The Political and Military Aspects of Creating Anti-Access/Area-Denial Systems (A2/Ad): The Example of China and Russia

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Abstract

Over the last two decades, China and Russia have been developing Anti-Access/Area-Denial (A2/AD) systems mainly based on long-range Air Defense, ballistic and cruise missiles, supported by Electronic Warfare and cyber-attack capabilities. Initially, these systems were used for defense purposes, but over time. it was recognized they could be also applied for imposing military situation in the specific regions and create effective response to NATO countries and their concept of conducting military operations. The main aim of the article is to asses and present the impact of Chinese and Russian Anti-Access/Area-Denial (A2/AD) systems on changes in global political relations and balance of military power. In the course of this study, the author used numerous analyzes, synthesis, comparisons and case studies methods mainly concentrated on presently operating A2/AD systems. This article undertakes the analysis of the Chinese bases located in the South China Sea and Djibouti, Russian A2/AD systems within Russia's borders with particular emphasis on Kaliningrad Oblast, and A2/AD systems in Crimea and Syria created as part of Russian military operations. This research allowed us to conclude that some of the A2/AD systems serve to defend borders, while the rest are created to influence the geopolitical and military situation or to gain an advantage in the area of military operations. It can be also evaluate that the use of these systems allow dominate future conflicts because they enable to establish a full control zones which are completely closed for opponents forces operations.

Keywords:

air defense, anti-access/area-denial, defense, safety, military operations

1. Introduction

The methods of ensuring world security and the methods of creating military systems directly related to them are the result of threat changes and evolve in each decade. Therefore, we can assume that every new military system is different from the previous one. On the other hand, this is only an assumption, because if we look closely, the general framework, concepts, and purpose of creating safety systems and their military subsystems remain unchanged. Military systems usually have two fixed objectives: defensive and offensive activities. The defensive goals are to preserve sovereignty and deter the enemy from his own territory. The offensive ones are focused on ensuring victory in the military campaign and dominating the enemy at home and abroad. The only thing that fundamentally changes is the weapon and its combat capabilities. Nowadays, as a result of technological development, weapons are more accurate, faster, and could affect the enemy at very long distances with less involvement of own operating personnel. Presently, military systems are able to operate at intercontinental distances in various combinations of environments like land, sea, air, space, as well as in cyberspace. One such operational concept based on the latest military achievements is the concept of Anti-Access /Area Denial (A2 /AD). However, the idea of conducting military operations this way has been known known throughout the history of wars (e.g. Maginot Line or Isolation of Great Britain and its defense in World War II), but its name and character was defined and refreshed again two decades ago. Nowadays, concept of A2/AD is mostly dominated by China and the Russian Federation, countries which in their polities and military activities are in opposition to NATO countries. At the same time, it can be observed that Russia and China, which originally declared that these A2/AD systems serve only to defend their borders, are increasingly developing military capabilities and are creating new A2/AD systems also outside their borders. This raises the main research problem: what is the purpose of creating Anti-Access /Area Denial systems? In order to answer the main research problem, author also asks specific questions: to what extent Anti-Access/Area-Denial zones can play a defensive or an offensive role? What is their impact on military balance and the geopolitics relations in a specific region? What are the real possibilities of using these systems in the military operations? In the course of this study, the author decided to answer all these questions in article and verify his main hypothesis based on the predictions that probably in the future, the dominant way of exerting political influence and gaining military advantage before and during operations will be the dislocation of A2 / AD systems in the key areas.

The idea of Anti-Access /Area Denial (A2 /AD)

In subject literature, the A2/AD concept has various names, including the concept of isolating of the battlefield, the concept of blocking access and counteraction, the doctrine of closing access for the intervention forces. They also have an abbreviated name (anti-access concept) and a colloquial name (anti-access). However, the closest to its essence and purpose is a two-part name: the concept of Anti-Access / Area Denial (A2 /AD). The correct nomenclature is particularly important from the perspective of distinguishing between two activities implemented under the A2 / AD concept. The actions of A2 are completely different from the actions of AD. They use different means of combat, are carried out at different

distances and in different areas, and their effects are also different from those obtained by AD means. Anti-Access (A2) and Area Denial (AD) are therefore two essentially different groups of activities carried out ultimately for a common goal, which is to gain an advantage over the opponent in a specific area (Dobija, 2019).

The development of the two-part name makes it possible to understand purposes and tasks which are carried out within this concept. Anti-Access (A2) are activities that use long-range combat measures to prevent an enemy from deploying forces in a Joint Operation Area (JOA). In other words, the enemy's forces are prevented from entering the operational area by actions limiting his freedom of movement. Anti-Access is understood primarily as a set of actions carried out against the enemy, making it difficult to reach the area of operation (JOAC, 2012) . These actions focus on limiting enemy freedom of maneuver in each possible dimension of warfare. They are implemented in the land, sea, air, space and cyber dimensions. Considering above-mentioned activities it should be stated that they will be carried out globally under A2, using the latest combat tools and technological achievements. They will be characterized by higher speeds and greater momentum as well as dynamics of operations, previously unknown from traditional forms of air, land or sea combat. The concept of A2 actions are conducted in order to prevent the enemy's troops (creating a kind of wall) in front of the place of operation and will focus mainly on the disorganization of its movement. Thus, the priority targets for the A2 combat assets will be airports and seaports as well as land communication routes. Permanent supervision over the air corridors and sea routes leading to the area of operation will also be carried out. It should be noted that the concept of A2 activities is not only the involvement of the latest military equipment, ships, planes, submarines, ballistic missiles or satellites, but also information warfare carried out in cyberspace. Nowadays, with the enormous and progressive digitization of all civilization it may turn out that the one who controls cyberspace also controls the enemy's ships, planes and satellites. When ruling in cyberspace, one could control information, decision centers, power plants, command posts and its armed forces (Krepinevich,2003).

On the other hand, Area Denial (AD) covers all activities involving the use of weapons with shorter ranges than Anti-Access ones. The main purpose of AD activities is to limit the opponent's freedom of action in the Joint Operation Area (JOA) (JOAC, 2012). Unlike A2, AD measures are focused on limiting enemy combat activities in the operating area. It is strictly military in nature and is used to conduct direct warfare. The A2 / AD concept considers two possible scenarios in which AD means are triggered. First, when A2 measures fail and the opponent manage to enter the JOA, then AD resources are automatically activated. The second, when A2 means constantly isolate the enemy from Joint Operation Area and at the same time AD means conduct close military operations inside the JOA. Hypothetically, this type of scenario could be played by Russian A2/AD system dislocated in the Kaliningrad Oblast. The A2 part could isolate NATO troops from providing support to the Baltic states and the ranges of the AD systems would allow them to combat and control of the military situation in the Baltic states region. The advantage created in this way would ensure that Russian forces gain local supremacy and separate the rest of the NATO forces. One of the best explanations of the A2/AD idea is presented in the words of Professor Andrew A. Michta: "the A2 / AD concept is a combination of activities that limit the possibilities of military access to an operation area, with activities that limit the possibility of operating in a controlled area" (Michta, 2019). Thus, he further stated that the area around the Anti-Access system does not have to be an area of military operation, but it can be a place where ensuring control will allow for gaining an advantage or even ruling in a selected region of the world.

Taking into account the indicated two basic types of activities of A2 / AD concept, the two groups of means could be use appropriately for their goals. As part of Anti-Access (A2) measures, the following systems could be distinguished:

– long-range reconnaissance systems,

– anti-satellite systems,

– other means which are used for carrying out cyber-attacks against: IT networks, command posts, troop movement control systems, supply networks, elements supporting the resilience of the troops,

– Theater Ballistic Missiles (TBM),

– Cruise Missiles (CM): launched from bomber aircraft -Air Launched Cruise Missiles (ALCM), launched from surface and submarine warships - Sea Launched Cruise Missiles – SLCM, and Ground Launched Cruise Missiles (GLCM),

– intercontinental-range submarines,

On the other hand, for the implementation of the Area Denial (AD) tasks, the following systems are used:

– operational and tactical level of Electronic Warfare (EW),

– reconnaissance measures,

– combat aviation (fixed and rotary-wings aircraft),

– unmanned UAVs,

– air defense systems, including Land and Navy air defense systems,

– short-range artillery,

– anti-ship missiles and torpedoes,

– sea and land mines,

– ground maneuver units,

– and all other measures limiting the enemy freedom of action, used from a distance allowing for the avoidance of direct contact with the opponent (Kreuder, 2013).

The use of the above systems in conjunction with the principle of synergy makes them virtually insurmountable. Such a combination creates a multi-layer, closed protective bubble over a large area and completely paralyzes the enemy's actions. At the same time, the dislocation of such systems directly affects the state security policy, especially in countries whose territories are within the range of systems gathered in such zones.

Anti-Access /Area Denial (A2 /AD) – China and Russia case study

Nowadays, there are two countries in the world that specialize in the A2/AD concept - China and Russia. Although these countries use similar military means under the A2 / AD concept, the purpose of their use differs.

China is first of all concerned with the defense goals of A2 / AD and the preservation of its borders sovereignty. Currently, by dislocating systems in the South China Sea, they are "pushing" the United States out, treating it as a potential aggressor. In recent years, a situation has been observed in which a significant part of the Pacific Ocean, previously dominated by US forces, was lost to the armed forces of the China. This became possible because nowadays, China is not only an economic but also a military power. Economic development allowed China to create new military units and expand them into more and more advanced regions. By assuming a defense policy, China began to make its old aspirations to dominate the seas and oceans more realistic. The waters around Taiwan, recognized by Beijing as its rebel province, and the areas in the South China Sea, where China has so far had territorial disputes with its neighbors (Vietnam, the Philippines and Malaysia) have become a key area.
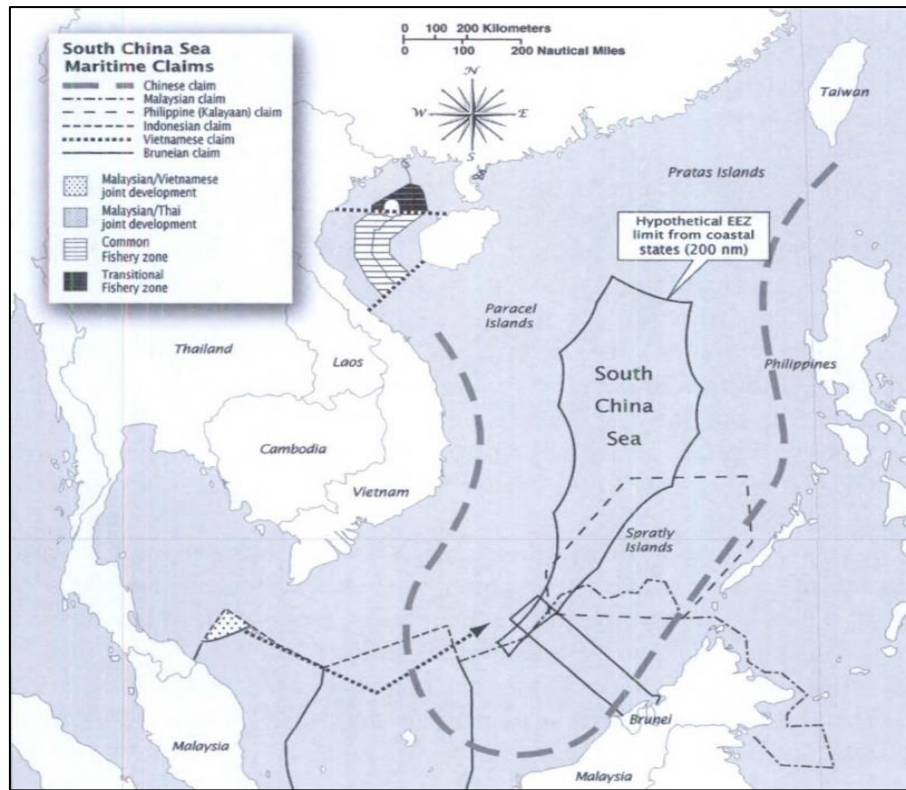
Figure 1. South China Sea claims – marked in dotted line (South China Sea Maritime Claims, Adopted from: National Defense University Press, Public domain, via Wikimedia Commons, 2011, Source: https://commons.wikimedia.org/wiki/File:South_China_Sea_Maritime_Claims.jpg).

Interestingly, China's current dominance in this area is based not on its overwhelming military potential, but on developing strategic strike capabilities within the framework of the A2 / AD systems being developed. These systems make it possible to isolate and maintain potential enemy naval forces (in the intention of the US forces) at large distances from continental borders (Permal, 2014). Keeping the aggressors away from their own territory is possible mainly by dislocating A2 / AD systems on artificial reefs and islands in the South China Sea. The adopted defense concept is based on the use of specialized military means, including reconnaissance satellites, radars, anti-ship and ballistic missiles, anti-aircraft systems and attack aircraft. The concentration of these weapons on artificial islands (rebuilt reefs) located far from the coast of mainland China deprives the US Navy, and above all the US NAVY carrier groups, of gaining an advantage in this region.

Figure 2. Fiery Cross Reef a militarized and controlled by China reef located in the South China Sea (Fiery Cross Reef 2020 jpg., Adopted from: SkySat, CC BY 2.0, https://creativecom-mons.org/licenses/by/2.0, via Wikimedia Commons, Source: https://commons.wiki-media.org/wiki/File:Fiery_Cross_Reef_2020.jpg)

The implemented scale of the military projects shows growth of China's arms budget. It is the second largest budget in the world just after the US. In 2021, it amounts 1.35 trillion yuan ($ 208.47 billion). Deployment of China's A2 / AD systems in distant territories means that, at least for the moment, the United States do not have the capability of responding and restoring its dominance in the disputed areas. In addition, the latest Chinese anti-ship mis-siles Donfeng DF-26 with the range 5,000 km could threaten US aircraft carriers, even though they are outside the China Sea (Guizner, 2016).

Therefore, it can be concluded that Anti-Access / Area Denial (A2/AD) systems could diametrically change methods of war conducting. The aircraft carriers perceived so far as the main power on the seas and oceans lost their primacy in the face of the possibility of using long range (thousand kilometers) anti-ship missiles or strike groups of planes located on artificial islands. That is the way the A2 / AD system changed the balance of power in the South China Sea and some parts of the Pacific Ocean. Despite the fact that Chinese A2/AD has a defensive and regional character which is historically associated with the China terri-tories, one cannot exclude that there is a change of military balance in the South China Sea region. What is worrying the most is the scale of expenditure on Chinese armaments and the establishment of the first (in 2017) Chinese military base on another continent in Dzibutti (West Africa). Declared as a logistic base, it was created to ensure the safety of the Chinese merchant fleet. So far, its tasks have been focused mostly on the supply and maintenance of warships. The warships stationed there provide peaceful anti-piracy operations to supervise the China's economic interests in Africa. Nevertheless, experts point out that the location of the base has military and geopolitical importance not only for China but also for the whole world. This is because it is a sensitive and strategic area called the Horn of Africa. From this area China could control the movement of the world's merchant fleet flowing through the

Red Sea and further through the Suez Canal to the Mediterranean Sea. It is also possible that this base will be equipped with A2/AD system later. If that happens, it can radically change military force of balance in the Middle East and China can influence from this place on the North Africa and even South Europe countries.

Summing up, A2 / AD systems currently play a central role in China's military strategy and successfully defend the interests of the world's largest economy. The Chinese economy, which is export-oriented and at the same time dependent on the import of raw materials is largely based on the free use of sea routes. For this reason, escort missions in the Red Sea and a permanent presence in the Indian Ocean are crucial for China. At the same time, the strategy adopted by China is to base the Anti- Access/ Area Denial systems in distance areas, which allows them to move the defense line and prevent potentially hostile warships from reaching their shores. Although these actions are defensive in nature, they de facto allow China to pursue an expansive policy, which is particularly visible in the South China Sea. It should be also noted that the Republic of China is developing its navy at a very high pace, introducing over 100 ships (including 2 aircraft carriers) into its service over the last 10 years. These actions can testify to the further expansion plans and exerting political and military influence beyond the area of the declared Chinese territorial waters. Sensing a weakening position, the USA has started working on new strategies that could break through A2/AD zones domination. One of the proposed concepts is based on a multidimensional attack conducted both in cyberspace, in the electromagnetic spectrum, by rocket artillery, unmanned aerial systems, and hypersonic missiles (Hypersonic Glide Vehicle). This last, previously unknown weapon, will be characterized by high precision, and primarily high speeds, several times exceeding the speed of sound, and the ability to carry any type of combat warheads (NATO, 2011). The purpose of using all the above systems in a coordinated manner is to disrupt and disable the A2 / AD command, thus creating conditions for carrying out the next phase, conventional attacks on the other military systems located inside the zones. The breaches created in this way in the defense zones and, at the same time, the inability to strike at long distances will allow the transition to the 3rd phase of the operation and the introduction of land and sea troops supported by aviation in order to take over the areas previously occupied by A2 / AD forces (Behrendt, 2020).

The US concept of counteracting A2 / AD zones proves their great influence on the process of shaping the geopolitical and military situation in the world. These zones can diametrically affect the movement of air and sea in a selected areas and excluding the possibility of deploying opposing ground forces in their vicinity. Assuming China's further economic development, it cannot be ruled out that in the future A2 / AD systems will also be deployed in new areas of interest far away from the country's continental borders. Let's hope it will be dictated mainly by the need to ensure the security of the continuity of supplies of raw materials and energy for the Chinese economy, which is currently the largest and at the same time the most expansive in the world.

A slightly different concept of A2/AD is implemented by the Russian Federation. Historically, the Russian Anti-Access/Area - Denial systems were initially created as a network of defensive bastions deployed around the borders of the largest world territory. Thus, the A2 / AD bastions became the solution that allowed for the concentration of forces in selected areas, while maintaining the ability to act at very long distances. As a result of the concept, the Russians have created as many as nine A2 / AD systems, ranging from Vladivostok and Kamchatka, to the western borders of Europe. Over time, they also began to be deployed in sensitive regions in order to dominate the military situation and extend the sphere of influence to opposite border states and their allies. An example of such activities is dislocation of the A2/AD system in the Kaliningrad Oblast, which is a Russian exclave bordering with NATO countries, or the dislocation of A2 / AD systems in areas of military conflicts in which Russia is currently involved (Crimea and Syria). So far, the Russian Federation maintains as

many as 11 A2/AD, 9 of which directly serve to defend its borders, while the rest are created to influence the local political and military situation or to gain an advantage in the area of military operations. Below is the list of A2/AD systems as of August 2016:

1. Kaliningrad;
2. Murmansk / Polarnyj;
3. Saint Petersburg;
4. Moscow;
5. Novorossiysk;
6. Vladivostok / Nakhodka;
7. Petropavlovsk/Kamchatka;
8. New Earth;
9. Tiksi;
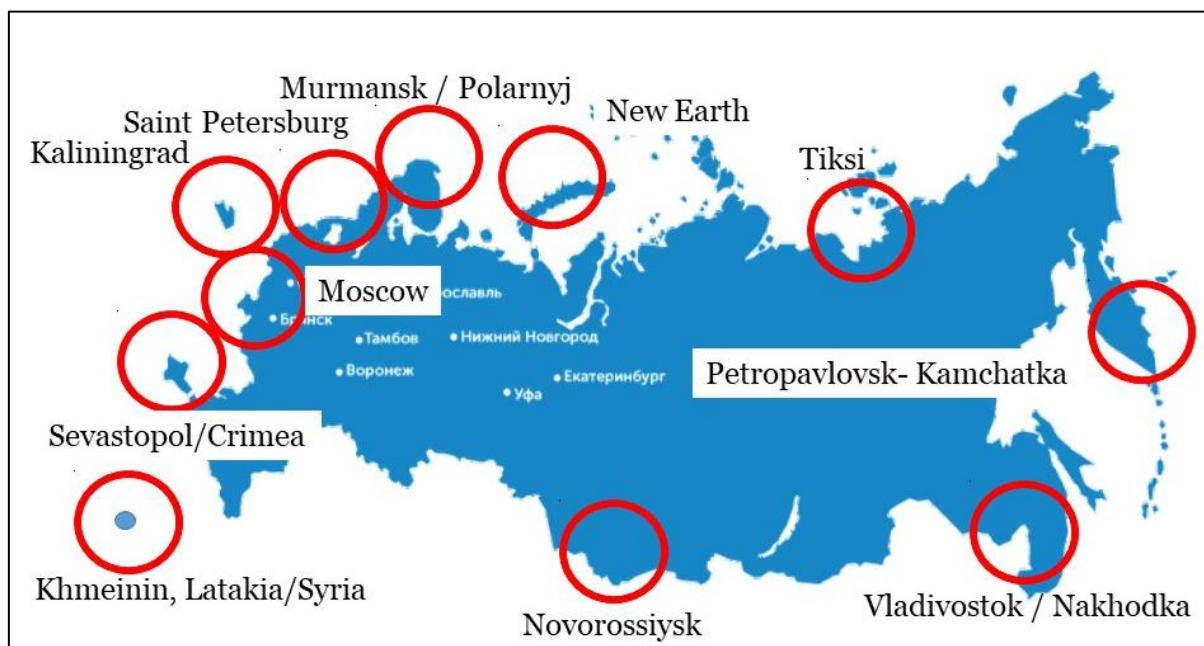10. Sevastopol/Crimea;
11. Khmeinin, Latakia/Syria

Figure 3. Dislocation of Russian's A2/AD systems(The authors own work)

A striking example of the creation of the A2 / AD system, which affects the political and military situation in the region, is the one established in the Kaliningrad Oblast which is the most western Russian exclave bordering the NATO countries. The Kaliningrad Oblast is cut off from the rest of the country, borders Lithuania and Poland, and from the north, it has an extensive coastline on the Baltic Sea. In a straight line, the Kaliningrad Oblast is about 250 km away from the borders of the Russian Federation. The distance to be covered by land routes from the Kaliningrad Oblast to the Russian border is 450 km, while the sea route to the nearest Russian port (Saint Petersburg) is estimated at approximately 550 nautical miles. This territory has strategic military and economic importance for the Russian Federation. The process of increased militarization of the oblast began in 2009, when Russia entered the phase of economic crisis and, at the same time, increased its military expansion. In the following years, Russia invested in non-military means of combat, which ultimately led to the transformation of the Kaliningrad area into the Russian A2 / AD zone (Sukhankin, 2018).

A particularly significant increase in spending on the militarization of Kaliningrad and its alienation from Western partners was visible in 2013, during the Ukrainian crisis when Russia took over Crimea and eastern Donbass. This zone is currently the most heavily armed of all A2/AD zones and allows for the supervision over air, land and sea space in Baltic Sea and most of central Europe. It is estimated that about 12-15 thousand soldiers are currently stationed there. They are equipped with:

    - combat aircraft (689th Reg Su-27 and 4th Reg Su-24, Su24MR, UAV Squad),

    - air defense systems (183rd Reg S-400, 1545th Reg S-300, 22nd Reg Pancyr-S1,),

    - long-range reconnaissance and EW systems (142nd EW Battalion, 302nd Reg),

    - ballistic missile and winged missile systems (152nd Brig Toczka- U/M, Iskander -M, 244th Brig BM-21, 2A36, Hiacynt-B),

    - marine and coastal missile systems (25th Costal Missile Reg Bastion-P),

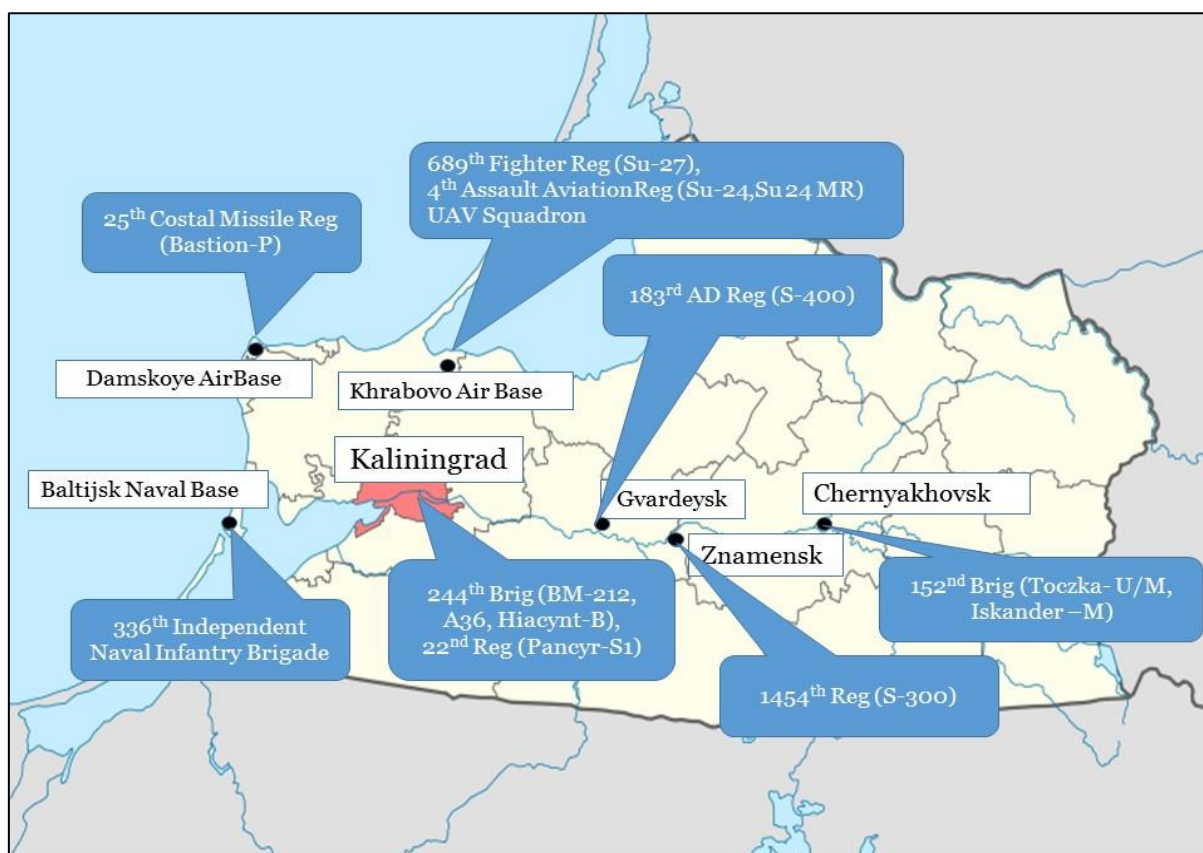   - submarine and surface warships.

Figure 4. Dislocation of the main forces in the Kaliningrad Oblast A2/AD (The authors own work)

S-300 and S-400 long-range anti-aircraft systems can be distinguished among the most dangerous air defense systems deployed in the Kaliningrad Oblast. Depending on the version and type of missiles, they allow for the destruction of air targets at distances of 150 km (S-300 PMU set with a 48N6E missile), 200 km (S-300 WM set with a 9M82M missile), and even 400 km (set S-400 Triumph armed with 40N6 missile). Of course distances of 400 km are achieved only when air targets are flying at very high altitudes. Therefore, the full ability of the S-400 system to destroy air targets is assumed at distances about 250 km. The S-300 / S-400 systems are multi-channel, thus they can engage several or a dozen targets simultaneously, including ballistic missiles and winged missiles. The dead zones of both of

the systems are supplemented (covered) by the following short-range anti-aircraft systems: Pancyr, Tor M-1, Buk and Tunguska.

From the NATO perspective, the A2/AD system deployed in the Kaliningrad Oblast poses a particular threat to European countries. In the event of a possible conflict, Russian troops and weapon dislocated in Kaliningrad allow the Baltic countries to be cut off from the supply and support NATO lines of communication in a very short time. In this regard, the special perception should be focused on the "Suwalki Corridor" called also "Suwalki Gap". This is a small land located between Kaliningrad Oblast and Belarus, a Russian ally. This area is a 100 km long border between Lithuania and Poland,, and the main route of land communication between the Baltic states and the rest of Europe. The seizure of the "Suwalki Corridor" by Russia would enable a connection for Russian troops from Belarus, while simultaneously cutting off Lithuania, Latvia and Estonia from land communication with other NATO countries. This area is extremely important for ensuring the security of the Baltic states, the former Soviet republics, towards which Russia's policy is conducted from the position of the dominant state. At the same time, US politicians and military commanders point out significant infrastructural, communication and organizational shortcomings that prevent NATO countries from quickly redeploying forces and reacting in this area. It is commonly known that Russia and Belarus would show interest in this area in the event of a potential escalation of conflict with NATO countries. A clear example of these efforts are the joint military exercises carried out close to the Polish and Lithuanian borders. An example of this can be exercise ZAPAD-17 cared oud where Poland and Lithuania were presented as aggressors defeated by the joint forces of Russia and Belarus. During the exercise, the Russians moved air defense systems and tactical Iskander-M ballistic missiles from their bases in Russia in order to strengthen the A2 /AD system in the Kaliningrad Oblast, and then carried out their simulated massive attack on the aggressors. The ZAPAD -17 maneuvers were a kind of offensive war with different combinations of simulated attacks on the Baltic states, air strikes at the Lithuanian border and landing troops at the Estonian - Latvian border. The offensive combat variants were also practiced by Russia in earlier years during the ZAPAD-09 and ZAPAD-13 exercises.

Figure 5. Location of Suwalki Corridor (Gap) and possible Russian military actions
(The author own work based on google.maps.com)

The presented actions of Russia and neighboring Belarus allow us to conclude that the "Suwalki Corridor (Gap)" is one of Russia's strategic priorities, after wide access to the Baltic Sea. The main threat to Poland and Lithuania is also the possibility of restricting or blocking access to the ports in the Baltic Sea by naval and missile forces stationed in the Kaliningrad Oblast as part of the A2 / AD system. Affecting trade routes to Gdansk and Klaipeda could result in large economic losses and political destabilization in the Baltic Sea basin. The forces deployed in the oblast (the Russian fleet and costal missile systems) also allow for having an impact on the Scandinavian countries, including neutral Sweden and Finland. There is a widespread belief that Russia's ability to restrict access in the Baltic Sea region may be used to close this basin. This would be aimed at preventing the displacement of naval forces, as well as cutting off the Baltic states from providing land and air military support to their Western allies. Therefore the "Suwalki Corridor" would be the only place from which NATO reinforcements for the Baltic states could arrive. The sea and air routes would be too dangerous to use them in the first phase of conflict due to the strength of the Russian Baltic Fleet and their air superiority in this area.

The dislocation of such a large number of troops in such a small area and the creation the A2 / AD zone has a great impact on European security and the efficient functioning of the Alliance. As a result of that situation, NATO countries decided in 2016 to dislocate four multinational battalion battlegroups with locations in Poland and three Baltic States. The aim of the initiative called Enhanced Forward Presence (eFP), was to increase the defense on the eastern flank of the Alliance bordering the Kaliningrad Oblast. The NATO Battalion Battle Group (BGB) dislocated in Poland started its service on April 13, 2017. The core of the battalion consists of US armored cavalry soldiers. However, it also includes soldiers from Great Britain, Romania and Croatia. The Battalion Battle Group in Lithuania was formed by the German, Belgian, Czech, Dutch, Icelandic, French and Norwegian troops. The Latvian

BGB is made up of allies from Canada, Albania, Montenegro, the Czech Republic, Iceland, Poland, Slovakia, Slovenia and Italy. The Estonian BGB, on the other hand, relies on the support of Great Britain, Denmark and Iceland. Each of the 4 BGBs consists of about 1000-1500 soldiers who conduct a series of training courses to maintain their constant combat readiness. These soldiers operate in a six-month rotation system.

The strengthening of NATO forces as part of the creation of the multinational rotating BGB made the occupation of the "Suwalki Corridor" by Russia to be considered unlikely, mainly due to the unpredictable political consequences and the involvement of many countries in the conflict and due to NATO's military and economic advantage. Moreover, it is believed that the Russian Federation, due to the size of its territory and de facto encirclement by the United States and the presence of China, cannot afford to weaken the A2/AD garrisons in the eastern part of the country. The only method by which Russia could gain an advantage is to divide and deepen disputes between NATO countries using the "Suwalki Corridor" as propaganda to affect Poland and Lithuania and building tension in relations between NATO and Russia.

Looking at the A2/AD system dislocated in the Kaliningrad Oblast, one can conclude that it performs both offensive and defensive functions. Firstly, it allows for military domination and isolation in a sensitive area, while on the other hand, it is a part of the network of defensive bastions on which Russia secures its borders. However, some Russianists argue that it is incorrect to believe that Russia will not start a conflict against NATO, others foresee this possibility. Unfortunately, as recent history shows, what is irrational for Western countries may be logical for Russia (it is so-called mirror imaging phenomenon described as assessing the ways of acting of aggressor from our perspective instead of from aggressor's position). An example of such thinking by Western countries was the initial ignoring of Russian actions during the annexation of the Ukrainian Crimea or Russia's involvement in the operation in Syria. These actions came as a big surprise to many countries and initially met with their lack of reaction. Presently, the concerns of Europeans related to A2/AD Kaliningrad Oblast are following:

- The possible deployment of a large number of nuclear warhead-capable Iskander-M mobile missile complexes with ranges that cover the entire Baltic Sea and most of Central Europe countries,
- Quick possibility to reinforce A2/AD troops by air or sea military transport which allow to build the Russian military advantage in the region,
- Convenient dislocation of Russian troops to start a hybrid invasion on the former Soviet republics (Lithuania, Latvia and Estonia),
- Borders with Suwalki Corridor – strategic place which can be easily occupied or used as a perfect terrain for force connection with Belarus in order to cut the three Baltic countries off from their NATO allies,
- Conventional long-range strike capabilities against NATO countries using cruise missiles Kalibr and strike bombers,
- A combination of tactical and strategic military exercises named ZAPAD (conducted in an atmosphere of secrecy and non-transparency) as a potential start for Russian military intervention,
- Information and psychological war (specially aimed at Poland and Lithuania) and constant provocations (force present) in the sea and air space,

On the other hand, objectively looking at the map of the Baltic Sea, it can be noticed that NATO controls most of its territory. It should also be noted the actual ranges of Russian missiles are very often smaller than declared, What is more important, Russian forces suffer from a lack of long-range reconnaissance capacity indispensable for effective missile guiding and hitting targets at long distances. Therefore, looking at the A2 /AD systems realistically, one can also notice many other limitations, including:

- There is always not enough air defense systems to protect all of the sensitive assets in the area,
- Long range air defense systems have to be protected by medium or short range AD systems, requiring great efforts and the need of force movement from other unprotected areas,
- Declared AD ranges (300- 400km) are only realistic in terms of targets that are flying at a very high altitude (normally they fly at low levels to avoid radar detection and shooting by AD systems),
- Satellite surveillance gives insufficiently precise guides for Russians maritime and land long rage-missiles. The technology is still underdeveloped and NATO has a reliable anti-satellite weapon,
- A high concentration of forces in a small area makes them an easy target. It is supposed that in future various types of unmanned vehicles, like aerial, sea and land, will be crucial in defeating enemy A2/AD systems.

Despite these limitations, Russia continues to pursue its strategy of deploying A2/ AD systems in the areas of its military and political interest. Since the annexation of Crimea in 2014, it has also drastically increased its presence in the Black Sea region. Russians A2/AD systems have practically covered all of the Black Sea to deny other countries' access and free movement. Within five years, the number of Russians troops increased from the initial 12,000 (before illegally seizing Crimea) to 32,000 aiming to reach 43,000 in 2025. Currently, the following units and A2/AD systems are stationed on the Crimean peninsula:

- 31st Air Defense Division composed of two AD regiments: 12th Air Defense Regiment and 18th Air Defense Regiment (S-300PM and S-400, Pansyr S1) 1096th Reg (SA-8 OSA, Buk),
- 27th mixed aircraft division composed of three fighters regiments (37th, 38th, 39th) equipped with e.g. Su-27SM, Su-30M2, Su-3M2, Su-24M, Su-25, Tu-22M3, Ka-52, Mi-28N, Mi-35M, Mi-8AMT, 43rd Independent Naval Reg (Su-24,Su-24MP, Su-30SM) 318th Independent Mixed Aircraft Regiment (An -26, Ka-27),
- 15th Independent Coastal Artillery and Missile Brigade (1st Bastion-P and Bastion-S Squadron, 2nd Utios Stationary Squadron, 3rd Bal Squadron),
- 475 th Electronic Warfare Center (including the Murmansk-BN high power reconnaissance and jamming system),
- Different classes of submarines (5) and warships (30) with Kalibr missiles.
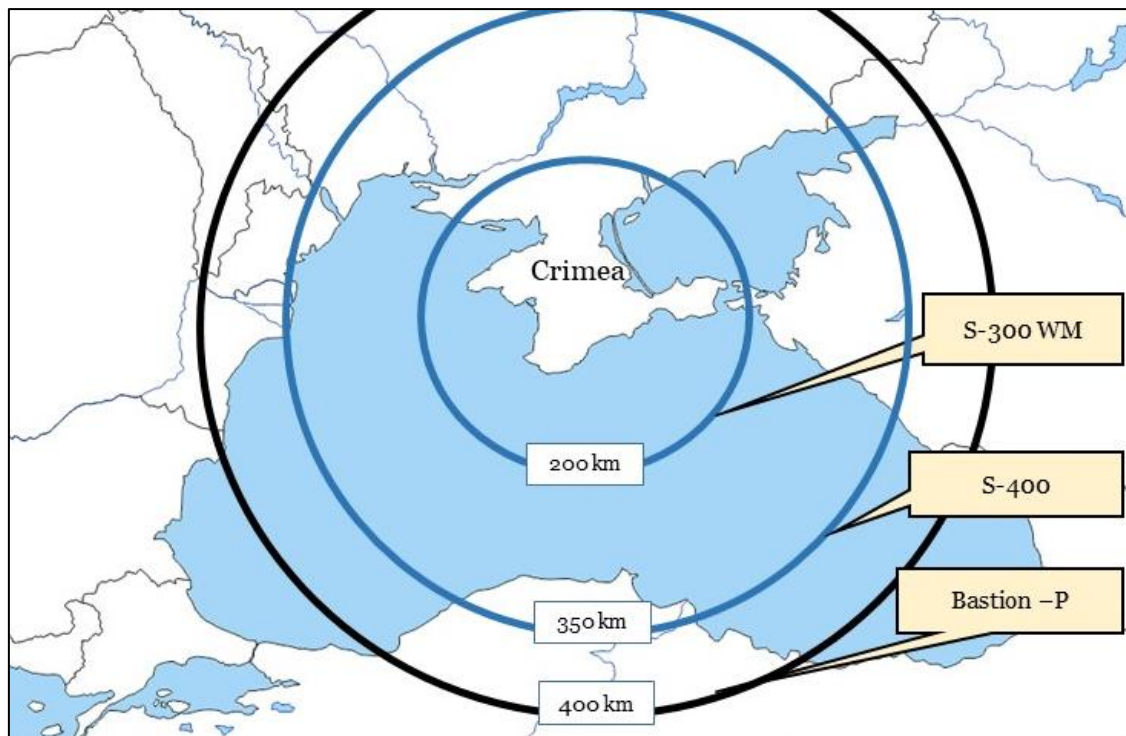
Figure 6. Estimated ranges of selected Russian missile systems located in Crimea A2/AD (The Author own work)

Coastal defense created under the A2/AD system with its Bal and Bastion anti-ship missiles can destroy not only Ukrainian ships, but also Romanian and Bulgarian ones, as well as those located in Turkish ports. In addition, the ranges of the S-400 anti-aircraft systems, supported by the Pansyr S1 and SA-8 OSA systems and Tu-22M3 Backfire bombers cover most of the Black Sea basin. Furthermore, Kalibr missiles, thanks to their ranges, could hit targets in southern and eastern Europe, central Asia and the Middle East. Electronic reconnaissance and electronic warfare facilities located in Sevastopol are also an integral part of this system. They can monitor the movement of all ships not only in the Black Sea but also in the Mediterranean Sea. In this manner, Russia gives a clear sign to Western politicians that they may face clear resistance if they wish to support Ukraine militarily. In addition, in the Black Sea region, Russia constantly conducts psychological activities and demonstrates its strength e.g. by performing low-pass flights close to NATO ships. Russia is also modernizing facilities in Crimea that were used in the past to store nuclear weapons. Therefore, it should be noted that, among others, the mentioned Tu-23M3 bombers, Bastion coastal defense system and Kalibr missiles and submarines have the ability to carry nuclear warheads.

Unfortunately, at the moment, there is no agreement between NATO countries on how to restore the balance of power in the Black Sea basin. The idea of creating a joint Bulgarian-Romanian flotilla as a response of the Alliance countries to the Russian military potential accumulated in Crimea has also fallen. One of the obstacle in restoring the balance of power in the Black Sea is the 1936 Montreux Convention. It limits the tonnage of warships entering the Black Sea and the duration of their stay in this area to 21 days. For these reasons, the US, GB, France and other NATO nations must constantly rotate their warship presence there. Military control of the Black Sea is essential for Russia, giving them access to the Balkans and the Mediterranean Sea. Some observers of the political and military situation claimed that the expansion of the A2 / AD system within Crimea may indicate that Russia still feels insecure in this region, as many countries do not accept the annexation of Crimea

and recognize it as an integral part of Ukraine. As it turned later, this system gave the Russians perfect military access to Syria conflict (e.g. Bastion coastal defense system was delivered from Crimea to Syria as part of the local A2 /AD system built up there by the Russians). In addition, during the Syrian conflict, the activities of the Russian troops were supported by ships in the Black Sea that carried out missile strikes against targets in Syria.

The Russian A2/AD dislocated in Syria was established to protect sea (Tartus) and air (Latakia) expeditionary bases. As part of creating this system, the following equipment was brought to Syria:

- 2* S-400 system batteries at Khmeinin, dislocated at Latakia and Masyaf,
- S-300 system battery at Tartus,
- Bastion-P battery in Masjaf,
- EW 1RŁ257 Krasucha-4 system in Khmeini,
- Admiral Kuznetsov Aircraft Carrier with about 30 Su-33,
- Additionally project 21631 Bujan-M missile ships were on duty in the Kaspisian Sea, which, equipped with Kalibr cruise missiles with a range of 2,500 km, attacked targets in Syria.

Figure 7. Ranges of Russians missile systems dislocated at Syrian A2/AD (Author own work)

Initially involving to the Syrian conflict, Russia declared that its military activities would be limited to the combat aviation and would be directed only against the so-called Islamic State (IS). However, the first weeks of the Russian operation in Syria confirmed the earlier assumptions made by many observers that the Kremlin's goal is not to fight with the Caliphate, but to defend the regime of President Bashar al-Assad. Moscow chose not only the very moment of starting its intervention (at the end of September 2015), but also its scope and nature of the military means used, mainly in the form of bombing and aviation assault. As a result of the two weeks of Russian air support for pro-government Syrian

ground forces, the opposition formations operated in the provinces of Idlib and Latakia stopped their offensive activities.

Generally involving the Syrian war, Russia has to show its military power and presence in the world. This means this was also an attempt to re-establish Russian Federation activity in this part of the world in a much more "concrete" way than it has been in the past 25 years. Using the A2/AD system, they have protected their expeditionary forces and took control over most of the joint operation area. In addition to the base expansion agreement with Syria, Russia has deployed sophisticated anti-aircraft and anti-ship missile launchers, and strategic bombers. When Russia completed its mission in December 2017, it began slowly to replace the combat air wing in Khmeini with more interdiction assets. The dislocation of A2/AD systems gives Moscow a number of strategic benefits, such as the possibility of using its naval and air military installations with a real influence on the Middle East region while simultaneously countering NATO's relative influence. Such a capability creates considerable political and security challenges for the alliance especially by denying NATO access to the Black Sea, the Baltic Sea, and now to the eastern Mediterranean regions (Paravincin, 2016). Success in establishing an A2/AD zone in the eastern Mediterranean would deny NATO the ability to take "action against Russia or its allies in the region (Georgetown SSR, 2017)." It may be observed that Russia is pursuing this endeavor via three main paths: (1) posturing a credible and present military force; (2) exploiting fissures within US and Western relations with regional allies, to include Egypt and Turkey; and (3) establishing a permanent base agreements (Altman, 2016). Additionally, Russia's access to the region currently relies heavily on positive or at least neutral relations with Turkey, the only state with the power to block Russia's access route from the Black Sea to the Mediterranean Sea.

Summary

In recent years, Since now the military conflicts conducted by regular armies have been based on a pattern in which the main aim of first phase was to win airspace dominance over the theater of operations in order to ensure freedom of action for the navy and army. For many years, this concept has been mainly developed by NATO countries and led by the USA. In response, the Russians and the Chinese began to develop a strategy that NATO planners have started name A2/AD (Anti-Access / Area-Denial). It involves the deployment of long-range missile systems surface-to-air/surface/water, long range radars and radio-electronic jamming systems in the Joint Operations Area (JOA). Thanks to them, Russia and China became able to establish a full control zones which are completely closed to enemy air and sea operations. The size of the A2/AD areas are mostly defined by the ranges of its combat systems. It can also be observed that China and Russia are constantly developing their military technologies and increasing the ranges of their missile systems. Today, they are able to create excluded A2/AD zones with a radius of between 400 and 600 km (depending on the type of missiles located inside zones). Although the strategy based on A2/AD has its previous defensive character, nevertheless it could also be successfully used to achieve the offensive military goals. A2/AD strategy exert political influence on border states, push them out of hitherto areas of influence and make long-term changes in selected regions of the world. This is especially visible in the South China Sea, the Crimean Peninsula and the eastern part of the Mediterranean basin where China and Russia has established their A2/AD zones.

Nevertheless, comparing the Russian A2/AD strategy to the Chinese one, it should be noted that the former is more aggressive. Russia often uses A2/AD systems to provoke strong political and military reactions, especially from NATO countries. This was visible during ZAPAD exercises carried out in the area of Kaliningrad A2/AD zone and the "Suwalki Corridor", especially when Russia deployed Iskander missiles to the Kaliningrad Oblast without prior announcement. In addition, Russia began to use the A2/AD concept for offensive purposes and to dominate in the areas where it conducts military operations. It was especially noticeable during the conflicts in Ukraine and Syria. However, it cannot be excluded that in the future other countries which possess A2/AD abilities will use this offensive strategy too. Its advantage is the possibility of achieving dominance in the air, sea and land in a very short time and effective isolation of the opponent's actions. Summing up, it can be observed that the original defensive character of A2/AD systems has evolved and now they are more often use for offensive purposes and military operations. In the author's opinion, the presented research results allow us to confirm the previously formulated hypothesis. They also point out that the dislocation of A2/AD systems will be the leading concept of future military operations and will have a large impact on world military and geopolitics relations. The briefly described results in the article are also a part of a larger research project entitled: "Functioning of the Anti-Access/Area –Denial (A2 /AD) in operation" in which author has been involved since 2018.

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.

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