The United States and Russia cooperation paradox in human spaceflights: the role of the outer space international governance regime

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Abstract:

The international situation in outer space constitutes a certain paradox in international relations. Indeed, the situation especially in the field of human spaceflights is contradictory where two superpowers (United States and Russia) cooperate extensively while having very difficult relations on Earth. Exploring this paradox can help to better understand why international relations in outer space differ from relations on Earth. It can also contribute to considering how international relations studies need to adapt in order to better understand political issues intrinsic to outer space.
Firstly, this paper investigates the dominant argument in the literature to explain cooperation in outer space which is the role of the outer space international governance regime. It presents the way in which the literature defends that this regime explains cooperation between United States and Russia in human spaceflights. It demonstrates that the regime cannot explain this cooperation notably because the regime is inefficient, unstable, contested and lacks several mechanisms that are prerequisite for a regime in order to contribute to cooperation. Finally, the paper explores how a multidisciplinary approach around science and technology studies could help to better understand the cooperation paradox in human spaceflights.

Keywords:
Critical Security Studies; Interdisciplinary Research; International Cooperation; Regime; Russia; Space; Technology; United States of America (USA)

"As man draws nearer to the stars, why should he not also draw nearer to his neighbour? As we push ever more deeply into the universe-probing its secrets, discovering its way-- we must also constantly try to learn to cooperate across the frontiers that really divide Earth's surface."
President Lyndon B. Johnson, August 29, 1965
(Woolley & Gerhard, 2018)

The United States and Russia Cooperation paradox in Human Spaceflights: The Role of the Outer Space International Governance Regime

The international situation in outer space is a paradox in the international governance spectrum. Indeed, more specifically the situation of human spaceflights is contradictory where two superpowers (United States and Russia) cooperate extensively (e.g. Apollo-Soyuz mission, Mir-Shuttle, International Space Station) while having very difficult relations on Earth (e.g. Cold War, economic sanctions, geopolitical tensions, etc.). Exploring this paradox could help to better understand why international relations in outer space differ from the ones on Earth and how international relations studies need to adapt in order to better understand political issues intrinsic to outer space.

Few authors identified this paradox. In fact, the prevailing view in the literature identifies an opposite conclusion which is that the situation in outer space is actually the reflection of politics on Earth and therefore does not constitute a paradox. The studies that noted this contradictory aspect, as well as being rare, are also incomplete and not sufficiently persuasive because they do not present clear mechanisms that could explain this paradox beyond the simple conclusion that outer space constitutes a distinct political arena from Earth.

Beyond the US-Russia cooperation paradox in human spaceflights, the prevailing argument in the literature to explain general cooperation in outer space is the presence of the outer space international governance regime. However, recent research of few authors (Grunner, 2004; Stuart, 2009) noted that the outer space regime has very important flaws which lead to conclude that this regime cannot be considered as a significant explanation to understand the US-Russia cooperation paradox in human spaceflights. Nevertheless, it is not yet obvious in the literature that the outer space regime is collapsing, and it is now the time to gather these flaws in order to refute the argument that this regime can explain cooperation in outer space.

To demonstrate that the outer space international governance regime cannot explain US-Russia cooperation in orbital spaceflights, this paper is divided in four sections. Firstly, the cooperation paradox between US and Russia in human spaceflights will be presented in detail. Secondly, the prevailing argument to explain cooperation in outer space – the outer space regime – will be presented. The third section will gather the different arguments demonstrating that the outer space regime cannot be considered as a sufficient explanation for the US-Russia cooperation in human spaceflights. The last section will briefly present a new multidisciplinary approach that needs to be explored in order to explain this paradox. This approach is investigating how the concept of securitization as well as science and technology concepts of biopolitics and the impact of space scientists on politics could help to better understand this cooperation paradox.

The US-Russia Cooperation Paradox in Human Spaceflights

Exploring the paradox of the US-Russia cooperation in human spaceflights consists of determining what are the manned spaceflight cooperation projects between the two countries in outer space and what was the state of their cooperation on Earth at the same moment. Therefore, the period between 1972 and today must be explored because it is in 1972 that their cooperation in human spaceflights began. Indeed, the fierce competition between United States and the USSR during the space race is widely documented (Sheehan, 2007, p. 55). Cooperation during this period was practically inexistent and it is with the end of the Apollo program in 1972 that the cooperation started significantly with the Apollo-Soyuz Test Project mission. Firstly, it is important to mention that this paradox is all the more unlikely because United States and Russia do not need to cooperate in order to realize important orbital human spaceflight projects like the construction of a space station. In fact, both countries demonstrated that they are able to develop their own space station independently, autonomously and efficiently notably with the American project Skylab (1973-1979) and the Russian projects Salyut (1971-1985) and Mir (1986-2001) (Loff, 2015; NASA, 1997, 2016). It is also important to highlight that it is also the case for China that operates and develops alone its own space station Tiangong 2 since September 2016 (Reuters, 2016). Secondly, it is important to note that this contradictory cooperation is not a unique case. Indeed, there are other cooperation projects between the two countries that are diverging with the general state of their bilateral relations notably regarding the situation in the Arctic and with the ICAO. However, even if these other contradictory cooperation projects exist, the fact remains that the paradox of the US-Russia cooperation in human spaceflights constitutes a distinct and extremely important field of cooperation and deserves its own analysis.

The Apollo-Soyuz Test Project Cooperation

In the middle of the Cold War, as ironic as it seems, United States and the USSR made numerous efforts to cooperate in orbital human spaceflights, especially since the beginning of the 1970s. The best example of this dynamic is the Apollo-Soyuz Test Project (Shaffer, 1980, p. 25). The project consisted of "a highly complicated, joint manned rendezvous and docking mission" between the American spacecraft Apollo and Soviet spacecraft Soyuz in orbit around the Earth (Moltz, 2007, p. 166). The operation was a total success and necessitated important contacts, exchanges and collaboration between the United States and USSR. Moreover, the project was a highly complex one because both spacecrafts were entirely incompatible: they were not equipped with the same technology and did not use the same language. Therefore, this mission required a very extensive collaboration between the two countries both technically and politically (Crouch, 1999, p. 239). It is notable for these reasons that several experts consider the Apollo-Soyuz mission as the foundation of the International Space Station (Babintsev, 2010, p. 19).

Cooperation in Mir-Shuttle and the International Space Station (ISS)

The project of the ISS is widely considered to be the most intensive collaboration between the United States and Russia all areas taken together since World War II. The origin of the ISS goes back to the Mir-Shuttle program (1993-1998). This program was the first human spaceflight cooperation in orbital outer space between the United States and Russia in the post Cold War context in which the American shuttles connected seven times

to the Russian orbital space station Mir collaborating in hundreds of scientific experiments (Evans, 2014, p. 443). Created immediately after the end of the Mir-Shuttle program, the ISS was originally formed from the reunion and connexion of the American module Unity and the Russian module Zarya. Since 2011, the cooperation became even more important. With the withdrawal of the American Space Shuttle the same year, the United States and Russia collaborated to transport the American astronauts to the ISS. In fact, in 2007, NASA signed a $719 million contract with ROSCOSMOS (Russian Space Agency) to send astronauts to the ISS between 2011 and 2014. The purpose of this contract was to help Russia to maintain the Soyuz and Progress spacecrafts which are the only one capable of sending human beings to the ISS. By the meantime, NASA was developing the ORION spacecraft which was supposed to enter in service in 2014 to assure the transportation of astronauts (Lardier, 2007, p. 84). However, the ORION project is still in its development phase and now aims more for outer space explorations such as a return to the Moon or the human exploration of Mars (Northon, 2014). Therefore, in 2013 NASA signed another $424 million contract with ROSCOSMOS until 2017 (NASA, 2013). In 2014, in order to end their reliance on Russia, the United States signed a 6.8 billion contract with two private American companies (SpaceX and Boeing) to assure the transportation of astronauts to the ISS by 2017 (Siceloff, 2014). Facing the fact that SpaceX and Boeing's spacecrafts would not succeed to transport astronauts in 2017, the United States signed another contract with ROSCOSMOS to assure American presence in the ISS until 2019 (Northon, 2015). It is just recently on March 8, 2019, that SpaceX managed to complete the uncrewed flight test of its spacecraft (NASA, 2019).

Furthermore, we would assume that once the private American spacecrafts will be in service, the United States will end their transportation partnership with Russia. However, in November 2016, NASA administrator Charles Bolden and head of ROSCOMOS Igor Komarov both declared in a joint press conference in Russia that once NASA starts flying commercial crew vehicles, both countries will continue their cooperation with Russian cosmonauts flying on US commercial spacecraft and NASA astronauts continuing to fly on Soyuz (Foust, 2016). Finally, it is important to clarify that the cooperation between the two countries on the ISS is not just about using vehicles to get to the laboratory. Inside the ISS, the ongoing experiments are characterized by an important cooperation between United States and Russia. It is notably the case with experiments on aerospace medicine (Duncan, 2007), technology demonstration, microbiology, education (Hasbrook, 2016) and astrophysics (Thumm, 2011).

Geopolitical Tensions on Earth

Now that we have a better portrait of the important Russian-American cooperation in orbital outer space, it is now necessary to compare this situation to the one that both countries share on Earth in order to highlight this paradox. Regarding the context on Earth during the Apollo-Soyuz Test Project, the purpose of this mission as stated by President Nixon and USSR Secretary General Kosygin was to concretize the spirit of the "Détente" period of the Cold War (Crouch, 1999, p. 240; Johnson-Freese, 2007, p. 62). In fact, the year of 1975 (the one of the orbital spaceflight) is recognized as being the height of the "Détente" period. However, even if the goal of this paper is not to present an overview of US-USSR relations during the Cold War which are largely documented (Bogle, 2001; Crockatt, 1995; Shavit, 1993), it is important to note that the six years of preparation and

collaboration which were necessary for the Apollo-Soyuz mission occurred during the peak of the Vietnam war. This period is considered as being the shy beginning of the Détente and the relations between the United States and USSR were still very difficult (Sheehan, 2007, p. 65). Thus, the extensive cooperation between the two countries in human spaceflights remains very surprising, contradictory with the state of the situation on Earth.

However, since the end of the Cold war and until the beginning of the 2000s, the geopolitical situation between United States and Russia had improved and it could partially explain the cooperation between the two countries during the Mir-Shuttle program and the first phase of the construction of the ISS. But, since 2002, we can note important tensions and conflicts between United States and Russia that led to the difficult geopolitical and diplomatic relations that still prevail today. Thus, in 2002 the withdrawal of the United States from the ABM treaty harmed both countries' relations. In 2007, their relations deteriorated notably because of the deployment of the American anti-missile shield in Poland. At the time, President Putin qualified the situation as being the most dangerous since the Cuban missile crisis in 1962 (Traynor, 2007). In 2012, the mutual sanctions between the two countries intensify particularly with the Magnisky case (Camp, 2012). Then in 2013, with the issue of Russia accepting Edward Snowden's asylum, the United States cancelled a high-level meeting between Barack Obama and Vladimir Putin (Sonne & Entous, 2013, p. A1). In 2014, following the annexation of Crimea by Russia, the tensions between Moscow and Washington accentuate. President Obama mentioned: "the United States has mobilized the international community in support of Ukraine to isolate Russia for its actions" (The White House, 2014b) and the United States raised their heavy sanctions on Russia also affecting the property and interests of Russian political figures in the United States (The White House, 2014a). Under the Trump administration, sanctions continue to grow and are now affecting Russian defence and intelligence sectors (The White House, 2017). Finally, to this accumulation of sanctions we can add the difficult situation in Syria where both countries favour very different interventions which contribute to harming their relations and cooperation (Sengupta, 2017).

The US-Russia cooperation paradox in human spaceflights in the literature

Now that the state of the US-Russia cooperation paradox in human spaceflights is established, it is now important to explore if the scientific literature concerning international relations between the two countries in human spaceflights is also identifying this contradiction. In fact, it appears that the vast majority of studies presents the opposite conclusion that politics in outer space is actually the reflection of politics on Earth and therefore do not constitute a paradox. These conclusions are surprising especially after the previous demonstration where it is clear that relations in human spaceflights between Russia and the United States are way easier than their relations on Earth.

Thus, regarding the Cold War era, the main argument in the literature supports that the relation between the two countries was the reflection of the political reality on Earth. Sheehan (2007, p. 13) explains that the first three decades of the space era (1957-1987) were dominated by the politico-military confrontation between the two superpowers. During the Apollo-Soyuz Test Project, authors agree on the fact that this exceptional cooperation has been possible because of the "Détente" period and as soon as 1976, when "Détente" was finished, the relation between the two countries has been "disintegrated" making all forms of cooperation in human spaceflights impossible (Moltz, 2007, p. 173).

Sheehan adds that the Apollo-Soyuz cooperation has been possible (even if Sheehan notes the paradox) for opportunist reasons (Sheehan, 2007, p. 19). He explains that this cooperation has been possible only because this project did not question the hegemonic position of both countries. Thus, the Apollo-Soyuz cooperation has been possible only for a brief moment to serve mutual interests. Sheehan concludes that during the Cold War "such cooperation remained hostage to broader political dynamics" (Sheehan, 2007, p. 66).

Several authors maintain that outer space remains an arena intrinsically linked to the power and national interest of the United States and Russia. For instance, Klein (2006, p. 35) explains that relations between States in outer space must be understood in all respects similar to the maritime case where the dynamics on high seas remain linked to national power. Furthermore, several studies complete this vision defending that outer space constitutes in fact a constitutive element of Russian and American national interests as being an essential resource for the military apparatus. It is notably the case with the Gulf and Iraq wars where outer space resources were used as essential force multiplier for the American army (Babintsev, 2010, p. 25). Beyond the military case, some authors are also defending that outer space constitutes the reflection of States' situation on Earth because "space is a strategic resource as it plays an important role in the achievement of social goals" (Indian Pugwash Society, 2009, p. 25). Lefebvre (2011, p. 129) supports this view and explains that the level of control on outer space resources is a good indicator to measure the development level of societies.

Few authors have noted the paradoxical situation regarding US-Russia relations in outer space and especially in human spaceflights. However, in addition to being rare, these studies are also incomplete because their arguments remain exploratory. Indeed, their responses remain little convincing because they do not demonstrate the mechanisms that could explain the paradox beyond the fact that outer space simply constitutes a political arena distinct from Earth. It is notably the case of Michael Sheehan (one of the most prominent researchers in the field of outer space politics) who says that projects in orbital outer space as the ISS "has proven to be remarkably resistant to the shifting moods of bilateral and international relations" (Sheehan, 2007, p. 181). In order to explain this situation, Sheehan's response is indeed very vague explaining that outer space exploration is "a naturally 'federative' activity which encourages international cooperation on a variety of grounds (Sheehan, 2007, p. 174) . Therefore, he brings very few explanations to demonstrate how and why this cooperation in outer space is so much easier than cooperation on Earth. Driscoll (2003, p. 9) also notes this paradox and explains that a general attitude emerges today between United States and Russia regarding the fact that outer space constitutes "a renewed hope of being able to work together for mutual benefits, free of Earth's conflicts". However, Driscoll brings a beginning of demonstrations explaining that this peaceful aspect of orbital outer space cooperation is made possible essentially thanks to the outer space international governance regime that currently exists.

Regime Theory to Explain International Cooperation in Human Spaceflights

The cooperation paradox between United States and Russia in human spaceflights is now known. It also turns out that most studies in the literature does not identify this paradox and the authors who raise this situation give very few explanations. However, cooperation in outer space (but not specifically regarding the US-Russia cooperation paradox in human spaceflights) is a subject that has already been studied among political

scientists and the prevailing argument in the literature to explain cooperation in outer space is the one of the outer space international governance regime. This section will present briefly what are the founding principles of international regime theory on which the outer space international governance regime is based. Then, the different arguments of the prevailing literature explaining why the outer space regime could constitute a source of explanation for cooperation in outer space will be presented.

Regime Theory

The concept of regime was elaborated notably by Robert Keohane and Stephen Krasner in order to counterbalance realism and neorealism which perceive cooperation between States as being very difficult, even impossible (Keohane, 1984, p. 37). In fact, regime theory explains that international regimes can have an important impact on cooperation among States particularly through international institutions and international law (Keohane, 1984, p. 25). Even if regime theory does not support that international cooperation means a complete absence of conflict, supporters of this approach explain that cooperation is possible thanks to regimes because they allow a better coordination among States (Keohane, 1984, p. 51). Thus, Keohane (1984, p. 88) identifies three essential functions of a regime that favours cooperation: lowering transaction cost between States, reducing asymmetry of information and assuring stability. Furthermore, a regime tends to be more efficient if the numbers of actors implied is relatively small (Axelrod & Keohane, 1985, p. 235). Keohane also explains that regimes can facilitate cooperation even in situations of international instability or hegemonic decline as it was the case during the end of the Gold exchange standard system where the rules and founding principles of international trade such as the balance of payments, the IMF and the World Bank remained intact (Keohane, 1984, p. 186). Thus, given the fact that the outer space international governance regime implies essentially very few actors and that the US-Russia cooperation in human spaceflights persists despite the very difficult relations on Earth, an analysis of the outer space regime is essential in order to determine if it can explain significantly how and why United States and Russia are cooperating so extensively in human spaceflights.

The Outer Space Regime as the Prevailing Argument in the Literature to Explain Cooperation in Human Spaceflights

The prevailing argument to explain cooperation in outer space is the one of the outer space regime. Stuart (2009, p. 12) sums up well this argument explaining that this regime, constituted of international treaties managed by the United Nations Office for Outer Space affaires (UNOOSA), makes cooperation possible in orbital outer space because it separates the notions of sovereignty and territory. Thus, the regime allows the States to consider outer space as being a neutral arena, free of possessions and conflicts while preserving their sovereignty on the objects they are sending in outer space. Dolman (2002, p. 113) explains that according to this perspective, we can understand cooperation in outer space simply by the same way cooperation is happening on international waters thanks to the international waters treaty which also separates notions of territory and sovereignty. The outer space regime thus gives the mechanisms essential to govern the intrinsically transnational issue which is outer space (Stuart, 2009, p. 11). These mechanisms are notably that the regime is allowing a delimitation of space activities, a registration of space objects and the notion of innocent passage (Dolman, 2002, p. 114-119).

Flaws of the Outer Space Regime: Not a Meaningful Reason for Cooperation

Even though the outer space international governance regime contains several interesting points to explain cooperation, other studies demonstrated that in fact it contains several flaws that make us strongly doubt of the capacity of the regime to explain US-Russia cooperation in human spaceflights. One of the most convincing reasons to refute the effectiveness of the outer space regime is that the alleged dynamic that the regime can separate the notions of sovereignty and territory is contested. Stuart (2009, p. 13) explains that notions of sovereignty and territory remain present in orbital human spaceflights project as it is the case for the ISS where the different countries keep their own sovereignty on their own modules. Furthermore, beyond the fact that the actual regime cannot separate sovereignty and territory in outer space, it appears that the regime can hardly explain cooperation in human spaceflights because it does not respect the three essential functions of a regime as identified above by Keohane (lowering transaction cost between States, reducing asymmetry of information and assuring stability). Before presenting the arguments defending why the outer space international governance regime is not respecting the essential functions, a brief presentation of the regime in question is in order.

Portrait of the Actual Outer Space Regime

The Outer Space Treaty (1967) is the first major treaty that sets down the governance of outer space activities. On January 1, 2016, the treaty has been ratified by 104 countries including the major space powers such as the United States, Russia, China, India, France and Germany (United Nations, 2016). The general goal of the treaty is that the exploration and peaceful use of outer space must be conducted in the common interest of all mankind (Dolman ,2002, p. 129). Therefore, the treaty also establishes that outer space, including the Moon and all celestial bodies cannot be subject to national appropriation or claim of sovereignty and that scientific investigations of all celestial bodies shall be open with free access to all (Dolman, 2002, p. 129). Moreover, the treaty also seeks to define outer space as fundamentally a collaborative enterprise appealing that all "States shall endeavour to explore outer space in a spirit of cooperation, allowing observation of space activities where equitable, and with regard to the ecology of Earth and outer space" (Dolman, 2002, p. 130). In this same collaborative enterprise, the treaty asks that all stations, installations, equipment, and space vehicles on any celestial bodies to be open to representatives of all nations. Finally, probably one of the most important elements of the Outer Space Treaty is that it is prohibiting States to place nuclear or any other kinds of weapons of mass destruction in orbit around the Earth nor install such weapons on the Moon or any other celestial body (Dolman, 2002, p. 130).

On the Outer Space Treaty, which constitutes the core foundation of the international space regime, is added the Rescue Agreement (1968) which clarify the fact that "all astronauts are envoys of mankind and so every effort shall be made to render them assistance in the event of accident, distress or emergency" (Dolman, 2002, p. 130). Thus, the Rescue Agreement is explaining what kinds of efforts must be done which are for instance to return safely and promptly any personnel of a spacecraft that lands in a territory of a Contracting Party or in high seas or in any other place not under the jurisdiction of any state to the representatives of the launching authority of the spacecraft. In January 2016,

94 countries including the major space powers had ratified the Agreement (United Nations, 2016).

The third piece to be added to the international outer space regime is the Convention on the international liability for damage caused by space objects (1973) which has been ratified by 94 countries including the space powers (United Nations, 2016). It "recognizes that damage can be caused by space operations despite precautionary measures undertaken by States involved" (Dolman, 2002, p. 132). Therefore, the convention seeks to establish an international legal regime that can mitigate liability and strengthen international cooperation. It states that all launching States are totally liable for damage caused by their spacecraft on the Earth or to aircraft in flight (Dolman, 2002, p. 132).

The fourth and last major piece of foundation of the international outer space regime is the Convention on registration of objects launched into outer space (1976). Ratified by 62 countries including the major space powers (United Nations, 2016), this Convention seeks basically to codify space registration. For instance, it states that at a minimum, countries must provide the launching date of the space object, the territory and location of the launch, the basic orbital parameters of the space object (period, inclination, apogee, perigee) and its general functions (Dolman, 2002, p. 132).

An Inefficient Regime: Militarization and Weaponization of Outer Space and the prisoners' dilemma

As stated above, one of the essential functions of a regime is to reduce the asymmetry of information between actors. By doing so, it helps to counter the prisoners' dilemma and the problem of collective action (Keohane, 1984, p. 93). However, it appears that the outer space international governance regime is not able to accomplish this function because it is directly contributing to an uncontrolled militarization and weaponization of outer space. These consequences make the regime inefficient not only because they contribute to considering outer space as an unsafe environment where cooperation cannot be easier than on Earth but because the different actors can not have the access to the right information regarding the weapons and military uses in outer space.

Indeed, since the beginning of the outer space regime, both United states and Russia/USSR understand very differently one of the core elements of the Outer Space treaty and it is the notion of a "peaceful use" of outer space. Still today, these different interpretations are very problematic. For the USSR, a "peaceful use" of outer space was a synonym of "wholly not military" (Indian Pugwash Society, 2009, p. 53). It meant that space objects could not carry any weapons but could also not be integrated to the military complex particularly through military intelligence. However, for the United States, Johnson-Freese (2007, p. 108) explains that the definition of a peaceful use of outer space was a synonym of "non-aggressive". Moreover, the definition of what constitutes a non-aggressive outer space object has evolved through times. Thus, from the Kennedy presidency until the Carter administration, a non-aggressive space object meant that it could not carry any firepower nor defensive or disarmament capacity. However, it could contribute to the military complex through military intelligence. Since the Regan administration, the vision of a "peaceful" use of outer space as being non-aggressive evolved and then meant that the space object could be equipped with firepower of disarmament capacity in order to assure their defence (Johnson-Freese, 2007, p. 108). Therefore, we notice that these two definitions of what constitutes a "peaceful" use varies

significantly between a perspective "wholly not military" to a perspective that accept firepower capacity. Consequently, this vagueness created by the Outer Space Treaty directly contributed to the militarization and weaponization of outer space by allowing "legal differences of opinion on which types of space hardware are subject to international law and under what circumstances" (Johnson-Freese, 2007, p. 109). Thus, we can affirm that the Outer Space Treaty (still considered today as the foundation of the outer space regime) is not efficient to favour cooperation because it is actually reinforcing the prisoners' dilemma since the actors can not access the information of the other actors regarding the important issues of weapons and military uses in outer space. Its inefficiency to prohibit the deployment of conventionally armed weaponry and militarized space objects contributes to considering outer space as an unsecured environment where cooperation is not easier than what it is on Earth. Therefore, we cannot consider the outer space regime as significantly contributing to international cooperation in space (Su, 2010, p. 268).

An Unstable Regime: Political Influences on Its Legal Framework

Another explanation why the outer space international regime cannot explain the paradox of US-Russia cooperation in human spaceflights is because the regime is subject to important political influences which are rending its legal structure very unstable. This dynamic is particularly demonstrated with the cases of the failures of the Anti-Ballistic Missile (ABM) Treaty in 1972 and the Moon Treaty in 1979. Thus, since this regime cannot be considered as stable and can not "[…] establish stable mutual expectations about others' patterns of behavior" (Keohane, 1984, p. 89), it can not be considered as explaining the cooperation between United States and Russia in human spaceflights.

Indeed, the ABM Treaty is a good example that politics has precedence over the outer space international governance regime. Dolman (2002, p. 133) explains that the ABM Treaty was a bilateral agreement between United States and the URSS and its purpose was to ban the development, testing and deployment of anti-ballistic systems that are land, air, sea of space-based. The only exceptions included in the treaty was that it was allowed to have one ABM site in defence of the national capital (Washington and Moscow) and one at a single testing site in each country. This situation was acceptable for the USSR and the Soviet Union effectively created and still maintains a ABM ring around Moscow. However, the situation in the United States was not that easy. After the ratification of the treaty, it appears very controversial in public opinion and for the United States government to create ABM capacities only for the elites in Washington while leaving the rest of the country undefended (Dolman, 2002, p. 133). Thus, it is notably for this reason that the Reagan administration unilaterally decided to develop the Strategic Defense Initiative (development of space-based and ground-based ABMs) which render the treaty almost inoperable (Dolman 2002, 133). In 2002, following the 9/11 events, the United States officially withdraw from the ABM Treaty. This example of the ABM Treaty shows how geopolitics still have important influences on the legal framework of the outer space regime which cannot be considered as a sufficient explanation for the US-Russian cooperation paradox in human spaceflights.

A second example demonstrating the instability of the outer space regime because of the precedence of politics is the Moon Treaty in 1979. This agreement was meant to clarify an important part of the Outer Space Treaty which is the "equal access" to outer space. The Moon Treaty wanted to revise this traditional Western view of space lay around

"equal access" to the view defended by the former Soviet Bloc and Less developed countries which is of "equal benefit" (Dolman 2002, 133). This distinction between "equal access" and "equal benefit" is very important since the latter is more in line with the goal of outer space as being for the benefit of all mankind as stated in the Outer Space Treaty. However, the United States had very hard discussions on this treaty especially on the issue of possession and ownership of outer space materials such as Moon rocks. The vast majority of the countries debating on the Moon Treaty explained that since celestial bodies are not subject to national appropriation, anything brought back from them could not belong to one country but rather to all humanity. In the end, the United States was strongly against the principle of giving up a significant portion of their space rocks (Driscoll 2003, 50). Thus, the Moon Treaty has been ratified by only 16 countries so far and by no major space powers (United Nations, 2016). This second example of the Moon Treaty also corroborates the fact that geopolitics still surpass the legal framework and thus the outer space regime cannot be considered as the reason why United States and Russia are very good collaborators in human spaceflights.

A Contested Regime: Need for a New "Space Code of Conduct"

Because of the inefficiency and the instability of the outer space international governance regime, it appears that this regime is today contested and important pressures are being made by the United Nations General Assembly in order to establish a new "Space Code of Conduct" on which the United States and Russia still don't have common ground (Tannenwald, 2004, p. 370). Indeed, beyond the fact that the definition of a "peaceful" use of outer space is still contested, it appears that the regime is not able to settle disputes notably regarding issues on properties in outer space and "today some nations view treaties only as a roadmap for future treaties-not as law themselves (Grunner, 2004, p. 306). Moreover, several studies noted that the outer space regime lacks of a real governing body capable to implement and enforce the dispositions of the regime (Grunner, 2004, p. 331). Combined with the lack of stability and access to information identified above, this contested aspect of the regime is greatly undermining the regime's ability to reduce transaction costs. Thus, this state of the outer space international governance regime which is highly contested contributes to the fact that we cannot consider this regime as being a significant reason explaining US-Russia cooperation paradox in human spaceflights.

Multidisciplinary approach to Explore: (de)Securitization of Outer Space, Biopolitics and the Role of Space Scientists

It is now demonstrated that the dominant argument in the literature supporting that the outer space regime can explain cooperation in outer space can be highly contested. Indeed, the outer space regime can not be considered as a sufficient argument to explain the US-Russia cooperation paradox in human spaceflights. It appears thus necessary to do more research beyond the existing studies on outer space cooperation. To do so, the research must try to understand the political situation in outer space out of the statist approaches which are adapted for the situation on Earth (like the concept of regime) and not to the own situation in outer space. Set (2015, p. 185) agrees with this perspective and explains that traditional international science methods based on the Westphalia system cannot be applied to outer space. To realize this new research, it is necessary to understand the impact of the distinct intrinsic nature of the outer space environment on human social

relations. Three critical approaches could constitute new ways to explain the US-Russia cooperation paradox and it is securitization theory, biopolitics and the role of space scientists. These approaches, which are not based on statist models, have already explored outer space issues but have explored very little about cooperation in outer space. This last section of the paper will briefly present how these approaches could constitute new ways to explain the US-Russia cooperation paradox in outer space and therefore bring an important contribution to the field of international relations and the study of outer space generally.

Securitization Theory to Explain Human Spaceflights Cooperation

Securitization theory comes from the Copenhagen School in critical security studies. Two of the most important authors contributing to this school are notably Ole Waever and Barry Buzan (Peoples, 2011, p. 80). Essentially, the Copenhagen School adopts a fundamentally constructivist approach in their understanding of security issues. In that sense, "they refute the claim that there are (any) inherent security issues" (Peoples, 2011, p. 81). Thus, their focus in understanding security issues in outer space goes beyond the issues of militarization, weaponization and international regime. Security must be understood as a intersubjectively constructed issue "between those claiming an issue as security and a relevant target audience" (Peoples 2011, p. 81). Security is then intrinsically dependant on how security actors are framing issues as being important to national security or not and this process is called securitization. Columba Peoples (2011, p. 80) gives a good summary of the concept of securitization which is "[...] the process through which an issue comes to be seen as an issue of security. When an issue comes to be treated as an issue of national security, it is justifiable to use exceptional political measures to deal with it. It is securitized: that is, treated with the same degree of urgency as military threats have been historically". Furthermore, the opposite process of de-securitization is as important in which political actors can bring back a securitized issue into the arena of de-securitized “normal” politics (Waever, 1995, p. 5). Thus, regarding the case of US-Russia spaceflights cooperation, the issue is to determine how discourses from the different actors involved are considering human spaceflights as being a threat or not (securitized or de-securitized). This approach will allow to determine if the US-Russian cooperation can be explained because the different authorities of both countries (government, presidency, NASA, ROSCOSMOS, etc.) are using different and contradictory discourses regarding their relations on Earth and in outer space.

Biopolitics, the End of Territoriality and the Role of Space Scientists to Explain Human Spaceflights Cooperation

Although securitization will help to explain *how* United States and Russia manage to cooperate extensively in human spaceflights while having very difficult relations on Earth by using different security discourses, it remains that we must understand *why* both countries are using these paradoxical discourses. Indeed, political discourses can give us very little to understand *why* political leaders are taking these decisions to cooperate in human spaceflights. Three approaches can provide a very interesting explanation which are the end territoriality, biopolitics and the impact of space scientists on politics.

Indeed, regarding the end of territoriality, it is fair to ask if cooperation is so important in outer space simply because there is no territory in outer space? Without

territory, can political conflicts –even the nature of politics– be considered as the same as they are on Earth? Does the intrinsic hostile nature of the outer space environment for human beings favours or obliges cooperation over conflict? These are questions that the approach on the end of territoriality is asking and it opens the way to a better understand of cooperation in human spaceflights. In fact, this approach seeks to distinguish itself from the "Earth grounded" international relations in which territory is a fundamental aspect of geopolitics which defines partially the actors' behaviours. Lake (2003, p. 209) explains that at the core of international relations is the concept of sovereignty which he defines as being "an institutional arrangements for organizing political life that is based on two principles: territory and the exclusion of external actors form domestic authority structures". Moreover, the notion of territory in international relations is often defined as being a constitution of "blocks of rigidly bordered space and domination or control as the modality of power upon which the bordering relies" (Agnew, 2005, p. 442). However, in the approach of the end of territoriality, the notion of territory does not exist anymore. It is simply physically impossible to establish a territory in outer space as it is possible at the terrestrial, maritime and air levels. The very notion of sovereignty in outer space questioned:

> In general, any other orbital spacecraft will overfly many different nations, and must cross every longitudinal line on the globe. This physical problem makes it impossible to create a sovereignty regime over outer space by simply extending national boundaries upwards, as was done with airspace. The nature of orbital space flight poses unique issues of sovereignty and regulation that are not present on the high seas (Beck, 2009, p. 6).

This situation of the end of territoriality in outer space affects significantly relations between States. This approach implies that we must consider international relations (or simply social relations) in outer space as being fundamentally different than what they are on Earth (Roberts, 1988, p. 1075).

Furthermore, in addition to the absence of territory in outer space, it is also a fact that the environment in outer space is intrinsically hostile to human beings and therefore has important biopolitical impacts on human spaceflights. To illustrate this situation Al-Rhodan (2012, p. 25) proposes that we must get rid of the "Earth-grounded" conceptions and more take into consideration that the state of relations in outer space is based on a "symbiotic realism" logic rather than a nation-state logic. Indeed, since there is no territory in outer space and that the environment is fundamentally hostile to humans, States seem to really have no choice but to cooperate over going into conflicts (hence the use of the word "symbiotic"). To support this point, Al-Rhodan (2012, p. 25) explains that this symbiotic situation is particularly relevant to the field of space security in which States must maintain a secure and cooperative environment in outer space because "ultimately, space will either be sae for everyone of for no one". He gives for example that a simple form of aggression in outer space (using a weapon or a defensive system) could have catastrophic consequences where a space debris –going at a relative speed of 7.6 km/seconds– could provoke a chain reaction that could totally destroy all space objects in orbit at the same altitude. Thus, Al-Rodhan (2012, p. 215) explains that in such a situation of conflict in outer space "we would all be losers, no matter which country we are from".

Therefore, the fact there is no territory and sovereignty in outer space and that its fundamentally hostile environment to human beings have very important biopolitical impacts constitute a very interesting explanation track to understand why the United States and Russia are cooperating extensively in human spaceflights. Since a simple conflict in

outer space could have consequences beyond our imagination, it seems that cooperation in orbital human spaceflights will always come over conflicts. However, even if conceptually this approach can seem convincing, it needs to be tested and verified in depth by investigating more deeply the dynamics of human spaceflights and to do so, an investigation of the role and impacts of space scientists on politics is needed.

Indeed, it is the scientists and space engineers that possessed the highly complex knowledge allowing the survival of human beings in spaceflights. They know what the intrinsic dangers of space venture are and what are the ways to counter them. It is thus essential to look at how space scientists managed to convince politicians that the best outcome (if it is not the only outcome possible) in human spaceflight is for nations to cooperate. This research can be done by using a dynamic similar to the works in the field of science and technology studies in international relations. As Timothy Mitchell demonstrated in *Carbon Democracy*, the use of new technology like coal fostered the emergence of democracy in the 1800s (Mitchell, 2011, p. 12). Could the use of new technology in outer space ventures have a similar impact on cooperation? Furthermore, as Bruno Latour is stating in *Science in Action* "scientists and engineers invariably argue that there is something behind technical texts which is much more important than anything they write" (Latour, 1987, p. 63). Combined with the important impact that scientists can have when there are several people, network and organizations working together on a same topic (Latour, 1987, p. 145), it is very likely that space scientists can have an important impact on the cooperation paradox between United States and Russia in human spaceflights. This future research could bring an important contribution not only to our understanding of international relations in outer space, but also to support the fact of the important role of science and technology in our understanding of world politics.

Conclusion

To conclude, the situation in human spaceflights between United States and Russia is an important paradox in the international relations and governance spectrum. Indeed, it has been demonstrated that United States and Russia cooperate extensively in human spaceflights while having very difficult relations on Earth. The prevailing view in the literature explains cooperation in outer space through regime theory defending that the actual outer space international governance regime manages to assure a cooperative environment in outer space. However, we have demonstrated that in fact the outer space regime cannot be considered as a significant argument explaining the US-Russia cooperation paradox because the regime is actually inefficient, unstable and contested. Therefore, we cannot conclude that the outer space regime is the preeminent factor that favours cooperation in outer space. Now, new approaches need to be explored to understand this paradox. Securitization theory, the end of territoriality and its biopolitical impacts constitute great avenues to explore for further studies as well as the role and impacts of space scientists. Since we are at the edge of a new era of human spaceflights exploration with the United States and Russia who have already agreed in September 2017 that they will cooperate to build a new space station around the Moon and a possible exploration to Mars, this subject is one that will need more investigation from international scientists.

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