

# NATO's Role in Space

## How and Why NATO Member States Should Expand Their Purpose and Capabilities in Space

LT COL EMMA PALOMBI, ITALIAN AIR FORCE

### Abstract

This article argues that NATO should expand its purpose and capabilities in space to effectively address the security threats that extend to and from space. The collective security of NATO member states in space can be strengthened through the pooling of satellite capabilities, diversifying the use of satellites, developing niche space specializations, and increasing the number of launching sites. Such cooperation will also enhance the relationship between NATO's European allies and the United States, the international system's hegemon. Integration of the space domain is essential for NATO to successfully improve its deterrence strategy in space and extend collective defense into outer space. Ultimately, how NATO responds to and integrates space in its daily operations will determine its relevance in the space domain and the success of its relationship with the United States.

\*\*\*

The importance of space has increased tremendously in the international arena, impacting states' national power and security policies. As a military alliance, NATO must prioritize the security of its members and recognize the significance of space in achieving that goal. Although NATO has acknowledged the importance of space, it still has much to do to integrate space into its mission and operations. This article argues that NATO must expand its role in space via its European member states, who can collectively increase their space assets and launch sites while developing niche space capabilities and technologies. This will contribute to the alliance's security and strengthen NATO's relationship with the United States, the current hegemon in the unipolar international system and the leading space power. The article examines the literature to explain when states are more likely to cooperate in international relations via military alliances. It also traces the evolution of NATO and introduces the concept of the *alliance security dilemma* that the European allies face vis-à-vis the United States. The article presents its main argument and explains the methodology, which includes qualitative case-study discussion and quantitative data. The findings confirm that NATO must expand into space to extend its collective defense function and provide tangible support to the United States. The article concludes by outlining

important parameters for NATO's space expansion and key observations to guide future implementation.

### Cooperation in International Relations

In international relations, the concept of cooperation among states has been extensively discussed, particularly by the neorealist and neoliberal schools of thought. Both agree that states exist in an anarchic environment, lacking a higher authority to arbitrate relations between them, leading to inherent uncertainty.<sup>1</sup> However, neorealists view interstate relations as more conflictual than neoliberals, with disagreement on whether institutions can mitigate this uncertainty. In this environment, states' primary goal is survival.

In general, neorealists see interstate relations as more conflictual than neoliberals, but they are divided on how states should ensure their survival in this anarchic international environment. Offensive realists argue that states must maximize power by any means necessary, including territorial conquest which often results in unavoidable wars.<sup>2</sup> On the other hand, defensive realists emphasize maximizing defensive security postures, such as forming alliances or developing retaliatory military capabilities, to ensure state survival, and argue that not every security dilemma is bound to escalate into a conflict.<sup>3</sup> In 1950, John H. Herz introduced the concept of the *security dilemma*, arguing that the increase of security and strength of one state causes fear in other states, which in turn increases their security and alarms the first state further, creating a spiraling and antagonistic dynamic.<sup>4</sup> In the context of the security dilemma, defensive realists claim that only when a state faces another state whose approach appears expansionist and threatens the status quo is conflict likely to occur. If both states are satisfied with the status quo and no expansionist will is perceived, defensive realists predict the mitigation of the friction coming from the security dilemma and the opportunity for states to cooperate.<sup>5</sup>

Defensive realists are generally more optimistic than offensive realists about the potential for cooperation among states.<sup>6</sup> They view the specificity of the situation,

---

<sup>1</sup> Robert Jervis, "Realism, Neoliberalism, and Cooperation: Understanding the Debate," *International Security* 24, no. 1 (Summer 1999), 43, <https://www.jstor.org/>.

<sup>2</sup> John J. Mearsheimer, *The Tragedy of Great Power Politics* (New York: W.W. Norton & Company, 2001), 3, <https://is.cuni.cz/>.

<sup>3</sup> Jervis, "Realism, Neoliberalism, and Cooperation," 48–49.

<sup>4</sup> John H. Herz, "Idealist Internationalism and the Security Dilemma," *World Politics* 2, no. 2 (January 1950), 157, <https://www.jstor.org/>.

<sup>5</sup> Jervis, "Realism, Neoliberalism, and Cooperation," 50.

<sup>6</sup> Jervis, "Realism, Neoliberalism, and Cooperation," 47.

the degree of transparency, and other states' objectives as key factors in enabling cooperation. Defensive realists advocate for states to pursue security through the build-up and accrual of defensive measures, such as alliances and retaliatory measures, which they believe can help to reduce the likelihood of conflict in the international system.<sup>7</sup> In contrast, offensive realists regard cooperation solely as a temporary tool that states can use "to improve their relative power position vis-à-vis their main adversary."<sup>8</sup> Furthermore, neorealists assert that states only see institutions as valuable when they facilitate the achievement of goals that would otherwise be too difficult or costly to attain alone.<sup>9</sup>

While neoliberals agree that the international environment is anarchic, with no sovereign ruler to govern over states, they disagree with neorealists that it is inherently conflictual and argue that there is room and potential for cooperation among states.<sup>10</sup> Neoliberals argue that despite the anarchic nature of the international environment, cooperation among states is possible, and that international institutions—which are formal expressions of such cooperation—play a crucial role in facilitating it.<sup>11</sup> By supplying information, reducing transaction costs, creating conditions for iterated interactions, generating expectations among members, and providing credible deterrents for defectors, neoliberals contend that international institutions enhance the chances of cooperation between states.<sup>12</sup>

In summary, the study of state cooperation is a subject that has been extensively examined by neorealists and neoliberals, who offer different approaches to understanding the conditions that foster cooperation and the role of institutions in promoting it. Alliances, a type of institution, are crucial in understanding NATO, a military alliance that both neorealists and neoliberals recognize as an example of state participation. The subsequent section will define military alliances.

### What Is a Military Alliance?

Etymologically, the word *alliance* comes from the Latin verb *alligare*, which means "to bind" or "to connect." In this article, the definition proposed by Stefan Bergsmann in his 2001 work *The Concept of Military Alliance* is adopted. Bergs-

---

<sup>7</sup> Kenneth N. Waltz, "The Emerging Structure of International Politics," *International Security* 18, no. 2 (Autumn 1993): 51-54, <https://www.jstor.org/stable/2539097>.

<sup>8</sup> John J. Mearsheimer, "A Realist Reply," *International Security* 20, no.1 (Summer, 1995): 85, <https://www.jstor.org/stable/2539218>.

<sup>9</sup> Jervis, "Realism, Neoliberalism, and Cooperation," 54.

<sup>10</sup> Jervis, "Realism, Neoliberalism, and Cooperation," 47.

<sup>11</sup> Jervis, "Realism, Neoliberalism, and Cooperation," 54.

<sup>12</sup> Charles Lipson, "Is the Future of Collective Security Like the Past?," in *Collective Security beyond the Cold War*, ed. George W. Downs (Ann Arbor: University of Michigan Press, 1994), 114.

mann defines an alliance as “an agreement among states in the realm of national security in which the partners promise mutual assistance in the form of the substantial contribution of resources in the case of a certain contingency the arising of which is uncertain.”<sup>13</sup> According to this definition, only states can enter into an alliance since they hold the power exclusivity in matters of national security. Bergsmann’s precise language excludes other forms of security arrangements, such as alignments, coalitions, unilateral guarantees, and treaties of neutrality. *Alignments* are informal groups that lack explicit agreements, while *coalitions* are formed to address expected circumstances, whereas alliances require unexpected events to trigger mutual assistance between states. *Unilateral guarantees* do not involve reciprocity assistance, and *treaties of neutrality* do not promise a defensive intervention as required by alliances.<sup>14</sup>

Bergsmann’s definition effectively captures the scope and nature of NATO by defining a military alliance narrowly. NATO is classified as a military alliance because its member states meet the following criteria: (a) they have signed the founding treaty of NATO, (b) they “are resolved to unite their efforts for collective defence,” and (c) they will take measures to assist any other NATO member state in the event of an armed attack, including the use of armed force if necessary.<sup>15</sup> The following section examines the purpose and evolution of NATO.

### **Focus on NATO as a Military Alliance: Purpose and Evolution**

To understand the role NATO, as a military alliance, may play in space, it is first necessary to outline the reasons behind NATO’s foundation and the ways in which it has evolved.

### ***NATO’s Origin and Evolution During the Cold War***

NATO was established on 4 April 1949 as a collective defense military alliance with 12 founding member states: Belgium, Canada, Denmark, France, Iceland, Italy, Luxembourg, Norway, the Netherlands, Portugal, the United Kingdom, and the United States.<sup>16</sup> The initial main rationale behind NATO’s creation was to respond to the threat posed by the Soviet Union after World War II. However, NATO’s purpose expanded to include responding to three distinct needs in Eu-

---

<sup>13</sup> Stefan Bergsmann, “The Concept of Military Alliance,” in *Small States and Alliances*, ed. Erich Reiter and Heinz Gärtner (Heidelberg: Physica-Verlag HD, 2001), 21, <https://www.bundesheer.at/>.

<sup>14</sup> Bergsmann, “The Concept of Military Alliance,” 28–29.

<sup>15</sup> “The North Atlantic Treaty,” NATO, 4 April 1949, <https://www.nato.int/>.

<sup>16</sup> “Founding Treaty,” NATO, 4 April 1949, <https://www.nato.int/>.

rope: constraining Soviet expansionism, impeding the formation of new regional militarism, and helping European nations' political integration.<sup>17</sup>

NATO's various purposes are codified in several articles of its founding treaty. Article 2 of the North Atlantic Treaty emphasizes nonmilitary cooperation among its members, encouraging economic collaboration through the development of international institutions.<sup>18</sup> Article 3 of the Treaty addresses military cooperation, directing member states to "maintain and develop their individual and collective capacity to resist armed attack."<sup>19</sup> Article 5 of the Treaty invokes Article 51 of the U.N. Charter, providing for collective self-defense: in the event of an armed attack against one or more NATO member states in Europe or North America, all NATO allies will assist the attacked state, even "with the use of armed force, to restore and maintain the security of the North Atlantic area."<sup>20</sup> These three articles of the Treaty summarize the original needs that NATO's constitution sought to address.

The aftermath of World War II had a significant impact on the evolution of the Alliance. The war left Europe with devastating economic and social outcomes and a sense of insecurity as the Soviet Union supported communist parties in various countries. Military cooperation, coupled with the economic aid of the Marshall Plan, was intended to help restore the political and economic stability military security in Europe.<sup>21</sup>

Initially, NATO did not have a well-defined military command structure, but the need to establish a clear chain of command became evident in 1949 when the Soviets detonated their first atomic bomb and again in 1950 when the Korean War began. As a result, the Alliance established its Supreme Headquarters Allied Powers Europe (SHAPE) in the vicinity of Versailles, France, and its civilian secretariat in Paris, France. In response, the Soviet Union and seven Central and Eastern European countries signed the Warsaw Pact in May 1955, a collective defense treaty that was the ideological opposite of NATO.<sup>22</sup>

In a Cold War bipolar international system with two main powers, NATO was a military institution that grouped states aligned with the United States. The Alliance's strategic concept, the Massive Retaliation doctrine, reflected the harshness of international bipolarism. If the Soviet Union had attacked one of the NATO members, the Alliance would have responded using all means necessary,

---

<sup>17</sup> "A Short History of NATO," NATO, 3 June 2022, <https://www.nato.int/>.

<sup>18</sup> NATO, "The North Atlantic Treaty."

<sup>19</sup> NATO, "The North Atlantic Treaty."

<sup>20</sup> NATO, "The North Atlantic Treaty."

<sup>21</sup> NATO, "A Short History of NATO."

<sup>22</sup> NATO, "A Short History of NATO."

including nuclear weapons. Such a posture, given the catastrophic risks associated with a potential nuclear war, was intended to discourage any type of aggression by the Soviets and their allies.<sup>23</sup>

The stability obtained through the counterbalance of threat and opposing forces is the beneficial effect that defensive neorealist Kenneth Waltz recognizes in a bipolar system like the US–Soviet one. According to Waltz, “In a multipower world . . . dangers are diffused, responsibilities unclear, and the definition of vital interests easily obscured,” while “the bipolar world of the postwar period has shown a remarkable stability.”<sup>24</sup> Due to the lack of peripheral states, everything converges on the interests and intentions of one of the two actors, and crises are better addressed and solved internally, within the two dominant powers’ spheres of influence.

Waltz also points out that successful alliances require a leading state but not equality among members.<sup>25</sup> This argument may explain NATO’s success, as its member states have accepted and recognized US preeminence and influence since the very beginning of NATO. The allies had an interest in keeping a strong bond with the United States, which, in turn, had an interest in having each member state politically stable and militarily strong enough to counter regional Soviet interference.<sup>26</sup>

In the 1960s, the stability achieved on the European continent was challenged by the Cuban missile crisis and the Vietnam War. NATO survived those tensions, and at the end of the decade, a *détente* in US–Soviet relations took place.<sup>27</sup> Washington and Moscow established direct lines of communication, and an acceptance of the status quo led to a change in NATO’s military strategy. From its initial strategy of *Massive Retaliation*, NATO transitioned to *Flexible Response*, based on a conventional armament defense.<sup>28</sup>

From a diplomatic perspective, this phase was well expressed by the so-called “Hammel Report” (*Report of the Council on the Future Tasks of the Alliance*), a document produced in 1967 by Belgian Foreign Minister Pierre Harmel. Acknowledging a change from the 1949 scenario, the report recommended that NATO combine deterrence with *détente* and facilitate a dialogue with the War-

---

<sup>23</sup> NATO, “A Short History of NATO.”

<sup>24</sup> Kenneth N. Waltz, “The Stability of a Bipolar World,” *Daedalus* 93, no. 3 (1964), 882–84, <http://www.jstor.org/>.

<sup>25</sup> Waltz, “The Stability of a Bipolar World,” 881.

<sup>26</sup> Waltz, “The Stability of a Bipolar World,” 880.

<sup>27</sup> Joseph S. Nye and David A. Welch, *Understanding Global Conflict and Cooperation: An Introduction to Theory and History*, 10th ed. (Boston: Pearson, 2017), 164–72.

<sup>28</sup> NATO, “A Short History of NATO.”

saw Pact countries. In essence, the Harmel Report pointed out that NATO had a twofold role: military and political.<sup>29</sup>

Evidence of the rapprochement between the West and the East was the 1975 Helsinki Final Act signed by all European NATO countries, Canada, the United States, the Soviet Union, and all the states of the Warsaw Pact. In the Helsinki Final Act, all signatories pledged to respect their citizens' fundamental rights and promote détente between the East and the West.<sup>30</sup>

In 1987, the United States and the Soviet Union signed the Intermediate-Range Nuclear Forces (INF) Treaty, agreeing to dismantle intermediate nuclear and conventional ground-launched ballistic and cruise missiles. During the 1980s, communist governments faced economic decline. In 1989, the fall of the Berlin Wall marked the end of the Cold War and the dissolution of the Warsaw Pact.<sup>31</sup> This also marked the end of bipolarism, where "two states or two blocks overshadow all others" and marked the beginning of U.S. unipolar hegemony.<sup>32</sup> What did this mean for the future of NATO?

### ***NATO after the Cold War***

Political scientist Stephen M. Walt highlights that "the advent of unipolarity has had profound effects on the nature of contemporary alliances." This has led to a lack of consensus among scholars on the real impact of unipolarity on international alliances.<sup>33</sup> One of the key questions arising from this impact is the role of NATO after the dissolution of the Soviet Union, which can explain why realist predictions of NATO's demise did not come true.

Since the end of the Cold War, NATO has intervened militarily in four main crises: the First Gulf War, the Balkans, Afghanistan, and Iraq. Professor Galia Press-Barnathan's analysis suggests that these military conflicts reflect changed dynamics among European NATO countries due to the shift toward a unipolar, US-led international order.<sup>34</sup> The new security environment was marked by an increase in the number and types of threats and the emergence of an "alliance security dilemma."<sup>35</sup>

---

<sup>29</sup> "Harmel Report," NATO, 1 July 2022, <https://www.nato.int/>.

<sup>30</sup> NATO, "A Short History of NATO."

<sup>31</sup> NATO, "A Short History of NATO."

<sup>32</sup> Waltz, "The Stability of a Bipolar World," 887.

<sup>33</sup> Stephen M. Walt, "Alliances in a Unipolar World," *World Politics* 61, no.1 (January 2009): 86–87, <https://www.jstor.org/stable/40060222>.

<sup>34</sup> Galia Press-Barnathan, "Managing the Hegemon: NATO under Unipolarity," *Security Studies* 15, no. 2 (June 2006): 275, <https://www.tandfonline.com/doi/abs/10.1080/09636410600829554?journalCode=fsst20>.

<sup>35</sup> Press-Barnathan, "Managing the Hegemon," 273.

Since the beginning of unipolarity in 1991, the threat perception among NATO allies has increased. During the Cold War bipolar system, the threat was identified exclusively with the Soviet Union. In contrast, unipolarity is marked by the lack of a single main opponent and the emergence of potential threats. Additionally, the shift to a unipolar system has led to a diversification of threats. While the hegemon's concern is directed toward global threats, weaker allies must concentrate on geographically closer threats that arise on a regional scale. In Europe, such threats could include a spread of Russian nationalism or imperialistic desires, as well as crises in the Balkans. Those new threats warrant a prolongation of security alliances like NATO. Furthermore, the difference in threat perception between the hegemon and the other allies generates an alliance security dilemma. In practical terms, the smaller and weaker allies want to keep the security arrangements that the NATO alliance provides but face the dual "risk of abandonment and entrapment" from the newly established hegemon, the United States.<sup>36</sup> Under the alliance security dilemma, allies fear either being abandoned by the hegemon at the onset of regional crises or being trapped and forced into the hegemon's strategic plans. To counter such a dual risk, the allies can adopt two strategies: (1) try to restrain the hegemon through pacts and (2) create a division of labor. This second strategy aims to gain unique capabilities that will increase the allies' bargaining power over the hegemon either individually or as a group, as well as increase their operational independence in managing regional threats.<sup>37</sup>

This alliance security dilemma has been evident in the four conflicts of the Gulf, the Balkans, Afghanistan, and Iraq. European allies first perceived it during the 1991 Gulf War, when they realized their power disparity compared to the United States. Relying on its superior power, the United States could abandon its allies or impose its will on them. The European NATO members recognized the need for European integration and unity to internally balance the United States during the Gulf War. The alliance security dilemma was highlighted again in the 1999 Balkan conflict when the Allies faced the abandonment–restraint challenge. They required US military support in Europe but were cautious not to become dependent on US leadership. European NATO members applied the dual strategy described earlier by developing a division of labor through a European provision of forces and leveraging NATO's ties to restrain the United States to guarantee its military intervention in the Balkan conflict.<sup>38</sup>

---

<sup>36</sup> Press-Barnathan, "Managing the Hegemon," 273–79.

<sup>37</sup> Press-Barnathan, "Managing the Hegemon," 273–74.

<sup>38</sup> Press-Barnathan, "Managing the Hegemon," 306–07.



A similar dynamic occurred in Afghanistan, where NATO allies feared that the United States would concentrate all its efforts on that conflict, potentially abandoning its other security commitments elsewhere. The Global War on Terror posed a clear risk of entrapment, as supporting the Bush administration's doctrine could have bound the European NATO member states to US strategic goals. Such a risk of entrapment became evident again in 2003 during the postconflict phase of the Iraq War, when allies felt pressure to help rebuild Iraq.<sup>39</sup> In the years that followed the end of the Iraq War, European countries applied a strategy of restraint by leveraging preexisting NATO decision-making procedures and agreements. They also concentrated their efforts on a division-of-labor strategy within the context of the European Union (EU), planning to integrate their military capabilities under the EU's umbrella. While this strategy required a long time to implement fully, it could have helped the European allies become more independent militarily and provide support if needed.<sup>40</sup> It would have mitigated fears of abandonment and increased their ability to restrain the hegemon, if required, through concessions or denial of support.

Overall, since the dissolution of the bipolar order, NATO has been essential for European allies to manage the internal alliance security dilemma by employing the division-of-labor and restraint strategies.<sup>41</sup> While NATO European allies have been successful in managing their relationship with the US hegemon, modern-day developments and the evolving security environment necessitate that NATO expand its mission and operations into space to continue playing an essential role. The next section outlines the primary reasons why NATO must expand its operations and presence in space.

### **NATO Must Expand into the Space Domain**

Considering the increasing and critical role that space plays in providing security on the ground, this article argues that NATO must expand its military capacities into the space domain. This would enhance the security of all NATO member states and provide crucial support to the United States, the current hegemon with which NATO has a vital interest in maintaining a strong relationship.

Specifically, the article proposes that (a) NATO extends its collective self-defense capabilities to outer space, (b) the European NATO countries collectively increase their space capabilities and assets by pooling their space resources, and (c)

---

<sup>39</sup> Press-Barnathan, "Managing the Hegemon," 307–08.

<sup>40</sup> Press-Barnathan, "Managing the Hegemon," 308.

<sup>41</sup> Press-Barnathan, "Managing the Hegemon," 308.

the allies diversify their space specializations and technologies to provide niche services to the United States. Before the article demonstrates the validity and necessity of this argument, it first discusses the significant role space plays in national and international security.

### ***Why the Space Domain?***

Space is a domain that is crucial for national security, and it is heavily relied upon by most countries, including all NATO member states. It plays a vital role in various essential activities, such as military operations, economic transactions, communication, weather monitoring, banking, and agriculture. In the military sector, space-based assets are indispensable for early warning, intelligence, surveillance, and reconnaissance (ISR), as well as position, navigation, and timing (PNT), and secure communications capabilities. NATO's "operations and missions, including collective defense, crisis response and counter-terrorism" are similarly dependent on space-based resources.<sup>42</sup> However, this dependence also creates a vulnerability for NATO member states, as outer space has become an increasingly congested, contested, and competitive domain, with multiple actors operating, often with competing interests.<sup>43</sup>

Outer space poses unique challenges that affect NATO's operations and member states. Issues like orbital debris and accidental collisions can seriously impact ground military capabilities, while the use of dual-use technologies and nuclear capabilities in space presents further risks to state security. These challenges not only affect individual NATO states but also the Alliance's ability to preserve the security of its member states by preventing, deterring, and responding to crises.

NATO faces ground challengers like China and Russia who possess antisatellite capabilities and can conduct hostile activities toward the United States and NATO allies by degrading or denying their space-enabled military capabilities.<sup>44</sup> For instance, in 2019, Norway accused Russia of "harassing" communications systems during a NATO exercise, which affected NATO's GPS signals and secure communication. The incidents were traced and attributed to Russian sites.<sup>45</sup>

Space has become a crucial element for states as a multiplier of national power and an enabler of security policies. NATO, as a state-centered military organiza-

---

<sup>42</sup> "NATO's Approach to Space," NATO, 12 April 2023, <https://www.nato.int/>.

<sup>43</sup> Sandra Erwin, "Space Force Leaders Questioned on Their Plans to Invest in Technology and Workforce," *SpaceNews*, 4 May 2022, <https://spacenews.com/>.

<sup>44</sup> "NATO's Overarching Space Policy," NATO, 17 January 2022, <https://www.nato.int/>.

<sup>45</sup> Frank A. Rose, "NATO and Outer Space: Now What?," *Order from Chaos* (blog), 22 April 2020, <https://www.brookings.edu/>.

tion, must develop capabilities in space if it wants to remain relevant and keep up with the United States.<sup>46</sup> To strengthen the NATO–US relationship, the Alliance must expand its role in space and be capable of restraining the United States if needed. The next section discusses what functions NATO must assume to achieve this goal.

### ***Considerations for NATO in Space***

There are two main points to consider when examining NATO’s role in space. First, the Alliance must fulfill its primary function as a collective defense alliance. As many threats and security challenges now extend to and from space, NATO must expand its collective self-defense capabilities to outer space. This requires acquiring military capabilities that enable NATO to deter and defend against threats in space to guarantee the security of all its member states.

Second, the current international system is still a unipolar order, where the United States enjoys power preponderance, particularly in the military realm.<sup>47</sup> Since the collapse of the Soviet Union, the United States has enjoyed hegemony, and NATO has had to reshape its relationship with Washington. European NATO member states have a vested interest in remaining in the Alliance to benefit from its security provisions and protection.<sup>48</sup> However, the relationship with the United States poses two risks to other NATO members—the fear of being abandoned by the hegemon and concern of being entrapped by Washington’s strategic plans.

As discussed above, NATO members have adopted two strategies toward the United States since the end of the Cold War: (1) restraining Washington through the bonds of the Alliance agreements, and (2) providing support in specific military sectors.<sup>49</sup> Today, military threats and national security interests are moving into space, which is becoming an increasingly important “element of national power” and a “security policy tool” for states.<sup>50</sup> European NATO members should be prepared to apply the same two strategies toward the United States in the space domain. Specifically, they should collectively increase their space capabilities and assets and diversify their space specializations and technologies to provide niche services to the United States. The combined space capabilities of

---

<sup>46</sup> Tale Sundlisaeter, “Space Power in the High North—Perspectives from the Kingdom of Norway” (PhD thesis, University of St Andrews, 2022), 8–15, <https://research-repository.st-andrews.ac.uk/>.

<sup>47</sup> Nuno P. Monteiro, *Theory of Unipolar Politics* (New York: Cambridge University Press, 2014), 3.

<sup>48</sup> Press-Barnathan, “Managing the Hegemon: NATO under Unipolarity,” 308.

<sup>49</sup> Press-Barnathan, “Managing the Hegemon: NATO under Unipolarity,” 308.

<sup>50</sup> Sundlisaeter, “Space Power in the High North,” 8–15.

NATO states, along with their individually specialized and unique support, will impact the United States as both a restraining and a supportive tool. This approach will help the Alliance achieve the threefold effect of expanding its military capabilities in space, extending its collective defense to all domains, and continuing its vital relationship with the United States. The next section outlines the methodology used to demonstrate the validity of this article's argument before presenting the results on how NATO can best develop its space capabilities.

### **Case Study and Quantitative Data**

To support the thesis that NATO should expand its purpose and capabilities in space, this article utilizes both a case-study approach and quantitative data. The case study relies on primary and secondary sources, including NATO publications, official NATO representatives' statements, and institutional changes adopted into NATO's structure, to determine which space capabilities NATO should prioritize. Additionally, a quantitative analysis of NATO member states' space assets in different orbital regimes is conducted to evaluate how their combined space capabilities can support the Alliance's collective security purpose. The Union of Concerned Scientists' Satellite Database, which is available online, is used to group, analyze, and assess the current space assets of NATO member states.<sup>51</sup> The data provided in this analysis is valid as of 1 May 2022.

#### ***Case Study: NATO's Evolving Approach to Space***

NATO's official policy on space reflects its awareness of the complex challenges associated with space. This attention to space is not new, as evidenced by NATO's development of its own satellite system in the 1970s.<sup>52</sup> However, in the 2000s, the Alliance abandoned the idea of having its own satellites and instead relied on France, the United Kingdom, and Italy for its space assets. This approach, known as "SATCOM 2000," became NATO's program for satellite communications.<sup>53</sup> Since 2019, the program has also received contributions from US satellites. Today, while the Alliance does not own satellites, it relies on its member states "to provide space data, products, services, or effects . . . required for the Alliance's operations, missions, and other activities."<sup>54</sup>

---

<sup>51</sup> Readers can access the database at <https://www.ucsusa.org/>.

<sup>52</sup> NATO, "NATO's Approach to Space"; and "NATO, We Have Lift Off," NATO, 12 February 2019, <http://www.nato.int/>.

<sup>53</sup> Victoria Samson, "Nato And Its Changing Approach To Space," *Turkish Policy Quarterly* 20, no. 2 (September 2021), 76, <http://turkishpolicy.com/>.

<sup>54</sup> NATO, "NATO's Overarching Space Policy."

At the London Summit in December 2019, NATO leaders recognized space as an “operational domain, after air, land, sea, and cyberspace.”<sup>55</sup> According to scholar Victoria Samson this definition indicates that NATO’s focus is “on the integration and interoperability of assets belonging to different member states . . . as enablers of military operations . . . rather than those with the capacity of denying space to adversaries.”<sup>56</sup> This aligns with NATO Secretary General Jens Stoltenberg’s statement that the Alliance’s approach to space is defensive and does not support the deployment of weapons in outer space. Given that NATO was founded as a defensive alliance, extending its defensive posture to space is a logical continuation.<sup>57</sup>

Another significant step in the Alliance’s approach to space was taken at the Brussels Summit in June 2021, when NATO leaders agreed to invoke Article 5 if “attacks to, from, or within space present a challenge to the security of the Alliance.”<sup>58</sup> This means that an attack against any NATO member state in or from space will trigger the collective defense clause of Article 5. NATO’s 2022 *Strategic Concept* reiterates the Alliance’s commitment to play a role in space it recognition of the challenges and threats in this evolving domain.<sup>59</sup>

On 22 October 2020, the Alliance established the NATO Space Centre at Allied Air Command in Ramstein, Germany, which serves as a focal point for NATO commanders to address matters related to space-enabled access and data sharing. NATO recognizes the importance that space has in deterrence and defense and emphasizes the need for space situational awareness (SSA) and access to space services.<sup>60</sup> SSA involves tracking and predicting objects’ position and trajectory in space, and the Alliance is investing in a Strategic Space Situational Awareness System (3SAS) to integrate space in planning, training, and emerging space technologies.<sup>61</sup> Additionally, NATO members are making significant investments in providing their military assets with more resilient and efficient satellite communication services.<sup>62</sup>

As a defensive alliance, NATO recognizes space as an operational domain that plays a vital role in enhancing the defense and collective security of its member states.

---

<sup>55</sup> NATO, “NATO’s Approach to Space.”

<sup>56</sup> Samson, “Nato And Its Changing Approach To Space,” 79.

<sup>57</sup> “Press conference by NATO Secretary General Jens Stoltenberg ahead of the meetings of NATO Ministers of Foreign Affairs” (Brussels, NATO, 19 November 2019), <https://www.nato.int/>.

<sup>58</sup> NATO, “NATO’s Approach to Space.”

<sup>59</sup> NATO, “NATO’s Approach to Space.”

<sup>60</sup> NATO, “NATO’s Approach to Space.”

<sup>61</sup> Space Foundation Editorial Team, “Space Situational Awareness,” September 2019, <https://www.spacefoundation.org/>.

<sup>62</sup> NATO, “NATO’s Approach to Space.”

While the Alliance has taken several specific steps to integrate space into its mission and operations, there are still gaps that NATO needs to consider. This article identifies these gaps and presents them in the discussion section, following a quantitative examination of each NATO state's contributions in terms of orbital assets.

### ***Quantitative Data: Space Assets of NATO Member States in Various Orbital Regimes***

This section presents the results of a quantitative research study that collected space data from US NATO allied states. The data are presented in table 1 and include:

- number of satellites owned by each US NATO allied member state;
- users of satellites—civil, government, commercial, or military;
- purpose of each satellite: earth observation, communication, navigation/global positioning, or other;
- location, or class of orbits of satellites: elliptical, low Earth orbit (LEO), medium Earth orbit (MEO), or geosynchronous orbit (GEO); and
- spaceport capability—by state.

Regarding the collection and computation of the data, the following is specified:

- Satellites are recorded by state ownership. In other words, the states listed are the official owners of the respective satellites.
- In case of multiple owners/users/purposes of a specific satellite, only the first reported owner/user/purpose was considered and counted.<sup>63</sup>

---

<sup>63</sup> "Satellite Database," Union of Concerned Scientists, 1 May 2022, <https://www.ucsusa.org/>.

**Table 1. NATO satellites and spaceports.** (Sources: Union of Concerned Scientists Satellite Database; All of the World's Spaceports on One Map).

| STATE                 | TOTAL SATELLITES | USERS    |            |            |          | PURPOSE           |            |            |       | ORBIT      |     |     |     | Spaceport/<br>Launch site           |
|-----------------------|------------------|----------|------------|------------|----------|-------------------|------------|------------|-------|------------|-----|-----|-----|-------------------------------------|
|                       |                  | Civilian | Government | Commercial | Military | Earth observation | Commercial | Navigation | Other | ELLIPTICAL | LEO | MEO | GEO |                                     |
| Belgium               | 2                |          |            | 2          |          |                   | 2          |            |       |            |     |     | 2   |                                     |
| Bulgaria              | 2                | 1        |            |            | 1        |                   | 2          |            |       |            | 1   |     | 1   |                                     |
| Canada                | 56               | 8        | 5          | 42         | 1        | 5                 | 42         |            | 9     | 2          | 22  |     | 32  | 1 in development <sup>64</sup>      |
| Czechia               | 4                | 1        | 2          |            | 1        | 3                 |            |            | 1     | 1          | 3   |     |     |                                     |
| Denmark               | 4                |          | 1          | 1          | 2        | 1                 | 2          |            | 1     |            | 1   |     | 3   |                                     |
| Finland               | 18               | 2        |            | 16         |          | 16                |            |            | 2     |            | 18  |     |     |                                     |
| France                | 22               | 2        | 2          | 18         |          | 2                 | 15         | 5          |       | 1          | 4   | 4   | 13  | 1 in development for mini satellite |
| France + other states | 9                |          |            | 9          |          |                   |            | 9          |       | 1          |     | 8   |     |                                     |
| Germany               | 45               |          | 28         | 15         | 2        | 29                | 1          | 14         | 1     | 3          | 25  | 14  | 3   |                                     |
| Greece                | 2                |          | 1          |            | 1        |                   | 1          |            | 1     |            | 2   |     |     |                                     |
| Greece + UK           | 1                |          | 1          |            |          |                   |            |            | 1     |            | 1   |     |     |                                     |
| Hungary               | 1                |          | 1          |            |          |                   |            |            | 1     |            | 1   |     |     |                                     |
| Italy                 | 15               |          | 4          | 10         | 1        | 5                 | 10         |            |       |            | 14  |     | 1   |                                     |
| Lithuania             | 2                |          |            | 2          |          |                   | 2          |            |       |            |     |     | 2   |                                     |
| Luxembourg            | 42               |          | 15         | 23         | 4        | 31                | 9          |            | 2     | 4          | 29  |     | 9   |                                     |
| Netherlands           | 14               |          | 14         |            |          |                   | 14         |            |       |            | 14  |     |     |                                     |
| Norway                | 9                |          | 9          |            |          |                   | 9          |            |       |            | 9   |     |     | 1+1 in development <sup>65</sup>    |
| Poland                | 5                |          | 5          |            |          |                   | 5          |            |       |            | 5   |     |     |                                     |
| Poland + UK           | 1                |          | 1          |            |          |                   | 1          |            |       |            | 1   |     |     |                                     |
| Slovenia              | 2                | 1        |            |            | 1        | 1                 |            |            | 1     |            | 2   |     |     |                                     |
| Spain                 | 26               |          |            | 26         |          | 26                |            |            |       |            | 26  |     |     |                                     |

<sup>64</sup> "Canada's First Commercial Spaceport," Maritime Launch, 7 March 2023, <https://www.maritimelaunch.com/>.

<sup>65</sup> "The Norwegian Government Has Approved the Building of a New Spaceport," *SatNews*, 12 October 2021, <https://news.satnews.com/>.

| STATE             | TOTAL SATELLITES | USERS    |            |            |          | PURPOSE           |            |            |       | ORBIT      |     |     |     | Spaceport/<br>Launch site      |
|-------------------|------------------|----------|------------|------------|----------|-------------------|------------|------------|-------|------------|-----|-----|-----|--------------------------------|
|                   |                  | Civilian | Government | Commercial | Military | Earth observation | Commercial | Navigation | Other | ELLIPTICAL | LEO | MEO | GEO |                                |
| Turkiye           | 10               |          |            | 10         |          | 10                |            |            |       |            | 10  |     |     |                                |
| UK                | 486              | 17       | 60         | 319        | 90       | 101               | 270        | 34         | 81    | 12         | 378 | 55  | 41  | 7 in development <sup>66</sup> |
| UK + other states | 2                |          |            | 2          |          |                   | 2          |            |       |            | 2   |     |     |                                |
| TOTAL             | 780              | 32       | 149        | 495        | 104      | 230               | 387        | 62         | 101   | 24         | 568 | 81  | 107 |                                |

The collected data leads to the following observations:

- US NATO allied states collectively own 780 satellites (excluding 56 Canadian satellites, European allied states own 724 satellites). These assets could be utilized to augment the 3,433 operational satellites that the United States currently operates, resulting in an overall 22-percent increase in capacity, all other things being equal. However, the specific increase in capacity would vary depending on the type of satellite and orbital regime.
- The US NATO allies with the highest number of satellites are the United Kingdom, Canada, and Germany.<sup>67</sup>
- The predominant users of NATO allied states' satellites are commercial actors.<sup>68</sup>
- The most frequent purpose of satellites owned by NATO allied states is communication.<sup>69</sup>
- Most satellites of NATO allied states are located in LEO.<sup>70</sup>
- Eleven NATO European allies do not have any space assets. Those are Estonia, Finland, Iceland, Latvia, Romania, Slovakia, Slovenia, Albania, Croatia, Montenegro, and North Macedonia.<sup>71</sup>

<sup>66</sup> Dhara Patel, "UK Spaceports—Making British Spaceflight History," National Space Centre, 17 February 2022, <https://spacecentre.co.uk/>.

<sup>67</sup> Union of Concerned Scientists, "Satellite Database."

<sup>68</sup> Union of Concerned Scientists, "Satellite Database."

<sup>69</sup> Union of Concerned Scientists, "Satellite Database."

<sup>70</sup> Union of Concerned Scientists, "Satellite Database."

<sup>71</sup> Union of Concerned Scientists, "Satellite Database."



- Only the United Kingdom (Orbex LP1 at Kinloss) and Norway (Andøya Space Center), among the NATO allied countries, have orbital spaceports on their territory.<sup>72</sup> France is working on building at least one mini/micro launcher by 2026.<sup>73</sup>

## Discussion and Recommendations

The satellite data points to two important conclusions. Firstly, NATO allies collectively own a substantial number of satellites that could increase the space capabilities of the US by at least 23 percent of its current capabilities. While the US is currently the dominant space power, owning 63 percent of all satellites in space, or 3,433 out of 5,465 total operating satellites, the combined space capabilities of NATO allies,<sup>74</sup> which is a total of 780, can augment US space capabilities even further, particularly in the low Earth orbit (LEO), where NATO allies have a combined total of 568 operating satellites. LEO is crucial for communications, military reconnaissance, spying, and other imaging applications, and having more satellite redundancy and resilience in LEO is essential. Therefore, combined NATO member states' satellite capabilities can help achieve this objective. However, achieving full pooling of NATO member states' satellites may face opposition from some nations, such as France, which is proud of its space capabilities and may not want to let NATO use all its satellites in service of the US. The Alliance may have to come to terms with nations willing to allow only selected space capabilities while developing policies that discourage such nationalistic positions.

Additionally, the disproportional concentration in a few countries, with the UK alone owning more than half of the 780 satellites of the US NATO allies, suggests that more NATO member states should be encouraged to develop their own space capabilities. This consideration is further supported by the fact that 10 NATO European allies do not have any satellites.

Additionally, the low number of orbital launch sites in European NATO member states indicates another capability that should be developed. More spaceports should be built to serve as a backup in case of unavailability of any US site. Currently, Norway has one active spaceport and another in development, while the

---

<sup>72</sup> Nick Routley, "All of the World's Spaceports on One Map," *Visual Capitalist*, 18 October 2022, <https://www.visualcapitalist.com/>.

<sup>73</sup> Ministère de l'Enseignement Supérieur et de la Recherche, "France 2030 : présentation des premiers lauréats du volet spatial et signature du contrat d'objectifs et de performance du CNES" [France 2030: presentation of the first winners of the space component and signature of the CNES objectives and performance contract], 6 October 2022, <https://www.enseignementsup-recherche.gouv.fr/>.

<sup>74</sup> Union of Concerned Scientists, "Satellite Database."

United Kingdom has approved seven spaceports to be built. The European Space Agency (ESA) also has one active spaceport in French Guiana. Currently, the United States has six active spaceports, with more in development.<sup>75</sup> By building more launch sites, European NATO member states can enhance US launch avenues, giving the United States the option to launch from different sites worldwide and achieve various orbits.

Both conclusions focus on the critical topic of enhancing the resiliency of space assets, primarily through increased redundancy. *Resiliency* refers to a system's "robustness and survivability," or to the capacity of a system to withstand or recover quickly from difficulties.<sup>76</sup> This can be achieved through increased *redundancy*, defined as the multiplication of or the inclusion of extra components and assets in a network of satellites to prevent failure, damage, or service interruption. Increased redundancy leads to increased resiliency, aimed at keeping a system "operable, should one or more of its parts be attacked."<sup>77</sup> Furthermore, resiliency can "minimize adversary incentives to carry out first strike in space," since the enemy may not consider the cost-effectiveness of such an attack.<sup>78</sup> Even if the enemy's attack could destroy or degrade a space asset, an equivalent asset would be available to replace it, nullifying the attacker's efforts.

Resilience is fundamental to space deterrence and partnerships can contribute tremendously to strengthening it by sharing resources and capabilities.<sup>79</sup> By enhancing resiliency, NATO can develop its own deterrence strategy while also supporting the US defense strategy in space through the multiplication and sharing of space assets by European Allies.<sup>80</sup>

On the practical level, NATO member states can contribute to collective security of the Alliance in space not only by increasing the number of satellites and launching sites but also by diversifying the use of their satellites and developing niche space technologies. These niche specializations in space activities by NATO

---

<sup>75</sup> Thomas G. Roberts, "Spaceports of the World," *Aerospace Security*, 31 January 2023, <https://aerospace.csis.org/>.

<sup>76</sup> Andrea Console, "Space Resilience—Why and How?" Joint Air Power Competence Centre, 2 December 2018, <https://www.japcc.org/>; and Muhammad Raza, "Resiliency vs Redundancy: What's the Difference?," *BMC Blogs*, 10 September 2019, <https://www.bmc.com/>.

<sup>77</sup> "Resilient Space: The Real Star Wars," Aerospace Corporation, 27 November 2017, <https://aerospace.org/>.

<sup>78</sup> Zack Cooper and Thomas G. Roberts, "Deterrence in the Last Sanctuary," *War on the Rocks*, 2 January 2018, <https://warontherocks.com/>.

<sup>79</sup> Ryan Schradin, "Resiliency, Redundancy and Partnerships to Protect Global Commons of Space," *GovSat*, 22 July 2020, <https://sessd.com/>.

<sup>80</sup> Sandra Erwin, "U.S. National Defense Strategy Calls for 'Resilient, Redundant' Space Networks," *SpaceNews*, 27 October 2022, <https://spacenews.com/>.

European countries would create new ties with the United States and promote strategic constraint within the Alliance if needed.

An example of such an approach is France's "Graves" program, which specializes in "space intelligence gathering capability."<sup>81</sup> Introduced in 2005 and modernized in 2016, Graves is a "ground-based . . . space-surveillance system."<sup>82</sup> It is capable of tracking "satellites and objects in orbit at 400 to 1000 km above the Earth." The French Air and Space Forces use it to "track foreign spy satellites."<sup>83</sup> The program's success has made it an appealing partner for the United States, which in 2015 signed an agreement with France to share military classified intelligence information.<sup>84</sup> Graves exemplifies how specialized space programs can foster partnerships and cooperation with the United States, an objective that European NATO countries should pursue collectively under the NATO umbrella to maintain a strong bond with the US hegemon in the space domain.

After analyzing NATO's evolution in space and collecting data on US allies' current satellites in space, the next section will focus on additional important issues that NATO must address to enhance its role in the space domain.

### **Additional Issues that NATO Needs to Address**

Until today, NATO has shown awareness of the crucial role that space plays in modern military operations. Consequently, NATO has institutionalized certain changes, such as the creation of the NATO Space Centre at Allied Air Command in Ramstein, Germany, and the NATO Space Center of Excellence in Toulouse, France. However, NATO still needs to develop a clear strategic plan for integrating space in a meaningful way to remain a credible collective security alliance in defense of its member states and continue to be useful to the United States.

NATO's response to and integration of space in its daily operations will determine whether it can achieve a relevant role in space and manage its relationship, as an alliance, with the United States. If NATO fall behind, the United States may abandon it and form more convenient unilateral, bilateral, or multilateral joint ventures with other partners.

This study's results demonstrate that NATO can uniquely contribute to its collective security mission and U.S. space assets by increasing the latter's resiliency in various orbital regimes. NATO allies can do so through their collective and indi-

---

<sup>81</sup> Pierre Tran, "Deal Breathes New Life into France's Space-Surveillance Radar," *Defense News*, 12 December 2016, <https://www.defensenews.com/>.

<sup>82</sup> Tran, "Deal Breathes New Life."

<sup>83</sup> Tran, "Deal Breathes New Life."

<sup>84</sup> Tran, "Deal Breathes New Life."

vidual space assets. Additionally, the Alliance must concentrate its efforts on integrating the space domain successfully into several additional areas.

First, NATO's official space policy does not include a defined deterrence strategy or a plan for implementing such deterrence in space.<sup>85</sup> NATO must clearly outline how to integrate space within its defense plans and operations.<sup>86</sup> This task will be challenging as NATO will need to reconcile its position on space with the differing views of its member states. For example, NATO views space as an operational domain, whereas the United States regards it as a war-fighting domain "where offensive and defensive military operations take place."<sup>87</sup> Furthermore, while NATO has declared its intention not to deploy weapons in space, some of its members, such as France and the United States, have conducted tests and studies on various space-based weapons systems technologies.<sup>88</sup> Such conflicting views could potentially increase in future, considering that more nations could become interested in further developing space weaponization technologies. This scenario raises questions for NATO, including how to reconcile its members' differing perspectives and whether it will be necessary to redefine NATO's definition of outer space.

A second important issue concerns the North Atlantic Treaty's Article 5, which forms the foundation of the Alliance's collective defense.<sup>89</sup> Victoria Samson has highlighted the vagueness of NATO Secretary General Jens Stoltenberg's approach to addressing the cases covered by Article 5 during a November 2019 press conference.<sup>90</sup> This ambiguity was reinforced at the 2021 Brussels summit, where Alliance leaders stated that "the invocation of Article 5 would be taken by the North Atlantic Council on a case-by-case basis."<sup>91</sup> This highlights the need for NATO to define a clear threshold for triggering Article 5 and establish the domain in which a response will take place.<sup>92</sup> Additionally, the U.S. has taken a firm position to respond to attacks "in time and place of its choosing," further complicating matters for NATO to address.<sup>93</sup>

---

<sup>85</sup> NATO, "NATO's Overarching Space Policy."

<sup>86</sup> Rose, "NATO and Outer Space."

<sup>87</sup> Congressional Research Service, *Space as a Warfighting Domain: Issues for Congress*, IF11895 (Washington, DC: CRS, 2021), 1, <https://crsreports.congress.gov/>.

<sup>88</sup> Hanneke Weitering, "France Is Launching a 'Space Force' with Weaponized Satellites," *Space.com*, 2 August 2019, <https://www.space.com/>; and Theresa Hitchens, "Exclusive: Pentagon Poised To Unveil, Demonstrate Classified Space Weapon," *Breaking Defense* (blog), 20 August 2021, <https://breakingdefense.com/>.

<sup>89</sup> NATO, "The North Atlantic Treaty."

<sup>90</sup> Samson, "NATO And Its Changing Approach To Space," 81.

<sup>91</sup> NATO, "NATO's Approach to Space."

<sup>92</sup> Samson, "NATO And Its Changing Approach To Space," 81.

<sup>93</sup> Samson, "NATO And Its Changing Approach To Space," 82.

A third area concerns Article 6 of the North Atlantic Organization Treaty, which states that “the allies may only invoke collective defense in response to armed attacks against territory, vessels, forces, or aircraft stationed on allied territory, in the Mediterranean Sea, or in the Atlantic north of the Tropic of Cancer.”<sup>94</sup> In a 2020 article entitled “NATO’s Return to Space,” researcher Benjamin Silverstein points out that Article 6, written in this way and with such “geographic limits,” excludes the possibility of invoking collective defense also in response to an armed attack against a satellite. According to Silverstein, “Expanding the parameters of Article 6 would send strong signals to adversaries that threats to space-based assets will not be tolerated,” and it would be “an opportunity to blanket allied space assets with Article 5 protections.”<sup>95</sup> In all, NATO should consider changing its language, to be able to assume a collective defense posture also in space. To address those challenges, this article proposes that NATO adopt the following recommendations.

First, NATO faces the challenge of designing a realistic deterrence strategy for space, which requires its members to agree on accepted norms of behavior in space. The absence of clear norms of behavior in space provided by the outer space legal regime makes it even harder to define what constitutes a threat and how to apply collective defense. The 1967 UN Outer Space Treaty (OST), which is the primary legal reference for space activities, is vague and too broad.<sup>96</sup> Although it prohibits the use of nuclear and mass destruction weapons in space, it does not explicitly limit the placement of other types of armaments.<sup>97</sup> To address this issue, in 2020, the UN General Assembly adopted the 75/36 resolution, which encourages the reduction of “space threats through norms, rules, and principles of responsible behaviors.”<sup>98</sup> NATO could contribute to defining norms of behavior in space by hosting a discussion forum of allied states. Reaching a common ground on norms of behavior in space, shared definitions of the use of force, and agreed-upon arms control measures will be essential for NATO’s future.<sup>99</sup> NATO should

---

<sup>94</sup> NATO, “The North Atlantic Treaty.”

<sup>95</sup> Benjamin Silverstein, “NATO’s Return to Space,” *War on the Rocks*, 3 August 2020, <http://warontherocks.com/>.

<sup>96</sup> Office for Outer Space Affairs, United Nations, “Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies,” 19 December 1967, <https://www.unoosa.org/>.

<sup>97</sup> Victoria Samson and Brian Weeden, “Enhancing Space Security: Time for Legally Binding Measures,” *Arms Control Today*, December 2020, <https://www.armscontrol.org/>.

<sup>98</sup> “75/36 Reducing Space Threats through Norms, Rules and Principles of Responsible Behaviours,” United Nations Disarmament Yearbook (New York: United Nations, 12 July 2020), 1, <https://doi.org/>.

<sup>99</sup> Stephen van Evera, “Offense, Defense, and the Causes of War,” *International Security* 22, no. 4 (1998): 14–22, <https://doi.org/>.

therefore accelerate the creation of codes of conduct in space, upon which the Alliance can build its framework of deterrence and collective defense more easily.

Second, to effectively act on its ambitions in space, the Alliance must recognize the crucial role of outer space and give it real visibility within NATO's structure, rather than treating it "as merely a 'novelty item.'"<sup>100</sup> As suggested by Frank Rose, key NATO offices such as the Assistant Secretary General for Defense Policy and Planning or the Assistant Secretary General for Defense Investment should address space-related matters at the strategic level.<sup>101</sup> At the operational level, the Allied Command Transformation should integrate space capabilities into every NATO exercise and wargame to increase preparedness against possible attacks on NATO's space assets. Moreover, NATO should establish a close dialogue with the US Space Force and the US Space Command and work together with them. It would be desirable for NATO personnel to participate regularly in the US Schriever Wargame. Similarly, cooperation should occur on the EU side, and NATO should serve as a bridge between US and EU capabilities, thus expanding the range of usable space services and leveraging resiliency, as discussed in a previous section of this article. One example could be the Public Regulated Service (PRS), which is an encrypted navigation capability of the European global navigation satellite system Galileo. Making it accessible to all state members of the Alliance would provide a valid substitute for GPS in case the latter is jammed or rendered unusable.<sup>102</sup>

## **Conclusion**

NATO was established as a collective defense military alliance after World War II to confront the threat posed by the Soviet Union. The end of the Cold War led to a unipolar international system, which brought about an increase in the number and types of threats and the emergence of an alliance security dilemma. European NATO members desire to maintain the security provided by the alliance but are faced with the dual risk of abandonment and entrapment by the United States. To counter this, since 1991, European NATO members have aimed to gain unique capabilities that increase their bargaining power and operational independence.

However, space has added new dimensions and challenges to NATO's role and purpose. As a state-centered military organization, NATO has recognized the importance of space in enabling national power and security policies. Yet, the Alliance's efforts to integrate space into its mission have been limited to institu-

---

<sup>100</sup> Rose, "NATO and Outer Space."

<sup>101</sup> Rose, "NATO and Outer Space."

<sup>102</sup> Rose, "NATO and Outer Space."

tional changes. To remain a credible collective security alliance in defense of its member states and useful to the current ground and space hegemon, NATO needs to develop a clear strategic plan on how to play a meaningful role in space.

This article examines NATO's evolving perspective on space and presents quantitative evidence showing how NATO can enhance the collective defense of its members, including the United States, in and from space. The case study and data presented here demonstrate that NATO member states can contribute to collective security in space by pooling their space assets and developing niche space capabilities. This will enable NATO to continue to be a useful alliance to the United States in space and provide European members with tools to restrain US hegemony if necessary.

In addition, NATO must focus on two key areas to successfully integrate the space domain. Firstly, the Alliance must clearly define its deterrence strategy for space and integrate it into its defense plans and operations. Secondly, NATO should clarify what invoking Article 5 in response to an armed attack against a satellite would entail for the extension of collective defense into outer space.

If NATO fails to respond promptly to the challenges posed by the space domain, its role and strategic relationship with the United States could be undermined. ✪

#### **Lt Col Emma Palombi, Italian Air Force**

Lieutenant Colonel Palombi is an Italian Air Force flight instructor pilot. She joined the Italian Air Force Academy in 2000 when the first female cadets were admitted. After graduating in with a degree in political science and being promoted to the rank of second lieutenant, in 2005 she completed her pilot training at Sheppard AFB, Texas. As a first lieutenant, in 2006 she was assigned to the 46th Airlift Brigade in Pisa, Italy, where she served until 2011 flying the Hercules C130J. During her service in Pisa, she accomplished several out-of-area flight operations and was deployed multiple times in Afghanistan, as a C130J crew member.

In 2009 she was promoted to the rank of captain. From October 2011 to March 2018, she served at the 31st Wing in Ciampino AFB (Rome), where she operated as a flight commander and instructor pilot on Dassault Falcon 900 EX and Falcon 900 Easy. According to the 31st Wing's mission, Palombi conducted several hospital flights and state flights. In 2017 she was promoted to the rank of major. In March 2018 she was posted to the 70th Wing in Latina Air Base, where she qualified as a flight instructor on the trainer aircraft T-260B. From September 2021 until September 2022, Lieutenant Colonel Palombi was appointed commander of the 207th Squadron, being responsible for the selection and flight training of the Italian Air Force and other Armed Forces' cadets. From September 2021 to May 2022, she held the position of the Chief of the Operations branch of the 70th Wing. In 2021, Palombi was promoted to the rank of lieutenant colonel. She is currently a student at the Air War College, Air University, Maxwell AFB, Alabama.

#### **Disclaimer**

The views and opinions expressed or implied in JIPA are those of the authors and should not be construed as carrying the official sanction of the Department of Defense, Department of the Air Force, Air Education and Training Command, Air University, or other agencies or departments of the US government or their international equivalents.