BZ) and 19th Lublin Mechanized Brigade “Franciszek Kleeberg” (19. BZ), both belonging to the 18th Mechanized Division. Jarosław Kaczyński spoke about purchases for four battalions, which would equate to at least 232 tanks (with 58 units per battalion). At least 12 additional tanks will be needed for training purposes, for a total number close to 250.

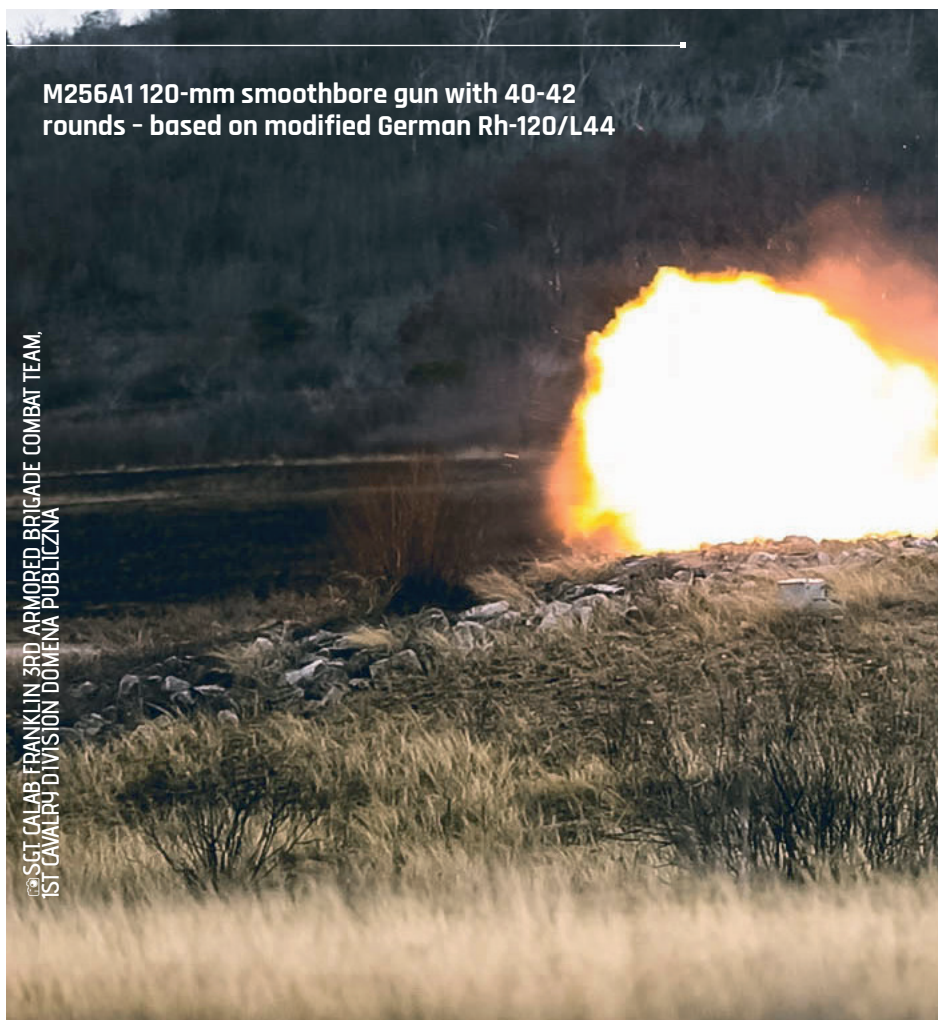
US Army M1A2SEPv3 Abrams Main Battle Tank during exercises

© SGT CALAB FRANKLIN 3RD ARMORED BRIGADE COMBAT TEAM, 1ST CAVALRY DIVISION DOMENA PUBLICZNA



M256A1 120-mm smoothbore gun with 40-42 rounds - based on modified German Rh-120/L44

© SGT CALAB FRANKLIN 3RD ARMORED BRIGADE COMBAT TEAM, 1ST CAVALRY DIVISION DOMENA PUBLICZNA





Purchase of tanks and complementary command, support, and medical evacuation vehicles, training simulators, vast supplies of ammunition (including programmable ammo), training and logistic support,

and expansion of necessary infrastructure will take 23.3 billion PLN. These funds will come from outside of the Ministry Of National Defence budget and according to the official announcement won't

impact the Polish Armed Forces Technological Modernization Plan. Additionally, the military servicing facilities will be equipped with the capability of supporting Abrams tanks for Polish Armed Forces.

Some of the first M1A2SEPV3 received by the US Army in 2020

SGT CALAB FRANKLIN 3RD ARMORED BRIGADE COMBAT TEAM,
1ST CAVALRY DIVISION DOMENA PUBLICZNA

Formalities And Protests

On the same day, Minister Of National Defence Mariusz Błaszczak announced via social

media that a letter of request will be sent to the United States Department Of State regarding the tanks (notably, the announcement didn't mention when exactly the letter will be sent). It will mean initiating purchase

procedures according to Foreign Military Sales program. Within a few months, the American Defense Security Cooperation Agency should promulgate the Department Of State's consent for the transaction,





US ARMY

listing concrete numbers and maximum value (which will be negotiated by the Polish Ministry Of National Defence). Afterwards, both governments will sign an agreement in the form of Letter of Offer and Acceptance.

Earlier this year, on February 26, spokesman of the Polish Defence Ministry's Armament Inspectorate told MILMAG that US Army made a bid in an analytical and conceptual phase of Polish new tank program "Wilk", started in 2017, though the announced Abrams tanks purchase is not part of the project.

As we were informed by major Platek on July 14, cost of tanks, vehicles, and support services





The US Army received their first M1A2SEPV3 in May 2020. By the end of 2021 they will receive over 550

should not exceed 20 billion PLN, with the remaining costs covering construction of new infrastructure. Additionally, Major Płatek clarified the number of tanks that will be purchased from Americans announced by Deputy Prime Minister Kaczyński as two hundred and fifty.

On 19 July 2021, press office of Silesia-Dąbrowa Solidarity trade union published an open letter to Polish president Andrzej Duda signed by the union leader Dominik Kolorz, chairman of Regional Section Of Military Industries Krzysztof Strzelbicki, leader of Solidarity trade union in Bumar-Łabędy mechanical works Zdzisław Goliszowski, and leader of Solidarity union in Institute Of Research And Mechanical Development OBRUM, Ryszard Szynekiewicz. The letter criticized the decision to purchase Abrams tanks, stressing the high cost, lack of prior announcements,

and negative impact on Polish military industry, especially interests of both companies.

Abrams' New Incarnation

Early configuration of the M1A2SEPV3 (System Enhanced Package, version 3) Abrams tank was demonstrated during the Association of the United States Army Annual Meeting and Exposition in Washington, 12-14 October 2015.

SEPV3 modernization package included addition of ADL (Ammunition Data Link), which transfer data between modernized fire-directing IFCEU (Improved Fire-Control Electronics Unit) and fifth generation munitions, such as M829E4 Advanced Kinetic Energy armor piercing fin-stabilized discarding sabot and



M1A2SEPV3 being produced in General Dynamics Land Systems (GDLS) Joint Systems Manufacturing Center in Lima, Ohio

M1147 Advanced Multi-Purpose programmable ammunition.

Modernization also included IFLIR (Improved Forward-Looking Infrared to identify a target) thermovision system and the tank was equipped with modified compact remote weapon system CROW-LP (Common Remotely Operated Weapon System-Low Profile) with 12.7 mm M2HB Browning heavy machine gun. The gas turbine engine Honeywell AGT1500 was updated to TIGER standard (Total Integrated Engine Revitalization) with improved automatic transmission Allison DDA X-110-3B, and a new fuel consumption reducing Auxiliary Power Unit.

The tank was also equipped with Enhanced Hull Power Distribution Unit/Common Remote Switching Modules, and the Battery Monitoring System, larger slip rings, Next

Generation Armor Package, and Joint Tactical Radio System. Electric systems were upgraded. Ballistic protection of front armor and turret was improved, as was anti-mine defense, thanks to AN/LQ-12 Crew Duke V3 Counter Remote Control Improvised Explosive Device Electronic Warfare V3).

M1A2SEPV3 tank is 9.77 meter long (with hull being 7.93 meters in length), 3.75 meter wide, and 2.44 meter high, with 0.43 meter ground clearance. It has an operational mass of 66.8 tons and crew of four (commander, driver, loader, and gunner). Its primary weapon is a smoothbore 120 mm, 44-calibers long M256A1 gun (with a supply of 40 to 42 rounds), a modified licensed German Rh-120/L44 gun. It's accompanied by a coaxial 7.62 mm M240 machine gun. Additional



The newest variant of Abrams tank was picked by Taiwan and Australia





armament is composed of one or two M240 machine guns (with up to 10,400 rounds) and one mentioned earlier M2HB with 900 rounds. One six-tubed M250 smoke grenade launcher is placed on each side of the turret.

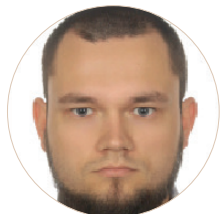
M1A2SEPV3 is equipped with a GPS receiver, a Linux-based FBCB2/BFT-2 communication platform supported by Joint Tactical Radio System. It has a digital radio station and, optionally, a phone for communication with supporting infantry.

The Abrams tank can reach a maximum speed of 67 kph on roads and 40 kph off-road. Its maximum operational range is 426 kilometers, or 150-200 km off-road (the numbers are taken from the pre-revitalized engine variant, though, making it likely

that SEPV3 has longer actual range). It has six fuel tanks with a total capacity of approximately 1900 dm³ and can run on multiple types of fuel, including diesel, marine diesel, gasoline, and jet fuel.

The first tanks in the M1A2SEPV3 variant entered active US Army service in May 2020. Five hundred fifty units have been already ordered, with a request for another 70 for fiscal year 2022. Future users of the export variant will include Taiwan, ordering 108 M1A2T (previously designated as M1A2X, a special variant of SEPV3), and Australia getting 75 M1A2SEPV3. Poland will be the third user of the export variant, and the first in Europe. Additionally, the US Army will keep over 80 M1A2SEPV3 in Poland as their prepositioned stock, starting in 2023/24.

ELEMENTS OF GERMAN TANK GUNS PRODUCED IN HSW



RAFAŁ MUCZYŃSKI

On July 21, Huta Stalowa Wola (Stalowa Wola Metalworks, belonging to the Polish Armament Group) signed a license agreement with German company Rheinmetall Waffe Munition (belonging to

Rheinmetall AG) regarding production of selected parts of Rh-120/L44 120-mm smoothbore tank guns in Poland.

The license covers production of 120-mm barrels for Leopard 2A4/A5/PL/PLM1 tanks used by Polish Armed Forces and acquisition of competence to fit Huta Stalowa Wola in Rheinmetall AG group's supply chain. Huta Stalowa Wola current competences include production of gun barrels in calibers between 30 mm to 155 mm, and length of up to 9 meters. Additionally,

for a few years now, HSW has produced 120-mm barrels for M120K Rak mortars, 155-mm ones for self-propelled gun-howitzer Krab, and towed mortars.

Sebastian Chwatek, chairman of the Polish Armament Group board said: *One of the Polish Armament Group's strategic goals is creation of competency centers for particular groups of products within the Group. Huta Stalowa Wola, which has the greatest capabilities in barrel production in our country, expands their field to cover an extremely important*



The contract was signed by CEO of HSW Bartłomiej Zając and CEO of Rheinmetall Waffe Munition Roman Koehne. Signed contract provides a license for 20 years



product designated for the Leopard 2 tank family. Today's agreement is our next step in the direction of becoming the Polish Armed Forces primary choice for delivery of military equipment and comprehensive service for its life cycle.

Bartłomiej Zajac, CEO Huta Stalowa Wola added: *With the acquisition of license for manufacturing tank gun barrels, HSW now has the entire spectrum of artillery barrels and acquires new competence and business opportunities regarding tank gun barrels. For our company, it constitutes another milestone in building specialized military gear for the Polish Army. Producing tank barrels expands our activity regarding armored projects.*

Roman Koehne, CEO Rheinmetall Waffe Munition, noted:

Contract signed today is the next step in the development of our cooperation with HSW, with which we are very pleased. Huta

Stalowa Wola is a professional partner, and we are ready to expand it further to cover more types of modern tank weapons if the Polish Ministry Of National Defence decides to arm Polish tanks with new types of 120 or 130 mm guns.

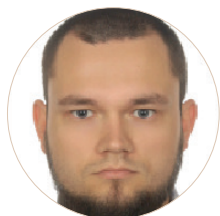
Cooperation with Rheinmetall was initiated in 2012 and has been primarily focused on production of barrels for Krab gun-howitzer. License agreement for production of tank barrels is the next step of the cooperation which will bring benefits not only to the both sides of the contract, but also to the Polish Armed Forces, securing vital national interests regarding elements of tank guns by launching the production of Rh-120/L44 barrels in Poland.

The company invested in development of their barrel manufacturing competency in the last few years. Since 2017, it

has expanded the barrel-making section, acquired new numerically controlled machine tools and autofrettage machines used to strengthen the interior of the barrels. Thanks to the signed contract, HSW portfolio will also include Leopard gun barrels. The company also increased employment and trained specialized staff.

HSW invested 34.35 million złoty in development of the barrel making section, including over 20 million funding from the state's treasury not constituting public aid. In the years 2018-2020, further investments took another 16.4 million złoty. The total sum of investment into the capability of making gun barrels reached 50.7 million złoty. HSW spent nearly 3 millions on technological research and development and implementing production of barrels of various calibers.

MIECZNIK PROGRAM: SPAIN OFFERS POLAND F-100



RAFAŁ MUCZYŃSKI

Spanish shipbuilding company Navantia revealed that they are offering their F-100 missile frigate for the Polish Miecznik coast defense ship program.

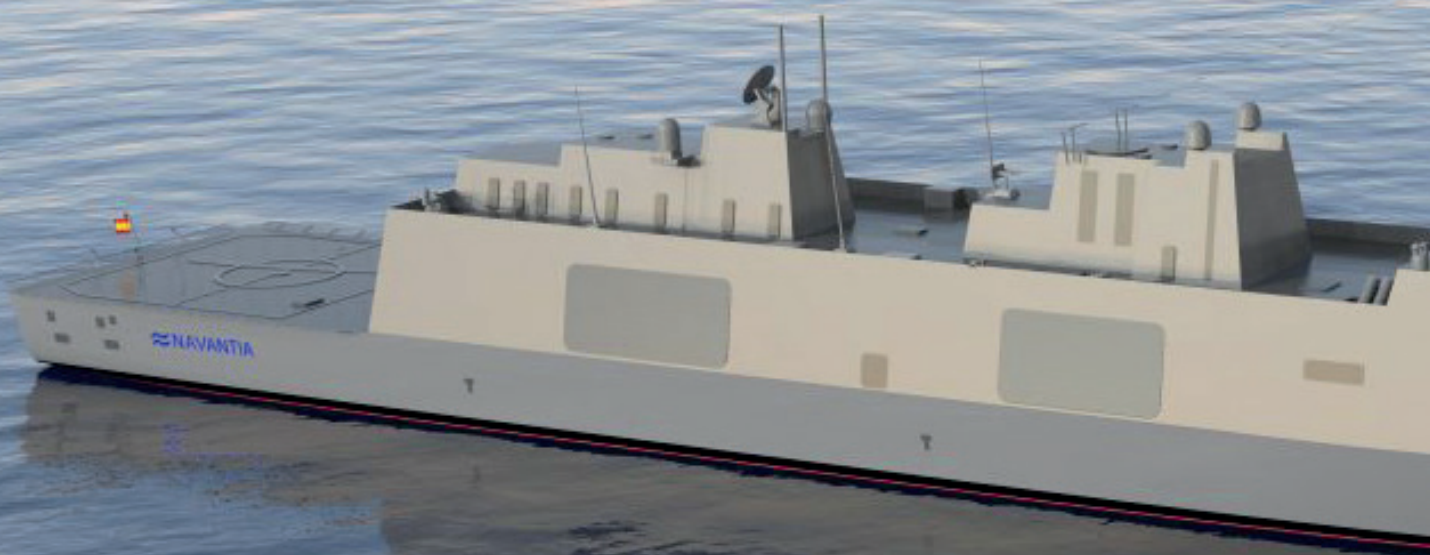
On August 6, Spanish shipbuilding company Navantia revealed that it offered F-100 as a bid for the Polish Miecznik ("Swordfish") coast defense ship program. It was a surprise, as the commentators expected Navantia to offer F-110 frigates, which are still in the planning phase.

Navantia is one of the three potential contractors, whose concepts will be refined by the end of November this year, along with ThyssenKrupp Marine Systems (TKMS) offering MEKO A-300 PL (Mehrzweck-Kombination)

and British Bacock (Arrowhead 140). At the turn of 2021-22 the best concept will be selected with the specific project development following.

Javier Herrador, commercial business and development director of Navantia said:

Navantia is ready for active presence in Poland to support construction and servicing the ships. We are proud to offer the Polish Navy a partnership model which will be mutually beneficial and will help our friend and ally Poland maintain marine defense



capabilities based on modern technology, advanced and tested by the Spanish Navy and our export customers.

In practice, it means that the F-100 project will be the basis for development of three Miecznik missile frigates for the Polish Navy. Five (out of six planned) ships are serving Spanish Navy (Armada Española) as a Álvaro de Bazán class (Álvaro de Bazán, Almirante Juan de Borbón, Blas de Lezo, Méndez Núñez, and Cristóbal Colón) and entered the service between 2002 and 2012.

Three slightly bigger Australian air warfare destroyers (AWD) of the Hobart class (Hobart, Brisbane, and Sydney) based on the same design entered service in the years 2017-2020. The project

was modified to integrate the American Aegis combat system in its Baseline 7.1 version.

F-100 was also the basis for five slightly smaller Norwegian frigates of the Fridtjof Nansen class (Fridtjof Nansen, Roald Amundsen, Otto Sverdrup, Helge Ingstad, and Thor Heyerdahl), introduced in 2006-2011. One of the frigates, Helge Ingstad was rammed by Maltese tanker Sola TS and sunk near Sture oil terminal in Øygarden. After it was recovered and towed away, the damage assessment deemed the repairs too costly and Helge Ingstad was scrapped.

In their basic, Spanish configuration, F-100 are 146.7 meters long, 18.6 meters wide, with 4.75 meter draft, standard displacement of 5900 tons,

and maximum displacement of 6594 tons. It is propelled by two General Electric LM2500 gas turbines with a total power of 46 650 hp (34 790 kW), and two Caterpillar 3600 diesel engines with total power of 12 000 hp (8900 kW). It grants speed of up to 28 knots and range of 4500 naval miles at an optimal speed of 18 knots. The crew is composed of 201 officers and sailors.

The ships are equipped with 48-cell vertical launching system Mk 41 VLS with 32 anti-air SM-2MR Block IIIA or 64 RIM-162 ESSM missiles, eight launchers of anti-ship RGM-84 Harpoon missiles, 127-mm naval gun Mk45 Mod 2, and two 325-mm Mk 32 Mod 9 torpedo tubes with 12 Mk 46 Mod 5 light torpedoes.

Spanish shipbuilding company Navantia revealed that they are offering their F-100 missile frigate for the Polish Miecznik coast defense ship program. / Phot: US Navy



MIECZNIK PROGRAM: GERMANY OFFERS POLAND MEKO A-300 PL

German company ThyssenKrupp Marine Systems offered a missile frigate MEKO A-300 PL for the Polish Miecznik coast defense ship program.

On August 6 German company ThyssenKrupp Marine Systems (TKMS) revealed they have offered their MEKO (Mehrzweck-Kombination, multipurpose combination) A-300 PL missile frigate for Polish Miecznik ("Swordfish") coast defense ship program.

TKMS is one of the three potential tenderers, whose concepts will be refined by the end of November this year, along with Spanish Navantia (offering F-100), and British Bacock (Arrowhead 140). At the turn of 2021-22 the best concept will be selected with the specific project development following.

Dr Rolf Wirtz, chief executive director of TKMS said:

As a leading provider of frigate technology for nineteen military navies across the world, including six NATO fleets, ThyssenKrupp Marine System is proud to offer Poland MEKO A-300 PL, the newest variant of our famous MEKO frigate family.

With the selection of German offer, TKMS will start a permanent technological partnership with Polish industry regarding construction, integration, and

extending lifespan of MEKO A-300 PL frigates in Poland. As Wirtz pointed out, cooperation with local industries for manufacture of their ships is

a standard practice for TKM, as over 50% of exported ships were built by foreign shipyards. It is worth noting that the A-100 project used for the Polish patrol



TKMS

corvette ORP Ślężak (241), originally designed as Gawron missile corvette, comes from this family of ships.

Analysis

Earlier analyses took into account a possible offer of MEKO A-200, four of which are used by Republic Of South Africa (as MEKO A-200 SAN), and two by Algeria (as MEKO A-200 AN). The not-yet existing MEKO A-300 (together with improved A-200 NG) was already offered

to Greece as replacement of their four Hydra frigates (MEKO 200 HN) but the offer was rejected.

Official information regarding MEKO A-300 doesn't exist, though according to Greek industry portal Doureios Ippos ("Trojan Horse"), ships offered to Greece would have 125-130 meters of length, and displacement of 5500 tons. They would carry up to 64 anti-aircraft missiles, including 32 long range Aster 30 or SM-2MR, and 32 medium range RIM-162 ESSM or CAMM-ER. Its main battery

would be a 127-mm naval gun. No information of anti-ship armament was leaked. They would be also equipped with Thales APAR Block 2 multi-purpose radar and Thales SMART-L long range surveillance radar.

It's worth noting, that in case of weapons carried by surface ships, their quantity and exact types depends on wishes and choices made by the purchaser, for example Polish Ślężak carries less weapons than the initial project or other similar MEKO constructions.

German company ThyssenKrupp Marine Systems offered a missile frigate MEKO A-300 PL for the Polish Miecznik coast defense ship program. The photo shows a related MEKO A-200 frigate



FT-5 FOR



WB GROUP



GRZEGORZ SOBCZAKI

On August 12, WB Group revealed a number of selected systems and products they will be promoting during this year's International Defence Industry Exhibition MSPO in Kielce. The presentation included an unmanned aerial system FT-5.

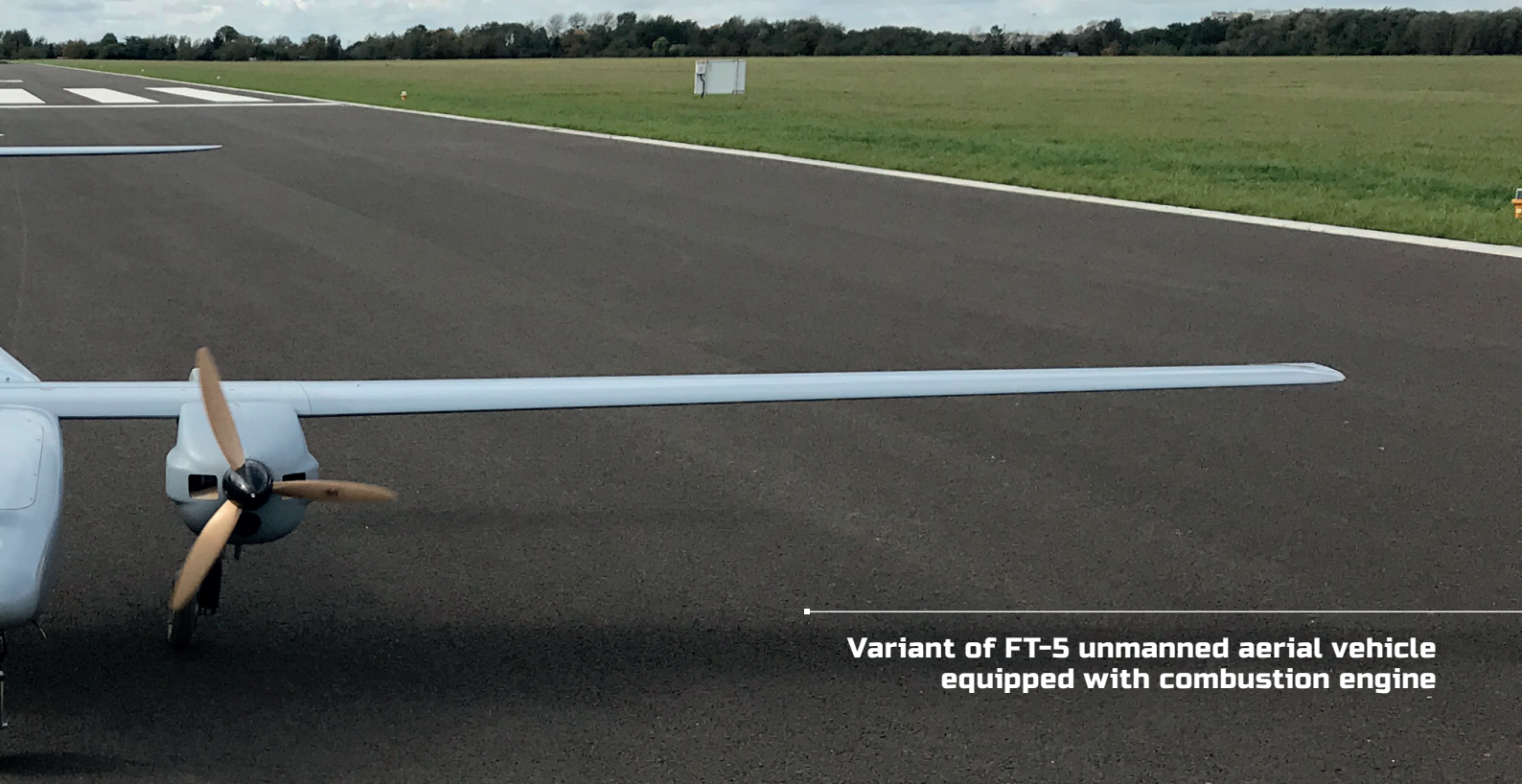
FT-5 design is a response to demands of Orlik Project, from which WB Group was excluded. It can be used for various purposes—reconnaissance and intelligence missions, observation, escorting, monitoring of disasters, or patrolling national borders.

Unmanned aerial vehicle has a wingspan of 6.4 m and length of 3.1 m. It has a take-off weight of 85 kg. FT-5 is designed with three different power plant types, all of them using two engines/motors powering propellers. The first one is electric, capable of staying airborne for four hours.

Another version uses a piston engine with a flight duration of 10 h. Third variant has a hybrid power plant. A piston engine inside the fuselage provides electricity to two electric motors powering propellers. That solution provides flight duration of up to 14 h.

FT-5 with all the listed power plant variants can take off from paved surfaces like a regular plane. The representatives of Flytronic company assure that 100 meters of paved surface will suffice for take off or landing—it doesn't have to be a runway, mere road or parking lot will be

ORLIK PROJECT?



Variant of FT-5 unmanned aerial vehicle equipped with combustion engine

enough. What's more, FT-5 takes off and lands autonomously, requiring no action from the operator during those complicated phases of flight.

Two-engine construction provides a surplus power, allowing FT-5 to reach its maximum ceiling of 5000 m above sea level much faster than competing UAVs with similar purposes. The plane's power plant allows to develop a maximum speed of 155 km/h, though during the missions the vehicle cruising speed is 100 to 110 km/h.

The primary sensor carried by FT-5 is an infrared and daylight

cameras. Camera working in infrared frequencies is cooled, and has resolution of 640×512 pixels. It is capable of 15x optical and 4x digital zoom. Daylight camera has a CMOS sensor with resolution of 3840×2160 pixels. That camera offers 30x optical and 4x digital zoom capabilities. The sensors also include laser rangefinder with a static range of 15 km and range in motion of 10 km, and a laser target pointer.

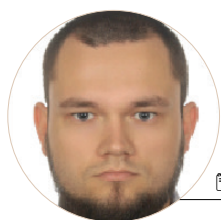
FT-5 can be also equipped with COMINT/ELINT electronic warfare sensors, contamination detectors, and weapons.

Communication systems used by the unmanned aerial vehicle allow for an operational range of 180 km with line of site. The plane can fly autonomously along the predetermined route (even with the loss of radio contact), with the option of modifying it in-flight. When the contact is lost, the plane can either autonomously return back into signal range or land in a predetermined point.

The plane's personnel is composed of four people needed for its assembly and disassembly. The system can be transported in an off-road vehicle.



WISŁA: OFFSET NEGOTIATIONS WITH RAYTHEON AND NORTHROP GRUMMAN FINISHED



RAFAŁ MUCZYŃSKI

Polish Armament Group has finished negotiations and signed executive contracts with Raytheon Missile & Defense and with Northrop Grumman regarding offset agreements accompanying purchase of Patriot anti-air and anti-missile system for the first phase of the Wisła program.

On August 12, Polish Armament Group announced finalization of negotiations and signing executive contracts with Raytheon Missile & Defense and with Northrop Grumman regarding offset agreements accompanying purchase of MIM-104 Patriot PAC-3+ (Post-Deployment Build 8) anti-air and anti-missile system for the first phase of the Wisła program.

The agreements cover eleven offset obligations, primarily regarding capabilities tied to the Wisła program. Signed contracts will secure training and technological support necessary for

expansion of developmental, engineering, and production capacity. That will significantly accelerate modernization of anti-air and anti-missile defense. The contracts will come into force after the Minister Of National Defence signs the offset agreement annex and the Council of Ministers approves it.

Sebastian Chwatek, Chairman Of The Board of Polish Armament Group noted: *Thanks to engagement and cooperation from the Ministry Of National Defence we made a breakthrough and finished the negotiations regarding offset obligations between our partners. I would like to stress that in a good partnership, the sides will always find a way to reach a mutually beneficial agreement. The fruitful collaboration with Raytheon Missile & Defense and Northrop Grumman is another important step on the road of building strong relationships between domestic companies and development of Polish Armed Forces potential.*

Shawn Rantas, director of Patriot For Poland program, Raytheon Missile & Defense added: *Engagement of Raytheon in fulfilling our offset obligations toward Poland was, and remains constant. Thanks to our regular cooperation with the Ministry Of National Defence and Polish Armament Group we reached a favorable conclusion by finalizing the agreement which creates specific, significant perspectives for Polish industry. Thanks to the established relations with Polish suppliers and that agreement, the potential and competences of Polish industry can be better harnessed to ensure the success of the Wisła program. We are eager to move forward with implementation.*

Christine Harbison, vice president and a general director of Combat Systems And Mission Readiness division at Northrop

Grumman said: *Contract with the Polish Armament Group is an expression of Northrop Grumman's efforts to expand sovereign capacities of Polish industry within the framework of technological modernization of Polish Armed Forces. We intend to work closely together with the Polish Armament Group and other licensees covered by the offset program for the Wisła, striving to achieve goals set by Poland for the anti-air and anti-missile defense modernization program.*

Raytheon Missile & Defense offset obligations will be realized in participation with 7 out of 14 companies that compose Polish Armament Group's Wisła Consortium. License agreements between Northrop Grumman and Polish Armament Group are part of a comprehensive offset program managed by Raytheon Missiles & Defense.

According to the contract, Northrop Grumman will provide training and technological support for the Polish Armament Group-Wisła Consortium to expand their engineering and production capabilities in the support of Integrated Battle Command System (IBCS), the key element of the Wisła program. The IBCS system was developed in cooperation with the US Army. It was purchased by Poland from the US Government in 2018 under Foreign Military Sales program.

The Polish Armament Group-Wisła Consortium responsible for realization of the program from the Polish Armament Group side is composed of fourteen entities: Polish Armament Group (consortium leader), Huta Stalowa Wola, Mesko, PIT-Radwar, Military

Electronic Works, Jelcz, Autosan, OBR CTM, WZU, Tarnów Mechanical Works, Military Aviation Works-WZL1, Military Aviation Works-WZL2, PCO, and Military Communication Works No 1. Additionally, some of the unlisted companies belonging to the Polish Armament Group participate as subcontractors.

The Wisła program aims to provide medium-range air defense missile systems with a networked system of communication and command. In the first phase of the program Poland will acquire two batteries (sixteen launchers) of the Patriot system in a configuration that includes PAC-3 MSE missiles and IBCS system. Elements of the batteries, including the launchers, are currently produced in companies belonging to the Polish Armament Group.





Can M-346FA replace Su-22?





✉ JAKUB LINK-LENCZOWSKI
📷 LEONARDO

Light, multi-purpose M-346FA planes could become an inexpensive solution to increase strike potential of the Polish Air Force, persuaded representatives of Leonardo company during the “M-346FA – one body, two souls” virtual seminar.

M-346 Master is used for training military pilots in Poland, Italy, Israel, and Singapore. It is an advanced training plane (Lead-In Fighter Training, LIFT) for teaching procedures and skills necessary for combat operations on military planes. In the Polish Air Force, it is used to train future F-16 C/D Block 52+ pilots.

Leonardo's proposal

According to Leonardo's assurances, the Master's strike variant, M-346 FA (Fighter Attack), can be a light combat plane. That construction is supposed to be a more economical alternative for supersonic attack aircraft. It's supposed to prove itself in performing multiple tasks, supporting more expensive multi-purpose fighters.

Advantage For Polish Air Forces?

M-346 FA is supposed to help modernize the Polish combat

aircraft fleet without seriously impacting the national defense budget. While the Master's combat variant isn't a full-scale supersonic attack aircraft, it is expected to prove itself in a number of tasks. M-346 FA is developed for realization of reconnaissance tasks, digitally aided close air support (DACAS), and limited strikes against air and surface targets, supporting line combat aircrafts.

In Poland, thanks to its integration with F-16 C/D and F-35 A systems, M-346 FA could take over some of their tasks, which should cut down the operational expenses. According to Leonardo's declarations naming it a successor to Su-22, M-346 FA could also provide air support to the Polish Army. Because of its interoperability with NATO systems it could also be used to support joint allied missions.

What about the industry?

During the seminar, Leonardo's representatives assured of the company's intent to harness the Polish industry into the development of the Polish variant of M-346 FA, stressing its numerous shared qualities with the M-346 Bielik advanced training plane already used by the Polish Air Force. Similarity between the two planes would help unification of support and servicing processes, as well as quick transfer of pilots between training and combat versions.

Leonardo attaches great importance to its engagement in Poland. Leonard Poland was created in January 2019, based in Warsaw, and is an active participant in the Polish security and defense industry, cooperating with local businesses, said Marco Lupo,



CEO of Leonardo Poland. This has been strengthened with Leonardo's recognition of Poland as a home market, as is the case with the United Kingdom and the United States, where Leonardo also makes important defense investments. Leonardo perfectly understands the stipulations of the Polish side when it comes to the offset offers, technology transfers and know-how. Therefore, in the modernization programs for the Polish Armed Forces, we offer a number of benefits and active cooperation with Polish industry and scientific and research institutions. The M346FA fighter jet in the Polish configuration is part of this proposal, added Marco Lupo.

Description Of The Construction

During the seminar, Leonardo's representatives emphasized low operational costs of M-346 FA. Digital control system Fly-By-Wire, working in Care-Free mode, prevents exceeding operational limitations derived from the design of wings and engines, which is a big help to pilots and the technicians in regard to costs of exploitation and servicing. M-346 FA parameters were optimized for subsonic flights with up to 0.9 Ma, which are the most suitable for attacking ground targets, avoiding rapid wear of the engines.

The producer also assures that the operational costs of the Polish combat version could be reduced thanks to economy of scale. The training M-346 AJT delivered to the Polish Air Forces will be accompanied by transfers of technology and cooperation with Military Aviation Works WZL-1 regarding their servicing. That support could easily cover the new planes in combat version, and the industrial collaboration could be expanded, including development of the Polish version of M-346 FA.

Technical support is also made easier by HUMS and S-HUMS diagnostic systems, which serve to monitor and accumulate data regarding operation and

An armed M-346 FA can support other types of combat planes



condition of the plane's gear and structure. Ground support system allows for quick estimation of the state of the systems, shortening time needed to detect and solve problems, and performing planned and unplanned servicing tasks.

Equipment and armament of the M-346 FA plane was optimized for the modern battlefield and tasks performed within NATO operations. Leonard Griffio-M346 multiband radar with identification friend or foe (IFF) system has 29 modes of work, seven modes to support air-to-air missions, thirteen to support air-to-surface operations, six for close air engagements, and three for

navigation. The radar can detect, track, and seek any types of targets, above and below the flight pitch, at any altitude. The radio location is characterised by wide scanning range and capability of tracking up to ten targets at the same time in TWS (Track-While-Scan) mode up to 90 kilometers away — 8 of which marked on the multifunction display. Targets are selected with HOTAS switches and helmet-mounted display (HMD). M-346 FA is equipped with Tactical Data Link, capable of sending and receiving information about situation in air and on ground in the plane's zone of operation. TDL provides information regarding

the combat targets, and shares the information about targets detected by the plane's sensors with allied aircrafts and ground units.

Safety, survival, and self defense are enhanced by Defensive Aid Sub-System (DASS), which includes radar warning receiver (RWR), missile approach warners (MAWS), chaff and flare launchers, and systems that reduce radar signature of the plane, decreasing detection chance.

Critical systems and construction elements are doubled: two engines, two sets of independent accessory drive systems, quadrupled electronic flight control system Fly-By-Wire

After their tests in requested configuration, M-346 FA can be delivered to their first user still in 2021



(FBW), two separate hydraulic and electric systems, two batteries ensuring 30 minutes of flight in emergency situations. Additionally, for the flight safety, the plane is equipped with an autonomous extinguisher in engine compartments and auxiliary power units. The vehicle is also fitted with a Pilot Activated Recovery System (PARS) capable of leveling the plane automatically.

The plane is capable of being refueled mid-flight, which combined with capability of carrying external fuel tanks extends operational range and flight time, up to seven hours.

Armament And Combat Potential

M-346FA has seven external hardpoints for various types

of weapons and gear, including guided (laser or GPS) and unguided bombs, guided air-to-surface and air-to-air missiles, gun pods, reconnaissance and navigation pods, and ECM systems.

M-346 FA armament can be freely configured in various combinations, including integration with guided medium range air-to-air AMRAAM missiles, active radar guidance system, Inertial Navigation System (INS), and the best available modern missiles, both American and European, such as ASRAAM, Meteor, and Spear—programmable networked long range missiles. Meteor missiles are capable of operating beyond visual range (BVR) with high speed and maneuverability.

For a close range engagement, M-346 FA pilots can use





ASRAAM missiles, which have an advantage of being capable of attacking threats within 360°, basically in any position compared to M-346 FA.

Operational capabilities of M-346 FA are wide, allowing it to function effectively in network-centric environment, hybrid warfare, or full-scale conflict, during close air support missions (CAS, DCAS), forward air control (FAC-A), combat search and rescue (CSAR), battlefield interdiction, (BAI), tactical air support of marine operations (TASMO), airspace defense, intercepting low velocity aircrafts, and reconnaissance (RECCE).



M-346 FA is equipped with seven external hardpoints for various types of weapons and equipment



RAFAŁ MUCZYŃSKI

Bayraktar TB2 Suprise

On May 24, in presence of presidents of Poland and Turkey, Andrzej Duda and Recep Erdogan, Polish minister of national defence Mariusz Błaszczak and CEO of Baykar Makina, Haluk Bayraktar, signed a contract for purchase of Bayraktar TB2 unmanned combat aerial vehicles produced by Baykar company. The deliveries will be taking place between 2022 and 2024. The signed agreement also covers deliveries of MAM-L and MAM-C precision munitions, SAR radars, simulators, training and logistic support, and spare parts.

The purchase was announced two days earlier, on May 22 when the Polish minister of national defence Mariusz Błaszczak revealed incoming purchase of 24 Bayraktar TB2 (Taktik Blok 2) combat and reconnaissance unmanned aerial vehicles armed with anti-armor guided missiles, produced by Turkish company



Baykar Makina. It was confirmation of earlier information from May 19, which showed a picture of those drones with Polish Airforce markings.

The contract covers delivery of four sets of Bayraktar TB2. Each set is worth approximately \$67 million (approximately 246 million złoty). Each set contains

six armed Bayraktar TB2 drones. Polish Armed Forces will receive a total of 24 UCAVs. The contract also includes delivery of ground control stations, ground data terminal, SAR multipurpose radars with active electronically scanned array (AESA), simulators, and supply of spare parts.

Tested On Battlefield

The Ministry Of National Defence notes that the purchased planes have worked well in actual combat situations – Turkey used them during military operations in the Middle East and Africa. It was stressed that the Polish

industry doesn't manufacture comparable unmanned aerial vehicles. The deliveries of the first Bayraktars will begin in 2022.

Turkey used those drones in reconnaissance operations in Syria and Libya, and recently while supporting Azerbaijan in the second war with Armenia over Nagorno Karabakh. Azerbaijani Bayraktar TB2 were also used during the conflict. Azerbaijani drones supposedly destroyed Armenian T-72 tanks, BMP-1 and BMP-2 tracked infantry fighting vehicles, as well as 9K33 Osa, 9K35 Striela-10, and two S-300 PS anti-aircraft batteries. On October 19 one of the Azerbaijani Bayraktar was shut down by Armenians. One Ukrainian drone was performing reconnaissance flights over Donbas, provoking public Russian protests.

Surprise Contract

The Ministry Of National Defence hasn't revealed the formal procedure behind the selection and purchase of the planes. Unofficially, the talks with Turkey were supposedly taking place since November last year. Neither Operational Center nor Armament Inspectorate of the Ministry Of National Defence answered the MILMAG questions.

On April 13 2021, during the session of the parliamentary national defense committee, Wojciech Skurkiewicz, Ministry Of National Defence secretary of state, informed the deputies of the plans to purchase 15 sets of medium-range unmanned aerial vehicles for the Gryf program, and four sets of medium-altitude long-range

(MALE) for the Zefir program. Turkish drones are closer to operational parameters of the first program, though the producer advertises them as MALE grade UAV.

Another unknown is where they will be stationed. There are 15 sets of Orbiter 2B drones at the 12th Unmanned Aerial Vehicles Base in Miroslawiec. On the other hand, the 32nd Air Force Base in Łask will hold American drones according to Poland-United States Enhanced Defense Cooperation Agreement signed on August 15, 2020.

Bayraktar TB2 Capabilities

Turkey currently utilizes over 160 Bayraktar TB2 unmanned combat aerial vehicles. Their introduction to service started in 2014. In

Bayraktar TB2 perform their start and landing completely autonomously while the flights are partly autonomous with the help of autopilot



2019 their first Bayraktars were received by Katar and Ukraine, in 2020 Azerbaijan. They were also received by the Libyan Government Of National Accord and pro-Turkish North Cyprus.

The drone has 6.5 meter of length, with a wingspan of 12 meters. Bayraktar TB2's starting mass is 630 kilograms. It is propelled by a single 100 horsepower (75 kW) Rotax 912 piston aircraft engine. It allows the plane to reach a top speed of 222 kph and maximum altitude of 8240 meters. Bayraktar has a maximum range of 150 km, flight endurance of 27 hours and 3 minutes. Bayraktar TB2 is capable of fully autonomous start and landing, and the flight is part-autonomous with the help of autopilot. It can carry up to 150 kilograms of payload, including up to 75 kilograms of weapons. Its fuel tanks can hold 300 dm³ of fuel.

Four hardpoint can carry laser-guided Roketsan MAM-L precision munitions weighing 22.5 kg and 8 km range, laser-guided MAM-C weighing 8.5 kg and similar range of 8 km, or four 120-mm anti-armor laser-guided Tübitak SAGE Bozok missiles, with mass of 16 kg and range of 6 km. There were also tests involving the Roketsan L-UMTAS/

Mizrak- (Uzun Menzilli Tanksavar Sistemi) guided long range anti-armor missile, with caliber of 160 mm, weight of 37.5 kg, and range of 0.5 to 8 km.

It is worth noting that since October 27 2020 Canadian company Bombardier Recreational Products stopped deliveries of Rotax 912 engines to Turkey. Those engine units are produced by Austrian Rotax company, which is a subsidiary of Bomber Recreational Products. It is possible that this issue will be solved by Ukrainy, which not only purchased Bayraktars but will also be their co-manufacturer.

Bayraktar TB2 is equipped with an optoelectronic unit with visible light camera, IR-based thermovision camera, laser finder, and laser target pointer, which can be replaced by a multipurpose radar with active electronically scanned array. Recently, Canadian optoelectronic units L3 Harris Wescam MX-15D were replaced with Turkish Aselsan CATS EO/IR/LD.

Serbia and Morocco made their purchase orders for Bayraktar TB2. Their interest in the drones also showed Bulgaria, Hungary, and Kazakhstan. Poland is the first NATO country to become foreign user of Bayraktar TB2.

Polish Minister Of National Defence Mariusz Błaszczak informed about purchase of 24 Bayraktar TB2 unmanned combat and reconnaissance aerial vehicles, produced by Turkish Baykar Makina company

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