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MISSILE DEFENSE AND POLISH SECURITY

ABSTRACT The purpose of the article is to present the multifaceted issue that is missile defense in the context of Polish safety. The fact that Poland is a member of NATO, but also its geographical location and the nature of potential security risks, mean that its position in terms of missile defense is not equivalent to that of other countries. In the case of Poland, we are dealing with plans to create a broadly understood air defense system; a compromise solution, the result of irreconcilable requirements, in which missile defense will be just one of many tasks rather than a priority.

Key words: Poland, missile defense, air defense, modernization

Missile defense is generally associated with installations whose purpose is to intercept enemy missiles following a ballistic path towards a defended territory. However, in reality it is a much broader, multifaceted issue, especially when considering the safety of a specific country. In the case of Poland it is influenced by, on the one hand, the political benefits resulting from participation in the BMD initiative and, on the other end of the spectrum, providing the armed forces with the capability to counteract and prevent security threats.

In order to present the nature of missile defense in the Polish reality, the article will focus on information concerning the United States national missile defense strategy, whose purpose is to locate and neutralize potential threats, with particular emphasis on the Aegis Ashore site which is being constructed in Poland, and existing and potentially fruitful areas of cooperation between European allies in the context of this issue. The author will also present arguments which dispel the myth that the installation, in its planned form, could pose a threat to the safety of the Russian Federation or defend Polish territory from the threat of Russian ballistic missiles located in the Kaliningrad Oblast.

The paper also contains information on Russian means of air attack, whose proximity to the Polish border necessitates the creation of a national defense system; a system which would differ in its nature from other such systems found in European countries. Different conditions mean that Poland is creating a missile defense system in which missile defense is just one of many elements. Even if the threat was limited to just this form of attack, using the system to intercept incoming missiles is only one of many means of defense. Others include: creating unfavorable conditions which limit the enemy's capability of using this means of attack (bearing in mind political, economic and military repercussions), deployment of the armed forces and the creation of a warning network which would hinder the enemy's capabilities or numerous options centering on the idea that the defender should target the archer, not the arrow.

MISSILE DEFENSE IN THE STRATEGY OF NATO AND CHOSEN MEMBER STATES

In its strategic concept from 2010 the North Atlantic Treaty Organization recognized missile defense as one of its fundamental responsibilities.[1] The document states that the proliferation of ballistic missiles creates a real and growing threat for countries in the Euro-Atlantic area. Additionally, the development of capabilities to defend societies and territories from ballistic attacks is considered a fundamental element of collective defense.[2] What is more, the document highlights that the intention of the allies was to cooperate in this area with non-NATO entities, especially Russia.

A decade later one may get the impression that the purpose of this new, collective task was to confirm the need for an intergovernmental entity at a time when the alliance appeared to be past its prime. For those who criticized the organization's excessive involvement, an unconvincing justification for its continued existence was the necessity to carry out interventions outside the treaty area. Focusing on the defense of member states, if only momentary and declarative rather than factual, from a new, or rather rediscovered, threat, cut the dispute on whether to use geographical or functional categories in the effort to provide security. The response to the threat of ballistic missile attacks coincided with the expectations of those who viewed NATO as entity limited to the defense of the territory of its members. At the same time, forces capable of conducting *out of area* interventions were required in order to effectively counteract threats and eliminate their sources.

It must be stated that the new strategy concept was approved in conditions which differ from the current state of affairs. Once again, after the war with Georgia, rela-

1 *"Active Engagement, Modern Defence". Strategic Concept for the Defence and Security of the Members of the North Atlantic Treaty Organization. Adopted by Heads of State and Governmentat at the NATO Summit in Lisbon 19-20 November 2010*, at <http://www.nato.int/strategic-concept/pdf/strat_concept_web_en.pdf>.

2 Ibid., pp. 10, 16.

tions with Russia were at a crossroads. The member states considered the possibility of maintaining a limited partnership with their old rival, ignoring Putin's statement in Bucharest,[3] which were a direct announcement of future aggressive actions.[4] The first protests of the 'Arab Spring' – both the result of and the reason for the instability near the NATO borders, whose effects and the conclusions drawn in response forced the allied states to once again consider their actual capabilities[5] – broke out one month after the concept had been announced. This was to be followed by the annexation of Crimea and Russian intervention in Syria.

Briefly put, the project aiming to protect Europe from the threat of ballistic missiles comprises the creation of a common system of command (particularly the "Command and Control Battle Management and Communication – C2BMC" program at Ramstein Air Base in Germany) and voluntary forces declared by member states, with particular importance given to the American contribution in the form of the "European Phased Adaptive Approach" (EPAA) program.[6] *The program consists in projects realized on the territories of other member states, such as, for instance, the installation of a AN/TPY-2 Surveillance Transportable Radar in the Turkish city of Kürecik, approximately seven hundred kilometers to the west of the Turkish-Iranian border. The ability to detect incoming ballistic missiles is enhanced by the distribution of four American Arleigh Burke-class destroyers, equipped with a new version of the Aegis Combat System software, at Naval Station Rota, in the southern part of the Atlantic coast of Spain. These warships, equipped with Standard Missile-3 (SM-3) Block I (A and B)* missiles, designed with the objective of intercepting ballistic missiles with a range of up to three thousand kilometers,[7] conduct systematic patrols in the southern part of the Mediterranean Sea.[8]

As the expansion of the European part of the missile defense program continued, two Aegis Ashore installations, a land equivalent of the anti-missile destroyers, were commissioned. The first was built in the Deveselu commune in Romania and became operational on 12 May 2016. The following day another installation was launched in Redzikowo, a village located near the city of Słupsk, Poland, which is to be completed in 2018.[9] The installations are not identical. The Deveselu installation operates on an older version of Aegis BMD 5.0 CU compatible with SM-3 Block IB missiles, while the

3 A. Gheciu, "Transcending Old Divisions? NATO and Russia after the Cold War", *Politique Américaine*, no. 13 (2009), pp. 50-52, at <http://dx.doi.org/10.3917/polam.013.0037>.

4 P. Bajor, "Integracja Ukrainy i Gruzji z NATO. Implikacje dla jedności Sojuszu Północnoatlantyckiego", in J. Cisek (ed.), *Współczesne relacje transatlantyckie*, Kraków 2010, p. 126.

5 I. François, "NATO and the Arab Spring", *Transatlantic Current*, no. 1 (2011), p. 5.

6 *NATO Ballistic Missile Defence*, NATO Fact Sheet, July 2016, at <http://www.nato.int/nato_static_fl2014/assets/pdf/pdf_2016_07/20160630_1607-factsheet-bmd-en.pdf>, 18 August 2017.

7 "Standard Missile-3: Beating Ballistic Missiles on Land and at Sea", Raytheon, at <http://www.raytheon.com/capabilities/products/sm-3/>, 18 August 2017.

8 R. Ellison, "A Primer on American Missile Defense", *American Foreign Policy Council Defence Dossier*, no. 19 (2017), pp. 16, 18.

9 "Key Missile Defence Site Declared Operational", NATO, 12 May 2016, at <http://www.nato.int/cps/en/natohq/news_130721.htm>, 18 August 2017.

one located in Redzikowo will be based on version 5.1 and the SM-3 Block IIA missile, which can intercept faster targets with a greater range, at higher altitudes.[10] Both bases will contain a vertical launching system (VLS), comprised of three cells, each one consisting of eight levels, and containing 24 missiles in total.

It is worth noting that the Aegis land installation provides a far greater guarantee of security for its host country than the presence of warships with a similar system, creating the impression of stability and continuous involvement. However, as will be mentioned later on, this does not mean that it is a more effective solution.

The distribution of the means of detecting and intercepting presented above, especially data concerning the geographical locations in which effectors in the form of *interceptor* missiles of a particular kind may potentially be fired, clearly suggests, in contrast to political statements and official documents, that the entire 'system of systems' was designed in order to counteract MRBM attacks launched from the Middle East. There are at least three countries in this area, namely Iran, Israel and Saudi Arabia, which are in possession of medium-range ballistic missiles. With the exception of Iran, the countries are recognized as partners in terms of security by NATO.[11]

It is worth noting that the EPAA program was met with resistance in some countries. For instance, Turkey was reluctant to accept a radar installation whose primary task was the early detection of ballistic missiles launched from Iran's territory in the direction of Europe. However, Turkish policymakers ultimately decided that the installation would be a means of accessing data and technology which would facilitate the creationof a national air defense system, including missile defense.[12]

Germany presents yet another approach to this problem; in 2013 it was decided that there is no foreseeable threat of an air or missile attack on German territory.[13] This statement is confirmed by events taking place at the time: Germany's gradual disposal of air defense measures in the form of limiting the number of Patriot batteries, withdrawal of the short range launcher and maintaining residual short range air defense capabili-

[10] Until now (August 2017) two attempts have been made by Aegis BMD 5.1 using the SM-3 Block IIA missile to intercept a target imitating the MRBM, the first of which proved successful and the second ended in failure. The software is to become fully functional by September 2018. "Next Generation Aegis Ballistic Missile Defense System Successfully Engages Medium Range Ballistic Missile Target", PR Newswire, 6 February 2017, at <http://www.prnewswire.com/news-releases/next-generation-aegis-ballistic-missile-defense-system-successfully-engages-medium-range-ballistic-missile-target-300402437.html>; A. Panda, "Missile Defense Blues: SM-3 Block IIA Fails Second Intercept Test", *The Diplomat*, 23 June 2017, at <http://thediplomat.com/2017/06/missile-defense-blues-sm-3-block-iia-fails-second-intercept-test/>, 18 August 2017.

[11] M. Dickow et al., "Germany and NATO Missile Defence. Between Adaptation and Persistence", *SWP Comments*, no. 22 (2016), pp. 3-4.

[12] B.C. Göynü, "Current Ballistic Missile Defense Program and Discussions in Turkey. NATO Missile Defense System and Turkey's Stance", IFAR² Fact Sheet, January 2013, at <https://ifsh.de/file-IFAR/pdf_english/NATO%20BMD%20and%20Turkey%20-%20IFAR%20FactSheet3.pdf>, 18 August 2017; A. Bermant, *The Russian and Iranian Missile Threats. Implications for NATO Missile Defense*, Tel Aviv 2014, pp. 53-54.

[13] B.C. Göynü, "Current Ballistic Missile Defense Program..."; A. Bermant, *The Russian and Iranian...*, pp. 53-54.

ties, useful mainly in expeditionary missions. Germany's continued missile defense capabilities in the form of Patriot batteries and steps taken post-2014, with the goal of creating a modern air defense system, are considered the result of NATO commitments rather than the necessity to defend the country's territory. Theoretically speaking, our western ally could potentially be under threat from ballistic missiles with a range of three thousand kilometers launched from Iran's territory or missiles with a range of five hundred to one thousand kilometers fired from the Kaliningrad Oblast. However, the widespread view among German experts is that, in the near future, Iran will not be capable of constructing such long-range missiles. On the other hand, according to German politicians, the threat of Russian aggression is limited to the territory of the former USSR and countries of the Soviet bloc.[14] This is why the potential beneficiaries of the German anti-missile capabilities are to be primarily the allied countries of the south and east of Europe.

Spain, where a group of American warships are stationed at Naval Station Rota, has a squadron of five F-100 class air defense frigates (also known as the Álvaro de Bazán class of frigates), which are also equipped with the more advanced Aegis system. Although these warships, in the current configuration of combat systems, are not capable of shooting down ballistic targets, their potential for modernization means that if a decision was made to adapt them to this task, they would only be inferior to American units out of all the NATO forces.[15] It should be noted that other NATO members also have a number of warships that could, in theory, also be modernized to aid in BMD.[16] These countries include, among others, Great Britain (six type 45 destroyers), Norway (five Fridtjof Nansen-class frigates),[17] Holland (four LCF-class frigates), Germany and Denmark (three F124 and Iver Huitfeldt-class frigates each), France and Italy (two units of the Horizon/Orrizonte type each). There are thus currently thirty warships in the possession of European NATO states which could theoretically serve as mobile platforms tracking and intercepting incoming ballistic missiles. The Spanish units mentioned above and a number of the Dutch ships already have such capabilities.[18] Several other states have considered or declared the need to adapt their naval and com-

[14] Ibid., p. 30. Also: J. Gotkowska, "Obrona powietrzna RFN – problemy i perspektywy rozwoju", *Komentarze OSW*, 10 April 2013, at <https://www.osw.waw.pl/pl/publikacje/komentarze-osw/2013-04-10/obrona-powietrzna-rfn-problemy-i-perspektywy-rozwoju>, 18 August 2017.

[15] "The Transatlantic Aegis Partnership", Lockheed Martin, 7 April 2014, at <http://www.lockheedmartin.com/us/news/features/2014/140407-mst-the-transatlantic-aegis-partnership.html>, 19 August 2017. Also: S.J. Lipiecki, "Hiszpańska tarcza Aegis – fregaty rakietowe typu Alvaro de Bazán", *Nowa Technika Wojskowa*, no. 1 (2017), pp. 88-98.

[16] P. Dodge, M. Ziemke, "NATO Ballistic Missile Defence", in Y. Alexander, R. Prosen (eds.), *NATO. From Regional to Global Security Provider*, Lanham 2015, p. 165.

[17] The Norwegian frigates, built in Spanish shipyards, have common roots with the F-100 project. Just like their 'cousins' they are equipped with the Aegis system, but in a simplified version, and carry more modest weaponry.

[18] Ch.P. Cavas, "US Carries Out First Live BMD Intercept in Europe", Defence News, 20 October 2015, at <https://www.defensenews.com/breaking-news/2015/10/20/us-carries-out-first-live-bmd-intercept-in-europe/>, 19 August 2017.

mand systems to meet BMD requirements. Interestingly, such announcements have been made numerous times since the mid-2000s but with no observable effects.[19] According to preliminary information, the first European NATO country that may come into possession of exoatmospheric interceptor missiles is Belgium, which plans to obtain two frigates armed with such projectiles by 2030.[20]

A different attitude to the issue may be observed in the case of Poland and Romania; the two NATO countries which decided to provide territory for the Aegis Ashore installation. As allies of the United Stated, as is the case with other European NATO members, they may receive threats of missile attacks from state or non-state – assuming the latter have such capabilities – Middle Eastern or North African actors of international relations. In comparison to their Western European partners, however, the main security threat for these two countries is believed to be the aggressive and expansionist policy of the Russian Federation, which repeatedly and, it seems, against its own interests, attempts to prove to the world that it is a global power that does not need to concern itself with its neighbors. Even if one were to apply the previously described somewhat reactionary views of German strategists and politicians to describe the security situation in Poland and Romania it is clear that as NATO border states, previously in the sphere of influence of the USSR, their position differs from that of other European countries. Although the Romanian situation will not be further analyzed in this paper, it is worth noting that the country's attempts to obtain appropriate military capabilities, bearing in mind its needs and defense budget, mirror those of Poland.

The configuration of the Aegis Ashore installation which is under construction in Poland has been optimized to intercept individual missiles. Although it is capable of all-around defense in the case of such threats, it would definitely be more effective when intercepting IRBM and MRBM from the Middle East and potentially, after future modifications, ICBM launched from East Asian countries, such as China[21] or

[19] Interestingly, another 'surge' of assurances about the adaptation of ship systems to the needs of BMD took place at the end of 2016. At that time Germany began to announce such plans, whereas Denmark and Norway, the latter of which had previously been reluctant to invest in missile defense, began to conduct analyses in this direction. "German Navy to Modernize its F124 Sachsen-class Frigates with New Radar to Join NATO BMD", Navy Recognition, 23 December 2016, at <http://www.navyrecognition.com/index.php/news/defence-news/2016/december-2016-navy-naval-forces-defense-industry-technology-maritime-security-global-news/4719-german-navy-to-modernize-its-f124-sachsen-class-frigates-with-new-radar-to-join-nato-bmd.html>, 19 August 2017; D. Wasserbly, R. Scott, "Royal Danish Navy Sets SM-2 Buy as Priority, Mulls Frigate BMD Upgrade", Jane's 360, at <http://www.janes.com/article/65700/royal-danish-navy-sets-sm-2-buy-as-priority-mulls-frigate-bmd-upgrade>, 19 August 2017; "Russia Threatens Norway to Stay Out of NATO Missile Defense", Atlantic Council, 21 March 2017, at <http://www.atlanticcouncil.org/blogs/natosource/russia-threatens-norway-to-stay-out-of-nato-missile-defense>, 19 August 2017.

[20] "Future Belgian Navy Frigates May Have Ballistic Missile Defense Capabilities", Navy Recognition, 5 January 2015, at <http://www.navyrecognition.com/index.php/news/defence-news/2017/january-2017-navy-naval-forces-defense-industry-technology-maritime-security-global-news/4766-future-belgian-navy-frigates-may-have-ballistic-missile-defense-capabilities.html>, 18 August 2017.

[21] "Missiles of China", Missile Threat, at <https://missilethreat.csis.org/country/china>, 21 August 2017.

North Korea.[22] To enable such capabilities it would most probably be necessary to find suitable locations for the construction of early-warning radars in Central Asia.[23]

In Polish discussions on the subject of security, the threat of missile attack is automatically associated with Russian SRBM, or, to be more precise, the 9M723 missile used in the Iskander system (NATO designation: SS-26 Stone). The declared range of the missile is under 500 kilometers, in accordance with the INF Treaty. However, some analyses suggest that this may not be the case in reality. These arguments stem from the fact that the range specified in the treaty applies to missiles moving on a lower, endoatmospheric trajectory below 50 kilometers and with a heavy, 700-kilogram warhead. According to calculations a lighter (for example, nuclear) warhead and an optimal (partially exoatmospheric) trajectory may increase the range to as much as 750 kilometers.[24] The missile may move on the aeroballistic track, which means that after reaching the highest point of the trajectory it may perform maneuvers such as sudden altitude or course correction.[25] The Iskander class of ballistic missiles are generally known for their capacity to overcome enemy air defense systems. To the benefit or Russian propaganda they are portrayed as an answer to the construction of missile defense systems under the EPAA. In the context Poland and Romania are mentioned as targets of attack.[26]

Upon examining the basic characteristics of the missile it is clear that the Aegis Ashore system, in its current form, would be almost completely ineffective against it. Chiefly because its effectors in the form of SM-3 class missiles were designed to destroy ballistic missiles or heads carried by them outside the atmosphere. Assuming Iskander were to move on an optimal trajectory to achieve a longer range, the apogee of which would be beyond the atmosphere, only then could it be effectively intercepted.

The year 2014 brought a major change: since Russia 'once again' began to pose a threat, the Aegis Ashore installations in Europe were no longer located in a safe sanctuary area, where the distance from the source of danger, in the form of hostile states developing rocket and nuclear programs, meant that ballistic missiles were the only means of carrying out that threat. The characteristics of the SM-3 make it completely useless against other targets, such as a plane or cruise missile.

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[22] Based on official, unreliable information released by the country, there are many indications that the maximum range of Korean missiles allows for an attack on the island of Guam (at a distance of around 3500 kilometers). On the other hand, the distance that Korean missiles would have to overcome to reach the territories of European NATO states is 2000 kilometers shorter than the distance from Korea to the west coast of the USA.

[23] AN/TPY-2 radars were also deployed in the Negev desert in Israel and most probably in Qatar. D. Donald, "TPY-2: Discriminating the Threat", AIN Online, 18 June 2013, at <http://www.ainonline.com/aviation-news/defense/2013-06-18/tpy-2-discriminating-threat>, 21 August 2017.

[24] S. Forss, "The Russian Operational-Tactical Iskander Missile System", *Department of Strategic and Defence Studies Working Papers*, no. 42 (2012), pp. 13-16.

[25] R. Hanifan, *Concise Dictionary of Engineering. A Guide to the Language of Engineering*, London 2014, p. 10.

[26] A. Akulov, "Russian Iskander-M Missile System: Credible Deterrent", *Strategic Culture Foundation*, online journal, 19 September 2016, at <https://www.strategic-culture.org/pview/2016/09/19/russian-iskander-m-missile-system-credible-deterrent.html>, 21 August 2017.

The Russian Federation has a substantial air force which, in addition to multirole combat aircraft, features tactical and strategic bombers – carriers of cruise missiles first used in Syria.[27] 9M728 cruise missiles, with a range under 500 kilometers, installed on the same carriers as ballistic missiles, are equipped with independent rocket brigades with the Iskander-M system and assigned to particular army associations and military districts. The 152nd Missile Brigade stationed at Chernyakhovk, approximately 40 kilometers outside the Polish border, will receive both types of rockets in 2017.[28] Tests are currently being conducted with the 9M729 cruise missile, fired from land launchers, which have a range that rivals that of 3M14 Kalibr-NK anti-ship missiles, and whose entry into service will be a clear violation of the INF Treaty.[29]

The exposure of the actual range of the Kalibr-NK cruise missile and the fact that it can be carried by small ships was one of the biggest surprises in recent years in the field of armaments. What is more, the majority of Russian warships which are currently under construction will be equipped with a similar type of missile. The Russian arms industry boasts the ability to place launching equipment and rocket containers on any missile vehicle capable of transporting a standard 40-foot container.[30] Existing information – undoubtedly made available for propaganda purposes – suggests that the Russian industry is working on hypersonic speed cruise missiles, which, according to some sources, can be fired from sea-based, and possibly even land-based, launchers currently in use.[31]

It appears that Russia is rapidly acquiring the capabilities that will allow it to implement, to a certain extent, its own version of 'Tomahawk diplomacy', a form of military response which employs ballistic and cruise missiles as a means of carrying out limited military operations of strategic importance.[32] In comparison to America, which can utilize aircraft carriers or large ships, Russian capabilities will have limited territorial coverage or limited intensity in the foreseeable future, due to the lack of carriers equipped with precise conventional weaponry with a global range, whose introduction would be

[27] P. Butowski, "Rosyjskie lotnicze pociski manewrujące uderzyły w Syrię", Zespół Badań i Analiz Militarnych, 2015, at <http://zbiam.pl/artyku%C5%82y/rosyjskie-lotnicze-pociski-manewrujace-uderzyly-syrie/>, 21 August 2017.

[28] T. Kwasek, "Operacyjno-taktyczny Iskander", *Nowa Technika Wojskowa*, no. 4 (2017), pp. 38-47.

[29] D. Barrie, H. Boyd, "Slingshot Redux: Russia's Alleged Ground-launched Cruise Missile", Military Balance Blog, 27 March 2017, at <https://www.iiss.org/en/militarybalanceblog/blogsections/2017-edcc/march-f0a5/russias-alleged-ground-launch-missile-0be2>, 22 August 2017.

[30] M. Dura, "Atak na Syrię zaskoczeniem dla NATO. Zmiana w doktrynie rakietowej Sojuszu?", Space24, 8 October 2015, at <http://www.space24.pl/266879,atak-na-syrie-zaskoczeniem-dla-nato-zmiana-w-doktrynie-rakietowej-sojuszu>, 21 August 2017.

[31] "Russia Continues Tests of 3M22 Zircon – Hypersonic Missile Reached Mach 8 Speed", Navy Recognition, 18 April 2017, at <http://www.navyrecognition.com/index.php/news/defence-news/2017/april-2017-navy-naval-forces-defense-industry-technology-maritime-security-global-news/5113-russia-continues-tests-of-3m22-zircon-hypersonic-missile-reached-mach-8-speed.html>, 22 August 2017.

[32] R.A. Pretsch, "Tomahawk Diplomacy and US National Security" (abstract), Research Gate, at <https://www.researchgate.net/publication/37162955_Tomahawk_diplomacy_and_US_national_security>, 22 August 2017.

dependent on the consent of third (transit) countries, which would *de facto* mean their involvement in the role of parties to the conflict.[33]

Due to geographical conditions, the restrictions imposed on the Russian 'Iskander and Kalibr diplomacy' have little effect in terms of reducing the scale of potential missile threat for the territory of Poland.

MISSILE DEFENSE AND THREATS TO POLISH SECURITY

In Polish discussions on the possible forms of hypothetical Russian aggression, representatives of two groups take center stage. The first group, citing examples from the wars previously waged by Russia and the USSR, predicts a mass land invasion, supported by hurricane air and missile attacks, and perhaps supplemented by a landing on the Coast. Although such a scenario cannot of course be completely ruled out, it is worth considering the probability of its occurrence at this point in time, applying the criterion of expediency and assessing the effects that such an undertaking would have on the attacking party. It is difficult to find a potential strategic goal that would justify the inevitable high human, political and economic losses. An adequate NATO response, which would multiply losses in all of these areas, seems highly probable in the event of such an attack. Therefore, from Russia's point of view, this is an unacceptable scenario: a war fought in this manner cannot be won and its expected costs would be an order of magnitude higher than the profits of victory, even if it were possible.

Representatives of the second group argue that the only possible form of military conflict between European countries is a hybrid war, as in the case of Crimea, with the required involvement of 'little green men'. However, reaching a settlement similar to that in Crimea could only take place in exceptional circumstances connected with the presence of significant Russian forces in the country and the aspirations of some Ukrainians to unite the peninsula with Russia coupled with the indifference/indecision of the majority of the population. Such attitudes were also present in among Ukrainian troops stationed on the peninsula. Consequently, it will be difficult for Russia to repeat this success, especially in Poland where there are no demographically strong ethnic minorities. In the foreseeable future it is also unlikely that, using the disinformation mechanisms of the hybrid war, the attitude of the broad masses of Polish society will shift towards a pro-Russian one, which is a key prerequisite for conducting a '*grab and jab*' invasion, as practiced by the Russian Federation.[34]

This, obviously trivialized, presentation of the most frequently constructed scenarios of a hypothetical military conflict between Russia and Poland serves to justify the

[33] In the majority of cases the displacement of naval forces is not subject to legal restrictions and does not require the consent of third countries as opposed to the military use of a neutral country's airspace.

[34] W.A. Mitchell, "The Case for Deterrence by Denial", *The American Interest*, 12 August 2015, at <https://www.the-american-interest.com/2015/08/12/the-case-for-deterrence-by-denial/>, 30 August 2017.

well-known saying that armies are always preparing for past wars. In the first scenario missile defense would not be a priority for air defense, which would be occupied with the protection of its own forces from tactical aviation strikes. In the second scenario it would play no role at all.

As previously noted, in order to create an outline of a coherent and realistic scenario of a potential military conflict, one must first consider its purpose, assess the forces and the strengths and weaknesses of the defender and the attacker, as well as all its consequences. If we allow ourselves to reflect on the reasons due to which interstate military conflicts break out, we find that most of them arise from economic factors. The forces which drive the economy for their own benefit use politics, and when that tactic becomes ineffective: war,[35] which is *an act of violence aimed at forcing the opponent to fulfill our will*.[36]

To present the potential use of missile defense for the territory of Poland, let us assume a scenario in which Russia tries to once again achieve a monopoly in the field of supplying the Polish economy with energy fuels, such as natural gas and crude oil. In the fact of the political will to diversify sources of supply, the Polish market does not react to Russian attempts to reverse the situation with the help of economic and political instruments. A decision is made about the limited use of force, in such a way as to prevent the escalation of actions that will undoubtedly occur if Poland or its allies decide to conduct retaliatory strikes. And so, without gradually increasing the readiness of his armed forces or giving off other signals that could be considered an external manifestation of an increase in tension, the opponent launches a surprising land and sea-based missile attack with the use of ballistic and cruise missiles directed against oil and gas transshipment and transmission installations in northern Poland. The runways of the country's main airbases are also targeted, making it impossible to retaliate. At the same time there is a coordinated cyberattack on information systems managing command centers and critical civil infrastructure, which further increases the scale of damage. In less than an hour after the first cruise missiles are launched the attacker announces, across all available channels, the end of armed operations and his readiness to negotiate. NATO refrains from retaliating: no one wants a war.

NATO has a military advantage and the potential to win. The question remains: at what cost? Retaliatory strikes are likely to lead to further escalation, but will not change the fact that the damage done by the opponent will radically change the strategic position of Poland.[37] Especially if the target were the critical infrastructure, which cannot be quickly and easily rebuilt, particularly the infrastructure intended for receiving and

[35] M. Vego, *Naval Classical Thinkers and Operational Art*, Naval War College, 2009, at <https://www.usnwc.edu/getattachment/85c80b3a-5665-42cd-9b1e-72c40d6d3153/NWC-1005-NAVAL-CLASSICAL-THINKERS-AND-OPERATIONAL-.aspx>.

[36] C. von Clausewitz, *O wojnie*, transl. by A. Cichowicz, L. Koc, Warszawa 2010, p. 15.

[37] Changing, to an even greater extent, without conducting military operations against these countries, the strategic conditions for the functioning of Lithuania, Latvia, Estonia and Finland, and restricting the space of freedom of Belarus.

transporting gas and oil, which would allow for an economy independent from the current monopolist – the Russian Federation.

Of course, the presented scenario may be considered unrealistic, although, as the literature indicates, it may be part of new trends in Russian strategic thought.[38] At this point, the question should be asked whether any other scenario is more likely and carries a lower risk of unleashing a full-scale war, at the same time allowing for negotiations even in the event of a forced return to economic and political cooperation? With its activity in the East of Ukraine, Russia has proven that the goal of its military action may be to destabilize the state, making it an unreliable and uncomfortable partner, in this case for the European Union and NATO. After this strategy was adopted the disputed area became a furnace for the smoldering conflict rather than a prize for Russia. It therefore appears that the enduring myth found in Polish discourse, according to which the potential goal of the opponent will be territorial gains, must be rejected. It seems more likely that Russia would strive for political and economical vassalization or at least Finlandization.[39]

From the point of view of the subject of the article, two conclusions can be drawn from the presented scenario. First of all, an efficient air defense, including missile defense, with a network-centric, decentralized warning and command system, is necessary to repel such an attack. Secondly, the American Aegis Ashore installation under construction in Redzikowo could, in its planned form, cooperate with the Polish air defense only as a link in the warning network, without the possibility of directing its fire against the threat.

As of yet it is difficult to say whether the US, in reaction to the new circumstances, will decide to augment the Aegis Ashore installations with new capabilities, although there have been reports that this is debated.[40] The necessary technical conditions are certainly in place, since the US Navy has a whole range of surface to air missiles on its ships with the Aegis system, not to mention the newest, avant-garde SM-6[41] or the ESSM, used for air defense at a distance of 50 kilometers with four missiles carried in every cell. The land-based missile defense system in Redzikowo will be controlled by a BMD 5.1 combat system featuring Baseline 9 software. Therefore, even in its basic version, solutions similar to those found in highly modernized US and Japanese naval vessels, including the SM-6, can already be implemented.[42] In order to add new capa-

[38] K. Ven Bruusgaard, "Russian Strategic Deterrence", *Survival: Global Politics and Strategy*, vol. 58, no. 4 (2016), pp. 13-14, 20, at <https://doi.org/10.1080/00396338.2016.1207945>.

[39] "Finlandyzacja", Stosunki międzynarodowe, at <http://stosunki-miedzynarodowe.pl/slownik/52-f/1234-finlandyzacja>, 23 August 2017.

[40] J. Palowski, "'Tarcza' w Redzikowie z obroną przeciwlotniczą. Odpowiedź na groźby Rosji?", Defence24, 9 May 2016, at <http://www.defence24.pl/365837,tarcza-w-redzikowie-z-obrona-przeciwlotnicza-odpowiedz-na-grozby-rosji>, 23 August 2017.

[41] A new generation of missiles against aircraft and ballistic missiles, but also mobile targets on land and sea.

[42] L. DeSimone, *Aegis BMD; The Way Ahead*, 6 December 2011, at <https://ndiastorage.blob.core.usgovcloudapi.net/ndia/2011/PEO/DeSimone.pdf>, 23 August 2017.

bilities to the set, the number of MK 41 Vertical Launching Systems (with eight cells each) would have to be increased. This should not pose a problem, as Spanish frigates all carry 6, American destroyers 12 and cruisers 16 such systems. On land, the weight of the additional launcher and finding the space to install it are no longer a problem. A lesser challenge is to provide electricity and an efficient cooling system.

Achieving these new capabilities therefore depends on the political decisions of the American administration and the allocation of appropriate funds by Congress rather than technical conditions. Such a decision would most certainly be met with loud Russian protests and with the resistance of some congressmen.[43] At the same time, it is a kind of test assessing the reality of US declarations on the willingness to defend its European allies from the threat of missile attacks.

One of the biggest challenges in terms of modernizing the Armed Forces is the reconstruction of Polish air defense. The "Air Defense System" program was one of 14 priority projects which appeared in the "Technical Modernization Plan of the Armed Forces of the Republic of Poland".[44] It was assumed that by 2022 the following items would be procured:

- Wisła medium range air defense systems;
- Narew short range air defense systems;
- Poprad self-propelled air defense systems;
- Grom/Piorun mobile air defense systems;
- Pilica short range artillery-missile air defense systems;
- Soła/Bystra mobile three-coordinates radio stations.

It was also emphasized that there would be funds for missile defense as part of the air defense expenditures.[45] Materials published at the time confirm plans to purchase six Wisła air defense systems, *capable of striking air targets at a distance of up to 100 kilometers and capable of intercepting ballistic missiles*, and eleven Narew batteries, to combat aerodynamic targets equipped with effectors with a range of 25 kilometers.[46] However, with time these plans were modified and, from 2016 onwards, refer to the procurement of eight mid-range and nineteen short-range batteries. In the case of the latter, it is currently not excluded that the acquired effectors will have a range of up to 40-50 kilometers.[47]

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43 More information on the subject of Russian objections and the American view on missile defense in the text of Tomasz Pugacewicz.

44 *Uchwała nr 164 Rady Ministrów z dnia 17 września 2013 r. w sprawie ustanowienia programu wieloletniego 'Priorytetowe Zadania Modernizacji Technicznej Sił Zbrojnych Rzeczypospolitej Polskiej w ramach programów operacyjnych'*, M.P. 2013, poz. 796.

45 Ibid., p.12.

46 *Plan Modernizacji Technicznej Sił Zbrojnych w latach 2013-2022*, at <http://dgrsz.mon.gov.pl/y/pliki/rozne/2013/09/program_uzbrojenia_5_sierpnia.pdf>, 24 August 2017.

47 J. Palowski, "Narew z opóźnieniem. MON: Nie zakończono analiz", Energetyka24, 14 February 2017, at <http://www.energetyka24.com/547176,narew-z-opoznieniem-mon-nie-zakonczono-analiz>, 28 August 2017.

The plan did not include the acquisition of missiles with a range of several hundred kilometers, capable of intercepting American THAAD-class ballistic missiles, in the upper layers of the atmosphere or outside it. No compromise was sought in terms of costs, in the form of a system such as the Israeli Arrow 2, whose effectors are supposedly designed to destroy incoming missiles at a distance of 100 kilometers and a height of 60 kilometers,[48] parameters which appear to be optimal for shooting down aeroballistic Iskander missiles on route, before they start performing maneuvers in the terminal phase.

The reason seems obvious: first and foremost Poland seeks to obtain weaponry to combat the numerous aerodynamic means of air assault, such as airplanes and helicopters, cruise missiles and unmanned platforms carrying weapons and means of reconnaissance. The name of the modernization program itself confirms this: an air defense system, in which missile defense is only one of many elements. This statement can also be confirmed by the fact that the acquisition of a Narew short-range system, whose purpose is to combat aerodynamic threats, was briefly considered in 2016.[49] From a statistical point of view the threat posed by ballistic missiles, though unmistakably real, is less significant than that posed by other airborne means. If the *Pareto principle*[50] is applied to the challenge that is providing Poland with sufficient air defense, it appears that a sensible distribution of funds, which represent a fraction of those required for the purchase of the most advanced anti-aircraft and anti-missile systems, will create, if not a 'shield', then at least a good quality 'sieve' with the ability to stop most attacks. At this point one may ask the following question: how many missile sets with what type of parameters should be deployed on Polish territory to recognize the degree of defense they provide as good or very good?

Israel, with its comprehensive, continuously expanding missile defense, with which it is still not sufficiently satisfied, further protected by American destroyers sent out on patrol from the Spanish base, has an area similar to that of the average Polish voivodship (province), half of which is taken up by the Southern District in the Negev desert, where there are no major urban centers. The defense systems of the not-so-large United Arab Emirates or the tiny Qatar, which in both cases is said to consist of 2 THAAD batteries and 9-11 Patriot batteries, is still considered insufficient by some analysts.[51]

Dedicated anti-missile systems, such as THAAD and Arrow, and especially their radiolocation stations, have dimensions and mass which hinder their fast displacement and occupying new battle stations, which disqualifies them in front-state conditions,

[48] M. Niedbała, "Zintegrowany system obrony powietrznej – wydanie izraelskie", *Nowa Technika Wojskowa*, no. 4 (2017), p. 84.

[49] J. Graf, "'Skupimy się na korekcie istniejących programów modernizacyjnych'. Kownacki dla Defence24.pl o reformie zakupów dla Sił Zbrojnych", Defence24, 29 April 2016, at <http://www.defence24.pl/sily-zbrojne/skupimy-sie-na-korekcie-istniejacych-programow-modernizacyjnych-kownacki-dla-defence24pl-o-reformie-zakupow-dla-sil-zbrojnych>, 26 August 2017.

[50] The 80/20 principle states that by engaging 20% of available funds in identified key areas 80% of possible goals can be achieved. W. Samuels, *Pareto on Policy*, New York 2017.

[51] M. Czajkowski, *Obrona przeciwrakietowa w stosunkach międzynarodowych*, Kraków 2013, pp. 172-173.

with a wide range of means of destruction available to the opponent.[52] It should be remembered that air defense installation are usually the first target during an attack, and their destruction allows for freedom of action on the battlefield.

This problem is even more apparent when considering the possibility of deploying our own stationary Aegis installations or similar means of defense, which is a feasible and financially viable solution. The example of Japan, whose ships have already been equipped with this system, with future plans to acquire the land version, demonstrates that in some geographical conditions this may be the most beneficial form of defense.[53] One land system can replace several ships, releasing them from their function as sentries and allowing for more flexible handling of resources.[54] In Japan there are no contraindications for the deployment of stationary installations, because its territory is a sanctuary which cannot be easily accessed by the opponent. Despite highly optimistic assumptions towards the end of the 2000s, this is simply not the case in Poland and Romania.[55] Of course, the main weapon of the hypothetical Aegis installation in Poland would have to be dual-purpose endoatmospheric missiles: against ballistic and aerodynamic targets, SM-6 class or better, with a long range and high trajectory. Their supplementation with SM-3 missiles would be beneficial for allied countries lying further away from the source of the threat, since shooting down incoming missiles in the *ascent* phase (the portion of the flight that begins after powered flight and ends just prior to apogee) is considered optimal. Along with the need to increase their number, expanding the assortment of available missiles would result in higher prices for a single set without removing the defect that comes with transferring it to land – no possibility of repositioning. The challenge would be to find a suitable location for a base which could utilize the benefits of both types of interceptor missiles.

In Polish conditions, it was decided that a three-story anti-aircraft defense would be constructed, the highest of which will be protected by medium-range missiles, the only ones which are, to some extent, capable of countering attacks using ballistic missiles.

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[52] For instance, deployment of the 60-ton ELM-2080 Green Pine radar from the Arrow set at a new operational site requires less than 24 hours. M. Niedbała, "Zintegrowany system...", p. 83.

[53] The cost of a single installation is estimated at 730 mln USD (80 billion JPY). "Japan Plans Installation of Land-based Aegis Missile Defense System Amid North Korea Threats", *The Japan Times*, 17 August 2017, at <https://www.japantimes.co.jp/news/2017/08/17/national/politics-diplomacy/japan-plans-installation-land-based-aegis-missile-defense-system-amid-north-korea-threats/#.WaFuvmLTIU>, 26 August 2017.

[54] S.J. Freedberg Jr., "Aegis Ashore: Navy Needs Relief from Land", Breaking Defense, 2 July 2015, at <http://breakingdefense.com/2015/07/aegis-ashore-navy-needs-relief-from-land/>, 26 August 2017.

[55] There are several reasons behind this difference: the insular location of Japan, which reduces the range of offensive agents an attacker can use to neutralize installations, the existence of an advanced warning and anti-aircraft (and anti-naval) network, comprised of ships and planes operating on waters separating the defender from the source of the threat. In relation to ground-based missile launchers deployed in Japan, these circumstances allow them to perform functions similar to those performed by radar stations in Qatar, Turkey or Israel and ships in the Mediterranean in relation to the Aegis Ashore installations in Poland and Romania in the fulfillment of tasks connected with neutralizing missiles launched from the Middle East.

As of August 2017 it seems clear that, as part of the Wisła program, an American Patriot system manufactured by Raytheon will be purchased in a version which will ultimately differ in its advanced capabilities and configuration from those currently used in the armed forces of the US and the 12 other countries which have so far acquired this type of weaponry.[56]

According to the memorandum between the United States Department of Defense and the Ministry of National Defense of the Republic of Poland,[57] as part of its first phase, in 2022, components of two batteries, in the newest configuration (PAC-3+ PDB-8, with PAC-3MSE missiles and a PESA AN/MPQ-65 phased-array radar capable of providing a 120-degree view of field), which are part of the IBCS (IAMD Battle Command System) 'system of command systems' currently under construction, will begin to be delivered. The IBCS, which is supposed to be the 'heart' of Poland's air defense, enables cooperation and exchange of information between all attached components: radars of various types, effectors of various types, command posts, manned and unmanned planes, satellite installations and so on. It enables the cooperation of all its components with one another and, as a mediator in transferring information from various sources to command posts and effectors, it processes all the data and creates a more complete picture of the situation.[58] The first two batteries will be ready for combat in 2023.

The second phase is to begin in 2018, well before the beginning of the first phase, after determining a list of projects and a schedule. During this phase Poland will receive another six batteries, with radiolocation stations, which, in accordance with Polish requirements will conduct circular observation, and new SkyCeptor missiles, developed on the basis of the American-Israeli Stunner missile.[59] The development of these new effectors, which, in future, will be a primary source of firepower, was forced by the price (about 5 million USD per piece) and characteristics of the PAC-3MSE missile, optimized to combat fast ballistic targets and, according to available data, capable of reaching a maximum altitude of 35 kilometers. The function of the more expensive missile will be to neutralize particularly demanding ballistic targets, whereas the SkyCeptor, which is one-fifth the price, will be used to combat aerodynamic targets and less demanding missiles: those flying at lower altitudes but with a longer range and high maneuverability even in the terminal phase of flight.[60] Every Patriot system will be equipped with 12 missile canisters, each with one missile.[61] In the second phase, Polish

[56] M. Niedbała, "System Wisła oczami Raytheon – czy to nadal Patriot?", *Nowa Technika Wojskowa*, no. 6 (2017), pp. 70-74.

[57] *Memorandum of Intent Between the Departament of Defence of United States of America and the Minister of National Defence of the Republic of Poland Concerning Patriot Defence Capabilities*, at <http://www.mon.gov.pl/d/pliki/rozne/2017/07/MOU.pdf>, 27 August 2017.

[58] T. Dmitruk, M. Niedbała, "System dowodzenia obroną powietrzną IBCS", *Nowa Technika Wojskowa*, no. 7 (2017), pp. 50-62.

[59] *Memorandum...*

[60] M. Niedbała, "System Wisła...", pp. 72-73.

[61] Unlike the older versions of PAC-3, which had up to 16 (in a 4x4 set) canisters per launcher, the PAC-

radiolocation stations and command posts are to be integrated with the systems. In the optimistic variant, in this phase, the Narew short-range system will also be connected to the IBCS, which would allow for the unique integration of both systems, raising their combat value.[62] After the delivery of all the system components is complete, the first two batteries will be upgraded to the same standard. According to representatives of the Ministry of National Defense, the entire process of implementation of the Wisła system is to be completed by 2027.[63]

The planned battery configuration appears to be highly advantageous due to its mobility and firepower. The Polish battery is to consist of two fire teams (platoons), both of which will have their own radiolocation stations and three launchers each, which seems more beneficial in comparison to solutions adopted in the armed forces of other countries.[64] Functionally, the Polish solution is equivalent to a squadron composed of two fully autonomous batteries. The advantages if this solution will be particularly visible especially when taking advantage of the options offered by the IBCS and creating hybrid subunits grouping launchers and detection means from the Wisła and Narew systems (which, according to available information, are to have a similar structure),[65] in virtually any combination. Finally, without breaking up the autonomous fire teams into smaller parts, it would allow for the creation of 16 subunits capable of providing point-defense and layered air defense around chosen structures.[66] Additionally, the following means of defense will remain at the disposal of particular types of troops: 11 Narew batteries (22 teams) and short-range artillery and missiles, including the newly acquired self-propelled Poprad sets, the mobile Piorun (Grom-M), Pilica (six batteries for the protection of airports) and Noteć (35mm cannons which have not been previously mentioned, 24 of which have been ordered for land subunits of the Polish Navy) as well as a myriad other useful means of low-level defense, acquired and modernized in past decades.

-3MSE uses a new configuration. Available marketing materials show the SkyCeptor missiles being launched from a launcher with a similar configuration. As in the case of the older models, it will most likely be possible to equip the launcher with both missile types (6+6). *PAC-3 Missile Segment Enhancement (MSE). Delivering Increased Range and Altitude*, at <http://www.lockheedmartin.com/content/dam/lockheed/data/mfc/pc/pac-3-missile-segment-enhancement/mfc-pac-3-mse-pc.pdf>, 27 August 2017.

62 M. Niedbała, "System Wisła...", p. 73.

63 "Kownacki: cały system Patriot za 10 lat w Polsce", Defence24, 10 July 2017, at <http://www.defence24.pl/626255,kownacki-caly-system-patriot-za-10-lat-w-polsce>, 28 August 2017.

64 For comparison, in the US configuration one radar set falls on eight launchers, while in the offer for Qatar it supports four launchers; D. Wiaderski, "Państwa arabskie rozwijają obronę przeciwlotniczą i przeciwrakietową", *Nowa Technika Wojskowa*, no. 12 (2012), p 29.

65 "Zestaw obrony powietrznej krótkiego zasięgu Narew", Militarium, 20 October 2015, at <http://militarium.net/zestaw-obrony-powietrznej-krotkiego-zasiegu-narew/>, 28 August 2017.

66 It seems likely that such reasoning could become the basis for a decision to increase by eight the number of planned Narew batteries, without violating the originally anticipated capabilities of operational forces cover.

In this context it is worth mentioning the purchase of 420 launching mechanisms and 1300 Piorun missiles, to be delivered in 2017-2022,[67] in 2016, more than the planned and completed delivery of 380 rockets and 100 launchers under the original Technical Modernization Agreement for 2013-2022.[68] This order is partially a consequence of the desire to equip the Territorial Defense Force (TDF), which is being formed as of 2017, with MANPADS (MAN-Portable Air-Defense Systems), which, considering their even displacement throughout the country, should prevent the opponent from operating at low levels and, consequently, from conducting effective attacks on land-based targets using airplanes, helicopters and unmanned aerial vehicles. Provided that a properly functioning warning and locating system is in place, the dispersal of defense measures may, in this instance, also provide some possibilities to combat cruise missiles moving at subsonic speeds.[69]

Based on the outline of the future Polish air defense system presented above, it may be said that the 'Polish Shield' is not a lesser equivalent, tailored to the needs and available budget, of the American 'missile shield'. The need to equip the system with measures to neutralize incoming ballistic missiles, without sacrificing functionality in other areas, was emphasised from the outset. In many ways, creating a well thought-out national system capable of neutralizing a wide range of mass-used means of air assault: aerodynamic and ballistic, hypersonic and low-speed, moving in high atmosphere and just above the earth's surface, manned and unmanned; especially if the country which is building it does not possess all of the technology necessary to achieve its goal, is much greater challenge than the construction of installations aimed at stopping individual – no matter how fast and technically advanced – medium-range missiles. The air defense system comprises effectors in the form of interceptor missiles, but also an entire network focused on detection and managing fire. Its purpose is not only to identify the threat and to develop the data required to fire anti-ballistic missiles, but also to gather and pass on information necessary to launch a counteroffensive.

In view of the untested, and certainly incomplete, effectiveness of intercepting missile defense measures the question arises whether other projects can be implemented to neutralize or minimize the threat? This question should be answered in the affirmative. Although shooting down an incoming missile seems to be the most obvious solution, there are also other possibilities.[70]

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[67] M. Cielma, "Piorun trafi do wojska", Dziennik Zbrojny, at <http://dziennikzbrojny.pl/aktualnosci/news,1,10410,piorun-trafi-do-wojska>, 28 August 2017.

[68] T. Dmitruk, "Piorun trafi do wojska", Dziennik Zbrojny, 20 December 2015, at <http://dziennikzbrojny.pl/aktualnosci/news,1,10410,aktualnosci-z-polski,piorun-trafi-do-wojska>, 28 August 2017.

[69] The author is less optimistic about the idea than its creator. However, he considers it worthy of deeper analysis. M. Dura, "Gromy i Pioruny przeciw Kalibrom", Defence24, 12 July 2017, at <http://www.defence24.pl/626796,gromy-i-pioruny-przeciwko-kalibrom>, 28 August 2017.

[70] J. Solomon, "Full Spectrum Anti-Theater Missile Warfare", Center for International Maritime Security, 18 August 2016, at <http://cimsec.org/full-spectrum-anti-theater-missile-warfare/27373>, 28 August 2017.

One of them, in anticipation of an expected attack, is the secretive relocation of forces capable of retaliatory strikes, especially multi-purpose aircraft, to alternate, civil-military or civilian, aerodromes or improvised runways, such as fragments of highways with reinforced surfaces and elements of auxiliary infrastructure on which roadside sections of airports are organized and which can be quickly disassembled. If possible, deployment should occur in an area which is theoretically outside the range of land-based missiles fired by the enemy.[71] It will be advantageous if several units of the relocated forces are grouped in a sufficiently large area which will allow a single fire unit capable of missile defense to control the space above them. Importantly, even if they are within the range of the means of destruction used by the enemy, new bases should be located as far away from the source of the threat as possible. This will force the opponent to utilize a ballistic trajectory optimal for long-range fire, which will reduce the speed and limit the maneuverability of the missile in the terminal phase of flight, facilitating its interception. In the case of cruise missiles and standard aircraft types, it will also give the defending side more time to detect and neutralize them.

The time of deployment, which, bearing in mind the current level of technological development and speed at which information circulates, cannot remain unnoticed by the opponent, is a good moment to prematurely provoke an anticipated hostile attack and directing it towards seemingly important or insignificant targets. This tactic facilitates the discovery of the opponent's battle positions and exposes them to a counterattack.

Another way to neutralize the threat is damaging – kinetically or by use of cyberattacks – the enemy's 'system of systems', attacking the infrastructure supporting rocket weapons, garrisons, bases etc. Whenever possible, especially when in the case of an attack from the Kaliningrad Oblast, the goal should be to break the logistic chain and isolate the area in which enemy rocket launchers are located. In the case described, if conflict were to break out, steps should be taken to seize control of the air, sea and land routes which are part of the enemy's supply chain.

The most important measures which could stop the opponent from attacking, apart from maintaining alliances and striving to internationalize the potential conflict, are political action and guarantees of support for allies from the Baltic states. There is a real, though rarely mentioned, threat of these states being pressured into forced neutrality by the Russian Federation. If this were to happen, the Kaliningrad Oblast would cease to be an enclave and a bridgehead for Russia in Western Europe; it would become – using terminology from the history of military engineering – a barbican[72] for which a transport route along the Baltic coast would constitute a shielded and safe neck.

From the point of view of Polish security and the possible increase of the country's international importance, it is even more important to create conditions and initiate

[71] If one assumes that the range of ballistic and cruise Iskander missiles is 500km then the area to the south and west of the Zielona Góra-Zamość line will constitute an unattainable zone for rockets launched from the Kaliningrad Oblast.

[72] "Barbakan", in *Encyklopedia architektury*, Archirama.pl, at <https://archirama.muratorplus.pl/encyklopedia-architektury/barbakan,62_494.html#>, 28 August 2017.

international projects that support a state of neutrality and full control over its territory and airspace through Belarus and Ukraine. For this to happen, Poland should remain unbiased in its political dealings with these two countries, based on closer economic ties, offer to make additional resource supply routes available and act as a lawyer and intermediary in EU and NATO-related matters.

The undertakings mentioned above, including the mere possession of a system capable of shooting down incoming missiles, even if they are associated with limited use of force, function as detterents and prevent the opponent from taking action (*deterrence by denial*). Other possible actions require the ability to perform retaliatory strikes, making military action unprofitable for the opponent. However, in this case 'ability' must be understood not only as having the appropriate means of combat, but also the will and understanding of decision-makers required to use them, in accordance with previously developed operational plans and in response to enemy actions.

There is also one more undertaking, located on the borderline between both previously described groups of actions: a concentrated – not just symbolic – counterattack launched immediately after the enemy's attack, direct against launch platforms, bases and command posts, as well as the neutralization of potential air and sea carriers of rocket weapons. A more incisive form of retaliation is an attack directed against other military facilities and the enemy's criticial infrastructure; thereby paralyzing it and causing maximum losses.

Poland has just begun the process of acquiring weapons suitable for conducting rocket-artillery counterattacks or retaliatory strikes. The country has so far procured NSM (Naval Strike Missile) land-attack missiles, part of the Naval Missile Unit (Morska Jednostka Rakietowa), with one squadron consisting of two batteries, which is to be supplemented with another squadron by mid-2018.[73] They are complemented by RBS-15 Mk3 missiles, 36 of which have been purchased for Orkan fast attack rocket warships.[74] Both types of missile can be fired at land targets, but, due to the possession of a small warhead and an expensive, complicated targeting system, they are optimized for combat against ships. Hence their mass usage would be against the principals of economics. It cannot be ruled out, however, that they would be very useful for destroying land-based mobile launch platforms, and they would certainly become the weapon of choice in the fight against ships carrying cruise missiles.

Greater capabilities in the field of fighting terrestrial targets are provided by the AGM-158A JASSM missile, with a range of 370 kilometers, 40 of which have been purchased for Polish F-16s, and 70 JASSM-ER missiles ordered in 2016, with a range extended to just under a thousand kilometers.[75]

[73] "Morska Jednostka Rakietowa", 3 Flotylla Okrętów, at <http://3fo.wp.mil.pl/pl/38.html>, 29 August 2017.

[74] M. Gajzler, "Pocisk rakietowy RBS15", Dziennik Zbrojny, 24 September 2012, at <http://dziennikzbrojny.pl/artykuly/art,7,36,2412,marynarka-wojenna,uzbrojenie,pocisk-rakietowy-rbs15>, 29 August 2017.

[75] "Polskie F-16 z pociskami JASSM. Pierwsza dostawa", Defence24, 20 January 2017, at <http://www.defence24.pl/531850,polskie-f-16-z-pociskami-jassm-pierwsza-dostawa>, 29 August 2017.

Perhaps the planned submarines will also be equipped with long-range cruise missiles. The decision whether to build at least three such units and equip them, or not, with weapons that can strike land-based targets will, is supposed to be made before the end of 2017.[76]

Rocket weapons acquired under the Homar program, which involves the purchase of 56 multiple rocket launchers together with numerous types of missiles with a range from 70 to 300 kilometers, are to be used in retaliatory strikes. According to information published in July 2017, the American offer for the HIMARS system, the most powerful of which is currently ATACMS, will be chosen. Within the next few years, a new LRPF Deep-Strike rocket, with a range of 500 kilometers, will be available for this set. The US offer is supported by the declaration of intent to integrate the launcher with the IBCS system, which will allow for their use as an element of missile defense, whose purpose will be the destruction of detected launch sites with the help of precise information transmitted in real time. The speed at which these ballistic missiles move makes them particularly suitable for this role.[77]

The intention of *achieving the ability to strike high-value, time-sensitive targets on average resonance using unmanned search and impact systems* has also been revealed.[78] Such targets include operational-tactical missile launchers. Announcements that dedicated radiolocation missiles would be obtained for multirole aircraft,[79] as well as similar missiles for the artillery,[80] which has in recent years gained unprecedented range and precision, appear to confirm the thesis that the emerging doctrine rejects the dogma of passive defense, leading to the gradual elimination of combat measures, in favor of active defense, the essence of which is to launch a counterattack with the objective of neutralizing the source of the threat according to the 'kill the archer, not the arrow' principle.

THE 'POLISH SHIELD'

The Aegis Ashore installation which is currently under construction in Poland is primarily a part of the instrument serving to defend US allies from the northern and west-

[76] "MON decyduje: okręty podwodne dla Polski w najbliższych tygodniach?", *Business Journal*, 26 May 2017, at <http://businessjournal.pl/mon-decyduje-okrety-podwodne-dla-polski-najblizszych-tygodniach/>, 29 August 2017.

[77] N. Bączyk, "Program Homar – Dawid kontra Goliat?", *Nowa Technika Wojskowa*, no. 6 (2017), pp. 46-47. Statements made by Minister Macierewicz, who announced that the demand for these launchers would be increased to 160 pieces, may confirm the special role assigned to the Homar sets by the Ministry of Defense. This would allow 8-9, rather than the planned 3, rocket artillery divisions to be equipped with this weapon.

[78] "Uderzeniowe BSP w zainteresowaniu MON", *Nowa Technika Wojskowa*, no. 1 (2017), p. 6.

[79] J. Gruszczyński, "Pocisk przeciwradiolokacyjny AARGM", Zespół Badań i Analiz Militarnych, 2017, at <http://zbiam.pl/artyku%C5%82y/pocisk-przeciwradiolokacyjny-aargm/>, 28 August 2017.

[80] M. Dąbrowski, "Krab z pociskami przeciwradiolokacyjnymi", Defence24, 19 July 2017, at <http://www.defence24.pl/wiadomosci/krab-z-pociskami-przeciwradiolokacyjnymi>, 28 August 2017.

ern part of the European continent against threats in the form of medium-range missiles fired from the Mediterranean area and the Middle East. From the Polish point of view, the construction of a stationary land base is, politically speaking, a more favorable solution than the declaration of redeploying ships which would perform a similar purpose to the Baltic Sea. However, if one considers this issue through the prism of military capabilities, ship systems are far better suited to neutralizing threats in the Baltic area.

Accusations have been made that Poland too hastily agreed to install the American system in its territory. Taking into account numerous actions undertaken by other European NATO members, though in the vast majority declarations of supporting the construction of facilities under the EPAA with their own resources, the above statement is clearly unwarranted. The construction of European BMD capabilities became a key NATO goal at the turn of the decade. At a time when there has been an unquestionable increase in Russia's assertiveness in cross-border politics and its increasingly frequent use of military instruments, the role of the missile defense system of the European continent must be redefined. Possible undertakings aimed at increasing the combat value of the unfinished installation in Redzikowo and the completed installation in Deveselu will be an indication that US allies treat them as key facilities in terms of European security. The tactic of revealing a 'soft underbelly' as a target for potential enemies, in order to show good intentions, does not seem to be a reasonable solution.

The decision to create the 'Polish Shield', consisting in the construction of a multipurpose universal air defense system in which missile defense will be carried out by only its most advanced component, with the greatest spatial capabilities, appears to be a more rational choice. Focusing solely on defending against ballistic missiles would equate to ignoring the threat of the equally prominent and increasingly advanced cruise missiles as well as traditional airborne means of attack and their unmanned counterparts. The myth stating that area defense against ballistic missiles with the help of the Wisła system is possible must be rejected. Point-defense is necessary in the case of this threat and may include administrative centers, the most important airports, ports, selected nodal elements of critical infrastructure and population centers. To a much greater extent, provided that a sufficiently dense target detection network is created, air defense will provide protection against cruise missiles and traditional planes and helicopters, even those moving at low altitudes, especially if means of detection and lower-level layered defense effectors can be connected to the IBCS system. Perhaps the new generation of missiles, which can be used by launchers in the system currently under construction, will provide greater missile defense capabilities, including an increase in the range at which targets can be intercepted.

The optimal configuration of a battery, composed of two autonomous fire units, is one which allows for the flexible deployment of individual subunits. It should be remembered, however, that the number of effectors per set is limited. The Wisła system fire unit is to have 36 effectors on three launchers as well as additional missiles, though not more than twice as many, on accompanying loading vehicles.[81] Although

[81] The number of anti-ship missiles purchased for the Naval Rocket Unit and missile cutters may be con-

this is more than in older generation sets, it should be remembered that current prices of means of attack – with the exception of planes and helicopters – are often far lower than those of the effectors which are launched to intercept them. This increases the enemy's eagerness to attack until all means of defense are exhausted. Therefore, it seems advantageous to combine launchers which provide defense to various levels within subunits. As a result, more sophisticated missiles would not need to be wasted on less demanding targets.

Striving to create a situation in which the potential enemy will not gain allies willing to provide him with military resources, territory and air space, is no less important than acquiring even the most advanced anti-missiles. It is a great advantage for the defending country if the opponent's resources capable of carrying out attacks are out of necessity located in a limited area, without supply routes that cannot be taken over.

The effectiveness of a country's defense may definitely be increased as a result of adopting a more active approach. It seems crucial to acquire the ability to quickly return fire if a missile is launched by the enemy, along with carrying out measures aimed at intercepting the projectile. The destruction of even a fraction of enemy land, air or sea platforms capable of transporting missile weapons greatly relieves the interceptor systems and reduces the risk of the enemy launching an attack with critical consequences. The list of planned purchases indicates that this approach is understood by decision-makers at the Ministry of National Defense.

The fact that the planned naval component capable of counterattacking and retaliation is to be based around submarine-launched cruise missiles may raise doubts. The use of this weapon from the waters of the Baltic Sea, revealing the position of its carrier, would deprive it of its greatest asset, also shared by units of this type; the ability to operate in secrecy. Due to the limited number of missiles at their disposal, submarines offer limited capabilities as launch platforms. They are comparable to those of the small and cheap corvette[82] and far less impressive than those offered by the large, more versatile frigate equipped with a VLS launching system, at similar acquisition costs. Relatively large, multipurpose surface ships can also provide zone air defense, which allows smaller units or aircraft to control the water body or conduct strikes on land-based targets. Since they cannot be covered from the mainland, due to the range of effectors used in medium-range sets, this solution, which is the equivalent of the concept of *distributed lethality* on a limited water body, appears to be optimal.[83] The capabilities offered by the ships would help to establish an additional layer of air defense over the northern parts of the country.

sidered a hint in this context. The total number of missiles – 75 in the case of the former and 36 in the case of the latter – in both cases amounts to 1.5 full fire units. Perhaps, due to the key role of air defense systems, this value may be higher.

[82] As demonstrated by the Russians who built Bujan-M-type ships and began the construction of the even smaller Karakurt corvette.

[83] T. Rowden, P. Gumataotao, P. Fanta, "Distributed Lethality", *U.S. Naval Institute Proceedings Magazine*, vol. 141, no. 1 (2015), at <https://www.usni.org/magazines/proceedings/2015-01/distributed-lethality>, 30 August 2017.

The article may come under criticism for forgoing any deeper deliberations on the possibilities of using allied missile defense support in the event of a hypothetical conflict. However, it should be remembered that such support will not be granted within the first hours or even days. Until then, as shown in the described scenario, the enemy may bave already completed most of his objectives. That is why it is worth looking at the acquired capabilities not as instruments which can win potential wars – because, in comparison to those of the enemy, they may prove to be insufficient in the long term – but as one of many deterrents, fulfilling their role if the enemy decides to employ 'Tomahawk diplomacy' tactics. If the enemy chooses to proceed in this manner, the planned retaliatory instruments – too weak to kill, strong enough to cause major damage – may fulfill their role without provoking a local version of the armor and cannonball race.

In order to prevent a surprise which could be catastrophic in its consequences, and which is a necessary condition if attacking a state with modern means of defense, the country's warning network – made up of a wide range of elements; from open-source intelligence to satellite surveillance – should be expanded. The view that potential aggression will be preceded by a gradual increase in international tension, as well as military preparation leaving no illusions as to its purpose, should be revised. Non-linear warfare, waged using advanced technologies, does not require long-term preparation. In special circumstances it can be initiated *ad hoc*, with the objective of exploiting particularly favorable conditions for the aggressor.

When considering the issue of Poland's missile defense from the perspective of political realism, which assumes the primacy of state interests (needs), the threat of the 'rogue states'[84] – which served as a pretext to develop Europe's missile defense capabilities, and the danger that is Russia – which served the same purpose in relation to the Polish national missile defense program, do not exhaust the list of potential threats. Equal attention must be paid to the existing and potentially achievable offensive capabilities of states that are currently not perceived as competing or hostile. The current missile defense, or – speaking more broadly – air defense, system, which will hopefully undergo frequent modernization during the period of its service, is to protect the European continent for another few decades. The idea that, in such a long-term perspective, international relations in our region of the world will remain as they are at present seems a utopian concept.[85]

[84] *Słownik terminów z zakresu bezpieczeństwa narodowego*, Warszawa 2008, pp. 95-96.

[85] It is worth noting that the anti-aircraft defense measures available to the Polish armed forces were, for the most part, parts of a system whose creation dates back to the second half of the 1960s. During the first two decades of this period any significant change in the geopolitical environment seemed unlikely. In the following decades, the region was subject to intense changes. Suffice it to say that at the time Poland shared its borders with three other states, none of which are still in existence.

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