SAFETY&DEFENSE
ISSN 2450-551X

Modern Missile Defense System as an Indispensable State's and NATO's Deterrence Tool

Maciej MARSZAŁEK

War Studies University, Warsaw, Poland;
m.marszalek@akademia.mil.pl, ORCID: 0000-0003-4490-4530

DOI: https://doi.org/110.37105/sd.157

Abstract

The main aim of this article is to prove the significance of the missile defense system for military deterrence at the allied (NATO) and national level (the US, Poland, etc.). To achieve the aim, theoretical research methods such as analysis, synthesis, comparison and generalization were applied. The results of the conducted research show that the missile defense system of Poland and other alliance members, and the NATO Integrated Air and Missile Defense System should be considered as the crucial elements of the military deterrence, even though such systems are not offensive in nature. Thus, the formulated thesis undermines the up-to-date understanding of the problem, and therefore may contribute to further discussion on the topic of using means of defensive deterrence.

Keywords:

ballistic missiles, intercepting missiles, military deterrence, missile defense system, security

Submitted: 18.08.2021 Accepted: 26.08.2021 Published: 20.10.2021

1. Introduction

Weapons of mass destruction and their carriers – ballistic missiles – remain one of the most important contemporary threats to the international security. These two elements (WMD and the capacity to carry it) become specifically dangerous if possessed by a state that has hostile intentions towards countries like Poland, and its allies. Poland, as a border state of the North Atlantic Alliance and the European Union, realizes policies that too often seem hard to accept for the Russian Federation. In such cases of higher tensions between these two states, Moscow usually deploys ISKANDER ballistic missiles to the Kaliningrad Oblast (Region), that borders Poland. Despite its classification as a short-range system, it should be underlined that its range covers virtually the entire territory of the Republic of Poland.

In the third decade of the 21st century, it is hard to imagine the security of the Republic of Poland without a missile defense system. Furthermore, it is seems more than reasonable to consider such national and NATO missile defense systems not only in case of an attack but in the context of the deterrence as well.

Attempts at expanding such a system may meet strong opposition from experts who too easily accept the mainstream media narration on future warfare. Recently, the conflict in Eastern Ukraine, and its hybrid character, have been widely acclaimed as a model for future conflicts. It is worth noting that the term "hybrid" has recently become very popular, assuming a firm position in theoretical discussions on contemporary and future warfare. However, when attempting forecast future conflicts, one must ask the following question: does it mean that all future wars will be similar to that in Ukraine since 2014? Unfortunately, based on the comments in the mass media and numerous popular and scientific, and academic articles, we could assume so. If that is the case, a future war, in which Poland and NATO will participate, will have such a hybrid character and characteristics of the Russian-Ukrainian conflict, it would seem that ballistic missiles with nuclear (or conventional) warheads will not be used in combat, and the battlefield would be dominated by "the little green men". Accepting such a scenario could be perilous. Hybrid warfare does not exclude any other means, tools and methods of using force against the adversary. To the contrary – hybrid precisely refers to a mix of conventional and unconventional methods, thus potentially including WMD. With these extremely dangerous weapons, potential adversaries of the US and its European allies intend to level the conventional potential advantage of the aforementioned actors. Thus, they intensify research and development of WMD and ballistic missiles (Marszałek & Żabicki, 2007, p. 68).

The main research question is reflected by the following question: Should a contemporary missile defense system (and also the Integrated Air and Missile Defense System) be considered as an indispensable military deterrence tool for the state and Alliance, and why?

Due to the complexity of such a question, it ought to be divided into three supplementary research questions:

1. How has the US missile defense system evolved over the past years?
2. What is the new NATO approach to the missile defense system?
3. What is military deterrence and what is its relation to the US and Polish missile defense systems and the integrated NATO air and missile defense system?

Employing the results the author's many years of research on the US and NATO missile defense system, and considering results of initial research on the topic of the identified (and aforementioned) main research question, the following hypothesis has been proposed: increasing the effectiveness of the contemporary missile defense system makes it a very important and even an indispensable tool of military deterrence. Thus, the missile defense system (and also the NATO Integrated Air and Missile Defense System) should discourage

a potential adversary from ballistic missile attacks on the territory of the US or other North Atlantic member state, including Poland.

The aim of the conducted research was to prove that the missile defense system (or the Integrated Air and Missile Defense System in the case of NATO) is an essential element of the widely understood military deterrence of a single state and the Alliance.

The research methods employed in the research process are founded on the critical analysis of the literature devoted to ballistic missile threats, the missile defense system, and the military deterrence. The most important academic and scientific publications, especially from the US, were carefully examined, including official reports by the US governmental agencies (*Missile Defense Review, 2019;* Karako et al., 2017).

2. NATO's approach to missile defense

In order to objectively assess and analyze future battle-space, one must assume that the threat of using WMD will not vanish. NATO missile defense will therefore become a crucial element of the defense system of the Alliance (Office of Secretary of Defense, 2019, pp. XVIII). It is not surprising that, recently the missile defense has been treated as a priority mission of the North Atlantic Alliance, focused on reacting to missile threats, potentially armed with nuclear warheads. It is also worth noting that missile defense is considered as a specifically important component of the NATO Integrated Air and Missile Defense System (NATINAMDS), which itself is a key element of the collective defense. What is more, among Western experts, both theoreticians and practitioners of the North Atlantic Alliance, the missile defense system is considered as an important element (means) of countering the proliferation of the WMD.

Despite some doubts raised by the Alliance's opponents, there is no doubt that the NATO missile defense system is of a solely defensive character. It should be considered as a long-term defense investment and not as an incidental commitment. In June 2016, the Alliance declared achieving certain (initial) operational capacity of the missile defense system. In its present form, the system has significantly greater capacity in defending NATO member states' populations, territories and armed forces against possible missile threats in southern Europe.

It is worth noting that the operational capacity of this system is shaped by the member states at the implementation, and not declarative, level. On the basis of their willingness and commitment in building and sharing national resources (of detection, command, control, and strike), member states contribute to the emergence of the overall NATO missile defense system. Some of them are already constructing their national systems, while others are still acquiring the components. Poland and Romania belong to the latter – they have just bought the US Patriot missile defense systems that counter conventional means of air attack and intercept ballistic missiles on the last stage of the trajectory.

for many years, the missile defense system was considered a key issue among NATO military experts and political decision-makers. However, at the beginning of the 21st century, one could have had the impression that the issue was treated more theoretically than as an area of NATO's practical involvement and implementation. The lack of political will, and in fact – the reluctance to spend enormous funds to develop the missile defense system virtually from scratch was clearly visible. Finally, the ever-present threat of a ballistic missile attack motivated NATO's decision-makers to agree on creating NATINAMDS, which took place at the Lisbon Summit in 2010. It seems that member states agreed on a justified

concept of building the new system upon already existing Integrated Air Defense System. Poland was among the supporters of the project of extending the defense system. The US European Phased Adaptive Approach (EPAA) anti-missile defense system became an important part of the NATO system with intercepting missile launchers to be based on the territory of Poland.

NATO's Strategic Concept from Lisbon 2010 is considered the Alliance's key political document founding basis for creation of NATO's missile defense system (Zarychta, 2013, p. 78). The document states the following: "The proliferation of nuclear weapons and other weapons of mass destruction, and their means of delivery, threatens incalculable consequences for global stability and prosperity. During the next decade, proliferation will be most acute in some of the world's most volatile regions" (NATO, 2010, p. 10), and vows to "develop the capability to defend our populations and territories against ballistic missile attack as a core element of our collective defense, which contributes to the indivisible security of the Alliance We will actively seek cooperation on missile defense with Russia and other Euro-Atlantic partners" (NATO, 2010, p. 16).

The aforementioned paragraphs clearly point out that the anti-missile defense was created intensively in that period. What is more, it was a time when attempts were made at normalizing relations with Russia, and that is why cooperation with Moscow in the anti-missile defense domain was taken into consideration. The creation of the Theater Missile Defense (TMD) was considered to be such a common endeavor. After the Russian-Georgian war ended, it was intended to further pursue this project, perhaps even to the point of enlarging it to the area of the national defense systems (Kupiecki, 2013 p. 31). It seemed that the much needed constructive cooperation with Russia was at NATO's reach. This optimist approach was, however, ill-founded. From today's perspective, we can be glad that some solutions were not implemented as presently they may be counterproductive and even dangerous to the security of the member states. They were mainly related to the location of the radar system on the territory of the Russian Federation.

3. **The essence of the missile defense system**

The US has the greatest experience in building missile defense systems. The fundamentals of ballistic missile defense have changed little over 70 years (Karako et al. 2017, pp.14). The beginning of the US national missile defense system dates back to the 1950s. The threat of the Soviet ballistic missiles was intended to be countered with "Nike-Zeus" guided missiles with nuclear warheads. The warheads were meant to be detonated at a very high altitude of even 100 km in the Arctic region. Possibly, it was meant to avoid collateral damage resulting from the use of nuclear warheads. Another program that was conducted by the US was the "Nike-X" project, which was later replaced with the "Sentinel" program. After president Nixon took power, the missile defense program was replaced again. The whole idea behind the program functionality was changed, and the program was renamed "Safeguard". It was intended to defend locations of the American offensive ballistic missile storage. This way, the caches were intended to survive the first Soviet rocket strike and be used in a retaliatory strike.

When characterizing the evolution of the US missile defense system, the ABM Treaty cannot be overlooked. This treaty, that significantly contributed to the evolution of the system, was signed by the US and the Soviet Union on May 26th 1972. This treaty prohibited

the parties to deploy missile defense systems on the entire territory of their countries. Each parties was supposed to name only two locations that were supposed to be defended with 100 single-warhead intercepting missiles (Kaczmarski, 2004, p. 17). One such missile defense system could protect the capital, while the other missile launcher of intercontinental ballistic missiles in other locations. Protocol from 1974 reduced the number of systems to one. Therefore, each party had therefore to make a choice (Hildreth, 2007, p. CRS-2). The US decision-makers decided that the system should defend the offensive component of the system in Grand Forks. The Soviet counterparts, on the other hand, decided to defend their capital, Moscow.

Another significant date for the development of the US missile defense program is March 23rd, 1983. On this day, President Ronald Reagan vowed to create a defense shield that would significantly reduce the striking capacity of the ballistic missiles (Kaczmarski, 2004, p. 19). According to some experts, it could have replaced deterrence with real defense. It is hard to argue with this assumption, as we have already assumed at the beginning of this article that the missile defense realizes mainly its deterrent function. The Strategic Defense Initiative (SDI), thanks to the Massachusetts senator, Edward Kennedy, became known as "Star Wars" (Blumberg, 1989, pp. 75-85). The project was introduced by President Reagan on January 6th, 1984. It was assumed that it would be realized within 5 years. However, taking into account the ABM treaty, the SDI program could have been only a research project. Only in 1987 was it implemented. A new multilayered system was intended to be capable of defending around 3500 objects (Kaczmarski, 2004, p. 18). The system was based on the activities of small satellites that, in the first phase, were to detect adversaries starting ballistic missiles. In the second phase, sensors tracking trajectory of the missiles were employed. In the third and final phase, the actions of the SDI envisaged the destruction of enemy ballistic missiles with intercepting missiles fired from the outer space-based launchers.

It is worth mentioning that the evaluation of the SDI program are not unanimous. Some military experts underline its greater input in quicker fall of the Soviet Union than its real operational capacities (Cutter, 2009, p. 241). The introduction of outer space rivalry between Washington and Moscow upset the Soviet economy. According to the experts on missile defense, President Reagan firmly contributed to planting this expensive and not necessarily efficient idea of missile defense in American society. It may be considered an important success that allowed for pursuing further work on the missile defense and setting up bases for the creation of the new National Missile Defense (NMD) system (Jankowski, 2011, p. 28).

An important impulse to develop the contemporary missile defense system of the US was the Rumsfeld Committee Report from 1998 (Rumsfeld, 1998). Potential threats from North Korea and Iran were underlined in the report. At that time, both of these states intensively pursued their ballistic missiles programs that were intended to threaten US territory at the beginning of the 21st century. The report content contributed to the US withdrawal from the ABM treaty. This step was deemed necessary to eliminate the Cold War-era restrictions, and thus facilitate works on the intercontinental ballistic missile defense system.

The concept of missile defense was presented to the European allies for the first time at the conference in Munich devoted to the security policy. In his speech, Donald Rumsfeld explained how the US perceives its missile defense. He connected the collective strengthening of the US security with that of other democratic states, referring specifically to the European allies.

After the 9/11 attacks, the US activities in the domain of missile defense accelerated. This defense was intended to be one of the most decisive responses to the emerging threats from so called the "rogue states". Thus, the creation of a missile defense system of a new quality was deemed necessary to ensure national and international security at the proper

level. From our perspective, it can be said that the creation of the "system of the systems", as it has often been referred to, proved to be a huge challenge for the Bush administration (Kozi ej, 2008, p. 24). In the meantime, the US also re-arranged the administrative structure of the system, creating the Missile Defense Agency (MDA) from the BMDO. According to experts, the creation of this agency significantly accelerated the work on the missile defense.

In those days, some well-founded doubts as to whether the traditional concept of deterrence as a sufficient basis for defending NATO members is valid were raised. Some of the politicians representing member states of the organization claimed that the deterrence strategy, while being ineffective towards terrorists, still was efficient in terms of state-to-state deterrence (Rabee, 2008, p. 13).

As it has been already mentioned, the missile defense project, in its current version of the beginning of 21st century, brought a new quality in the domain of missile defense due to its complexity. Components of the system were supposed to be placed on land, sea, in the air and outer space. The concept behind the system relied on the ability to intercept and destroy hostile missiles at every stage of their flight. The aim of the system was to be effective no matter the location from which the rocket would be launched and regardless of its trajectory.

Therefore, it is worth mentioning that there are three phases of the ballistic missile flight. The first phase - the boost phase - is the initial or starting one and lasts only 3 to 5 minutes. The second one, the mid-course phase, lasts the longest, up to 20 minutes. In this phase the missile travels outside the atmosphere (its flight becomes exo-atmospheric). Finally, the last phase is called terminal and lasts around1 minute (Jankowski, 2011, p. 44).

Combat components of the missile defense system were supposed to intercept and destroy ballistic missiles at every stage of their flights. Due to obvious reasons, the optimal and safest solution was to intercept them in the first phase, over the enemy's territory. Thanks to that, there was a possibility of limiting negative consequences of destroying a rocket with a WMD warhead. To serve this purpose, a laser weapon (Kinetic Energy Interceptor, KEI) based in outer space or on land and naval platforms was supposed to be used. In the first decade of the 21st century, the ABL concept – a Boeing 747 with a laser launcher – was strongly lobbied. This system had been developed since November 1996 to February 2012. The project costed around. $5.3 billion. It seems that the main reason behind scrapping the project was insufficient results in terms of the laser effective range. The range was too limited due to susceptibility of Boeing 747 to guided missiles. Increasing the range of the weapon itself, on the other hand, would mean increasing the laser power 20-30 times more than initially planned. Consequently, this would translate into significant technical issues, at the time impossible to overcome.

To destroy ballistic missiles in the second phase, the intercepting missiles were planned to be used. Practically, the responsibility for this task fell on Ground-Based Midcourse Defense (GMD) and the sea based Aegis Missile Defense. These two components were intensively developed in the first two decades of the 21st century for they guaranteed achieving the operational capacity with the highest probability, which indeed happened. Development of such technologies by the US would reduce the cost and burden of missile defense systems in realities of a conflict (Piotrowski, 2019, pp.2).

The ground-based missile defense systems such as THAAD (Sankaran & Fearey, 2017, pp. 2) and the Patriot were responsible for neutralizing the targets in the last phase of their trajectory. These systems are better suited for protecting smaller areas where important military installations and critical infrastructure may be located (Perkovich & Vaddi, 2021, p. 75). It should be underlined that these sets (sub-systems) can operate autonomously, as well as cooperate in combating enemy's ballistic missiles. Thanks to the US industry involvement, Europeans allies attempted to build an alternative system to the Patriot – the Medium Extended Air Defense System (MEADS).

By analyzing the functionality of various combat components in the terminal stage of ballistic missiles trajectory, we must come to conclusion that the only operational element is the Patriot system. It was employed during the first coalition's intervention in the First Gulf War in 1991 (McDowell, 1993, p. 87), and during the second coalition's intervention in Iraq in 2003. It seems well founded to conclude that the operational capabilities of the Patriot was positively verified in combat conditions, and these are much different that those of the tests. The latter are even often described as "laboratory conditions". The air defense system, the Patriot, will remain the main element of combating short-range ballistic missiles in their final stage of trajectory (Kowalski, 2016, p. 6).

We should positively assess the growing number of states that have acquired or plan to acquire the Patriot system. Afterwards, we can assume that the operational capabilities of the NATO Integrated Air and Missile Defense System to combat conventional and non-conventional means of air attack are consequently being increased. It results from the multi-functionality of the Patriot system as well.

4. **Military deterrence and air defense system**

Military deterrence has existed and has been used in practice for a long time. It does not mean, however, that it has been placed highly in the art of war and the practice of the use of armed forces. It seems that only with the development of the nuclear weapon and its carriers, the theory and strategy of nuclear, and thus military, deterrence were developed. It should be noticed that in that period military deterrence was associated with weapons of mass destruction, and mainly with the nuclear weapon. Presently, the conventional military deterrence is also taken into account.

The ultimate goal of military deterrence is to secure oneself from military aggression by making it unprofitable for the aggressor. Certainly, the development of means of warfare contributed to the increase of efficiency and credibility of military deterrence. The usefulness of the military deterrence to ensure one's security is seen by many states, even those that do not possess nuclear weapons. Some of these countries described military deterrence in their defense strategies as the aim and as one of the basics tasks of the defense system.

The idea of military deterrence seems relatively simple and relies on achieving desirable behavior of the adversary by a credible threat. The threat is based on the promise of using force as the ultimate means allowing the desirable political goals to be achieved. Therefore, the basic issue with military deterrence seems the identification of the means of employing the threat against the potential foe, in order to ensure the desired outcome. The foe's desisting from aggression due to unprofitability of such actions is considered the optimal and thus desired outcome. Causing such an impression can be achieved by implementing a wide array of political, propaganda, psychological and military undertakings.

The essence of military deterrence is to use the threat in order to achieve the desired behavior of the adversary. Such a threat must be based on a credible and factual foundation. In other words, deterrence is about convincing the adversary that his own interests force him to refrain from any hostile behavior (Olszewski, 1998, p. 16).

From the conducted analyzes on various definitions of military deterrence, it unambiguously shows that the most important goal of deterrence is to change the behavior of the adversary, who should refrain from using force. Common elements of existing definitions include:

- military deterrence has to restrain the adversary from using force, armed forces, or attempting a military action;

- deterrence requires persuasive actions on the position and motivation of the adversary through discouragement, dissuasion, restrain, convincing, encouraging;
- a threat is the instrument of deterrence that takes the shape of specific military sanctions: a punishment, reprisal, or a reciprocal attack in case when the adversary undertakes a military action (Olszewski, 1998, p. 16).

In light of our considerations, it seems well-founded to define the aim of military deterrence under various conditions of state (or a group of states, e.g. the Alliance) functioning. During peace-time, the aim of deterrence is to prevent military actions by an adversary (like surprising missile attack on a given target). The achievement of this goal is determined by possessing an adequate and credible combat potential, making an aggression unprofitable. Implementing these general considerations to the national missile defense system, that is simultaneously a part of the allied defense system, we should underline its desired operational readiness not only in times of peace but also under other conditions. The readiness of the system may discourage a state that would like to make threats with a ballistic-missile attack, and deter the state from a real attack.

The awareness of the existence of a missile defense system on its own can be enough to encourage military and political decision makers to assess the costs of the attack. Most probably, the relation of cost and result may prove to be unfavorable not only in military but also political terms. It is the latter dimension that may prove to be decisive in changing of the behavior of the potential adversary, for a missile attack in the time of peace can cause the aggressor to face more costs than benefits.

In the time of crisis, the aim of military deterrence is to restrain its escalation and to prevent the use of military force. In this state, besides increased psychological actions, it is necessary to undertake active demonstrative actions by the deterrence forces in order to convince the adversary about the capacity, determination and credibility of its retaliation.

In times of war, the aim of military deterrence is to restrain the adversary from escalating military actions and stop them (Olszewski, 1998, p. 19). In such circumstances, in which the fate of the nation perhaps even that of humankind (as the nuclear catastrophe cannot be excluded) may be decided, the meaning of the missile defense system of the US and NATO Integrated Air and Missile Defense System is huge. Let us remember that most contemporary armed conflicts and wars have started from decisive air-force and missile attacks.

In this case, an efficiently functioning missile defense system can discourage the adversary from firing other ballistic missiles, having in mind that, with a high level of probability, they may not reach the target. One can consider whether the efficiency of the US and NATO missile defense systems would reach a similar level.

Considering the complexity of the state's military deterrence system (that of an organization, e.g. the NATO), the missile defense system has to be unambiguously recognized as a part of the military deterrence. Such an approach seems entirely valid despite the fact that offensive means (e.g. ballistic missile with nuclear warheads, or combat air-force) are more often considered as such an element. The combat air-force's capacity to conduct efficient retaliatory attacks on the enemy's territory in virtually any conditions and at short notice is underlined as one of the most important of its characteristics.

Summarizing these short considerations on the military deterrence, we must understand and remember that to deter means to influence the opponent's decisions by using a credible threat of the solid defense and decisive retaliation. For there is a connection between deterrence and the decision-making protocol on the highest levels of command of a state or an alliance. The decision on the use of ballistic missiles armed with weapons of mass destruction surely would not be taken on the tactical or operational levels due to its enormous military and political weight.

5. Conclusions

The missile defense system remains an incredibly interesting and always current area of research both among theoreticians and practitioners. Considered in technical, military or political contexts, it has been an important subject of research and international analysis for the past decades (Kupiecki, 2015, p. 9). Its currency stems not only from the threat from weapons of mass destruction and ballistic missiles, but also from the still visible imperfections of the system. For neither political nor military decision-makers of the US and the NATO have not declared full operational readiness of the missile defense system(s).

Conclusions from analyzes of development of the US missile defense system (what applies to the NATO as well) clearly point to the importance of its political dimension. What is more, at some point of the development of the missile defense system, one could have the impression that the aforementioned political dimension is more important than the military one related to detecting and combating hostile ballistic missiles capable of carrying WMD warheads.

We should remember that the missile defense system is rightfully considered as an essential tool to counter the proliferation of WMDs, what is reflected in the NATO strategic concept of 2010. It is the elimination or neutralization of such weapons that the defending party is focused on. The ballistic missile itself, however, hard as a weapon to intercept, is only a carrier of the warhead. Yet due to the immense consequences of the neutralization of a ballistic missile carrying a warhead with WMD over a populated territory, it is crucially important to counter ballistic missiles far away of one's own state frontiers, or of those of the allies.

It seems that possible doubts concerning the relation between the missile defense system with the military deterrence were addressed. Developing and fielding credible and effective defensive capabilities may not only protect our forces during hostilities but also deter an adversary from attempting an air or missile attack (Joint Chiefs of Staff, 2013, p. 3). Taking into account the essence of the military deterrence, we can conclude that the very existence of the missile defense system can impact actions of a potential adversary. Political decision-makers (leaders) of a state that could have hostile intentions towards the US or the NATO (or any other state with the ballistic missile defense capabilities) can refrain from any hostile actions just because their awareness of the functioning of the missile defense system. In such a case, an attack would be inefficient, for the attacking party could lose more than it could gain. This would make the concept of military deterrence real.

It should be mentioned that the missile defense system, yet in the preparatory phase on its way to achieve full operational capability, performs a very important function of political integration of the states involved in its construction. Even making the land available for the US to place its defense system on another state's territory already increases the cooperation between these states. It is worth mentioning here the cooperation between the US, Poland, and Romania or the Czech Republic. Unfortunately, we have to observe as well that even among the Alliance member states opinions regarding the cooperation varied, divided, and thus not always positive. It is hard to believe that initially both the North Atlantic Treaty and the European Union were skeptical towards the American project of missile defense (Adamczyk, 2014, p. 46). Most probably, this stems from the fact that the system components deployed in Europe aim primarily at protecting the US from the intercontinental ballistic missiles fired from the Middle East.

The rocket launcher based in Alaska is of lower efficiency when it comes to counter ballistic missiles fired from the Middle East. According to the experts, it is because of a narrow window of opportunity to intercept a missile flying at a very high speed (up to 5000

m/s in the terminal phase). Thus, the region of Eastern Europe has gained in importance in the context of the US missile defense.

The integrating function of the missile defense system, consolidating the North Atlantic Alliance's member states is also visible in strengthening the collective defense, exemplified by creation of the NATO Integrated Air and Missile Defense System. Therefore, in the case of a missile attack on the US or any other NATO member state, it will be considered an attack on the whole Alliance. In such a case, a potential aggressor has to seriously reconsider whether it is worth to risk a military clash with the world's most powerful organization.

Declaration of interest – The author declares that he has no known competing financial interests or personal relationships that could have appeared to influence the work reported in this article.

References

1 Adamczyk, N. (2014). *Znaczenie amerykańskiej tarczy antyrakietowej dla bezpieczeństwa narodowego Polski,* Czasopismo Krakowskiej Szkoły Wyższej im. Andrzeja Frycza Modrzewskiego 8/2, http://cejsh.icm.edu.pl/cejsh/element/bwmeta1.element.mhp-fb8f2c6d-1c31-4590-b1eb-d1313eb82f9c.

2 Blumberg, A. (1989)., *The strategic defense initiative: An update and critique*, Interdisciplinary Peace Research: formerly Pacifica Review: Peace Security Et Global Change, pp.75-85, http://dx.doi.org/10.1080/14781158908412713.

3 Cutter, A. (2009). *System Obrony Przeciwrakietowej w amerykańskiej koncepcji bezpieczeństwa narodowego*, Prace naukowe Akademii im. Jana Długosza.

4 Hildreth, S. A. (2007). *Ballistic Missile Defense: Historical Overview*, CRS Report for Congress.

5 Joint Chiefs of Staff (2013). *Joint Integrated Air and Missile Defense*: Vision 2020.

6 Jankowski, D. (2011). *Amerykański system obrony przeciwrakietowej,* Wydawnictwo Adam Marszałek.

7 Kaczmarski, M. (2004). *Obrona przeciwrakietowa Stanów Zjednoczonych i jej implikacje międzynarodowe,* Wydawnictwo Adam Marszałek.

8 Katona A. (2015). *NATO Territorial Ballistic Missile Defense and its Implications for Arms Control,* The Nonproliferation Review, pp.253-272, http://dx.doi.org/10.1080/10736700.2015.1117314.

9 Karako T., Williams I., Rumbaugh W. (2017). *Missile Defense 2020. Next Steps for Defending the Homeland,* Center for Strategic & International Studies.

10 Kowalski, M. (2016). *Obrona przeciwrakietowa Stanów Zjednoczonych*, Pułaski Policy Paper.

11 Koziej, St. (2008). *Amerykański system obrony przeciwrakietowej*. Rocznik Strategiczny 2007/2008, https://https://wnpism.uw.edu.pl/wp-content/uploads/2020/03/01_2008. pdf

12 Kupiecki, R. (2013), *Międzynarodowe uwarunkowania modernizacji polskiego systemu obrony powietrznej,* [in:] *System obrony powietrznej Polski*, Akademia Obrony Narodowej.

13 Kupiecki R. (2015), *Obrona przeciwrakietowa w polskiej perspektywie,* Polski Instytut Spraw Międzynarodowych.
14 Marszałek, M., Żabicki, K. (2007). *Balistyczne pociski rakietowe teatru działań – wirtualne czy rzeczywiste zagrożenie dla bezpieczeństwa międzynarodowego*, *Zeszyty Naukowe*, no 2(67).
15 McDowell D. (1993). *Theater Missile Defense: A Joint Enterprise,* Joint Force Quarterly.
16 *Missile Defense Review* (2019), Office Of The Secretary Defense.
17 NATO (2010) *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 Government at the NATO Summit in Lisbon 19-20 November 2010,* Brussels: NATO Public Diplomacy Division.
18 Olszewski, R. (1998). *Lotnictwo w odstraszaniu militarnym,* Dom Wydawniczy Bellona.
19 Petrovich, G., Vaddi P. (2021). *Proportionate Deterrence: A Model Nuclear Review*, Carnegie Endowment For International Peace.
20 Piotrowski, M.A (2019). *Założenia nowego Przeglądu obrony przeciwrakietowej USA,* Warszawa, Polski Instytut Spraw Międzynarodowych no 15 (1763).
21 Rabee, S. (2007). *Amerykańska tarcza antyrakietowa w Europie. Konieczność, warunki, adaptacja,* Konrad Adenauer Stiftung.
22 Rumsfeld D. (1998) *Executive Summary of the Report of the Commission to Asses The Ballistic Missile Threat to United States*, http://fas.org/irep/threat/bm-threat.htm.
23 Sankaran J., Feary B.BL. (2017). *Missile defense and Strategic Stability: Terminal High Altitude Area Defense (THAAD) in South Korea*, Contemporary Security Policy, pp. 1-24, http://dx.doi.org/10.1080/13523260.2017.12680744.