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MISSILE DEFENSE SYSTEMS

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ABSTRACT

This paper deals with Missile Defense Systems' debate and their political effects, covering structures that combine air-to-surface missiles (SAMs), radars, computer, command and control stations. The project of an anti-missile defensive shield dates back to the Soviet-American Cold War rivalry. However, nowadays, these capabilities have spread throughout the world, encompassing also regional powers and their strategic environment. These systems have been placed everywhere, causing impacts in several spheres. Reportedly, their installation purposes are strictly defensive. Nevertheless, given their technical features, these systems can be also responsible for affecting others countries' most reliable strategic defense: their capacity to retaliate against foreign aggression. Therefore, these "defensive" weapons can be converted into offensive tools, and so they may degrade international stability: in one way, by nullifying the diplomatic means, which are in part resulted by the reciprocal vulnerabilities; and, in the other way, generating insecurity and uncertainty in eventual crises, due to preemptive incentives. The debate generates complex situations, and questions must be addressed, such as to clarify the border between national security and international instability. Thus, the relevance of this topic rests not only on the higher political spheres, but also on the conduct of military, economic and social interaction throughout the globe.

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Although it cannot be characterized as peaceful, the modern interstate system have not yet witness another major war between great powers since the World War II. Indeed, the creation of the United Nations (UN) and the institutions-based governance are responsible in large part for the greater stability in the international system (IS). In this sense, although most of the authors (neorealism-oriented) recognize the predominantly anarchic nature of the IS, institutions have an undeniably role in preventing the clash between great powers.

In this context of gradual institutionalization of the IS, some questions still holds a high sensitivity between countries. Perhaps the most prominent issue is related to conventional and nuclear military capabilities. The mere fact that the countries own and develop such capabilities, forces analysts to keep an eye on the realistic approach to International Relations (IR). Hereby, the claim that States' main purpose is related to their own safety is perhaps incontestable.

Therefore, international institutional framework has the challenge of keeping stability in an anarchy context, where each state seeks to create the necessary capacities to preserve its own existence. Hence, it is common to see discussions about nuclear or long-range missiles proliferation. More rarely are the topics related to "defensive" capabilities, as the missile defense systems, even they been capable, in certain configurations, to cause further instability to the IS than offensive systems.

Questions regarding the anti-ballistic missile defense systems, accordingly, must be treated seriously by the international community, particularly when we consider the destabilizing potential that they have since the Cold War. As will be seen later, many scholars believe that the nuclear stalemate of the Cold War prevented the direct clash between U.S. and USSR, and still remaining nowadays as an important stability factor in the IR (Lieber and Press 2006; Piccolli 2012; Martins and Cepik 2014). Then, in order to maintain stability, on the offensive hand, is essential to prevent the uncontrolled increase in nuclear-capable missiles or related. On the defensive hand, however, the international community must address the missile defense systems and the threshold which they threaten the security of other countries – through the elimination of their deterrence capacity –, and therefore the system stability

1 HISTORICAL BACKGROUND

The project of an anti-missile defensive shield dates back to the Cold War period, being necessary to look at its first initiatives for better understanding the actual systems around the world. At that time, both superpowers, the United

States of America (U.S.) and the Soviet Union (USSR), were deeply involved in an arms race, developing projects and new technologies to overcome one another. In this sense, it is important to comprehend the first Anti-Ballistic Missiles projects designed by both sides, the treaties that followed this projects and the maintenance of mutual vulnerabilities. After that, it is necessary to discuss the Strategic Defense Initiative of the Reagan Administration and its unwinding, the beginning of the American initiatives towards the end of the mutual vulnerabilities.

Since the end of the World War II, the Americans have been dedicating their time on projects of antimissile defense systems. It happened after the Germans launched V-1 and V-2 missiles – the world's first ballistic missile – over Great Britain and the Allied forces in France. This fact caused a big impact in the U.S.: they immediately started with researches in defensive countermeasures. In the following years, the Soviet development of nuclear weapons and long-range heavy aircraft, led the United States efforts to the creation of systems capable of striking Soviet bombers. This explains the development by the US Army of the Nike surface-to-air system[1] during the 1950's (Burns 2010).

In the next decade, however, as the Cold War unfolded, the U.S.' perceived threat changed from bombers to missiles and both U.S. Army and Air Force started to develop plans for anti-ballistic-missile defense (Berhow and Taylor 2005; MDA 2013). The growing threat of an expansionist Soviet Union[2], that had been developing long-range missiles, as the Intercontinental Ballistic Missiles (ICBMs), stimulated the development of Anti-Ballistic Missiles (ABM) capabilities in America[3] (MDA 2013). The Nike-Zeus nuclear-capable interceptor, a result of the former Army's program Nike, was the first system of this kind. Although it proved its ability of hitting Soviet ICBMs, it was substituted due to problems in its radar systems, in the early 1960's, by the improved Nike-X program[4] (Berhow

1 This system was deployed in 1953 during the Eisenhower Administration in U.S. cities and airfields to provide protection from Soviet bombers. The Nike-Ajax system was of short range and used liquid fuel, while the Nike-Hercules, an improvement of the previous, used solid fuel and had a larger range (Burns 2010).

2 The Soviet Union announced a successful test flight of an SS-16 ICBM in August 1957, and on October of the same year the Soviets launched Sputnik, the world's first artificial satellite (MDA 2013).

3 The arms race with USSR also stimulated the production of ICBMs in the U.S. For example, in 1959 and 1961 the Atlas D and Atlas E ICBM became operational. In 1962, Atlas F and Titan I became also operational and in 1963 came the Minuteman I developed throughout the Cold War (Berhow and Taylor 2005).

4 According to MDA (2013), the key components of the Nike-X ABM system included advanced phased array radars that could detect and track a large number of objects simultaneously; a new nuclear armed, high-acceleration, terminal defense missile called the Sprint; and the longer-range Nike Zeus interceptor, which was modified and renamed Spartan, for high altitude targets (MDA 2013).

and Taylor 2005).

However, with the beginning of the Lyndon Johnson administration in 1963, the president and the Secretary of Defense Robert McNamara, defended a different approach to deal with the Soviet missile threat. The American ABM systems like Nike Zeus weren't proving its effectiveness and the U.S. intelligence reports affirmed that Soviets systems would be operational already by 1966 (MDA 2013). So fearing such threat, both of them, the President and the Secretary of Defense,

> believed the best way to counter the deployment of a Soviet ABM system was through an arms control agreement or by overcoming it with offensive weapons. They resisted calls from members of the Joint Chiefs of Staff and members of Congress to match the Soviets and deploy the Nike-X ABM system, which they believed would have fueled a new and expensive arms race, until a different potential ballistic missile threat emerged (MDA 2013, 9).

Yet in 1967, the failure of the talks with the Soviets about an arms control agreement and China's detonation of its first hydrogen bomb led McNamara to announce the reinvestment of funds for deploying a thin-line ABM system based on the Nike-X program. Designed to deal with China less threatening missiles, this system was renamed Sentinel, protecting mainly the urban areas (MDA 2013, Burns 2010).

Nevertheless, the election of a Republican president, Richard Nixon, in 1969, changed ABM landscape: while deploying an antimissile system, Nixon has resumed ABM programs' negotiations with the Soviet Union. In addition, he has reoriented the defense systems from urban areas to the Minuteman ICBM storing sites, and renamed the system Safeguard (MDA 2013). Also in the early 1970's, both superpowers would come to table to negotiate, resulting in the Strategic Arms Limitation Talks (SALT) and the Antiballistic Missile Treaty in 1972 (ABM Treaty). The ABM treaty, signed by American President Nixon and Soviet leader Brezhnev, defined that each side would be entitled to two ABM sites, one near the national capital and one at an ICBM field – with no more than 100 ABM interceptor launchers each (Burns 2010, Pifer 2012)[5].

Another important part of the ABM Treaty is the Article V that states

5 According to Berhow and Taylor (2005), the immediate result of the ABM Treaty for the U.S. was the limitation of the Army Safeguard ABM system to just one site near Grand Forks, North Dakota. By the Treaty each superpower could have two sites, but a later Protocol in 1974 defined that each would be allowed to stay with only one site with 100 interceptors. By that time, Soviet ABM main system consisted of the A-35 installed to protect Moscow from an American attack (Burns 2010).

"Each Party undertakes not to develop, to test, or to deploy ABM systems or components which are sea-based, air-based, space-based, or mobile land-based". This part represents the concerns of that time regarding the future technologies that could be developed and the restrictions they should have. Other relevant part states that

> the Parties agree that in the event ABM systems based on other physical principles and including components capable of substituting for ABM interceptor missiles, ABM launchers, or ABM radars are created in the future, specific limitations on such systems and their components would be subject to discussion...and agreement (Burns 2010, 27).

It is important to bear in mind that the ABM Treaty represented a compromise of both superpower with the protection of the deterrence system (Burns 2010). According to Freedman (2003, apud Martins and Cepik, 2014), the concept structured by the Treaty recognized the maintenance of reciprocal vulnerabilities as the only element capable of assuring international balance, since any pretension of winning a nuclear war would be unreal. None of them would be able to launch a first-strike and completely blockade a second-strike from the other because the limitation on ABMs numbers. This form of deterrence – Mutual Assured Destruction (MAD) – lasted in the 1970s and through the 1980s (Berhow and Taylor 2005).

A significant change in the scenery of the ABM Treaty, however, happened when American President Ronald Reagan took office in 1981. He "desired a strategic alternative to the national security policy of nuclear deterrence and mutual assured destruction that left America defenseless against Soviet missile attacks" (MDA 2013, 12). At the same time, he was being advised by the Joint Chiefs of Staff to pursue a national security strategy with an increase emphasis on strategic defense (MDA 2013). All these factors led to the announcement, in 1983, of a major new program, the Strategic Defensive Initiative (SDI). Soon it became widely identified as "Star Wars", in a reference of the science fiction film (MDA 2013).

The SDI managed an expanded missile defense program that should combine the existing projects of the different governmental agencies (MDA 2013). The SDI program included technologies such as "ground-based interceptor missiles with 'hit-to-kill' capabilities, that is, they would destroy an incoming ballistic missile warhead by directly colliding with it (…)" (Pifer 2012, 6). It also included space-based systems, like sensors and interceptors[6]. According to Pifer (2012,

6 Brilliant Pebbles was a space-based interceptor composed by many small autonomous parts. It was a hit-to-kill interceptor, a technology that destroys the missile by coalition (MDA 2013).

6) "many of these technologies appeared to be potential violations of the ABM Treaty". Furthermore, "systems based on 'other physical principles', such as lasers, were subject to discussion under terms of the treaty" (Pifer 2012, 6).

Reagan's SDI had also the objective of exploring technologies that could destroy Soviet ICBMs in the boost phase[7], probably being "capable of defeating most of the warheads that the Soviets could launch in a retaliatory strike" (Pifer 2012). However, this projects were clearly a violation of the dispositions of the ABM Treaty, and giving it further developments would require "altering or possibly withdrawing from the ABM Treaty" (MDA 2013, 14). By that time the Soviets showed several concerns about the SDI, claiming that the program could be able to defeat most of the warheads that they would launch in a retaliatory strike (second-strike) (Pifer 2012). In other words, the Soviets would lose their second-strike capability, meaning that the U.S. was achieving nuclear primacy[8]. However, in the years of 1986/87 "Soviet scientists had concluded that the U.S. program faced large technological challenges and would not pose a serious threat to their strategic missile force for many years or decades" (Pifer 2012, 6). Furthermore, by that same decade, the Cold War has ended, and with the Berlin Wall's fall, the U.S. reviewed the program.

The revision made in the 1990s, during the George H. W. Bush administration, recommended a reorientation of the SDI to develop capabilities against limited attacks and to protect U.S. - and Allies - overseas forces against short and medium-range ballistic missiles (MDA 2013). The new system, called Global Protection Against Limited Strikes (GPALS), was announced in 1991. According to MDA (2013, 14), "GPALS was an integrated architecture with three components: a global, space-based system of Brilliant Pebbles interceptors; a force of ground- and sea-based theater missile defenses; and a limited, ground-based national missile defense element."

The trend toward theater missiles[9] continued during the next administration

7 The SDI dedicated a particular attention to technologies that could destroy ICBMs during the boost phase. This is the phase before the numerous reentry vehicles (warheads) could separate, so if they could successfully destroy missiles in this period, U.S. defenses would not have to cope with the smaller and dispersed warheads. This is also the phase when the missiles' engines were still burning and provided a bright and very visible target, far easier to see and track than a warhead (Pifer 2012).

8 According to Lieber and Press (2006, 8) the term "nuclear primacy" describes the situation in which one country has the military means to destroy its adversary's nuclear retaliatory capabilities in a disarming strike. Accordingly, the country who holds this rare capability has less incentive to cooperate and to act through peaceful means, since it cannot be deterred with nuclear retaliation.

9 The theater defense missiles are capable of dealing with ballistic missiles of short and medium-range that could threaten the U.S. forces on the battlefield - the theater of military operations (Pifer 2012). According to (Burns 2010), the objective of the Clinton administration was to negotiate

of the Democrat President Clinton. He was concerned with the compliance of the ABM Treaty, therefore, the GPALS were separated into two different components and the Brilliant Pebbles program ended. In 1993, the President also changed the name of the Strategic Defensive Initiative Organization (SDIO) to Ballistic Missile Defense Organization (BMDO)[10]. However, by the second term of the Clinton Administration, a Congress led by Republicans overshadowed the Theater Missile Defense and pressured the President to adopt the National Missile Defense (NDM) Act of 1999 (MDA 2013). It was known also as the Public Law 106-38 and stated that

> It is the policy of the United States to deploy as soon as is technologically possible an effective National Missile Defense system capable of defending the territory of the United States against limited ballistic missile attack (whether accidental, unauthorized, or deliberate) with funding subject to the annual authorization of appropriations and the annual appropriation of funds for National Missile Defense (United States of America 1999).

Although the President signed the NMD Act and searched for alternatives to install the system, he announced that would let this decision to the next administration. His resolution was due to a series of missile defense test failures and a wave of controversies over deploying a NMD system that included debate on altering or withdrawing from the ABM Treaty, once it contravened it (MDA 2013). In the following years of 2000s, the next Presidency would make a very important choice and take a big step towards the Anti-Missile Shield deployment.

2 STATEMENT OF THE ISSUE

2.1 UNITED STATES' NATIONAL MISSILE DEFENSE (NMD)

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amendments to the ABM Treaty with USSR so that a theater missile defense system could be tested and deployed without violating the pact. The agreement came only in 1997, and allowed the deployment of non-strategic defense missiles of and specific class (with velocity of five kilometers per second). (Burns 2010)

10 According to MDA (2013, 15), "The Theater Missile Defense portion of BMDO encompassed several Army, Navy and Air Force programs. These included improvements in the Army's PATRIOT missile, known as PATRIOT Advanced Capability-3, or PAC-3; and a new Army missile initially known as the Theater High Altitude Area Defense, or THAAD. Also included were the Air Force's Airborne Laser project; and the lower-tier Navy Area Defense and upper-tier Navy Theater Wide programs, both of which were based upon significant modifications to the shipborne Aegis air defense system and Standard Missile (SM) interceptor."

2.1.1 THE BUSH YEARS

In early 2001, George W. Bush took over the U.S. presidency and brought to his administration a strong commitment to deploying a missile-defense system in the shortest possible time (Burns 2010). In order to accomplish that, one of the first measures of the President was to send a notification to Russia on December 13th, 2001, indicating the U.S. intention to withdraw from the ABM Treaty, which became effective six months later (MDA 2013). In doing so, there would be no more legal restriction to development of a missile defense shield.

Another important measure that could influence the international system was taken in the next year, 2002, when President Bush issued a statement announcing a National Missile Defense Initiative, directing the Secretary of Defense the responsible for developing the initial elements of a strategic missile defense system by 2004. Under the Bush's leadership, Defense Secretary Donald H. Rumsfeld and the director of BMDO, General Ronald T. Kadish, reoriented the missile defense program. They envisioned an integrated and layered defense that would be capable of attacking warheads and missiles in all phases of flight – boost, midcourse and terminal[11] – as well as provide global defenses against missiles of all ranges. In view of these changes, in that same year, Rumsfeld issued a memorandum changing the name of BMDO to Missile Defense Agency (MDA).

In this sense, the American deployment scheduled to take place in 2004 included 20 long-range ground-based midcourse defense (GMD) interceptors and 20 sea-based interceptors positioned on three vessels (Burns 2010). Among those ones, 16 GMD interceptors were placed in Alaska, where work had begun on six missile silos in June 2002, and four were located at Vandenberg Air Force Base in California. Besides that, an unspecified number of Patriot PAC-3s and the sea-based interceptors would be deployed to protect against short and medium range ballistic missiles[12] (Burns 2010). At the same time, the Bush administration started planning for a European missile defense site to intercept ballistic missiles

11 As states before, the boost phase is the earliest segment of the missile trajectory, when rocket boosters are providing the momentum that will carry warheads to their targets. This phase is followed by the ascent phase, which is the segment of the trajectory after boosters have cut off, but before the payload has separated into warheads, decoys and counter measures. After that, there is the midcourse phase, the longest portion of the trajectory, during which warheads coast through space before reentering the atmosphere. Lastly, there are the descent phase, the initial state of reentry, and the terminal phase, the end of the trajectory, brief stage within the atmosphere immediately prior to detonation on target (Thompson 2009).

12 There were many disagreements inside the U.S. Senate about it. Not everyone agreed with the rushed deployment schedule, especially since it was acknowledged that the majority of the tests with system components had been less than satisfactory (Burns 2010)

launched from the Middle East (Burns 2010).

It is important to highlight the context in which these measures were stated, especially after the attacks of 9/11. This event gave rise to two initiatives that were responsible for the reinvigoration of the SDI – now renamed NMD – during the government of George W. Bush. The first initiative was the "Global Strike", based on the idea of ballistic missiles on land or submarines to destroy terrorist cells. This initiative was fundamental in enhancing American budgetary allocations that sustained research and development common to ballistic missiles and anti-aircraft during the years that followed (Piccolli 2012). However, it was the second initiative that gave the definitive boost to the U.S. to adopt such measures: the thesis of the "Axis of Evil". This was represented by Iraq[13], North Korea and Iran, countries that, according to the U.S. and some of its allies, as the United Kingdom, could make use of ballistic missiles in support of international terrorism (Piccolli 2012).

America's concern with North Korea's ambitious program for developing ballistic and nuclear weapons predated the arrival of Bush's administration. Especially in the late 1990, when talks with North Korea about the end its missile programs resulted in little progress (Burns 2010). However, during the Bush administration some factors reinforced this concern. In 2002, Washington charged that North Korean officials acknowledge the existence of a covert nuclear program in violation of the Agreed Framework[14]. In the next year, North Korea pulled out of the Non-Proliferation Treaty and the country formally declared that they were pursuing a nuclear weapons capability. Some years later, in 2006, North Korea launched several short and medium range missile and a long-range Taepo Dong-2 (TD-2) ballistic missile that could travel around 4,300 kilometers (Department of Defense 2010).

According to the U.S. and some allies, Iran also presented a significant regional missile threat. By 2004, Iran had made considerable progress in achieving self-sufficiency in medium-range ballistic missile production (Department of Defense 2010). In 2006, Tehran announced it had tested an improved version of the Shahab-3, with a range of 2.000 kilometers, and that Iran has the ability to mass-produce these missiles (Department of Defense 2010). Two years after that, Iran tested a space launch missile involving a two-stage rocket, named Safir, that was believed to employ a Shahab-3 for the initial stage and an indigenously designed and developed propulsion system for the second stage (Burns 2010).

13 It was believed that Iraq stocked weapons of mass destruction, which resulted in the American invasion of the country in 2003.

14 The Agreed Framework was the first of a series of bilateral missile discussions took place in 1996, which Washington officials urging North Korea to join the voluntary International Missile Technology Control Regime to regulate sales of ballistic missile and its technology (Burns 2010).

These both scenarios resulted in instability in the region and it prompted the United States and its allies to condemn the tests made by North Korea and Iran (Burns 2010). On the other hand, the proposal of expansion the missile defense system to Europe resulted in negative reactions of some European countries. In general, some of them had opposed U.S. withdrawal from the ABM Treaty and they were critical of Bush's initial plans for a missile defense system. Many have claimed that the expansion of the system to Europe could turn the region into an easy target for terrorist groups and, especially, it could damage European relations with Middle East (Piccolli 2012).

However, the international concern in front of some threat from Middle East increased when the U.S. National Intelligence Estimate concluded that, by 2015, North Korea would possess an ICBM able to target on the American mainland – as will be discussed in the next section, this estimate was wrong. Faced with this situation, George W. Bush chose to go ahead with expanding its antimissile system, moving closer to implementing a "Third Site"[15] for missile defense in Europe. The initial plan intended to encompass a ground-based interceptor (GBI) anti-missile system in Poland and a radar installation in the Czech Republic (Giles and Monaghan 2014). In doing so, the Bush administration set off formal negotiations with both countries in early 2007. Deployment of the Third Site system was scheduled to begin in 2011 and to be completed by 2013 at a total cost of 4 billion USD (Burns 2010).

Image 1: Ground-Based U.S. missile defense locations

Source: BBC News, 2009 apud Piccolli, 2012.

15 The European locations were referred to as the "Third Site", following the first two major U.S. missile defense installations in Alaska and in California (Burns 2010).

In face of that, Russia regarded the proposed U.S. interceptors as potentially offensive, once the missile defenses sites in Poland and in the Czech Republic were too close to its territory (Burns 2010). With this in mind, Russian President, Vladimir Putin, proposed a few solutions to the Pentagon. The first was establishing a missile defense radar site at the existing Qabala early warning radar station in Azerbaijan. Russia believed that proposal was better for a missile defense from both countries, once at that location, missile defenses could cover all of Europe, however a radar at Azerbaijan would not be able to track Russian missile launches. Putin also proposed locating the U.S missile defense systems in Turkey, Iraq or even on sea-based platforms, as well as involving other countries through the NATO-Russia Council, established in 2002 (Burns 2010). Nonetheless, the Bush officials were determined at the proposed missile defenses sites in both countries.

As well as Russia, China also rejected the American plans. Indeed, as early as the Clinton presidency, Beijing officials had showed concern about an American BMD system combined with its ICBMs. They believed that the system being employed to threaten mainland China if disagreements arose over the status of Taiwan (Department of Defense 2010). China's fear was further aroused when U.S. announced its initial Nuclear Posture Review, which argued that the country should be ready to employ nuclear weapons against China because of its ongoing modernization of nuclear and non-nuclear forces (Department of Defense 2010).

The U.S. has always believed that China has developing advanced ballistic missile capabilities that can threaten its neighbors, as well as anti-ship ballistic missile (ASBM) capabilities that can attempt to target naval forces in the region. Moreover, China continues to develop new SRBMs, MRBMs and IRBMs. The U.S. believes that such modernization will be capable of reaching not just Taiwan, but also U.S. and allied military installations in the region (Department of Defense 2010). In front of that, the Pentagon declared in 2008 that China has the most active ballistic missile program in the world (Burns 2010).

The MDA had spent five years in discussions with Poland and the Czech Republic without any concrete results. In doing so, during 2007 and 2008, U.S. Congress began calling for a new approach to missile defense in Europe. Ellen Tauscher, Democratic Congresswoman, focused attention on the need to defend against the existing threat of short and medium range missile from countries mentioned before (Burns 2010). With the support of Congress, Tauscher has proposed some changes in the European missile system, as well stated by Burns (2010, 93)

> Tauscher pointed out the capabilities of the mobile, shorter-range U.S. missile defense systems, such as the Navy's Aegis BMD

> system[16], and the Army's THAAD and Patriot systems, and worked to shift funding to such systems and away from the fixed ground-based missile system designed to defeat ICBMs. Significantly, Tauscher also declared that missile defenses in Europe should not be bilateral arrangements, but should be under the umbrella of NATO (Burns 2010, 93).

2.1.2 THE OBAMA YEARS

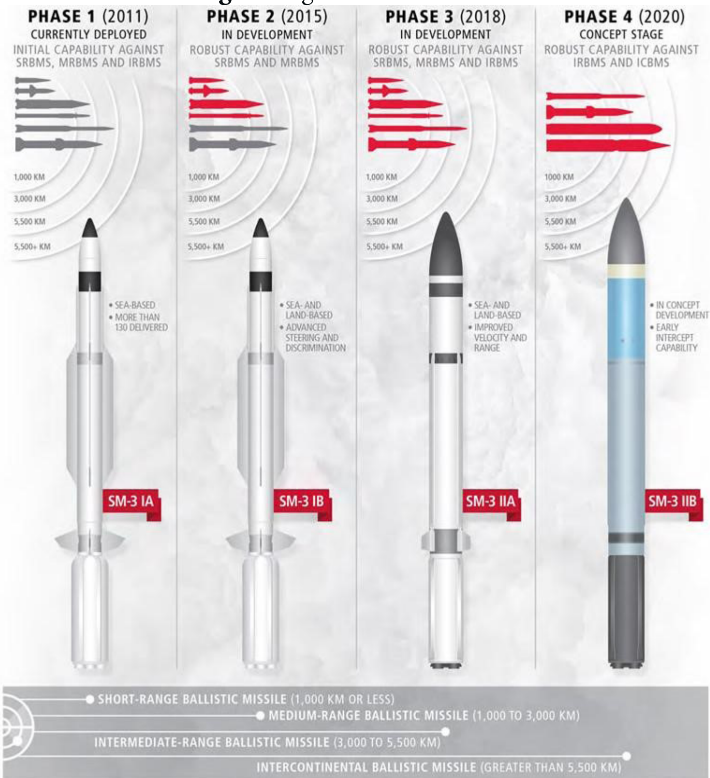
Upon taking office in 2008, Barack Obama brought to his presidency a new posture towards the NMD (Piccolli 2012). The Obama administration revised the George W. Bush plan for missile defense in Europe and early into his first terms, in 2009, he cancelled the plans to station a radar facility in the Czech Republic and ground-based interceptors in Poland (Cimbala 2012). In the same year, on September 17th, Obama announced a new plan for missile defense, creating the European Phased Adaptive Approach (EPAA) (MDA 2013).

The new approach deploys U.S. upper tier sea-based and land-based missile in Europe in four phases to supplement NATO lower tier systems as short and longer-range missile threats from Middle East proliferate (Giles and Monaghan 2014). Both North Korea and Iran had accelerated the process of developing short and medium range ballistic missiles. In August 2008, Iran launched its Safir Space Launch Vehicle (SLV) and, in the next year, the country would tried to use the Safir-2 SLV to place the domestically produced Omid satellite in orbit (Department of Defense 2010). Also in 2009, North Korea conducted new flight tests of the TD-2 (Department of Defense 2010). These factors only compound international concerns, especially from U.S and its allies, about the intent of North Korean and Iran ballistic missile programs.

On the other hand, as Giles and Monaghan (2014, 19) stated "the missile defense program moving forward will adapt to the ever increasing ballistic missile threat capability but still be able to protect the U.S. forces abroad and NATO allies". The plan of Obama administration was to replace the idea of a land-based defense by the use of Aegis systems aboard cruisers of Ticonderoga class and destroyers of Arleigh Burke class (Piccolli 2012). However, in the later phases, the system was to be based also on land as "Aegis Ashore" (MDA 2013).

16 The Aegis system offers the ability to provide surveillance and tracking of ballistic missile and also offers an upper-tier missile defense capability in the form of the SM-3 Block IA interceptor (Department of Defense 2010).

Image 2: Aegis BMD SM-3 Evolutions



Source: Hicks, 2008.

As mentioned before and illustrated in image 2, the new approach consists of four phases, in which the defense system would be improved, as follows (Department of Defense 2010; Giles and Monaghan 2014):

a) Phase I (2011 time frame): existing missile defense systems will be deployed to defend against short and medium range ballistic missile. Yet, this phase will focus on the protection of portions of southern Europe by utilizing and early warning radar established in Turkey and BMD-capable Aegis cruisers complete with the SM-3 Bock IA medium-range.

b) Phase II (2015 time frame): involves establishment of a land-based SM-3 site in Romania, besides American capabilities will be enhanced by the fielding of a more advanced interceptor, the SM-3 Block IB, able to engage short and medium range ballistic missile and additional sensors.

c) Phase III (2018 time frame): involves the improvement with the second and last land-based SM-3 site located in nothern Europe, besides the interceptor will be once more upgraded to the SM-3 Block IIA at sea and land-based sites.

d) Phase IV (2020 time frame): involves one more upgraded in the interceptors to the SM-3 IIB, this additional capability would be able to destroy a potencial ICBM launched from the Middle East against U.S.

However, in March 2013, the United States announced the cancellation of the Phase IV, claiming that the technology required has not been yet developed (Department of Defense 2010). On the other hand, Chuch Hegel, former Secretary of Defense, announced the decision to reinstate 14 ground-based interceptors – which it reduced in Obama's first term – in Alaska and in California by the year 2017 (MDA 2013). Since then, the U.S. has been working closely with NATO allies. It is important to emphasize that during the Lisbon Summit in 2010, the members of the organization decided that the development of a shield missile would happen under the umbrella of NATO. In others words, NATO would also be responsible for the financing of the system (Piccolli 2012).

In 2013, the United States announced intentions for extending missile defense plans into Asia through the deployment of an additional AN/TPY-2 forward-based radar in Japan. At least, the administration would continue to move forward with an enverinonmental study of missile defense system's efficiency (MDA 2013).

2.2 THE DEBATE ON THE THEATER MISSILE DEFENSE (TMD)

The other side of the studies on missile defense is regarding the Theater Missile Defense (TMD)[17]. As seen, the National Missile Defense aims to protect one country against Intercontinental Ballistic Missiles (ICBMs), which are capable of devastating large areas of the affected country. TMD, in turn, is intended to protect smaller areas[18] against short and medium range ballistic missiles, whose

17 According to Wei-chin Lee (2001, 110) "The emerging interest in TMD is partially motivated by the 1991 Gulf War when Israel and Saudi Arabia faced Saddam Hussein's Scud missile attacks. The Patriot air defense system, which then was designed more to shoot down aircraft than missiles, was deployed to defend against Iraqi Scuds. Although its technical effectiveness during the Gulf War has been a subject of debate, its political symbolism was propagated by live news coverage, and it offered Israel a justification to resist public pressure for retaliatory strikes against Iraq".

18 "TMD systems are generally divided into two categories: the lower-tier and upper-tier systems, with an interception altitude of 40 kilometers (km) marking the threshold boundary between them. A complete TMD system would combine both upper-tier and lower-tier elements. Lower-tier defense systems are designed for smaller defended area ("footprint") roughly within a radius of 50 to 60 km of where the interceptor missiles, such as the Patriot Advanced Capability Level-2 (PAC-2), and Patriot Advanced Capability Level-3 (PAC-3) are deployed. Upper-tier defense systems, designed to cover larger defended areas, include the ship-based Navy Theater-Wide Defense (NTWD), land-

mid-course and reentry speed are significantly lower[19] (Wilkening 2004). Accordingly, TMD's effects over the international balance are often ignored, since the main factor of great powers' nuclear deterrence are the ICBMs[20], whether launched from the ground or from nuclear submarines. When they are not ignored, especially in the aforementioned case of the planned U.S. system for Europe (PAC-3), it is because they are part of a larger network of systems – in that case, U.S.' National Missile Defense (Riqiang 2013).

In this sense, if the TMD does not directly threaten the balance between the major powers, since their exploitation by some country does not generate directly the nuclear primacy, why it must be addressed? The answer to this question lies in a more restricted level of analysis of international relations. The TMD relates directly to the regional balance because it serves as National Missile Defense to several countries: either because they have a small territory, being fully covered by TMD systems, or because the country is geographically close to its major rivals (Wilkening 2004). In this sense, TMD is part of a nebulous category of analysis: in some cases, being classified as strictly defensive – as when used in protection against rockets and missiles fired by an allegedly terrorist organization (Hezbollah-Israel case) – but it can also be labeled as offensive – when employed in order to cease the mutual vulnerabilities on the regional level. Therefore, according to Wu Riqiang (2013, 19) "[the] problem about tactical BMD [TMD] is that some tactical BMD [TMD] systems might have strategic capability or some tactical BMD [TMD] assets might be used for strategic purposes".

Then, much of what is discussed about the NMD and U.S.–Russia/U.S. –China's relations can also be applied to the TMD and the relationship between regional powers and those that are emerging. As an example, one can highlight a very wide range of pairs, such as Israel-Iran, Saudi Arabia-Iran, Saudi Arabia-

based Theater High Altitude Area Defense (THAAD) systems, and other boost-phase intercepting systems. As an improved version of PAC-2, PAC-3 is equipped with a new extended-range interceptor technology (Erint) hit-to-kill interceptor designed to hit targets at around 30 km in altitude. By contrast, an upper-tier system like THAAD is designed intercept missile warheads at a range of 40-150 km, with a defended area of several hundred kilometers in diameter. The deployment of a system like THAAD requires modern phased-array X-band radar with a long-range detection capability of up to 500 km and the technological capability of distinctly separating decoys from actual warheads" (Lee 2001, 110).

19 The following definition is according to the U.S.' Department of Defense (2014). Classification by range: Intercontinental Ballistic Missile (ICBM) – over 5500 kilometers; Intermediate-Range Ballistic Missile (IRBM) – 3000 to 5500 kilometers; Medium-Range Ballistic Missile (MRBM) – 1000 to 3000 kilometers; and Short-Range Ballistic missile (SRBM) – up to 1000 kilometers. Classification by the average re-entry speed: ICBM – 7 km/s; IRBM – 5 km/s; MRBM – 3 km/s; and SRBM –2 km/s.

20 Due simply to the fact that the great powers (United States, China and Russia) are geographically far apart, outside the coverage of short and medium-range missiles

Israel, Israel-Syria, Turkey-Iran, China-Japan, China-Taiwan, South Korea-North Korea, Japan-North Korea, India-Pakistan, China-India, among others. The number of possibilities is almost infinite, whereas ballistic missiles of short and medium range are relatively easy to purchase, or even develop. Therefore, TMD systems, as well as ballistic missiles and other delivery systems generally discussed in the context of international and inter-regional relations, should be subject of discussion, especially when it comes to missile defense systems. In this sense, then it will be presented an overview about the TMD around the globe and its relevance to the balance of regional relations.

2.2.1 THEATER MISSILE DEFENSE IN ASIA

In Asia, TMDs' debate is central to understand the regional balance. An exemplary case is that of China and Taiwan. In their relationship, for example, theater defense systems have a crucial role since the Third Strait Crisis (1995-1996), when China fired ballistic missiles in the waters surrounding Taiwan after the country rehearse a more independent posture. In response, Taiwan started strengthening its ties with the United States, including acquiring TMD systems for protection against Chinese ballistic missiles in order to support their independent status. In this case, as seen above, TMD mirrors NMD, generating dangerous responses in many ways by the Chinese government, either increasing considerably its amount of short and medium-range missiles or through diplomatic pressure to prevent Taiwan to carry out acquisitions (Lee 2001; Riqiang 2013).

In this sense, the question is whether the TMD in Taiwan will improve the cross-strait relations, or will have the opposite effect, leading to a poorest situation. On one side, supporters of TMD claim that its configuration is strictly defensive, "and should be viewed as a safety net limiting Chinese missile damage and thus deterring China from aggressive action. It is intended to be non-provocative and reactive only" (Lee 2001, 116). On the other hand,

> Such a development could potentially give Taiwan the capability to decide its own fate, including possibly declaring independence, without fearing Chinese missile attacks. Thus, this very dimension of TMD—its political impact—can transform its defensive character because Taiwanese deployment of TMD has the potential to generate a spiral of threat perception between China and Taiwan. This picture emerges clearly when one considers strategic game theory. Because an effective offensive capability can be weakened by an adversary's deployment of defensive capabilities—and because such defensive capabilities can be weakened by the first state's improvement of its offensive capabilities—it is axiomatic that both

> states would be encouraged to engage in an arms race, either for self-help/self-protection (in a state of anarchy) or for the potential use of military means for political ends. Aggravated by misperception, miscalculation, and hostility, this situation can easily evolve into a vicious cycle of competition and confrontation, aptly described by John Hertz as the "security dilemma." The ironic result is that an attempt to boost Taiwanese security by deploying TMD would necessarily decrease China's security. In turn, China would be prompted to upgrade its military capability to regain its relative superiority— thereby ultimately degrading Taiwanese security (Lee 2001, 116).

China, furthermore, has another similar situation with Japan. Like Taiwan, the latter intrinsically cooperates with the United States and is an organic part within the U.S.' NMD project. Japan has some naval vessels equipped with the Aegis system and participates actively in the development of the latest version of the SM-3 missile (the Block IV shown in the image 2). As the U.S.' TMD is under the umbrella of its NMD, Japan has also TMD systems, such as the PAC-3 (Monten and Provost 2005). This structure allegedly aims to protect against possible North Korean missiles, however, China fears that they might be used to nullify their deterrent power against Japan, since their historic rivalry (Monten and Provost 2005). In that case, China would become helpless and with no retaliatory capability in face of any offensive action against its territory – both have long territorial disputes in the region.

Another relevant case in Asia is the India-Pakistan relationship. The great asymmetry in conventional forces between them leads Pakistan to take a more assertive nuclear doctrine, since this would be the only way to maintain symmetric relations with the rival (Jaspal 2014). However, with the pursuit for a missile defense system by India, Pakistan fears to lose its nuclear retaliatory capability. Analysts claims it might generate an increasing instability in the relationship between both, since Pakistan could lower their thresholds for the use of nuclear weapons, as their perception of threat has increased. Zafar Jaspal (2014, 127) highlights that "it allows India to use its superior military muscle, which in turn obliges Pakistan to modernize its nuclear posture to deter conventional attack. Pakistan's nuclear deterrence posture in turn switches from deterrence to nuclear war-fighting." On the other hand, India claims that its missile defense is not motivated to harm Pakistan's deterrence, but to protect themselves against the growing proliferation of ballistic missiles in the region. Asia is home to one third of all the world's ballistic missiles: these, Syria, Iran, Saudi Arabia and China were among the countries feared by India (Pant 2005).

2.2.2 THEATER MISSILE DEFENSE IN THE MIDDLE EAST

Similarly, the Middle East is another region that coexists with the growing proliferation of ballistic missiles and weapons of mass destruction. As noted earlier, Iran is often at the center of the missile defense controversy, being a common target especially by the U.S. and Europe (Burns 2010). However, at the regional level, there is an even more intense dispute between short/medium-range missiles and TMD systems. In fact, the whole concept of TMD has been developed from the American experience in the first Gulf War in 1991, when the PAC-2 missiles were used to protect the Allied troops and Israel from Saddam Hussein rockets/missiles (Lee 2001). Since then, the regional powers have been acquiring more TMD systems, almost exclusively U.S.-made. Israel is a distinct case because, which have received U.S. technology in the past and today is able to develops its own antiballistic system, allegedly to match the rockets of non-state military groups, such as Hamas and Hezbollah, but also those from Iran.

The power correlation in the region is directly influenced by the ability to defend its territory against ballistic missiles from the neighborhood. In 1982, for example, Israel attacked Iraq's nuclear centrifuges, accusing Saddam Hussein of seeking to develop weapons of mass destruction. Iran got the message and since then tries to acquire anti-aircraft capabilities to neutralize the Israeli apparatus. However, it was not until the end of the embargo on Iran in April 2015 that Russia authorized the sale of its anti-aircraft system S-300, which, in its most advanced version, has ABM capacity. In this sense, Iran is building its missile shield just as Israel, Saudi Arabia and the Gulf countries. The controversial issue is the motivation of these shields: while one side accuses the other of exploiting the shield to be able to act more freely (and aggressively) in relation to its neighbors, the other justifies the ABM systems as the only way to safeguard its population against Middle East's growing threats.

2.3 THE BIGGER PICTURE ON NATIONAL MISSILE DEFENSE AND THEATER MISSILE DEFENSE

Therefore, while the debate on U.S.' National Missile Defense is often present in multilateral forums and international media, mainly regarding the Sino-Russian strategic stability, the theater Missile Defenses often are widely accepted as inherently stabilizing (Lee 2001). However, as noted above, for most countries, the debate on the feasibility and the need for TMD is no less problematic and controversial than the NMD in the United States.

In this sense, the link between TMD and NMD seems to go beyond the operational level, as in U.S.' case, where since the Bush Jr. administration a concept of a single layered defense is adopted. It is a double way relationship, where the systemic level (NMD) affects and is affected by the level of regional relations (TMD). In this sense, it seems to be difficult to isolate the international balance and NMD's debate from the regional balance and TMD, since a local war has the potential to affect the global balance (J. M. Martins 2008). Even though, in practice, some separation between them seems to be necessary. Otherwise, any missile defense would be unfeasible, since they would be seem as inherently destabilizing. In this case, the politics among nations would always be conflicting, leading the major powers to oppose any anti-missile system (Riqiang 2013).

This is the scenario apparently in vogue since U.S.' unilateral withdrawal from the ABM Treaty of 1970 in 2001 (Steff 2013). At the great powers level, the reaction was similar. Diplomatically, Russia maintained its opposition against the system, claiming that there is no assurance that it would not be used against them (Khoo and Steff 2014). China, in turn, maintained a more passive stance toward the United States, but was emphatic in expressing their concerns in relation to a joint missile defense between U.S., Japan and Taiwan. The result, according to the Chinese, it would be a growing aggressiveness by the last two with China (Khoo and Steff 2014). Moreover, both Russia[21] and China[22] seem to have adopted

21 "Russia is to replace half its nuclear arsenal by 2015, upgrade all nuclear systems by 2020 and initiate research into low-yield nuclear weapons. [...] One of the most significant new missiles deployed was the roadmobile Topol-M (SS-27) IBCM. It represented a qualitative advance over its predecessors, adding a Maneuvrable Re-entry Vehicle (MARV) capability, increasing its capacity to evade US BMD systems. A MARV Sea-Launched Ballistic Missile, the Bulava, equipped with BMD countermeasures was deployed into service in June 2012. A more advanced version of the Bulava, equipped with Multiple Independently Targetable Reentry Vehicle (MIRV) missiles and electronic BMD jammers, known as the Liner, was also successfully tested in 2011 and is set to be deployed in the near future. [...]The doctrine [of 2010] raised the threshold for using nuclear weapons; outlined a proactive agenda that emphasized the role of international law; rejected unipolarity and American primacy; and emphasized Russia's right to intervene regionally on behalf of Russian peoples and Russian interests. Although the doctrine declared nuclear and large-scale conventional war unlikely, US BMD was again identified as a vital threat to Russia. Indicating its ongoing balancing efforts, Russia activated its S-400 strategic air defense system in Kaliningrad on 6 April 2012, and has threatened to deploy new short-range "Iskander" mobile missiles to Belarus and Kaliningrad by the end of 2012" (Khoo and Steff 2014, 20-21).

22 "[r]esearch has intensified on improvements to China's long-standing road-mobile ICBM, the DF-41, which can contain up to 10 warheads, giving China the ability to increase the annual growth rate of missiles capable of hitting America from double to triple digits. The DF-41 is China's first MIRV-capable missile and equipped with improved countermeasures to penetrate US BMD systems. In August 2012, China reportedly tested a fourth new MIRVed submarine-launched ICBM, the JL-2. Deployment of BMD countermeasures has become a significant element of China's nuclear balancing effort. [...] The second prong of China's hard balancing response to US BMD has involved changes

an internal balancing posture (Waltz 1959), increasing the deployment of new nuclear and conventional systems with BMD countermeasures, while adapting its nuclear doctrine in order to be more flexible and capable of responding the new threats (Khoo and Steff 2014; Martins and Cepik 2014).

From the information presented above, one can see the outlines of the two spectrum of the debate. In summary, we have identified two clear positions taken here as extremes, characterizing completely no country's foreign and security policy, but being identified in most of their posture. The specific position of each country will be dealt with ahead; here we will see shortly the debate from a purest and distanced perspective.

On the one hand, it is argued that the growing proliferation of ballistic missiles, alongside with the crescent terrorist threats and the emergence of countries less aligned to the UN values, have brought greater insecurity in the international system, endangering international institutions and our nations (Heinrichs 2012). The best solution to avoid this situation, in this sense, would be to develop military means capable of overrule such offensive capabilities in order to provide direct protection and discourage the development of these systems (Thompson 2009; IFPA 2009; Heinrichs 2012). From this perspective, the difference between NMD and TMD is just a matter of scale, both being part of an integrated system to ensure the impregnability of a particular country and the international peace (IFPA 2009).

In turn, the other side defends a more particular approach, analyzing each case individually. It is considered unreal the argument that a global missile shield would create more security and international stability. From this perspective, the opposite would occur: with the end of deterrent capabilities, an arms race would be generated, causing strong instability in the international system (Lee 2001; Lieber and Press 2006; Jaspal 2014; Khoo and Steff 2014; Martins and Cepik 2014). Therefore, it would be essential the separation between NMD and TMD, not only in scale, but also in functionality and purpose (Sauer 2012). From this definition, the countries could develop anti-ballistic systems actually with defensive purposes, without generating insecurity in the international community (Riqiang 2013).

As seen in the last sections, both sides have relevant arguments, with theoretical and empirical grounds. Both have great tactical and operational

to its military doctrine. At the same time, while China has held a policy of No First Use (NFU) since its acquisition of a nuclear capability in 1964, its endorsement no longer appears to be unqualified. Recent research has documented instances of Chinese officials signaling that China's long-held NFU policy could be altered and/or the threshold for a nuclear response lowered during a regional crisis" (Khoo and Steff 2014, 23-24).

differences, although, paradoxically, aiming the same end: the stability of the international system. In this sense, the challenge is to conciliate both views around some questions. Which extent to the BMDs would be harmful to stability? How important is to differentiate NMDs and TMDs? What is the correct balance between national defense and regional/global stability? Is the debate relevant to the countries' decision-making process or the security dilemma (the self-help situation) will remain an imperative in foreign and security policy? Is the maintenance of reciprocal vulnerabilities sufficient for stability? These are all questions that permeate the debate on ballistic missile defense systems and their answers seem increasingly relevant to contemporary international relations.

3 PREVIOUS INTERNATIONAL ACTION

3.1 PREVIOUS INTERNATIONAL BILATERAL ACTIONS

The first international actions made towards disarmament and the control of production of missiles or anti-missile ballistic systems were bilateral. As mentioned before, the production of such systems began during the Cold War and together came the efforts for containment of its development and production. Both superpowers at that time, the Soviet Union and United States, were the responsible for those first developments and treaties.

The most important of them, already explained, is the Treaty on the Limitation of Anti-Ballistic Missile Systems (ABM Treaty). The ABM was signed in 1972 and had the objective of reducing the production and deployment of such systems in the U.S. and also in the Soviet Union, limiting the amount of sites and missiles permitted for each superpower. This Treaty also ensured the maintenance of mutual vulnerabilities between the countries, avoiding the possibility of nuclear primacy from one of the superpowers. Therefore, it's possible to affirm that both superpowers were compromised with the deterrence system and with the stability of the International System (Burns 2010).

At the same time, with the negotiations of the ABM Treaty, the Strategic Arms Limitation Talks (SALT) I was taking place. The SALT I pact had the specific objective of "freeze" the production of Intercontinental Ballistic Missiles (ICBMs) to its current numbers of 1972, the same year of the signing of the ABM Treaty. This was also a bilateral initiative from the Cold War and was expected to diminish the production and deployment of long-range ballistic missiles (Burns 2010). Although, according to Burns (2010), it failed to reduce either country's ballistic missile arsenal. The continuation of this initiative occurred with the SALT II, another round of negotiations between USSR and U.S. that lasted until 1979. SALT II aimed mainly on the reduction of MIRV warheads, but was unable to achieve results in this sense (Burns 2010). The SALTs gave rise to the Strategic Arms Reduction Treaty (START) I and START II, in 1991 and 1993, respectively, both between the same parties and with the objective of nuclear weapons reduction.

In April of 2010, the START I gave place to the Treaty between the United States of America and the Russian Federation on Measures for further Reduction and Limitation of Strategic Offensive Arms, known as New START. This Treaty limits the deployment of strategic warheads in 1.550 for each country, encouraging them to reach this number no later than seven years after the New Start entry into force - in 2011. In order to implement the treaties obligations, both countries established the Bilateral Consultative Commission, which should meet at least twice a year. However, due to the international adverse situation, the Treaty hasn't been respected in the last and current years and both countries even have raised their aggregate numbers of strategic offensive weapons. (NTI 2015b).

3.2 PREVIOUS INTERNATIONAL ACTIONS OF THE UNITED NATIONS

The Disarmament and International Security Committee (DISEC) has made several efforts towards disarmament and nonproliferation in the last years. Nevertheless, the resolutions already approved by the General Assembly, based on the reports of the DISEC, have focused mainly in issues like nuclear and mass destruction weapons, mines and arms trade. The efforts regarding the strategic or theater ballistic missiles or the defensive missile systems have few discussions and are included in different ways in the existing resolutions.

Since the last years of the 1990s, the General Assembly has passed resolutions that welcomed the bilateral efforts of the Soviet Union/Russia and the United States – to reduce strategic offensive arms. In the year of 2000, the United Nations General Assembly (UNGA) approved a resolution that included in its first topic: Preservation of and compliance with the Treaty on the Limitation of Anti-Ballistic Missile Systems. This resolution called on each of the States Parties to preserve and strengthen the ABM Treaty through full and strict compliance to it (UNGA 2000). It also considers the inviolability of the Treaty, the strongest interest of the international community (UNGA 2000). An important part of this resolution is the one that follows

> 3. Calls upon the parties to the Treaty, in accordance with their

> obligations under the Treaty, to limit the deployment of anti-ballistic missile systems and refrain from the deployment of anti-ballistic missile systems for the defence of the territory of their country and not to provide a base for such a defence, and not to transfer to other States or deploy outside their national territory anti-ballistic missile systems or their components limited by the Treaty (UNGA 2000, online).

This issue has been present in the UNGA resolutions until 2002, so it remained being considered the cornerstone in maintaining global strategic stability and world peace and in promoting further strategic nuclear arms reductions (NTI 2014b). From this year until 2005 the resolutions of the Assembly took into account mainly issues such as nuclear weapons and weapons of mass destruction, nuclear testing, nuclear-weapon-free-zones, terrorism, outer space militarization, etc.

The UNGA has also endorsed other initiatives on disarmament, such as The Hague Code of Conduct against Ballistic Missile Proliferation (HCOC). The HCOC was adopted in 2002 at an international conference held on The Hague. It is the first multilateral code in the area of disarmament and is aimed to diminish ballistic missile proliferation worldwide. The Code is a political initiative, an agreement amongst several States on how they should conduct their trade in missiles. The States are encouraged by the HCOC to take transparency measures regarding the research, producing and testing of such weapons (NTI 2014a). Since 2004, the resolutions of the UNGA started to include a topic welcoming the dispositions of the Code, inviting the non-signatory states to join it and encouraging efforts of this kind to deal with ballistic missiles proliferation (UNGA 2004).

It is also important to mention that the topic "Missiles" in the Resolutions of the General Assembly appeared as a suggestion of agenda - for further discussions and studies - even before the 2000's. However, this discussion has been postponed for several years and has been included inside bigger topics, such as "other matters of disarmament", "other weapons of mass destruction" or even in the resolutions about the HCOC, without receiving specific treatment. Therefore, the topic about missile defense systems has appeared in the DISEC agenda not in a priority or specific way. The main efforts until now turn around the recognition of other multilateral debates on the matter.

4 BLOC POSITIONS

Concerned about terrorism and the proliferation of mass destruction weapons, countries such as **Australia, Israel** and **Sweden** have narrowed their relations with NATO and agree on the need for a shield of missile defense system. Australia, for example, has been for decades contributing to U.S. monitoring of ballistic missile activity through a ground station (Davies and Lyon 2014). Besides that, since last year both governments has been work together to position more warships and aircraft in Australia in order to defend its territory from Chinese threat. Israel also has advanced the development of its defense system. Called Israel Iron Dome Missile and already in operation, this system added a new element to the conflict between Israel and Palestine (Tory 2012). Israeli officials are claiming that the shield is destroying 90 percent of missile and rockets that have been fired into southern of the country. Currently, five Iron Dome systems are deployed in Israel, most of them are located in the south, near Gaza, and each operates with a 45-mile radius (Tory 2012).

As seen before, concerned that the systems would help the United States military and allies extend its radar sensor capabilities deeper into their territories and compromise their own strategic deterrent, **China** and **Russia** strongly condemn the deployment of anti-ballistic assets near their borders (Yoon 2015, Kazianis 2015). Both countries claimed that the global missile shield has, in fact, an aggressive guidance, since it is based in the end of the mutual vulnerabilities that kept the peace in the heavy nuclearized world of Cold War (Martins and Cepik 2014). China, for example, in response to rumors of an American TMD' system deployment in South Korea, warned Seoul that such move would endanger their bilateral relationship and threaten regional peace and stability (Yoon 2015). Another illustrative case is from Russia, which notified Denmark that Danish warships might become targets for Russian nuclear missiles if the country decided to join the NATO missile defense shield (Sputnik 2015a). Soon after, Moscow also had a similar reaction when Ukraine showed its openness to host NATO's missile defense systems. The Kremlin spokesman acknowledged this move as posing a serious threat to the Russian Federation, forcing the country to adopt the required countermeasures (Associated Press 2015).

Being the target of almost every national missile defense in the world, the **Democratic People's Republic of Korea (DPRK)** holds a strong position on missile defense mattes. North Korea's growing arsenal of shot and medium-range missiles, in addition with longe-range missiles' and chemical weapons' allegations, raises concerns on its neighbors, leading them to pressure Pyongyang in all fronts: diplomatically and economically, mainly through international sanctions, and militarily, both with retaliatory capabilities and with missile defenses. DPRK, by its turn, claims that the ongoing establishment of missile defense system, especially those space-based, "was nothing but the extension of the confrontation policy of the cold war era, with the main purpose of gaining military hegemony, while creating an arms race on outer space. (UNGA 2013, online)" Pyongyang also states that these systems are justified on the false pretext of its non-existent ballistic missile threat, where even peaceful launches had been tagged as intimidating and belligerent, while other countries are not treated with the same logic (UNGA 2013).

However, the group has some of its members as living-part of the debate, as seen in the case of Iran. Some are more pragmatic. For example, **Egypt** has been increasingly close to Moscow, being the second country after Venezuela to buy the Russian S-300VM (World Bulletin 2014). However, Cairo also keeps strong ties, historically, with the United States in matters of military supply – Egypt has several Patriot PAC-3 U.S.-made batteries – and, more recently, with Israel, who is planning air-defense drills with Egypt and Jordan (Williams 2014).

Iran is in the center of the debate over missile defense. Western's allegations about the growing Iranian capabilities on missile technologies threatening Europe and the United States are promptly denied by Tehran, who claims that its developments aims just to mirror Israeli and Saudi's strike systems (Cordesman 2012). Indeed, the country just closed a deal for acquiring Russian surface-to-air missiles, which serves as Theater Missile Defenses (Heritage 2015). Ironically, this move led to great criticism by western countries and by regional actors (Sputnik 2015b), like Israel and other Gulf nations, since it might nullify their strike capabilities with, for the first time, systems classified as defensive by them (Associated Press 2013). Diplomatically, in the 18th Meeting of the General Assembly's First Committee in 2013, the Iranian representative stated that Tehran is concerned especially about the weaponization of space under the pretext of missile defense systems, since those actions jeopardize international community's efforts to strengthening disarmament and international security (UNGA 2013). In addition, according to Iran, "hosting an anti-missile system was an attempt to gain 'supremacy over other nuclear-weapon States'. That would not add to the security of host countries or the country operating the system; it would trigger an arms race" (UNGA 2013, online).

On the other hand, the **Gulf Cooperation Council** adopts a worried position on missile and nuclear proliferation in the Middle East, especially in relation with Iran. Accordingly, the member-states seeks cooperation with the United States on a wide range of matters concerning missile defense, consisting in greater information and intelligence sharing, interoperability, additional foreign military sales on both a bilateral and cooperative basis, and joint operational planning (Karako 2015). Indeed, the U.S.-GCC Strategic Cooperation Forum regularly reaffirmed its intent to work toward "a Gulf-wide, interoperable missile defense architecture" (Department of State 2015, online). While the common framework is not real, several countries have been buying and deploying defenses independently. Saudi Arabia, UAE, Kuwait, and Qatar, for example, have spent billions on Theater Missile Defense systems – the U.S.-made PATRIOT and THAAD (Karako 2015). In 2014, the United States took the unprecedented step of allowing foreign military trades with the GCC as an organization, like NATO and the African Union, allowing members to pool their resources and operations (The White House 2015).

Japan is a key Pacific ally of the United States, and both governments are trading the possibility to deploy a Terminal High Altitude Area Defense (THAAD) system and a ground-based version of the Standard Missile-3 interceptors mounted on Aegis destroyers (Japan Times 2014). Japan is also already the site of one American X-band radar, officially known as the AN/TPY-2, which is a central element for identifying ballistic missiles and coordinating a defense by interceptors (Johnson and Shanker 2012). Besides that, Tokyo dispatched four MIM-104 Patriot surface-to-air (SAM) missiles to Japan's southern border, while another three were placed near the capital (Johnson and Shanker 2012). Japan's intention is to create a four-stage anti-missile shield (Japan Times 2014). Chinese government is worried that this system has been aimed against its country, but Japan affirms that the country is just improving its ability to defend itself from surprise attack by North Korea. Another country worried about the possible North Korean missile attack is Republic of Korea. In 2006, the country announced that it would create an indigenous missile defense system, the Korean Air and Missile Defense System (KAMD). The systems included in the U.S. and Japan's missile shield are the Patriot Pac-3 missile defense system, Terminal High Altitude Area Defense system (THAAD), Aegis cruisers equipped with Standard Missile-3 (SM-3) and early warning radars (Montague 2014). A last country that could be included in this group is India, which has also been developing a missile defense system. The Indian government has placed two missile-tracking radars in the capital city of New Delhi, the first part of a planned effort to give the city a nuclear missile shield. The planned program, expected to be operational by 2016, would see New Delhi joining the ranks of cities like Beijing, Washington, London and Tel Aviv that already have missile shields (Tejas 2015).

Since the summit in Lisbon in 2010, the missile shield, which has its origin in the United States, is being built and financed within the **NATO** umbrella. At this summit, they also decided that the scope of the current Active Layered

Theatre Ballistic Missile Defense (ALTBMD) program's command, control and communication capabilities should be expanded beyond the capability to protect forces to also include NATO European populations and territory (Nato Reviews 2014). The U.S. European Phased Adaptive Approach (EPAA) and other possible national contributions were welcomed as a valuable national contribution to the missile defense NATO architecture (Nato Reviews 2014). During its 2012 Chicago Summit, NATO leaders declared that the missile defense system has been tested and installed at in Ramstein, Germany, while others allies provide sensors and interceptors to connect to the system (NATO 2012). Besides that, americans ships with anti-missile interceptors in the Mediterranean Sea and a Turkey-based radar system have been put under NATO command in the German base. That infuriated Russia, which believed the program was intended to counter Moscow's intercontinental ballistic missiles and undermine its nuclear deterrent (Associated Press 2012). However, the Western defense alliance insists the role of the planned shield is a defensive response to external threats, and is in no way directed against Russia or China. On the other hand, some countries members of Union European and also member of the NATO, such as Germany and Hungary. They have been worried about the measures taken by the bloc, because them could result in an unnecessary provocation of Moscow and them could turn the region into an easy target for terrorist groups and, especially, such measures could damage European relations with Middle East (Piccoli 2012).

An interesting group in the missile defense debate is the **Non-Aligned Movement (NAM).** In spite of being a diverse and heterogenic range of counties, the NAM core values can be identified in the topic. In 2014, **Indonesia** gave a statement on behalf of the group reiterating NAM's concerns regarding the abrogation of the ABM (Anti-Ballistic Missile) Treaty (NTI 2015). The statement was consonant with NAM's 14th General Summit Final Document, which condemned the adoption of national missile defense systems, since they could led to an arms race (NTI 2015). As a diverse group, the NAM encompass countries that are located distant from the instability centers, like **Cuba, Argentina, Brazil** and **South Africa** that often try to conciliate the visions between national security and international stability, attempting to develop institutional tools on national and theater missile defense to build trust among the parties emerged in regional insecurity.

The efforts to clarify the distinction between the theater missile defenses systems against limited threats from terrorists or rogue states and those systems that have affects over the nuclear or conventional balance are also one of **Pakistan**'s goals. As seen before, the Pakistani position is severely affected by the Indian capabilities, which could nullify its deterrence power over Delhi. Accordingly, the country considers the national missile defense systems' proliferation as highly destabilizing, since it would force the development of more furtive and advanced missiles by its forces, generating an arms race in the region (Sohail 2014).

Accordingly, **Venezuela** and **Syria** have also been in the middle of polemics in the last years, since both are seen as threats to, respectively, the United States and its regional South America' allies, and to Israel. These allegations are due to the short-to-medium-range ballistic missile capabilities owned by the two countries. However, recently, when they tried to acquire missile defenses themselves, the criticism was even higher (Associated Press 2013). Venezuela, indeed, has managed to buy the Russian-made S-300VM, the same theater missile defense Iran just bought, however, the Syrians have saw the same air-defense acquisitions from Russia been canceled after western pressures over Moscow (Binnie 2014, Army-Technology 2015). These systems might empower Assad's defense of Syrian airspace, preventing any unauthorized operation from air (through missiles or aircrafts) in its territory (Associated Press 2013).

Upon taking office in 2010, Victor Yanukovych and European Union has been negotiated a possible **Ukraine**'s entry into the bloc. However, this turned out not solidified, especially by Russian pressures, since Ukraine is historically part of its sphere of influence. The withdrawal of the signature with the European Union in late 2013 resulted in protests on Maidan square, dividing the population between those in favor of entry into the bloc and those who were against it and in favor of Russia. This scenario resulted in a civil war that lasted until the present day. The main Russian concerns is that Ukraine's entry into the European Union serve as a gateway also for NATO, which could result in the expansion of the missile shield to Russian borders, representing a clear threat to the second Russian attack capability. Currently, relations between Russia and Ukraine are not going well, mainly by the Ukrainian government considers that Moscow is supplying the rebels from the east in the civil war, which is approaching Kiev, the EU and NATO increasingly. In a similar situation, **Georgia**, which is also a country that historically is part of the Russian sphere of influence, has also been discussing the possibility of the country's entry into NATO, which worries Russia even more (Sputnik 2014).

5 QUESTIONS TO PONDER

1. Does the usual separation between offensive and defensive strategic weapons totally satisfy the reality of the international security debate? How can the development of shield missile systems affect the international system?

2. Are there some Ballistic Missile Defenses that could be harmful to international stability? Should there be regulations to the development of missile defense systems?

3. How important is to differentiate National Missile Defense and Theater Missile Defense?

4. What is the correct balance between national defense and regional/global stability? Is the debate relevant to countries' decision-making process or the security dilemma (the self-help situation) will remain an imperative in foreign and security policy?

5. How can the UN, DISEC and the international community act to prevent surprise attacks? What are alternative options for preventing these attacks?

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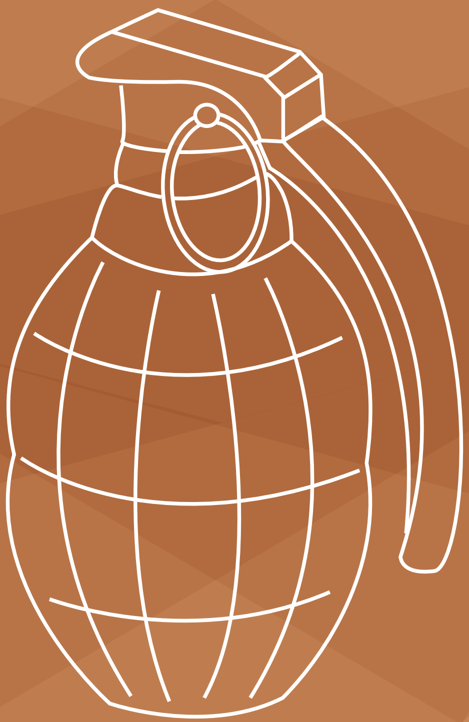

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PREVENTION AGAINST AN ARMS RACE IN OUTER SPACE

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ABSTRACT

The Outer Space has a great importance nowadays, and it is no longer possible to our society exist without it. Although it does not have a State that owns it, few countries have the capabilities to use and control technologies that involve the Outer Space. The United States and the Soviet Union had disputed it during the Cold War, what gives these two countries a great importance in this subject, altogether with China. Nevertheless, all countries depend on this sphere, and most countries defends that this should be a peaceful environment. However, some military activities, such as surveillance and intelligence gathering, use the Outer Space. The discussion arrives to the point of militarization versus weaponization of the Outer Space, in an attempt to establish regulations to the spatial activities. What can be concluded is the necessity of this discussion, in order to prevent an arms race in Outer Space.

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1 HISTORICAL BACKGROUND

1.1 FIRST STEPS TO OUTER SPACE: POST WORLD WAR II

Right after the end of World War II (1945), the winning superpowers entered a period of tension. Although a World War III never really came to existence, the Cold War between the United States and the Soviet Union (USSR) represented a possible real war scenario. The second half of the 20th century, thus, was a time of mutual threats on the use of force, and of technological and military competition in a bipolar world order (Hobsbawn 1995). This technological competition involved an odyssey to discover new means to develop, allocate and use weaponry. As a consequence, countries spent almost 50 years trying to make space a new war realm, first on a quest to reach it, then to establish a permanent presence, and finally, to use it as a part of their Grand Strategies[1]. Both superpowers tended to emphasize the economic and technological progress space exploration could bring. Nevertheless, the security approach advanced without embarrassment. In the end, even though it is configured as a new frontier where non-military areas can be exploited and developed, space should be seen as another instrument in the struggle for power and influence in the global system (Sheehan 2007).

The story of the Space Race begins in the after-war period, when there was a growing need to develop equipment's capable of detecting other countries activities. By the 1950's, United States' space programs, for instance, were restricted to reconnaissance and surveillance activities, such as the WS-119L Air Force program, that utilized high altitude balloons to fly over the Soviet territory (Bohem, et al. 2001). With the division of Germany between the Western and the Communist blocks, however, each of them incorporated the vigorous rocket programs[2] developed during the Nazi's regime (Wasser 2005). North Americans utilized these rocket technologies to begin their strategic use of space and take a step forward. That happened with project RAND, in 1946, that was an effort to design spaceships for the rockets to launch into orbit.

1 Grand Strategy is a concept that involves a notion of synergy between foreign, defense, security, industrial and other types of policies that States might elaborate in a given period of time creating, therefore, a broad scope on the long-term objectives a country has in the international system (Cepik and Machado 2011).

2 Operation Paperclip (1949-1990), for example, was an operation that incorporated ex-nazi scientists into Allied research programs. Their objective was to select "rare minds" that were part of the Axis and could develop armaments, so it would not fall into Soviet hands. The main technologies incorporated were rockets like the V2, used later to put American satellites into outer space (Jacobsen 2014).

In that sense, rocket related technologies such as Long Distance Deliver and Infrared Early Warning Systems[3] were a big concern in national laboratories of both blocks. However, for relative long time, American space technology researchers considered it a secondary issue of national security (Bohem, et al. 2001), since Boeing-29 planes remained the main bomb delivery arrangements until their ruin against the soviet Mig-15 planes during the Korean War in 1951 (McGill 2011). Meanwhile, in the USSR scientists spent a decade (1945-1955) also developing rocket technologies to enable the use of long-range weapons. They finally managed to create the ICBMs as vehicles to deliver nuclear weapons on American territory, giving them an advantage relative to their nemesis (Hall and Shayler 2001).

The development of this knowledge on rocket machinery was the hallmark of the beginning of Mutual Assured Destruction period, given that both sides of the Cold War conflict could deliver bombs intercontinentally, but also knew the risks of utilizing nuclear weapons first, making a war less probable to happen (Nucler Files 2015). Nevertheless, it also allowed countries to take objects into the High Earth Orbit. The successful launch of Sputnik I, mankind's first artificial satellite in outer space, in 1957 by the Soviet Union, made the U.S. Government, under Eisenhower Administration, review the national space policy, making it a priority for the next few years. Between 1957 and 1960, it was transformed on a major enterprise with both Congressional and popular support (Bohem, et al. 2001).

1.2 SPACE RACE AFTER SPUTNIK I

After the launch of Sputnik I, space became a reachable area. The posterior period was marked by the attempts of both superpowers to either send manned vehicles to space, or to conquer the moon. Lyndon Johnson, in 1957 Senate Majority Leader and Leader of the opposition against Eisenhower, was the main articulator of the requests that urged for a bigger governmental consideration of the consequences that Sputnik I could bring. He saw this issue as a key matter on U.S. survival, referring to Space Control as the key to controlling the world (Wasser 2005).

The U.S. Army was, then, responsible for the first successful American satellite launch into outer space, using the Army Ballistic Missile Agency's Jupiter Rocket, in 1957 (Bohem, et al. 2001). However, to take efforts to a new level and

3 Ballistic Missile Early Warning Systems (BMEWS) is a technology that became operational in 1959, and that is used to track Intercontinental Ballistic Missiles and space objects detecting its routes and notify their status (Global Security 2015).

pair up to their nemesis recent achievement, in 1958, the Eisenhower administration felt necessary the creation of a special agency, focused on space exploration with scientific and civil purposes. Later that year, the National Aeronautics and Space Administration (NASA) was born, and its mission was simple: develop a human space exploration program (Launius 2005).

As the moon also showed itself to be an aspect of Outer Space with potential influence on States military behavior, it was not kept aside from space strategy. Thus, considering the possibility that the natural satellite could serve as a military rocket base, that could provide "unequal advantage" for the State that claimed it for itself by making "rain sure and massive destruction", former American General Homer A. Boushey stated:

> […] their potential military implication is immense. Manned platforms in outer space or missile ramps upon the moon would give the controlling nation a seemingly overwhelming advantage from which to dictate (Wasser 2005).

Whereas the North Americans were capable of reaching the moon with NASA's Apollo 11, in 1969, thanks to a new rocket technology, the USSR started to focus on orbiting satellites systems, mainly for military support. In 1971, they managed to put their first space station into orbit, the Salyut 1 (CIA 2013). As a response, in the same year, Nixon made an unexpected and drastic change in North American space program. First, the president saw no encouragement to perform new manned missions out of the low orbit, since the moon was already at their reach. Second, the Apollo program was to be shutdown, in favor of the new Space Shuttle program for reusable satellite launcher (Callahan 2014). Thus, their policy could be condensed on the allocation and development of surveillance satellites, such as the KH-8 and KH-9, to compensate the other side greatest number of "birds" (Dunningan 2003).

Throughout the 1980s, the Space Race and the Cold War itself reached a critical moment. Ronald Reagan, U.S. President, developed a program to research the possibility of a space-based defense program, later called the Strategic Defense Initiative (SDI, also known as Star Wars). His aim was to, this time, actively use Outer Space as a mean for war and eliminate the threat posed by Soviet nuclear ballistic missiles. He envisioned the creation of Space and Ground Based Sensors and Missile Interceptors, Space Based Kinetic Kill Vehicles and Direct Energy – beam and laser – weapons (Global Security 2015). On the other side, USSR had already started to research on space-based weapons long before Reagan's SDI. Their intent, however, was not to intercept Ballistic Missiles, but to disable north-American defense system –before it even existed. They invested in a laser "cannon" project called Skif, and in an orbiting missile launching craft, called Kaskad, that could take down other satellites like those that would be used in the U.S. missile interception program (Day and Kennedy III 2010).

The SDI was later abandoned due to budget issues and both international and national pressures. It created, nevertheless, the bases for the potential use of space as a realm for missile interception equipment and weapons in general, an idea later cropped out in George W. Bush's administration, though with a broader scope of action (Global Security 2015). The Soviet Union, in a state of evident decay, responded to the initiative in an unexpected way: Gorbachev, knowing that the USSR could not match the American program, and that trying to would show its growing technological and economic limitations, made a last effort to show the peaceful purposes of their space plans through propaganda (Sheehan 2007). Their attempt to demoralize the U.S. space exploration failed, and among other factors, contributed to the fall of the Soviet Union, in 1991.

1.3 A NEW WORLD ORDER: EMERGING SPACE PROGRAMS

The beginning of the 21st century came to know not only new forms of making war, but also new types of threats to the international stability, such as terrorist cells and fast-growing economies. Outer Space, however, remains a key aspect of States' security agendas. The increasing number of countries seeking to uncover its potential uses, alongside with the always-advancing technologies on this matter make offensive space capabilities be closer than ever, and Outer Space may effectively become a war arena in the next decades (MacDonald 2008).

In 1989, the USSR, under Gorbachev's administration, engaged itself in a concession policy in the Middle East, ending the called 'Arc of Crisis' and leaving the correlation of forces in favor of Western powers. In this context, the U.S. invaded Iraq in a Security Council supported operation, justified on the defense of Kuwait's national sovereignty. The Gulf War was a mean for the north-Americans to put into practice its new 'medium intensity conflicts' strategy destined to eliminate the military and economic capabilities of regional medium powers (Visentini 2012). Space weapons made its debut in this war's Operation Desert Storm: it was the first time the U.S. used satellites outside of training missions, with the Global Positioning System (GPS) and navigation systems assisting troops of the coalition in major land campaigns. Space based technology, since then, became essential for armies' arsenals; GPS technology is now prominent in both civilian and military activities, from weapons systems to individual warfighters guidance battling abroad (Dissinger 2008).

The Kosovo (1998) and Iraq (2003) war, just like the Gulf War, showed the growing importance of space interface and high resolution images in contemporary warfare, not only in the operational scale (involving, thus, the civil economy) but also in the tactical scale (the military campaigns themselves). While during the Gulf War the United States used around 52 military satellites, this number doubled for the Iraq invasion in 2003. Their troops had 90% of communications services, 95% of their surveillance information and 100% of their positioning and navigation status coming from satellites (Cepik and Machado 2011).

On the other hand, despite the intense technological developments of the Soviet Union Era, when its Space Program was even capable to overcome the American at some points, the Russian Federation goes through a struggle to come up with new plans for space design and weapons for nearly two decades. Its technologies are mainly little incremented copies of old soviet rockets and apparels, such as the Angara, that is now being reproduced in the new Soyuz-5 design. Besides, the recent effort to reconsider the Federal Space Program before 2016 had some financial restrictions due to the economic sanctions to Putin's administration (Bodner 2015). Thus, the country's plans to develop Soyuz-5, bring back the Energia Rocket or build a new space station – derived from the Russian Segment of the International Space Station – are not viable in the current situation. The problem is that Russian space planning is a copy of Soviet initiatives, but without the same old social structure where they could select the finest minds and provide abundant resources; mostly because they are not being able to adapt its primary state concerns with the gradual dominium of space by commercial companies (Bodner 2015).

Finally, it is important to highlight the Chinese space program, which had a recent unprecedented impact on other countries' space militarization strategies. China's massive economic growth followed by a market liberalization permitted the accumulation of resources (both financial and natural) and the achievement of high technology means in a very short period. When China saw itself threatened by the Nuclear power of the U.S. and was abandoned by the former technological cooperation it had with USSR, the Chinese had to independently trace the guidelines for its development of capacities in space matters (Cepik and Machado 2011). In 2007, China launched a missile into space, successfully destroying one of its old communication satellites. This changed the whole perspective of countries (mostly of the U.S.) on security thinking, because now another country proved able to shoot down Low Orbit (LEO) satellites on which the military heavily depends. In 2008, the United States responded by launching a modified missile-defense interceptor, which also destroyed one of their unused satellites.

This mean that both countries face a dilemma on using or not these capabilities, and that a new Mutual Dissuasion scenario is possible (MacDonald 2008).

This discussion extends to the point where most countries now depend on space technologies, being for defense matters or commercial and civil ones. Although three countries represent the immense majority of ICBM's possessions and satellites control, pretty much all the UN members are somehow connected to the space assets. We have historically gone from satellites use in surveillance programs, passing through the fear of mass destruction raining from the moon, to the idealized space-based weapons and defense apparatus to finally reach the technologies that allowed us to destroy the objects we ourselves spent decades to put into the Earth's orbit. The paradox of the militarization of space represents a main issue on the contemporary world system, and it can either maintain the status quo, or represent the beginning of a new major instability among superpowers.

2 STATEMENT OF THE ISSUE

The Outer Space has been used for a short time in the history of humankind. Even though, the discussion about the utilization of this new sphere has started, and some definitions need to be made in order to prevent an arms race in Outer Space. Some concepts, however, must be clear before this discussion.

2.1 DEFINITION, IMPORTANCE AND USES OF THE OUTER SPACE AND SPACE ASSETS

The Outer Space is defined as all the space above 100 kilometers of the sea surface, in other words, the space above the Kármán Line. Above this point, due to environmental conditions of the atmosphere, an aircraft cannot be sustained and can only achieve an orbital velocity (Cepik 2015). The Outer Space is not a friendly environment for humans, but is used by them, through satellites, for many purposes.

Outer Space has transformed the way people live, and it is no longer possible to live without space-based infrastructures. The Outer Space is necessary for many sectors of the economy, such as agriculture, shipping, aviation and finances (Center for Security Studies 2015). Besides that, space-based infrastructures are also needed for monitoring weather conditions, long distance communications and military activities, such as surveillance, reconnaissance and electronic intelligence (Dunningan 2003, Cepik 2015).

The exploration of the Outer Space resulted in the developing of a new field of study and scientific research, which bequeathed the society important technologies like batteries, photo cameras and food conservation (Ribeiro 2007, Cepik 2015). In addition, the exploration of the Outer Space created a new industry that brings development and social welfare to countries that invest in this new sector, through technological spillover (Space Foundation 2013).

All the activities mentioned above converted the Outer Space in a vital area, and are possible due to devices developed by men and launched into Outer Space for different purposes – the satellites (Cepik 2015).

2.1.1 SPACE ASSETS: SATELLITES, ORBITS AND LAUNCH RESOURCES

Before the discussion about the use of the Outer Space, it is important to understand some key concepts for the operation of human activities in the Outer Space. The first and most important are satellites. They can be used for many different purposes, and each type of satellite fulfills a function. The main types of satellites are:

(i) Communication satellites, used for civil and military long distance communications;

(ii) Navigation satellites, used for orientation and navigation in the ocean and in the earth, and weapon guidance;

(iii) Observation satellites, used for reconnaissance and gathering intelligence;

(iv) Remote sensing satellites, used for monitoring the agriculture and natural resources; and

(v) Weather satellites, used for monitoring weather conditions and gathering data for the weather forecasts.

According to its function, each satellite orbits in a determined trajectory. There are four main types of orbits, with specific characteristics favorable for specific types of satellites. The main types of orbits, which are demonstrated in Image 1, are:

(i) Low Earth Orbit (LEO): It is the closest orbit to the earth, with an orbital height lower than 2,000 kilometers. The LEO is favorable for satellites of observation and reconnaissance;

(ii) Medium Earth Orbit (MEO): This orbit extends between an orbital height of 2,000 kilometers to an orbital height of 20,000 kilometers. The MEO is favorable for navigation satellites, such as the American Global Position System (GPS) and the Russian GLONASS;

(iii) Highly Elliptical Orbit (HEO): In this orbit, the satellites are positioned, most of the time, in a single region of the globe. The HEO extends between an orbital height of 500 kilometers to an orbital height of 35,000 kilometers, and is favorable for communications satellites; and

(iv) Geostationary Earth Orbit (GEO): In this orbit, the satellites are always in a fixed position, in an orbital height of 36,000 kilometers. The GEO is favorable for communications satellites (Cepik 2015).

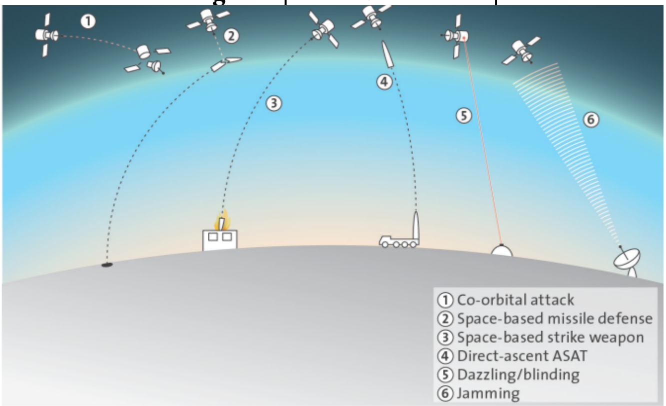
Besides the type, orbit and quantity of satellites, there are other important assets for the use of the Outer Space, such as launch vehicles, launch sites and ground control stations. It is important to pay attention to the launch vehicles, which are used for launching satellites into Outer Space, but can also be used for launching missiles. This potential dual use (civil-military) can create problems and be considered threats to other countries' national security (Maogoto and Freeland 2007b, Cepik 2015). Finally, it is important to address that for a real operational use of the Outer Space, the country must have the ability to maintain satellite and ground-based communications systems, in order to benefit from all possibilities that the Outer Space offer (Ávila, Martins and Cepik 2009).

2.1.2 THE MILITARY USES OF THE OUTER SPACE

After understanding the basic principles about the Outer Space, we can now enter the discussion about military resources in Outer Space. As we saw, the Outer Space is used by the military in order to assure communications, get information and guide weapons. The utilization of satellites for military proposes can be classified in two types: passive and active. The passive use of satellites means support the military action, and it is divided in (i) communications; (ii) geodetic information; (iii) meteorology; (iv) navigation and positioning – that include the weapon guidance; and (v) reconnaissance. The active use of satellites converts them into weapons and it is divided in (i) anti-satellite weapons systems and (ii) ballistic missile defense (Sheehan 2007).

It is important to pay attention to the anti-satellite weapons (ASAT), for its capability to destroy satellites, taking the surveillance and reconnaissance ability of a country (Ávila, Martins and Cepik 2009). The project of the ASAT can be divided in two mains categories: (i) "Soft Kill", which would cause temporary losses; and (ii) "Hard Kill", which would cause permanent damage (Cepik and Machado 2011). The Image 1 illustrates the types of ASAT weapons.

Image 1: Space and ASAT Weapons



Source: CSS 2015, 66

2.1.3 SPACE DEBRIS

Another concept that must be clear in the discussion about the utilization of Outer Space is "space debris". Space debris are objects that are in the orbit of the earth that have no practical use. Usually they are old satellites, leftover remnants of rocket boosters and fragments of satellites that have been destroyed. These space debris are a result of decades of ill-regulated activities in Outer Space, and can cause problems: a high-velocity impact with them can degrade or destroy a spacecraft, and some orbits could become unusable because of the concentration of space debris. (Klein 2006, Center for Security Studies 2015)

2.2 FORGING AN OUTER SPACE POWER THEORY

Bearing in mind that men have been using the Outer Space for less than a hundred years, it is usual to lean on Sea and Air Power Theories to forge a Space Power Theory, even though there is no consensus about such theory.

Giulio Douhet developed the Air Power Theory in his book "The Command of the Air". According to Douhet, the Air Power overlap the ground and sea powers, and in the future all battles would be decided in the air. The winner would be the one that could attack the fundamental industries and roads of the enemy, reaching the economical centers. Besides that, the Douhet's theory was the base for the developing of the strategical bombing, which had the intention of hitting civil targets, unsettling the moral of the people and generating paralysis through terror. Later, this would be known as the doctrine of Shock and Awe

(Costa 2014). In the beginning it was thought that the Outer Space and the air should be consider as a unique sphere of war, because both generates similar products for the users (satellites and aircrafts), but the critics of this idea would say that the Outer Space and the air are totally different, due to different environment characteristics (Cepik 2015).

There are two main theoretical of the Sea Power Theory: Alfred Mahan and Julian Corbett. Mahan developed the Theory of the Navy Power, which explicit the centrality of the sea in history, and defends the concentration of forces to win the war, in the battles. His theory was adapted to the Outer Space by Everett Dolman, in his book "Astropolitik". Dolman defended the importance of the dominance of strategic locations, such as the low atmospheric layer, geostationary orbits, Hohmann transfer orbits and Lagrange points – L4 and L5 (between earth and the moon). He affirms that the States must occupy or control these strategic locations in the Outer Space in order to assure its interests, just as Mahan said about the sea (Cepik 2015). Another similar point in Mahan's and Dolman's theories is that both authors identify the sea and the Outer Space, respectively, as fundamental to win a war.

Julian Corbett developed the theory of the Command of the Sea, in which the State should control the Sea Lines of Communication to obtain advantages over the enemy. John Klein adapted the Corbett theory to the Outer Space in his book "Space Warfare". Klein would affirm that any disturb in the Outer Space will have economical, diplomatic and military consequences, thus the Outer Space affect the correlation of power between States. Klein affirms that a State must combine all spheres to win a war, and the Outer Space do not define it. The theories of Corbett and Klein are similar, just like Corbett talks about the importance of the Sea Lines of Communication, so does Klein about the Celestial Lines of Communication[4]. Both, in their environment, are fundamental for the State to assure its economic, diplomatic and military interests. Klein affirms that the objective of every State in the space warfare is defend its Celestial Lines of Communication and affect the enemy ones. However, a problem may occur in the Outer Space, just like in the sea: the Lines of Communication may be shared by both States, which difficult the action (Klein 2006, Cepik 2015).

Based on these previous theories, it was developed the theory of the Command of the Space. Cepik and Machado (2011, 114) affirm that The Command of the Space is "the capacity of a country, by itself, to ensure its access to and use of space in peace and war, without the possibility of other country deny it". The

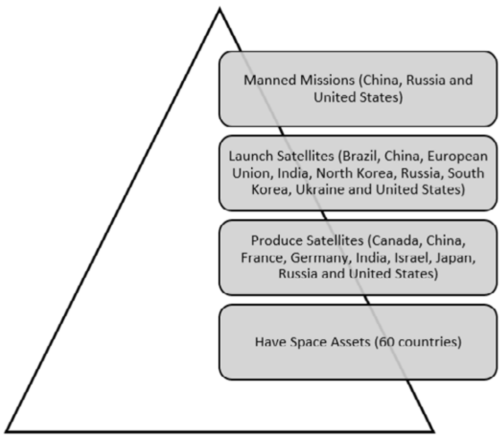
4 Celestial Lines of Communication (CLC) are routes on the Outer Space where are transported materials and information.

Command of the Space could be practiced in three different ways: (i) Presence, by the technological leadership and number of space assets, thus, it would be seen as a reference; (ii) Coercion, by the implicit or explicit threat of using the force; and (iii) Force, by potential hostiles actions (Klein 2006).

The Outer Space is a determinant sphere for the International Relations, for its importance in economics and politics. It determines the interaction between the countries, weighing between cooperation and competition. Therefore, the interaction with interests in Outer Space acquires contours of a Security Dilemma: States consider the space assets as important power capabilities and invest in it, which can be seen as a threat to other States. Thereby, the command of space is decisive for the configuration of the international order (Cepik 2011, 2015).

Since it is a very recent concept, it is difficult to determine which countries do have the command of space. However, the number of States that really use the Outer Space is very limited. Therefore, countries can the grouped in a technological pyramid (Image 2) according to its capabilities. In the base are the countries that have space assets, which are about 60 countries. Above them are the countries that produce satellites (Canada, China, France, Germany, India, Israel, Japan, Russia and United States). Above them are the countries with own ability to launch satellites (Brazil, China, European Union, India, North Korea, Russia, South Korea, Ukraine and United States). In the top of the pyramid are the countries that could accomplish complete manned missions in Outer Space – China, Russia and United States (Cepik 2015).

Image 2: Space Technological Pyramid



Source: Cepik, 2015

2.3 WEAPONIZATION VS. MILITARIZATION OF OUTER SPACE

The starting point of the difference between weaponization and militarization is that the Outer Space has been "militarized" since the earliest communications satellites were launched into orbit (Estabrooks 2003). Militaries around the world rely on space assets for C4ISR (command, control, communications, computers, intelligence, surveillance and reconnaissance) purposes. Besides that, the emphasis of researchers on defense accepts military uses as a "peaceful purpose", even when it is not particularly peaceful (Estabrooks 2003).

Another point to consider is the use of satellites to assist military operations. This is very different from the fight-testing and deployment of platforms specifically designed to kill satellites in space. By all means, these military activities would constitute space weaponization by any reasonable definition. Krepon and Clary (2003) also claim that space actors view the distinction between militarization and weaponization as vital, even if the precise crossover point remains a contentious subject.

In addition to this debate, Sarah Estabrooks (2003b, 2) states that

> Although space is heavily militarized, it is not yet weaponized. Space "weaponization" is generally understood to refer to the placement in orbit of space-based devices that have a destructive capacity. Therefore, while satellites may be used for aggressive measures, such as GPS navigation of fighter jets or precision guided missile delivery, satellites themselves have no destructive capacity and their support of military operations would not be considered weaponization.

A conceptualization that complements Estabrooks' thoughts derives from a study made by the Association Aéronautique et Astronautique de France (2008). According to this group of researchers, the concept of "militarized" outer space has been replaced by that of "weaponized":

> The expression "weaponization of space" defines the process which results in the deployment of weapons in space which may then become a theatre of conflict, a battlefield, through the use of weapons aimed at destroying targets either in orbit or on the Earth's surface. As already said, the arming of space constitutes a destabilizing factor for international relations (Association Aéronautique et Astronautique de France 2008, 62).

Also, according to David DeFrieze (2014), the concerns over weaponization involve the potentially destructive nature of space weapons. He states that it is impossible to define what constitutes a space weapon, and controlling an arms race based on definitions of what constitutes a weapon is doomed to failure with the exception of those clearly posing a substantial risk to humanity, such as nuclear and other weapons of mass destruction. The author finishes his argument defending the attempt to regulate and control the destructive behavior of nations rather than attempting to limit their technology – the main issue must be how countries use their technology.

Another way of seeing the issue depends on a state national security interest, where the interpretation of what is weaponization/militarization may vary - these definitions shows us how intricate is the reference to what can be deployed into space-orbits. Addressing North American national security interests, the United States uses space for military and commercial purposes far more than any other country. Also, their space policy acknowledges that the space assurance, unlike space dominance, holds the promise that the weaponization of Outer Space can be avoided (Krepon and Clary 2003).

The Pentagon has affirmed that there are no U.S. "force application" assets now operating in space, and there are no reported weapons in space orbited by other nations. The absence of flight tests and deployments of instruments of space warfare affirm that we have not yet crossed critical thresholds associated with the weaponization of space (Krepon and Clary 2003). Furthermore, it is recognized that definitions of what is a weapon in outer space must rely on the purpose for its use. In this sense, it is better to look for what interests are set to be protected and find means to protect those interests rather than to choose to assault others (DeFrieze 2014).

2.4 WAR IN OUTER SPACE: IS THAT POSSIBLE?

The debate on the possibility of a war in Outer Space is controversial. According to James Dunningan (2003), space war will occur when there is a war involving the nations that use space. However, as we know, many wars occurred involving nations that have some sort of space assets. History showed us that all grounds had some sort of conflict (air, land and sea), and in space it will not be different. Military satellites are increasingly the minority in space. At the same time, many more of the civilian satellites perform the same functions (reconnaissance and communications) as military ones (Dunningan 2003). Therefore, it does not necessarily follow that weaponization will continue to be avoided in a new era of asymmetric warfare (Krepon and Clary 2003).

David DeFrieze is emphatic in stating that we will never completely prevent countries from engaging in war. However, he also states that we can support peaceful measures to prevent escalation of conflicts and provide deterrence against aggressive or irresponsible behavior. The author says that contemporary international agreements do not offer means of addressing claims for destructive activity, relying heavily on diplomacy. He points out the need of a committee to provide a credible, knowledgeable, and equitable forum for regulating, monitoring, and adjudicating claims and disputes relating to the damage caused by objects launched into space, whether they are designed for destruction or not (DeFrieze 2014).

The Vision for 2020 document published by U.S. Space Command in 1997 was one clear indication of U.S. intentions for space weaponization (Estabrooks 2003). In the 21st century, the U.S. is preparing its doctrine to establish "space superiority", where they emphasize the need for "innovation within the armed forces [which] will rest on experimentation with new approaches to warfare, strengthening joint operations, exploiting U.S. intelligence advantages, and taking full advantages of science and technology" (Maogoto and Freeland 2007a, 1094).

Dunningan (2003) emphasizes that a country can affect an enemy communication by destroying its satellites or jam/blind them. Space warfare is now seen primarily as a mean of denying information support and command and control. The prevention of space conflict may depend on the recognition of mutual vulnerability in space, and the internalization of a sense of shared interest in avoiding worst-case outcomes (Center for Security Studies 2015).

Michael Haas, political scientist and researcher from the Center for Security Studies, analyses several trends that point in the direction of an increased risk over the next ten to twenty years of terrestrial conflict that may involve attacks on space systems, including the use of kinetic ASAT weaponry (Center for Security Studies 2015). Haas affirms that these trends are primarily the results of the re-emergence of sustained strategic rivalries among some great and medium-sized powers including the U.S. and China in East Asia, the U.S. and Russia in Eurasia, and potentially the China – India – Pakistan triangle in South Asia. Except Pakistan, all of these states have already demonstrated a basic anti-satellite capability, and the U.S. and China in particular are integrating space warfare scenarios into their military planning (Center for Security Studies 2015).

War in Outer Space would probably result in massive environmental damage – especially space debris and the increased probability of satellite chocks. Depending on the number and position of satellites destroyed, the utilization of affected orbital slots could be severely injured. In a worst-case scenario, these orbits could become virtually unusable for extended periods, as most of the debris would remain in place for decades or even centuries, with serious implications for both commercial and military users (Center for Security Studies 2015).

Another important issue to be considered in the context of a space war is the necessity to regulate international actions towards space. In this sense, a dichotomy is built: to prevent a war in Outer Space, the regulation is needed. However, this same regulation may create barriers for the deployment of new space assets from countries developing it in the 21st century. According to Leloglu and Kocaoglan (2008), the number of countries that benefit from space industry is still very restrict, and these countries need to cooperate and create regional space programs in order to join the group of countries that are benefited from this sector.

A problem that comes with the fact that just a few countries have the means to access space and develop scientific research and industry in the field is that the adoption of any regulatory framework would probably create barriers for these countries enter the space sector, by their limited technical and financial resources. It would be more difficult for them to fulfill the new standards of conduct in exploring space related activities (United Nations Institute for Disarmament Research 2015). It is true that cooperation in space will assure that it will be used for the well of humankind (Krepon and Clary 2003).

Finally, Michael Haas (2015) says strategic interaction along the 'final frontier' is set to enter a period of considerable danger. Adding to that, Dunningan (2003) made some prospects for the future, saying that a war in space will be largely a robot war, in a truly automated battlefield. It is not possible to make 100% prospects of what could happen; however, Alvin M. Saperstein (2002) says that the alternative to space war is to set a passive defense of space assets together with a treaty guaranteeing a space sanctuary (no weaponization of space). Although an overwhelming majority of countries at the United Nations has expressed support for a treaty to prevent an arms race in outer space (PAROS), only this treaty would not be enough. There would always be fear of secret weaponization on space by the opponent (Saperstein 2002).

2.5 CASE STUDIES

2.5.1 INDIA

India's first efforts in Outer Space began with clear objectives of social improvement, leading security and military matters in second place. Prime Minister Jawaharlal Nehru believed in the power of science to bring development, leading to India's first projects developed with help of space assets. Those projects were developed aiming to diffuse agricultural knowledge into rural India, where plagues have devastated several plantations. Using broadcast signals, educational programs were transmitted to communities, combining factors to propagate knowledge through television educational programs. These projects had high popular approval, achieving great goals in the community (Sheehan 2007).

The creation of the civilian space agency, Indian Space and Research Organization (ISRO) happened in 1969. Right after, the government established the Space Commission, with the mission to examine the development and the application of science and special technologies, envisioning national development (Sheehan 2007). ISRO and other Indian research institutions hada tough time, after nuclear tests of 1974 and 1998, facing sanctions of all sorts that barred outside technologies. Meanwhile, it is remarkable that space institutions faced these sanctions in such a positive way, creating alternatives and low cost projects to develop domestic technology using small budgets.

In this context, India was the 6th country to launch, with success, a satellite with its own launch vehicle. Also, according to Sobia Paracha (2013), the country has put in place the largest system of remote sensing satellites in the world: the Indian Remote Sensing Satellite (IRSS) series. It has also developed one of the largest communication satellite systems in the world: the Indian National Satellite (INSAT) series, with 10 satellites in operation, verifying the Asia Pacific region. Before the transition in space policy to a more military orientation, India was using its communication satellites for command and control of its forces, and meteorological satellites for weather conditions in battlefield and military operations (Paracha 2013).

Among other things, the Indian space program has helped the country to establish its diplomatic and political position in South Asia, making it strategically superior to Pakistan and a credible competitor to China (Paracha 2013). In 2008, India launched Chandrayaan-1 – its first successful launch to the Moon. It verified the existence of water in the natural satellite, serving as a practical opportunity to ensure the possibility of developing complex projects. In 2014, the country successfully launched its Mars Orbiter Mission, becoming the first Asian country to reach such achievement. These conquests were important contributions of India in the current Asian space race, becoming a symbol of the dissuasion capacities of the country – its launch vehicles are the base for their ballistic missiles, and Indian strategists admit to measure security efforts related to threats of China.

The Indian space program is increasingly militarized. A clear policy shift in this direction has taken place since 2007, after China's ASAT tests. The transformation is happening because of international cooperation, especially in the civilian domain. In order to get foreign support, India projects the civilian image of its space program by arguing that there are bureaucratic and organizational barriers between civil and military programs that control internal diversion. At the same time, there exists evidence of civilian technology acquired through foreign sources being diverted for military use (Paracha 2013).

2.5.2 EUROPEAN SPACE AGENCY

The European Space Agency (ESA) officially started in 1975, in the middle of the Cold War, as the European countries did not want to stay behind in the space race. In fact, many European countries already was investing in space assets, and the ESA was created to promote cooperation among them in space research and development of space assets and to coordinate these efforts in order to benefit all member States (Pasco 2011, Cepik 2015).

It is important to notice that not all European countries participate of the ESA: There are 22 member States – Austria, Belgium, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Luxemburg, Netherlands, Norway, Poland, Portugal, Romania, Spain, Sweden, Switzerland and United Kingdom. Bulgaria, Latvia and Slovenia are 'European Cooperating States' and Canada has signed a cooperation agreement with ESA (ESA 2015). All these countries contribute in the funding of the Agency, according to its GDP. In 2014, the main contributors were Germany, France, Italy, United Kingdom and Belgium (Cepik 2015).

The year of 2007 can be considered a mark in ESA's history, as the European Space Policy was published. In this document, the ESA clarifies the Agency intentions in outer space. The resolution emphasizes the importance of space programs in the development and independence of Europe and its people, and affirms that the member States could use civil space assets like Galileo (the European satellite navigation system) for defense matters (ESA 2007).

The European Space Agency has many projects and research programs. The main project of the ESA is the Copernicus, an Earth observation project. After that, there is the Galileo, a navigation project like the United States' GPS. The main targets of research of the ESA are the monitoring of polar activities, providing images of natural resources and providing information to emergency services (Cepik 2015). The Agency does not have satellites for military purposes; however, there are assets that may be for dual use (Union of Concerned Scientists 2015).

In comparison with other space agencies, the European Space Agency is an important player in outer space. The Agency has its own launch sites and have already send manned missions into space. However, the ESA can be prejudiced by an intrinsic characteristic: the diffuse decision power - the agency is not attached to a unique State like the other important space agencies, or to the European Union (Cepik 2015).

2.5.3 JAPAN

Japan's efforts into space began in 1955, with the launch of the "Pencil" rocket. However, it was only in the 1960's that the country's space policies and organizations took shape. In the beginning of that decade, the National Space Activities Council (NSAC) was set as an advisory committee to the Prime Minister, listing a series of principles of Japan's space activities: "autonomy", "international cooperation", "peaceful purposes" and "openness to the public". The Space Activities Commission (SAC) replaced this committee, in 1968 (Watanabe 2013).

Over the following years, Japan's Space Program became engaged in international cooperative efforts, joining forces with NASA and ESA, in 1985 and 1986. Next great accomplishments were related to successful launches, like H-II rocket, in 1994, and its indigenous rocket H-IIA, redesigned to reliability and minimize costs (Watanabe 2013). In 2003, Japan begun its space efforts in space security, launching the series of Information Gathering Satellites (IGS). It is important to address public and private efforts to indigenize space technology in Japan, which lead to the militarization of its space assets. Furthermore, according to Hirotaka Watanabe, in the past decade, Japan found difficulties in managing both peaceful purposes and open-ness to the public, together with its autonomy and international cooperation in space.

Restricting to national securities interests, Japan is an important space player in Asia. According to National Asia Research Associate, Saadia Pekkanen,

> Japan has the latest rocket and satellite capabilities for both civilian and military uses. It has independent capabilities for solid- and liquid-fuel rockets and a wide spectrum of advanced satellites that can be reconfigured for military uses. Japan has conducted manned space activities and space science missions and is now planning human spaceflight. Importantly, its developments on all fronts have taken place in plain sight of the public and under constitutional mandates stressing the peaceful uses of space (Wilkinson 2011).

Finally, there are two crucial documents to understand shifts about Japanese efforts in space: Basic Space Law of 2008 and Basic Plan for Space Policy of 2009. These documents focus on new diplomatic and security challenges, trying to answer three questions: 1) how to enhance national security utilizing space; 2) how to promote space diplomacy; and 3) how to reform the space-related administrative organizations (Watanabe 2013).

2.5.3 CHINA

The Chinese Space Program started in 1956 with the establishment of the Fifth Academy, linked to the Chinese Nacional Defense Ministry, responsible for developing the program. All the first developments of the Chinese capabilities in Outer Space were military ones. Just in the 1980s, some parts of the program were transferred to civilian control. Even though, nowadays 75% of the Chinese space assets are military controlled (Cepik 2015).

China launched its first rocket in 1960, and five years later, the country started the efforts to build its first satellite. In 1970, a launching vehicle was developed, and it was capable of launching the first Chinese satellite. In the 1980s, the Chinese Space Program passed thought a reorientation, focusing in the civil and commercial sectors over the defense one. There were massive investments on launching capabilities, and China started to offer launching services to other countries, thought the China Great Wall Industry Corporation. In 2003, China could send its first manned mission into space. In 2007, the country was successful in testing an ASAT, destroying an old Chinese satellite. In 2011, the Beidou, a position satellite system like the United States' GPS, become operational for clients in China (Cepik 2015, Sheehan 2007).

The Chinese government, concerning the Chinese Space Program, affirms that the development of the space industry has a strategic importance for the country and that the space program contributes to national development goals (Sheehan 2007). The Program is fundamental for China, and the government stresses the welfare that it brings to the population. According to the 2006 Chinese white paper, the space program is "a strategic way to enhance its economic, scientific, technological and national defense strength, as well as a cohesive force for the unity of the Chinese people." (Cheng 2011, 450). In international forums, the Chinese position regarding the use of space is toward the pacific use of this sphere (Cepik and Machado 2011). According to Sheehan (2007, 167) "China's preference is for space to be maintained as a weapons-free sanctuary supportive of its overall development policies."

China has one of the most important space programs of the world, and according to Cepik (2015) the Chinese program is the most ambitious and active space program nowadays. The country possess four launching sites and all types of satellites. Moreover, China invests in the production of micro and nano satellites, having the larger industrial park in this sector (Cepik 2015). In conclusion, China is a very important player in the space, and the national development of the country is very attached to the development of its space program.

3 PREVIOUS INTERNATIONAL ACTIONS

Given its increasing importance, Outer Space has become an arena for institutional development in the international system through disputes and rule definitions (Cepik 2015). In this sense, the discussion on the uses of the Outer Space is made mainly in a multilateral level, even if bilateral agreements are commonly used. Aiming to prevent an arms race in Outer Space, states ratified treaties and conversations on delicate issues, as anti-ballistic missiles and technologies that depend on space assets.

Most of these agreements took place in the context of the Cold War, as part of the stabilization of the International System of the Great Powers (Cepik 2015). In this context, the Committee on the Peaceful Uses of Outer Space was established as a permanent body through the resolution 1472 (XIV) at the General Assembly, in the 14th session that took place in 1958. It started with only 24 members, and nowadays, it has 77 members (UNOOSA 2015). This committee is a forum for the development of international space law and since its inception; it has concluded five international legal instruments and five sets of legal principles governing space-related activities.

In its scope of action, the committee consider three main issues. The first is to maintain close contact with governmental and non-governmental organizations concerned with Outer Space matters. Second, to provide for the exchange of such information relating to Outer Space activities as Governments may supply on a voluntary basis, supplementing, but not duplicating, existing technical and scientific exchanges. Third, to assist in the study of measures for the promotion of international cooperation in Outer Space activities. According to UNOOSA (2015), there are five main treaties related to space:

1) **The Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space**, including the Moon and Other Celestial Bodies (the "Outer Space Treaty"), adopted by the General Assembly in its resolution 2222 (XXI), opened for signature on 27 January 1967, entered into force on 10 October 1967;

2) **The Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space** (the "Rescue Agreement"), adopted by the General Assembly in its resolution 2345 (XXII), opened for signature on 22 April 1968, entered into force on 3 December 1968;

3) **The Convention on International Liability for Damage Caused by Space Objects** (the "Liability Convention"), adopted by the General Assembly in its resolution 2777 (XXVI), opened for signature on 29 March 1972, entered into

force on 1 September 1972;

4) **The Convention on Registration of Objects Launched into Outer Space** (the "Registration Convention"), adopted by the General Assembly in its resolution 3235 (XXIX), opened for signature on 14 January 1975, entered into force on 15 September 1976;

5) **The Agreement Governing the Activities of States on the Moon and Other Celestial Bodies** (the "Moon Agreement"), adopted by the General Assembly in its resolution 34/68, opened for signature on 18 December 1979, entered into force on 11 July 1984.

The international legal principles in those five treaties provide for many issues. Some of them are: non-appropriation of Outer Space by any country, gun control, freedom of exploration, liability for damage caused by space objects, safety and rescue of spacecraft and astronauts, prevention of interference with harmful substances in space activities and in the environment, notification and registration of space activities, scientific research and exploitation of natural resources in Outer Space and the settlement of disputes. Each one of the treaties give great importance to the notion that the domain of Outer Space, the activities carried out there and all that can bring benefits should be paid to improving the well-being of all countries and of humanity, and each includes development of elements of a common idea of promoting international cooperation in activities in outer space (Cepik 2015, UNOOSA 2015).

Other actions taken by states are agreements. The Strategic Arms Limitation Talks (SALT) where two rounds of conversations between the Soviet Union and the United States on arms control. The SALT I, from November 1969 to May 1972, determined the first agreements limiting and placing restrictions on some most important weapons of both countries. In the Treaty on the Limitation of Anti-Ballistic Missile Systems, countries are directed to the end of an emerging competition defensive systems that threatened stimulate the offensive competition to reach higher levels. Already the Interim Agreement on certain measures related to Strategic Arms Limitation offensive, the two nations took the first steps to verify the rivalry of its most powerful nuclear weapons on land and underwater (DOS USA 2015).

The SALT II, begun in November 1972, aiming to replace the interim agreement for a long-term treaty providing higher limits to the strategic offensive weapons systems. Also aimed to provide an equal number of strategic nuclear delivery vehicles to both countries to begin a process to reduce these vehicles, imposing restrictions on qualitative developments you could threaten the future stability. In the ABM Treaty (Anti-Ballistic Missile), ratified in 1972, the United

States and Soviet Union agreed not to install anti-ballistic missiles, except under very limited conditions laid down in the treaty. Each party also pledged not to "develop, test or deploy ABM systems or components based at sea, in space, in the air or on mobile bases on land" (FAS 2015).

The Missile Technology Control Regime (MTCR) is an informal and voluntary association, established in April 1987 by Canada, France, Germany, Italy, Japan, Britain and the United States in order to contain the spread unmanned systems capable of carrying nuclear weapons delivery systems that specifically can carry a minimum load of 500 kg, at least 300km. The Strategic Arms Reduction Treaty (START-1) was an agreement signed bilaterally between the US and Soviet Union on 31 July 1991 on the reduction and limitation of strategic offensive weapons use. START-1 limits the number of strategic delivery vehicles and nuclear warheads, halving the nuclear arming of 6,000 to 12,000 (Baylis 2006).

The START-2, ratified in 2000, complements the START-1, trying to establish other limits on strategic nuclear weapons to each party. In addition to the reduction of weapons from 6,000 to 3,000-3,500, its treaties delimit the use of supported technologies in space assets, especially regarding the launch vehicles, which can transform into rockets missiles (NTI n.d.).

4 BLOC POSITIONS

The **United States of America** is one of the greatest players in space. The country has satellites for civil, commercial, governmental and military purposes. These space assets are used for communication, observation, technology development and navigation (Union of Concerned Scientists 2015, International Institute for Strategic Studies 2015). The country worries about the regulation of activities in outer space, and has the objective of guarantee its national interests and security in space, keeping its stability. The United States defends that the outer space must be a peaceful environment; however, nothing should hinder the right to national and homeland security of the country (Department of Defense USA 2011). The government believes that an international regulation for the use of space is possible, but not before the definition of important concepts, like 'space weapons'. Moreover, the United States will not give up on its right to defeat space threats (Gertz 2014).

Canada has space capabilities, such as satellites for communications, observation and technology development. These assets are for civil, commercial, governmental and military uses (Union of Concerned Scientists 2015, International

Institute for Strategic Studies 2015). The country has a Space Agency since 1989, and it emphasizes the importance of the space in the development of technology. Canada also believes in the cooperation in the use of space, being a great partner of the European Space Agency (Canadian Space Agency 2015). Moreover, the country considers the developing of the national space industry as crucial for the Canadian sovereignty, security and prosperity (Canadian Space Agency 2014).

Another great player in the space sector is the **Federal Republic of Germany**; it has satellites of communications, observation and technology development. These are for civil, commercial, governmental and military uses. (Union of Concerned Scientists 2015, International Institute for Strategic Studies 2015). The "German Aerospace Center' (DLR) is the national space agency, responsible for the German activities in the space sector and cooperation with the European Space Agency (DLR 2015). The German position regarding the use of space highlights the importance of space activities that focus on benefit humankind. The main concerns of the country is to assure the national space industry and international legal frameworks for the utilization of space (Federal Ministry for Economics Affairs and Energy 2010).

France also has a strong space program and has several satellites in orbit. These are for communication, observation and technology development, used for commercial, governmental and military purposes (Union of Concerned Scientists 2015, (International Institute for Strategic Studies 2015). The 'Centre National d'Études Spatiales' (CNES) is the French space agency, responsible for guarantee France's independent access to space (CNES 2015). The country is a great partner of the European Space Agency, and believes in the regional development of the space sector (Embassy of France in London 2013). Moreover, the French government supports the non-weaponization of the space, claiming it should be a peaceful environment (Estabrooks 2004).

The **United Kingdom of Great Britain and Northern Ireland** has satellites for communication, observation and technology development purposes, used by civil, commercial, governmental and military actors (Union of Concerned Scientists 2015, International Institute for Strategic Studies 2015). The UK Space Agency is the national organization responsible for the UK Space Policy. This policy highlights that the United Kingdom must assure the British space interests, encouraging academic and industrial space sectors and promoting a safe and secure space environment (HM Government 2014).

Just like the United Kingdom, the **Spain** also has satellites for communication, observation and technology development, used for civil, commercial, governmental and military proposes (Union of Concerned Scientists 2015, International Institute for Strategic Studies 2015). Spain has a space agency, the 'National Institute of Aerospace Technology' (INTA), responsible for the Spanish activities in the space sector. The country highlights the importance of regional cooperation in space activities, and enhance the European Space Agency actions (National Institute for Aerospace Technology 2009).

The People's Republic of China is one of the most important countries in the space sector. It has several satellites, with many functions: communication, observation, technology development, and navigation. China's space assets are for civil, commercial, governmental and military uses (Union of Concerned Scientists 2015, International Institute for Strategic Studies 2015). China has a space agency, the 'China National Space Administration' (CNSA), and the government defends a peaceful use of the outer space, focusing in the developing of the Chinese society, and all humankind. China also highlights the importance of regional cooperation in the development and use of space (China National Space Administration 2003).

The Democratic People's Republic of Korea does not have space assets (Union of Concerned Scientists 2015, International Institute for Strategic Studies 2015). However, the country has a Space Agency, the National Aerospace Development Administration, and there has been a satellite launching in 2012, for observation proposes. The government claims its space activities have peaceful intentions, and, just like China, seeks the developing of the country (Talmadge 2015, The Guardian 2015).

The **Republic of Korea** has satellites for commercial, governmental and military uses. These are for communication, observation and technology development (Union of Concerned Scientists 2015). The country has a space agency, the Korea Aerospace Research Institute (KARI), and it has invested in the space sector in order to become one of the major space powers (Kang 2015). The Republic of Korea highlights the importance of international discussions and regulations regarding the use of space, and defends the peaceful use of this sphere, aiming the national security and development (Republic of Korea 2005).

Another important Asian actor in the space is **Japan**. It has satellites for civil, commercial and governmental use, which fit communication, observation, technology development and navigation purposes (Union of Concerned Scientists 2015, International Institute for Strategic Studies 2015). The 'Japan Aerospace Exploration Agency' (JAXA) is the national space agency. The country first priority in the space topic is to assure its national defense, and then the industrial development. Japan defends that the space should not hold aggressive asserts, and that international rules for the use of space must be established (Sawako 2009).

Australia is developing its space capacities, it has actually one satellite for communications, with dual use (commercial and military) (Union of Concerned Scientists 2015, International Institute for Strategic Studies 2015). According to the Australia's Satellite Utilization Policy (2013), the country highlights the importance of the space access to ensure national security, economic, environmental and social well-being. Even thought, Australia believes that the use of space must be done based on international rules, in order to guarantee a peaceful environment. The country also emphasizes the importance of cooperation in the use of space (Commonwealth of Australia 2013).

The United Arab Emirates has satellites for commercial, governmental and military purposes, for communication and observation (Union of Concerned Scientists 2015, International Institute for Strategic Studies 2015). The country has a space agency, the 'UAE Space Agency', and enhance the space industry as an important contributor to the economy and society developments. The United Arab Emirates also emphasizes the international cooperation for the development of the space sector (UAE Space Agency 2015).

Both **Kuwait** and **Qatar** do not have space assets or national space agencies (Union of Concerned Scientists 2015, International Institute for Strategic Studies 2015). Both countries do not have national space policies, but Kuwait defends the necessity of establishing an international accord to prevent the placement of any kind of weapons in space (Kuwait News Agency 2013). Qatar does not have an official position, but the country has a private organization, so called Qatar Foundation, which announced the establishment of an astronomy and space center (Varghese 2013).

T**he Kingdom of Bahrain** also does not have space assets (Union of Concerned Scientists 2015, International Institute for Strategic Studies 2015). The first steps in the space sector were made in 2014, with the inauguration of the National Space Science Agency (Geospatial World 2014). The country does not have a clear position on the topic, but it is a great ally of the United States, just like Qatar.

Developing countries usually fall behind on the space race. However, this does not happen exclusively due to technological factors, but it also involves the international balance of power. **Republic of India** is one of these countries that started with space programs seeking to develop the country economy and agricultural capacities, but was never able to aim for the militarized spectrum (Paracha 2013). Despite historical international constrains, recently, the country was able to successfully execute an ICBM launch, which opened a window for the possible development of Anti-Satellite weapons in the future. However, government officials guarantee that India's space program purposes currently remain pacific and that their technology is mainly for defensive matters (Space War 2012). In general, the majority of its space assets are under government control, and only a few are for declared military finalities, given that India already ratified the Outer Space Treaty (United Nations 2002).

Islamic Republic of Pakistan started with a great advantage over its neighbors on space matters. Its space program began by successfully launching rockets and satellites into space before the 21st century. Like many developing countries, it suffered from internal problems that ended up restraining its capability to develop such technologies for some years. Only recently, Pakistan was able to cooperate with China to launch an official communication satellite, and to restart its planning on the development of a remote sensing satellite. The countries space program purposes are mainly for socio-economic and humanitarian development, through agricultural and environmental monitoring (SUPARCO s.d.). Therefore, the country signed and ratified the OST, since it is concerned of the threats the weaponization could bring to its newborn assets (United Nations 2002).

Republic of Indonesia is a country with non-consolidated space capacities as well. Their first launch occurred in the 70's, with two communication satellites that were fabricated in the US. Nevertheless, the country started in 2005 its autonomous space capacities development program, achieving another launch in 2007, with a micro satellite that still operates today. There are two more assets being planned now, with a parallel program for the development of human resources and training along with international and regional partners, such as China, Korea, Japan and India (Fitrianingsih 2012). Regarding the weaponization of space, Indonesia declared in 2013 during an ASEAN summit, alongside Russia, that the country will bend every effort necessary to prevent that space become an arena for military confrontation and weapons deployment (RBTH Asia 2013).

Another country that suffers from a delay on the use of space but is currently compensating this capabilities gap is **South Africa**. The country's interest in space began very restrict and archaic, with little perspective. The apartheid regime, however, looked for the development on the use of space. Nevertheless, the US made one more victim of its international pressure and ended every government aspirations on the area. It only came to life again in the recent democracy years, when the SA government started to seek partnerships to develop space technologies, mainly with foreign space tech companies (Gottschalk 2010). Nothing points to a clear interest on the military use of space, and this supposition is reinforced by the country's agreement with most of the basic International Law treaties on the use of space, including the OST (United Nations 2002).

The **State of Israel** began its space related activities through the engagement of an academic community composed by scientists and engineers in the 60's. Years later, the government established its Space Agency emphasizing on the construction of space infrastructure and equipment, culminating on the launch of their first Satellite in 1988. Since that point, activities started to involve also defense matters and reached a consolidation point. The main distinctive characteristic of Israel's space program is its cutting-edge technology, with a present focus on LEO High-Resolution Image Satellites. Perspectives point for the use of such technologies for economic and commercial finalities, but also aiming on the possible contributions for their military capabilities (Ben Israel e Kaplan s.d.). The country, however, ratified the Outer Space Treaty (United Nations 2002).

The Kingdom of Saudi Arabia has plans for space exploration that are somewhat ambitious. Since the founding of the King's Space Agency, the main objective has been the development of science and technologies. They seek to become a regional leader in such activities, developing technologies for commerce and geographical observation (KACST 2014). Their latest space asset was launched in order to initiate a collaboration with NASA and Stanford, becoming the first Saudi satellite with capabilities that can serve multi strategic functions, and establishing a possible partnership for the future. Saudi Arabia have neither evidence of a support on the militarization of space, nor perspective on the development of weaponized assets (KACST 2008). Therefore, the country believes in and has already ratified the Outer Space Treaty (United Nations 2002).

Republic of Turkey is an essential and traditional state inside of NATO's main strategy. Therefore, it did not face the same severe restrictions on its space planning like other medium powers. However, the country is engaging in a quest to develop new partnerships, in both civil in military means in order to increment its capabilities. The country presents growing interest in sending manned missions to space, cooperating with China in this aspect (Space War 2013). The country is also a signatory of the Outer Space Treaty (United Nations 2002).

Islamic Republic of Iran, on the other hand, has an autonomous space program developed during the decades of national embargo. There is an historical fear on the threat posed by the possible use of nuclear weapons by the country. However, Iran's government guarantees that all research done inside its space facility is for peaceful purposes and have no military role. Its rocket and satellite technology, developed inside the country's borders, are mainly for commercial and weather monitoring functions. The only exception pointed out by the local government involves the development of technologies that would allow Iran to control its borders and monitor the possible western movement on its neighbor countries (Dareini 2012). Iran holds the position of signatory on the Outer Space Treaty (United Nations 2002).

The Republic of Lebanon, in contrast to many other countries, has a space program of little expression. It started in the 60's as a premature academic rocket research program, but ended up developing capabilities that were astonishing in comparison to other Middle East states, and even to USSR and the US. After successful launches, the military's became involved to try a major national space project. However, plans were down the drain when the region started to get unstable at later decades. Nowadays, its space program is of pitiful expression and has no capacity to perform or support the use of weapons in outer space (Hooper 2013).

Although in a desolating civil war for the past 4 years, the government of **Syria** decided to start its own space agency. It is not clear, until the present moment, what are the objectives that the government seek to achieve, but official declarations point out to the exclusive research and scientific nature of the program. There are still no satellites or other spacecrafts that hold the country's flag and estimates are that the space program will remain small for the years to come (Toor 2014). Syria is also a signatory of the Outer Space Treaty (United Nations 2002).

Arab Republic of Egypt is another newbie on the development and use of space technologies. It has one satellite orbiting the earth, and plans to launch a second one before 2017. The project involves only civil use satellites, specifically remote sensing assets that are planned to be developed through bilateral cooperation. Since it is on its early stages, it does not seem to be a main concern of the Egyptian government to create weapons for the use in space. In addition, the weaponization could put at risk their technologies achieved so far (SUPACRO s.d.). Egypt is also a signatory of the Outer Space Treaty, putting itself against the nuclear use and the offensive use involving space technology (United Nations 2002).

One other country that is still a long way from the developed economies in space matters is **Nigeria**, with a space program a little more than a decade old. The satellite program originated from a partnership with both UK ad China, for technological support. Yet, since the beginning, the country dedicates the space assets mainly to economic and governmental purposes, so it can follow up and aid the Nigerian growth. The only military intended purpose for it is the possible defensive use it can have, based on surveillance and monitoring, against militias in the country (Oladipo 2013). Nigeria currently have a 5 satellite quota and is also one of the few African countries that have already signed and is a party of the Outer Space Treaty, representing the possibility to use this technology in favor of state growth (United Nations 2002).

As Latin America suffered from the purposeful marginalization on technological affairs in order to maintain its dependency, countries of the region are starting a late development on their space programs. The **Bolivarian Republic of Venezuela**, for instance, started space researches in the 21st Century and currently owns only two satellites, granted by a new partnership with China. Their use is focused on communications and geographical research, in order to give economic support to remote communities (Magan 2013). The country does not seem to have short-term space militarization aspirations, and is also a signatory of the Outer Space Treaty (United Nations 2002). In the same way, **Cuba** was left aside from the economic connections of the western world. Although the unseen progression so far, and the unclear ambitions, the country has a concrete plan for creating a space center with Russian partnership (Sweeney 2008). It has no satellites on earth's orbit, and has already signed the Outer Space Treaty (United Nations 2002).

In South America, the autonomy ideal is also very clear. The Union de Naciones Suramericanas (UNASUR), urges for a multilateral cooperation in the region in order to, collectively, elaborate a space agency that could unite their efforts and achievements along with cost reductions. Contrary to other countries in the subcontinent, **Brazil** is pushing its space program mostly on its own. The main plan involves developing and launching a satellite for communication and defense purposes, to monitor the country's borders and naval units. Seen that the access to space is a requirement to the status of great power, it seeks to accomplish independently this ambition, and does not consider a short-term weaponization plan (Sanchez 2012). **Argentina** has a space program that is also far from achieving its maturity. It still depends on other countries launch capabilities to put its assets into orbit, counting on both regional and extra-regional partners, such as Brazil and Russia. Therefore, it does not see the weaponization of space as an aspect of immediate interest, and even condemns the security threats that Chile's space program represent to the region (Sanchez 2008). Both countries are signatories of the Outer Space Treaty (United Nations 2002).

In 2006, a representative of the **Russian Federation** argued that if all states observe a prohibition on space weaponization, there would be no arms race. The country also support establishing an obligation of no use or threat of use of force against space objects (Reaching Critical Will 2015). In addition, Russia has tactical military communication, reconnaissance, target designation and navigation satellites – all strategic space assets, but it does not mean that the country is in favor of the militarization of space. In June 2015, the state successfully launched a military satellite into space. However, it failed to enter the International Space

Station (PRESSTV 2015).

In 2014, **Ukraine** voted against the Russian resolution on "no first placement of weapons in outer space", which emphasizes the prevention of an arms race in space and that "other measures could contribute to ensuring that weapons were not placed in outer space" (United Nations 2014). Also, in the context of Ukrainian crisis, Russia has suspended cooperation with the country over joint space commercial program, said a representative of the federal space agency Roscosmos. "The project for the launch of Dnepr carrier rockets has been suspended. The prospects of this program will be determined later" (Space Daily 2015).

Caucasian country, **Georgia,** was one of the states that voted against a Russian draft resolution on banning arms race in outer space (NTI 2015). The state acted as an important agent of the Soviet Union during the Cold War period, mainly on the manufacturing of aerial and space materials. The technologies and capabilities developed contribute to the importance that the country has nowadays: it designed the first Space Reflector ever launched. This object is multifunctional, serving for either communication or specialized military purposes, enabling support for the western strategy (Global Security s.d).

The Republic of Poland ratified the Outer Space Treaty in 1968. The country launched its first satellite in 2012, using ESA's rocket. The main objective of this space asset is to monitor space debris and other objects orbiting Earth including the International Space Station (Radio Poland 2012). Also, an intention to develop military satellite communications part of its force modernization (SIGNAL 2008).

The **Czech Republic** is part of the European Space Agency (ESA). Despite cooperation inside this institution, that allows them to participate in joint researches, the government plans to initiate a National Space Programme. Government says this could help the country dive right in scientific and technical development attempts regarding space, despite economic constraints (Prague Post 2014). **Hungary** was the first country to sign a Plan for European Cooperating State (PECS) in November 2003 (Space Daily 2004). The country space agency is not consolidated, but this year (2015), the government achieved the status of permanent member on the ESA. This, politicians believe, could help improve the competitiveness of their industry. Both countries signed the OST, but neither have the conditions to think of weaponized systems in a short-term perspective (Daily News Hungary 2015).

Romania does not have its own spatial assets. However, the President of the Romanian Space Agency stated that the country is "benefiting from the international co-operation in the peaceful uses of outer space and is making, according to her resources, her contribution to this co-operation. We are determined to guide the space activities in which we participate towards practical applications" (United Nations n.d.).

Scandinavian countries are ESA members and all three of them (**Denmark, Norway** and **Sweden**) ratified the Outer Space Treaty. A Danish representative, speaking on behalf of the EU, confirmed the commitment to pursue a space weapons ban through the Conference on Disarmament, in 2002 (Estabrooks 2003). According to UCS (2015), Denmark own three satellites – two for technology development and one for earth observation. Norway own five communication satellites and Sweden own two, one for communications and the other one for earth observation.

5 QUESTIONS TO PONDER

1. If satellites can be used against another country´s space asset, should they be considered for potential military use?

2. Can a country's space defense program be considered a possible military act?

3. Who should enforce the demilitarization of space and regulate the strategic uses of every country in the different types of orbits?

4. What are space weapons and what are the boundaries, if they exist, of outer space?

5. How can the outer space be a peaceful environment?

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