Master Thesis

Rivals and Cooperation in Outer Space

The politics surrounding rivals and (non-)cooperation regarding space

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Introduction

The day that humanity first reached outside its thin atmosphere was also the day that outer space became a subject of international politics. As Sputnik I, the Soviet Union's and planet Earth's first artificial satellite, was orbiting around the world, a minor crisis happened in the United States of America (US). The Soviet satellite sparked doubts about the safety of American soil to Soviet nuclear missiles. American politicians could no longer dismiss Russian technological prowess. Sputnik caused not only the Space Race, but also accelerated the arms race and worsened the Cold War between the two rival superpowers.[1]

Today the crisis caused by Sputnik almost seems exaggerated. Sputnik was a simple satellite, equipped with just a battery, a radio capable of sending a repeating beep, and four transmitters, all in an oversized ball. Now, thousands of satellites circle the Earth. These satellites provide pictures of Earth, communication, navigation and a wide variety of scientific data. Some are small enough to fit in your hand, some are as big as a bus, and one specific satellite is large enough to house six humans for months. This satellite, the International Space Station (ISS), is an international project by most of the major space faring states, and is often seen as the example of human cooperation in space. These states, each with various cultures, ideologies and international relations, have all provided manpower, resources, and components to the station.

The main contributors to the ISS program are Russia and the US, who build most of the station, provide the most funds and maintain the main launch capabilities for the program. Despite the historical and current cold relations between the two states, the program is dependent on the continuing support by both states.[2] The US is currently even dependent on Russian rockets to get its own astronauts on the station. Almost all major space faring states, and even some relatively minor states (Brazil and Canada), have contributed to the ISS program, but one major state is missing: the People's Republic of China. It is not that China does not have the capabilities to support the space station. In fact,

[1] Everett C. Dolman, *Astropolitik: Classical Geopolitics in the Space Age* (2002), 93-95.
[2] Eligar Sadeh, James P. Lester and Willy Z. Sadeh, 'Modeling international cooperation for space exploration', *Space Policy* 3 (1996), 220.

China is one of only three states which has ever send a man into space, and besides Russia the only state that still has the required capabilities to do so. China has been locked out of the ISS because of the American unwillingness to cooperate with them. A climate of non-cooperation in space has formed between the two states. Note the use of the word 'non-cooperation' instead of 'competition', as the latter implies the existence of a second space race or a situation close to conflict, an implication this thesis wants to avoid. The climate of non-cooperation materialized clearly in the 2011 budget for NASA, where NASA was explicitly forbidden to use any of its funding to cooperate with China or Chinese companies, or to host Chinese scientists in any of their buildings.[3] So while the US is willing to closely cooperate with one of its rivals, it is completely unwilling to even consider cooperating with the other.

This raises the question that this thesis will try to answer: why and when do states cooperate with their rivals in space related issues? Cooperation between rivals is a very important subject for the study of international relations. Cooperation in one field can lead to cooperation in other areas. If rivals work together, it can improve their relationship and foster a bond of trust between the two states. The Apollo-Soyuz program is a good example of this. The program, in which American and Russian astronauts docked their spacecrafts together and shook hands in orbit, was considered a symbol of the period of détente. When rivals start to trust each other, tensions will be reduced and so will the chance of conflict. Understanding when states cooperate with their rivals could help better understand conflict and détente, as well as the formation or breaking up of power blocs.

Space as a backdrop to rival cooperation is interesting and important for several reasons. First of all, it is a relative new and developing theatre for international relations. But over time, space will become more important to international politics. This thesis will not go into the more exotic possibilities, such as colonization, as it is clear that Low Earth orbit is already filled with possibilities for international collaboration, competition and conflict. An especially important aspect of space is the increasing role of space assets in terrestrial conflicts. Satellites provide crucial intelligence, communication, reconnaissance and

[3] Congress of the United States, *Department of Defense and Full-Year Continuing Appropriations Act, 2011*, 86, section 1340.

navigation to the armies, navies and air forces of space faring states.[4] States will obviously try to protect their own space assets while trying to find a way to weaken those of their rivals and enemies. Furthermore, there are only a limited number of states with the capabilities to reach space. Space politics is largely done by these countries, which are mostly important regional or world powers. The relations between these powers can have a big impact on international relations in general, possibly shaping the world as we know it.

To research the question why states cooperate with their rivals in space, we will first look at theories on cooperation in general and some theories and models on space cooperation. It should be noted that space cooperation in this thesis refers to the political side of things, and not to the practical cooperation in orbit or between scientists. After this, we will study the cooperative relation between the US and Russia/the Soviet Union. Two cases will be highlighted: the establishment of space law in the Cold War, and the historical and current cooperation regarding the ISS. The first case has been chosen because the two states were clear rivals at the time. Yet the US and the Soviet Union set aside their differences to help create a series of multilateral treaties that form the basis of modern international space law, which is still generally followed by all space faring states today.[5] This case will focus on two treaties, the successful Outer Space Treaty and the failed Moon Treaty. The case of the ISS happened after the end of the Cold War. The plans for the ISS were already mostly finished when the Soviet Union fell. So Russia became a part of the project at a relatively late stage, yet it was still a huge contributor. These cases of successful cooperation will be contrasted to the failure of cooperation between the US and China. Since there are no real case studies for American-Sino cooperation, this part will instead analyse the space related military strategies and interests of both states, and the US-China space relations.

[4] Ashley J. Tellis, 'China's Military Space Strategy', *Survival* 3 (2007), 48.
[5] Nathan C. Goldman, 'Space Law', in: Sadeh ed., *Space Politics and Policy: An Evolutionary Perspective* (Dordrecht, 2002), 35.

Space cooperation and theories

Before we can look at cooperation, we first have to define it in a political context. Robert Keohane in his landmark book on cooperation defines it as a situation where two states with initially incompatible policies adjust their policies so these policies become significantly more compatible.[6] Keohane's book focuses primarily on international regimes which are long term structures of shared principles, norms, rules and decision making processes.[7] As this is a thesis on why states cooperate and not so much on the how, the exact types of regimes and why states continue to follow them is less relevant than the question why states form regimes in the first place.

According to Stephen Krasner there are three main causal variables that lead to regime creation, egoistic self-interest, political power and norms and principles. Egoistic self-interest is the most popular of these explanations. A state wants to increase their own resources and does not care much about those of other states, as long as those states do not intervene or help their interests. States cooperate to lower costs, increase information and reduce uncertainty.[8] Political power can be a desire for more individual power or for a stronger system. Individual power protects the interests of the state, so if a regime protects those interests a state is willing to use its power to create or maintain that regime.[9] Norms and principles that are vaguely shared amongst states are necessary for the creation of a regime.[10] For example, before a regime of non-proliferation is created, states already have to agree that proliferation is something to be avoided. There are also two secondary causal variables which are not sufficient to create a regime but do increase the likelihood of one being created if some of the above three main variables are there: Usage and custom, and knowledge. Usage and custom are the expectations between states that are spontaneously

[6] Robert O. Keohane, *After Hegemony: Cooperation and Discord in the World Political Economy* (Princeton, 1984), 52-53.
[7] Stephen D. Krasner, 'Structural causes and regime consequences: regimes as intervening variables', in: Idem, *International Regimes* (Ithaca, 1983), 2.
[8] Krasner, 'Structural causes', 11-12.
[9] Idem, 13-16.
[10] Idem, 16-18.

created over time as the states interact.[11] Rivals who do not cooperate are therefore less likely to do so later, as they do not expect the other to cooperate. New knowledge, such as the Mutual Assured Destruction doctrine, can show the necessity of a new regime.[12]

However, regimes are generally created in what Keohane calls 'dense policy spaces', where there are a lot of closely related issues. Outer space is not a dense policy space, so ad hoc agreements tend to be better suited for cooperation, as they are easier to set up.[13] The only true regime mentioned in this thesis, and one of the few regimes in space, is the space law regime. The ISS is also a long-term agreement, but is tied to the space station and not to principles and norms. When the space station itself inevitably retires, it will likely mean the end of the ISS project until (and if) new agreements are negotiated. So while the above reasons for regime formation can provide context for cooperation, they are likely not the entire answer.

There are also theories specific to cooperation in space. According to Eligar Sadeh et al. there are three initial conditions that determine how states think about cooperation regarding space research: science and technology, politics, and economics. Science and technology are the main reason behind space research and are the primary enablers of cooperation if there are no political or economic issues regarding the research. But if the technology has implications to political or economic security, it will reduce the likelihood of cooperation. Politics (and political events) determines how different political actors come together to create a cooperative relation between states. And economics finally determines how much can be invested in space research. If there is less money, there will be more cooperation to compensate for it.[14] These conditions are combined with political actors, such as organizations, states, and regimes, to form cooperation. These conditions and their interaction with actors are however a bit vague, especially the political aspect.

By zooming further in, we can take a look at the role of America's space agency NASA in international cooperation. When NASA was founded, international cooperation was one

[11] Krasner, 'Structural causes', 19.
[12] Idem, 20.
[13] Keohane, *After Hegemony*, 79.
[14] Sadeh et al., 'Modeling international cooperation', 209-210.

of its main goals.[15] Space historian Roger Launius has listed several political reasons why the US wanted to cooperate. Firstly, they wanted to create and maintain a positive international image. Secondly, they wanted to improve their relations with their allies and other strategic partners. Third, the US wanted to emphasise the openness of their government in comparison to the closed space program and government of the Soviet Union. And finally, they wanted to use space cooperation as a diplomatic tool for other goals. Furthermore there are two economic reasons for cooperation: reduced costs and more markets for aerospace products.[16] Stephen and Lisa Shaffer differentiate between symbolic and pragmatic goals. The political goals noted by Launius are all symbolic goals, and the Shaffers add to these the goal of controlling space capabilities and legitimizing space policies. Launius economic goals fit in the pragmatic goals, which also include the access to foreign know how and some control over foreign development of potentially dangerous space technology.[17]

Aside from these goals, NASA also had a set of guidelines to international cooperation, again summed up by Launius. The first guideline was that cooperation was on a project-to-project basis, so NASA did not agree with any agreements over multiple projects. Second, the project had to be of use not only to both parties, but also to science in general. Two related guidelines were that the scientific data would be available to all parties and that the scientific aspect had to be agreed on before requesting political commitment. The final two guidelines were that the project was clearly divided between the states, with both states funding and managing their own part separately. The final guidelines are important, as this ensures that NASA is not dependent on other states. NASA always wants to be the only party responsible for 'mission critical components', the parts that are essential for mission success.[18] NASA followed these guidelines closely during the Cold War.

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[15] Roger Handberg, 'Rationales of the Space Program', in: Sadeh ed., *Space Politics and Policy,* 35.
[16] Roger D. Launius, 'United States Space Cooperation and Competition: Historical Reflections', *Astropolitics* 2 (2009), 93-94.
[17] Stephen M. Shaffer and Lisa Robock Shaffer, *The Politics of International Cooperation: A Comparison of U.S. Experience in Space and in Security* (Denver, 1980), 46-48.
[18] Launius, 'Cooperation and Competition', 94-96.

The establishment of space law

When spaceflight became reality, both the US and the Soviet Union realized that they had to agree on certain rules. The Soviet Union called for the United Nations to act as a neutral third party to supervise the peaceful use of space, and the US agreed. In December 1958, a year after Sputnik, the UN established the Ad Hoc Committee on the Peaceful Uses of Outer Space (COPUOS). After some political problems, COPUOS finally convened in 1961 and proposed resolution 1721 which stated that international law would apply to space and all celestial bodies and that all states were free to peacefully explore and use space. It was the first formal document on space law.[19]

Later treaties expanded space law to be more than just an extension of international law. COPUOS negotiated and agreed on several major treaties, which form the basis of modern space law. The first and most important treaty is the Outer Space Treaty. This treaty established most of the rules and principles governing outer space and has been ratified and signed by most states, including all space faring states. The final attempted treaty, the Moon Treaty, stands in stark contrast to the Outer Space Treaty. The Moon Treaty was an attempt to further define the laws pertaining to the moon and other celestial bodies. Yet so far only sixteen states have ratified this treaty, and none of them are major space faring states. This chapter will analyze why the Outer Space Treaty worked and the Moon Treaty failed.

The Outer Space Treaty has been described as a "key development" of international law[20]. An article written shortly after the treaty was finalized called the treaty "a remarkable endeavour of great significance to international law and politics" partially because "[n]ations often in conflict with one another and adhering to widely divergent political philosophies have agreed on the first Treaty (...) governing activity in outer space."[21] The treaty provided a fundament for future space treaties, often purposefully being vague about certain subjects which would be the subject of later treaties. The treaty formalized three key ideas. First, that

[19] Dolman, *Astropolitik,* 125-127.
[20] Francis Lyall and Paul B. Larsen, *Space Law: A Treatise* (Farnham, 2009), 54.
[21] Paul G. Dembling and Daniel M. Arons, 'The Evolution of the Outer Space Treaty', *The Journal of Air Law and Commerce* 1 (1967), 420.

all general international laws were applicable to space. Second, that space was free for the exploration and use of all states, including non-signatories. And third, that no state was allowed to claim parts of space of celestial bodies as its sovereign territory, regardless of the presence of a base or the use of the area.[22]

In May 1966 the US first proposed a treaty on celestial bodies. The Soviets agreed and offered their own proposal for such a treaty, but later expanded it to also include outer space, the great void in between planets and moons. These proposals formed the basis for the negotiations through COPUOS that followed later the same year. The articles containing the key ideas summed up above were quickly adopted from the Soviet proposal, as most states already agreed on this.[23] Other articles from the Soviet draft were inspired by earlier treaties and were also accepted with relatively little trouble aside from some minor changes to gain the support from the Americans. Article IX, stating that states should aid each other and should try to prevent obstructing the activities of others, was a combination of the American and Soviet proposal that also had little resistance.[24] Articles XI and XII were proposed by the Americans and were accepted with some concessions to the Soviets.[25] The main issues were article IV and X, respectively an American and Soviet proposal.

The American proposed Article IV banned the use and storage of weapons of mass destruction in space, and the stationing and use of military forces on celestial bodies. Interesting is that the stationing of military forces is not forbidden in outer space, as both the Soviet Union and United States wanted to prevent a debate on the military satellites they both had circling the globe. There was a linguistic dispute surrounding the terms 'bases' and 'fortifications', with the Russian translations considered to be too specific. The Soviet proposal to replace them with 'installations' on the other hand was considered too vague by the US. More serious was the question if military resources could be used in space. The Soviet Union opposed this as a loophole to the "fundamental provision" of using space for purely peaceful purposes. They had finally to concede to the Western argument that many

[22] Lyall and Larsen, *Space Law*, 59-61.
[23] Dembling and Arons, 'Outer Space Treaty', 429.
[24] Idem, 435-441.
[25] Idem, 445-449.

peaceful space resources, such as the rocket, were initially developed by the military, while the US conceded on the linguistic debate.[26]

The Soviet proposal for Article X stated that states that allowed another state to use its earth observation facilities to track satellites should also allow all other states to do the same. So if Chile allowed the US access to its observatories, it also had to allow the Soviet Union and China if those states so desired. This proposal was an issue as it reduced a nations sovereignty, especially for non-space faring states that could not expect anything in return, and it was feared that this could kill the treaty. The US also argued that this would weaken the treaty as a whole, as it discouraged cooperation and set specific rules instead of principles. But the Soviets had a good reason to push for this article: to keep a satellite under surveillance for its entire orbit, a state needs observatories spread across the globe. The Soviet bloc was mostly located in central Eurasia, while the US had territories and allies in all four hemispheres. This gave the US a clear advantage in space affairs. The Soviets tried to compromise while halting the final agreements on the last two articles, but the resistance to their proposal was too strong. They finally conceded after bilateral talks with the US, saving the treaty just before it would be reviewed by the General Assembly. States would now "consider on a basis of equality any requests by other States", giving them much more room in negotiations.[27] The Outer Space Treaty was accepted by the General Assembly and ratified by a majority of UN states, including all space faring states.

The Moon Treaty was the last of the major space law treaties, and the only one to fail. The treaty was supposed to formalize the rules and principles regarding the use and exploration of the moon and other celestial bodies in the solar system. Negotiations started in May 1971, when the Soviet Union proposed the treaty. But unlike the Outer Space Treaty which took less than a year from proposal to ratification, the Moon Treaty was not finished until December 1979.[28] Most of the articles in the treaties were negotiated in a similar way as the Outer Space Treaty, some quickly accepted, others with minor debates and

[26] Dembling and Arons, 'Outer Space Treaty', 434-435.
[27] Idem, 442-444.
[28] Nancy L. Griffin, 'Americans and the Moon Treaty', *The Journal of Air Law and Commerce* ? (1981), 734-735.

concessions.[29] But Article 11, regarding the use and exploitation of resources on the moon, proved to be the treaty's undoing.[30]

The issues with this Article started during negotiations. The American delegation proposed the article, while the Soviets questioned the relevance of the article as exploitation of lunar resources was not considered feasible in the near future. The Americans argued that it was best to prevent future problems by formalizing the rules before national interests would complicate negotiations.[31] The Soviet Union also complained about the use of the term 'common heritage of mankind' in regards to resources, as it was not defined in the treaty and was considered to be a 'capitalist' notion because of the connection to inheritance law.[32] The discussion surrounding this article was not resolved until the Austrian delegation finally proposed a compromise in 1979. The term 'common heritage' would stay in the article, but the establishment of a regime to supervise the exploitation of resources was delayed until "such exploitation is about to become feasible."[33] This compromise was accepted by both the US and Soviet Union, and the treaty passed through the General Assembly.

But the treaty's future was not decided in the international theatre of politics, but in a national one. Surprisingly, despite Soviet opposition against and American support for article 11, the troubles were on the American side. The treaty was supported by all relevant government institutions, but it was opposed by the National Association of Manufacturers and several organisations and companies from the (aerospace) industry. Interesting is the position of the American Bar Association of lawyers, where the International Law section agreed with the treaty while the Natural Resources Law section disagreed.[34] Opponents of the treaty argued that article 11 implied a moratorium on the extraction of lunar resources until a regime was set up. The term 'common heritage', again supported by the US, proved to be a problem. At the time the treaty was debated, negotiations regarding the UN

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[29] Griffin, 'Americans and the Moon Treaty', 736-741.
[30] Note that the numbering of the articles changed from Roman to Arabic numerals between the treaties.
[31] Idem, 743-744.
[32] Fabio Tronchetti, *The Exploitation of Natural Resources of the Moon and Other Celestial Bodies: A Proposal for a Legal Regime* (Leiden, 2009), 50.
[33] United Nations General Assembly, 'Agreement Governing the Activities of States on the Moon and Other Celestial Bodies' [Moon Treaty], in: *United Nations Treaties and Principles on Outer Space* (New York, 2002), 32.
[34] Griffin, 'Americans and the Moon Treaty', 749 and 754, note 167 and 204.

Convention on the Law of the Sea were ongoing, and a debate on the 'common heritage' of the seas was part of this. It became clear that many states had different interpretations of this phrase than the US, with developing countries opposing the exploitation of submarine resources. The opposition of the Moon Treaty feared that this definition would also be applied to the moon.[35] They also feared that the negotiations of the new regime would be dominated by the developing world with the support of the Soviet Union to facilitate a redistribution of the world's wealth.[36] This was not entirely unfounded as the treaty did call for the regime to share the wealth from the resources equally among all state parties with special consideration for the space faring states and developing countries.[37] Despite the government's insistence that the Soviet Union did not support the definition from the developing states, the opposition won the debate when president Reagan's administration joined their side, and the US never ratified the treaty. The Soviet Union had agreed with the treaty despite its misgivings on the 'common heritage', so it is no surprise they also did not ratify after the US failed to do so because of the very same reason. At that point there was little reason for other states to sign the treaty, as the US and Soviet Union dominated space.[38]

The Outer Space Treaty was an example of compromise between two rival powers. Though multilateral, its debates were dominated by the differences in opinion between the American and Soviet delegation. But concessions and compromises by both sides made the treaty the corner stone of space law. The Moon Treaty was plagued by discussion regarding just one of its articles until it was finally agreed upon by all governments. It was the American political system that deemed the treaty unacceptable, even though the government had already given it its blessing. President Reagan saw the end of the Moon Treaty, but he did start something else: the first International Space Station.

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[35] Tronchetti, *Natural Resources of the Moon*, 56-61.
[36] Griffin, 'Americans and the Moon Treaty', 752-754.
[37] UN, 'Moon Treaty', 32.
[38] Tronchetti, *Natural Resources of the Moon*, 59-61.

Russia and the International Space Station

The International Space Station (ISS) is a seemingly ideal example of multilateral cooperation to achieve a greater good. But like many other examples of cooperation, the reasons for cooperating is less idealistic and more practical. The ISS started as Space Station Freedom (called ISS from now on for clarity), the newest of American space stations. NASA started talks with other space agencies in 1982, but it was not until 1984 that these talks became officials by order of president Reagan. While the station was an international project, it was still very much American. The first few agreements regarding the ISS show four indications that the station was American. First, the US would be the one to build and maintain the core of the station, including all essential elements such as life support and solar panels. Second, every partner state was responsible for the management and funding of its own research and hardware. Third, the US had the final decision-making authority if a multilateral decision could not be made. And finally, NASA hoped to try and prevent unnecessary transfer of technology to other states.[39] Basically, the ISS would have been an American station with some European and Japanese laboratories attached to it. Interestingly, at the beginning of the negotiations the other states hoped to reach a truly multilateral agreement with equal authority for all states. But the fact that the US was the only state capable of building and funding the station and providing transportation, the other states had to delegate more power to the Americans.[40] But while a final agreement was reached in 1988, the costs proved too prohibitive for the American congress and NASA started a series of redesigns to lower the costs.[41]

The end of the Cold War and the fall of the Soviet Union provided a way to not only lower the cost of the ISS, but also to stabilize the world. Russia had extensive experience with the construction and maintenance of space stations and had the required infrastructure and industry to help with the ISS. Russian participation to the program would also improve

[39] Sadeh et al., 'Modeling international cooperation', 219.
[40] Lynn F.H. Cline and Graham Gibbs, 'Re-negotiation of the International Space Station Agreements - 1993-1997', *Acta Astronautica* 11 (2003), 918.
[41] Sadeh et al., 'Modeling international cooperation', 220.

Western relations with Russia as it was a symbolic end to the Cold War, a way to show Western support to the Russian political and economic reforms and as it would improve economic ties between the former rivals.[42] Finally it would reduce the instability brought by the sudden change in power relations. Russian scientists and the aerospace industry were looking for work, and many states were hoping to obtain former Soviet rocket technology. If Russia would start work on the ISS, these scientists and industries would work on more peaceful technology that would be a boon rather than a threat to the West. It is no accident that Russia joined the Missile Technology Control Regime (MTCR, a regime aimed at reducing missile technology proliferation) at the same time it joined the ISS program.[43]

In 1993 the US formally invited Russia to the ISS, and multilateral negotiations were organised in Paris. Initially, it was expected that Russia would become a full member of the agreement reached in 1988 with relatively few changes, as the states wanted to prevent a long phase of negotiations.[44] But because the ISS had to be redesigned, because Russia and the European Space Agency wanted more influence to balance their potential contributions, and because the previous agreement still had some outstanding issues, the agreement had to be renegotiated.[45]

Some of the negotiations were multilateral, but the Russian and American space programs also met in bilateral talks focused on the political and legal aspects of the treaty. These aspects centred around the control of the station, and how much influence Russia would have on the decision making process. Alexander Yakovenko was the leader of the Russian delegation and wrote an article about the negotiations. He described the meetings as dynamic and flexible, and the general atmosphere as optimistic.[46] In 1994 the first agreements were reached, giving Russia more authority and already sending orders to Russian industries to start working on ISS related products. While this shows some willingness to compromise to Russia, the US was still unwilling to allow Russia to work on the

[42] Eligar Sadeh, 'Technical, organizational and political dynamics of the International Space Station program', *Space Policy* 3 (2004), 185-186.
[43] Stephen N. Whiting, 'Space and Diplomacy: A New Tool for Leverage', *Astropolitics* 1 (2003), 63; Sadeh, 'Dynamics of the ISS', 186.
[44] Cline and Gibbs, 'Re-negotiation of the ISS', 920-921.
[45] Idem, 922; Alexander V. Yakovenko, 'The intergovernmental agreement on the International Space Station', *Space Policy* 15 (1999), 81.
[46] Yakovenko, 'Agreement on the ISS', 81.

core part of the station, the modules containing life support and other essential systems. NASA was willing to let Russia work on 'critical path components', breaking a guideline it had followed until then, but Russia would stay dependent on the American part of the station and not the other way around. Russia proposed a compromise: they would build an autonomous part of the station, effectively creating two independent cores. But NASA wanted an integrated program and finally allowed Russia to work on the station core.[47]

The final ISS agreement reached in 1998 gave a lot more authority to the other states that participated to the program. The US was still the leader of the project and was responsible for decisions that had an impact on the safety of the station. For other decisions a multilateral solution was preferred, but if no consensus could be reached the US had the final say. The station was divided in a Russian and American part, and if Russia disagreed with the American decision it would only apply to the American half. Similarly, the previous agreement on the ISS stated that all astronauts onboard the station would fall under American law. The new agreement stated that astronauts would fall under the jurisdiction of their own nation, unless they harmed an astronaut or damaged material from another state.[48] Where Space Station Freedom would have been an extension of American sovereignty and its hegemony, the International Space Station had become a truly international affair.

But Russia's participation had its flaws. The biggest problem was the instability of Russia's political system and economy. While the program might help stabilize things, it obviously only played a minor role in Russia's domestic theatre. The ISS could not stop a failing Russia and if that happened would likely fail as well. The Russian financial crisis in 1999 caused the Russian space program to declare bankruptcy. NASA had to step in and drastically increase the funding for an earlier project to 600 million dollars to allow Russia to continue the program, despite NASA's guideline to reduce the transfer of funds as much as possible.[49] NASA also started development of a replacement for one of the critical

[47] Sadeh, 'Dynamics of the ISS', 182-183.
[48] Yakovenko, 'Agreement on the ISS', 82-83.
[49] Rochus Moenter, 'The International Space Station: Legal Framework and Current Status', *Journal of Air Law and Commerce* 4 (1999), 1055.

components Russia was supposed to produce. This proved to be unnecessary, although Russia was still two years late with this part of the project.[50]

To get Russia to join the ISS America had to compromise on their initial expectations of the project. Russia was given more authority and was given the responsibility of building and maintaining mission critical parts of the station, and that despite the fact that Russia's participation carried risks. NASA had to abandon several of its guidelines on cooperation it had maintained throughout the Cold War, including a large transfer of money to aid the failing Russian space agency. The US was clearly willing to go a long way to cooperate with its (former) rival to improve global stability, but the same cannot be said about the American relationship with China.

[50] Sadeh, 'Dynamics of the ISS', 185.

Sino-American space relations

China's space program has had problems since its inception in 1956. Just like the American and Soviet programs, space was at first secondary to the project. China wanted to develop its own ballistic missiles to deliver a Chinese nuclear warhead. Initially these projects were combined in a national effort with the phrase "two bombs, one satellite," an effort to internally produce an atomic bomb, a hydrogen bomb and a satellite. Worsening relations with the Soviet Union thwarted this effort however, as the withdrawal of Soviet advisors meant that China could not continue such a large scale project. Unsurprisingly, the satellite was the first project to be scrapped, and the Cultural Revolution delayed the project after the bombs had been developed. The space agency, now under military control to reduce the impact of the Cultural Revolution, finally managed to launch a satellite in 1970, making China the fifth state with a self-launched satellite. Budget cuts in 1978 slowed the program once again until a national plan focusing on high-tech R&D in 1986 revitalized it. The fall of the Soviet Union gave China access to cheap Soviet technology and allowed them to sell their launch services on the global market. China's program has steadily advanced in the past decades, even creating its own manned space program, although it is still somewhat behind on the major space states.[51]

One reason why the Chinese have invested so much in the space program lately is because the program gives them international prestige and respect.[52] This is not unique to the Chinese space program, as one of NASA's main goals was the same, and the Space Race during the Cold War was also largely about prestige rather than direct strategic benefits.[53] Mao Zedong ordered that China's first satellite was larger and more practical than the first satellites of the Soviets and Americans, and the same happened with the first manned mission. Chinese experts often mention the cooperation with Russia and Europe, implying that they are equals to these advanced space agencies. And China was one of the main

[51] Dean Cheng, 'Chapter 24: Spacepower in China', in: Charles D. Lutes, and Peter L. Hays eds., *Towards a Theory of Spacepower: Selected Essays* (Washington D.C., 2011), 451-459.
[52] Cheng, 'Spacepower in China', 464.
[53] Launius, 'Cooperation and Competition', 90.

founders of the Asia-Pacific Space Cooperation Organization (APSCO). APSCO is headquartered in Beijing and servers as an instrument of China to improve relations with other states and to legitimize its claim as a peaceful growing power.[54]

Although prestige is an important reason for the space program, most foreign experts tend to focus on its role in China's military strategy. While most space agencies worldwide have a close working relation with the military, China is the only major state were the agency is directly supervised by the military. China's military space program ties directly into its grand strategy. In the past few decades China has been rising in power, and the government fears that the US will try and contain China before it can threaten the American hegemonic position. China is especially worried about the safety of its shipping lanes on which its economy depended, and which could potentially be blockaded by the superior American navy. Chinese strategy is to prevent the US from effectively operating in the seas near China.[55] To achieve this, China has to be able to take on the American conventional forces if necessary, and since they are not capable of doing this in a direct confrontation China is looking for indirect ways to achieve this goal.[56] One indirect way lies through space.

To understand this we need to take a short look at the American military grand strategy. During the late Cold War, the Soviet Union was out producing the 'Arsenal of Democracy', causing the US to pivot to a grand strategy of qualitatively superior forces. A combination of information superiority and rapid communication would allow the Americans to deploy their forces and high-tech weapons for maximum efficiency.[57] Satellites proved to be essential for information acquisition, communications and navigation. They have been called "the relatively vulnerable eyes, ears and voice of American power," highlighting both their strength and weakness.[58] China discovered this after analyzing recent US wars, especially the first Gulf war, in which satellites gave the US a decisive advantage. This lead China to believe that the outcome of a war with the US would be determined by who had

[54] Cheng, 'Spacepower in China', 464-465.
[55] Ashley J. Tellis, 'China's Military Space Strategy', *Survival* 3 (2007), 46-48.
[56] Vishnu Anantatmula, 'U.S. Initiative to Place Weapons in Space: The Catalyst for a Space-Based Arms Race with China and Russia', *Astropolitics* 3 (2013), 141.
[57] Lewis, James Andrew, 'Chapter 14: Neither Mahan nor Mitchell: National Security Space and Spacepower, 1945-2000', in: Lutes and Hays eds., *Theory of Spacepower,* 285-289.
[58] Tellis, 'China's Military Space Strategy', 45.

information superiority, and that control over space assets was crucial to achieve this advantage.[59] This view is clearly present in a quote from a study by the People's Liberation Army Air Force: "It is impossible to achieve national security without obtaining space security."[60]

Unsurprisingly, the Chinese space strategy has been cause for concern amongst American military experts, while others are more concerned about how the US treats China's space program. At least one US expert on China's military thinks that China want to achieve space dominance, and not just the ability to deny space superiority to its foes.[61] Others consider China's space program as a potential driver behind a space arms race between the US and China.[62] James Moltz notes that "although U.S. military space documents rarely identify possible adversaries by name, China is clearly one state of concern."[63] While Moltz then sums up other states that pose a potential threat to the US, the fact that he singles out China shows that it is considered a bigger threat in space than Iran, North Korea, or even the advanced Russian space program. Joan Johnson-Freese, a space strategy expert who expands on Moltz' introductory article, argues that American military experts tend to use Cold War models and ideas when thinking about new threats such as China's space program. Because the US already has a double-edged relation with China due to a powerful though informal anti-Chinese coalition, Johnson-Freese thinks that America's position to the Chinese space program will be especially tense. She says that "at present, space is one of the last remaining venues of Cold War politics."[64] Johnson-Freese's article was written in 2006, and relations have not improved since then, as NASA has been forbidden to work with China.

The bill that banned cooperation between NASA and China was the *Department of Defense and Full-Year Continuing Appropriations Act* of 2011. As the name suggests, the bill was a standard yearly bill that ensured that the Department of Defense and associated

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[59] Cheng, 'Spacepower in China', 467-468.
[60] Baohui Zhang, 'The Security Dilemma in the U.S.-China Military Space Relationship', *Asian Survey* 2 (2011), 318.
[61] Tellis, 'China's Military Space Strategy', 51.
[62] Zhang, 'US-China Military Space Relationship', 312.
[63] James Clay Moltz, 'Preventing Conflict in Space: Cooperative Engagement As a Possible U.S. Strategy', *Astropolitics* 2 (2006), 124.
[64] Joan Johnson-Freese, 'A New US-Sino Space Relationship: Moving Toward Cooperation', *Astropolitics* 2 (2006), 143.

institutions were funded, so the ban on cooperation was a small rider on a bill that had to be passed. Section 1340 (of over three thousand sections) states that NASA is not allowed to use its funds to cooperate with China or any Chinese-owned company in any way unless specifically authorized by a law.[65] Later appropriation acts regarding NASA copied the section almost directly, but added another way in which the limitations could be bypassed. NASA would have to certify that the mission "pose[s] no risk of resulting in the transfer of technology, data, or other information with national security or economic security implications", and that it "will not involve knowing interactions with [Chinese] officials who (...) have direct involvement with violations of human rights." These certifications had to be submitted to Congress or the Federal Bureau of Investigations.[66] Although it is not explicitly stated, one can assume that these institutions could stop the mission if they disagreed with NASA's judgement, or could punish NASA or those responsible if they did not adhere to these standards. This process clearly discourages cooperation with China, as there are other states with who NASA can cooperate without having to jump through bureaucratic hoops and taking additional political risks.

The ban on collaboration fits in a pattern of non-cooperation with China, a pattern that started with the events on Tiananmen Square. Before those events, the US was willing to cooperate with the Chinese space program by transferring space technologies. This was done to widen the Soviet-Chinese rivalry, which would strengthen the American position in the world. But the fall of the Soviet Union and the Tiananmen Square protests abruptly ended the cooperative atmosphere.[67] In 2001 China showed interest in joining the ISS project and, as they called it, the "international family of space faring nations."[68] At the time, the US vetoed the possible participation of China. Some Chinese scholars had hopes that the

[65] Congress of the United States of America, *Department of Defense and Full-Year Continuing Appropriations Act, 2011*, 86 sec. 1340.
[66] Congress of the United States of America, *Consolidated Appropriations Act, 2016*, 89 sec. 531.
[67] Jonathan D. Pollack, 'The Cox Report's 'Dirty Little Secret'', *Arms Control Today* 3 (1999).
[68] Joan Johnson-Freese, 'US-China Space Cooperation: Congress' Pointless Lockdown', *China-US Focus* (10 June 2011).

Obama administration would allow China to join, or would at least improve space relations, but the 2011 ban put a stop to that.[69]

There are three recurring reasons why the US does not want to cooperate with China: disapproval of Chinese human rights issues and political system, national security issues, and the possible transfer of dangerous technology to China. The first issue, that of domestic issues in China, may seem unrelated to space but is clearly a driving issue behind the ban on cooperation. As noted before, NASA has to prove it will not interact with Chinese "officials who (...) have direct involvement with violations of human rights" if it wants to cooperate with China.[70] The author of the ban was Representative Frank Wolf, who was at the time the chairman of the subcommittee responsible of funding NASA.[71] He has written several letters to NASA administrator Charles Bolden on cooperation with China. In one letter he starts with a long explanation of the human rights issues in China and on his work to improve the situation there, stating that he has: "... supported efforts to limit new collaboration with China until we see improvements in its human rights record." Interestingly, he also responds to criticism of the ban by Dr. Geoffrey Marcy with the question if Marcy has done anything to improve human rights in China.[72]

But why do human rights matter for space cooperation? An important reason is that the US, just like many other Western governments, often tries to spread its own principles to other states. The international outrage caused by Tiananmen Square led to major technological sanctions, despite the event having little to do with foreign technology. Another, related, reason has to do with how American democracy works. Representatives represent their district, and very few districts care about the space industry, space politics or space in general. This means that ideology becomes much more important. Since there are so few representatives who are willing to spend political capital on space issues, and so

[69] Yun Zhao, 'Legal Issues of China's Possible Participation in the International Space Station: Comparing the Russian Experience', *Journal of East Asia and International Law* 1 (2013), 159; Zhang, 'US-China Military Space Relationship', 323-324.
[70] USA Congress, *Appropriations Act, 2016*, 89 sec. 531.
[71] Frank R. Wolf, *Wolf Letter to Bolden Regarding China and the ISS* (2012).
[72] Wolf, *Wolf Letter to Bolden Regarding Chinese Nationals at NASA Facilities* (2013).

many who oppose China for a variety of reasons, American space politics tend to favour non-cooperation with China even for unrelated reasons.[73]

This is not to say that non-cooperation is founded only on ideological reasons. The second reason of national security is much more practical and equally, if not more, important. Frank Wolf also touches extensively on this subject in his letters, pointing out the military applications of the Chinese space program[74] and its development of Anti-Satellite weapons (ASAT).[75] "Serious concerns about widespread espionage [by China] (...) as well as recent developments in China's space warfare program" are stated as reasons for the ban.[76] The US-Chinese strategic military rivalry and tension has already been expanded on earlier, and these fears are certainly not unfounded.

The third reason for non-cooperation, the issue of American technology being transferred to China, is closely related to the reason of national security. The two reasons are considered separate as technology transfer is directly related to collaboration and also has implications on global security. This issue is often considered to be the main reason for non-cooperation.[77] Since many space technologies have both a civilian and military purpose, transfer of civilian technology can lead to military developments in China. While this is a problem in and of itself, it could also lead to proliferation of these technologies to other states. There is a lot of uncertainty about China's stance towards non-proliferation. Officially, China follows the rules of the non-proliferation regimes, but a lack of transparency means that it can be hard to be sure.[78] And many US experts and politicians already do not trust China, due to Chinese cyber espionage attempts and the 1999 Cox report.

The *Report of the Select Committee on U.S. National Security and Military/Commercial Concerns with the People's Republic of China*, named the Cox report after the Committee's chairman, was a report on the transfer of potentially dangerous technology to China through cooperation and espionage. The report was written in 1999

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[73] Johnson-Freese, 'Congress and Space Policy', in: Sadeh ed., *Space Politics and Policy: An Evolutionary Perspective* (Dordrecht, 2002), 96-97.
[74] Wolf, *Letter Regarding China and the ISS*.
[75] Wolf, *Letter Regarding Chinese Nationals.*
[76] Idem.
[77] Zhao, 'China's Possible Participation in the ISS', 158; Johnson-Freese, 'US-Sino Space Relationship', 131.
[78] Tracey Hayes, *Proposal for A Cooperative Space Strategy With China* (Norfolk, 2009), 48-49.

after two American companies offered advice to China's space program when the Chinese had failed to successfully launch satellites for these companies. Representatives feared that this information could be used by China to improve its ballistic missiles, leading to the Cox report.[79] The report's conclusions most relevant to this thesis are that China has "stolen or otherwise illegally obtained U.S. missile and space technology that improves [China's] military and intelligence capabilities"[80], that China wants to obtain US technologies "by any means"[81], and that China "has proliferated such military technology to a number of other countries, including regimes hostile to the United States."[82] According to critics the report had little evidence to back its claims, and that those claims were mostly 'worst case' interpretations of the available evidence.[83] Nevertheless, and frankly unsurprisingly, these conclusions caused consternation amongst American politicians. This led to laws restricting the export of satellites and other forms of space technology, most notably the International Traffic in Arms Regulations (ITAR) which even limited export of satellites to American allies.[84] Even ten years after the report, its legacy is still alive as at least one Senator pointed at the Cox Report to warn Europe against cooperating with China.[85]

The American climate of non-cooperation with China is grounded on both a strategic military rivalry in space and issues of domestic politics. China is specifically designing its space capabilities with a war with the US in mind. Regardless of the legitimacy of their fear, this has worsened space relations with the US and gives America a genuine reason not to cooperate with China on space related matters. The US is also guilty of creating the pattern of non-cooperation, as the American system of democracy tends to favour ideology when it comes to space. While this means that taxpayers are less likely to have to pay for needless

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[79] Lewis R. Franklin, 'A Critique of the Cox Report Allegations of PRC Acquisition of Sensitive U.S. Missile and Space Technology', in: M. M. May ed., *The Cox Committee Report: An Assessment* (Stanford, 1999), 81-82.
[80] United States House of Representatives, *Report of the Select Committee on U.S. National Security and Military/Commercial Concerns with the People's Republic of China* [Cox Report], Volumes I-III (Washington D.C., 1999), xii.
[81] US House, *Cox Report*, xxxiv.
[82] US House, *Cox Report*, xii.
[83] Jonathan D. Pollack, 'The Cox Report's 'Dirty Little Secret'', *Arms Control Today* 3 (1999); Franklin, 'Critique of the Cox Report', 82.
[84] Franklin, 'Critique of the Cox Report', 93-94.
[85] Rob Chambers, *China's Space Program: A New Tool for PRC "Soft Power" In International Relations?* (Monterey, 2009), 56.

space adventures, it also means that politicians actively worsen space relations with China for unrelated reasons. Banning Chinese participation to the ISS is unlikely to free any Chinese dissidents, regardless of the arguments by the proponents of the ban. Furthermore, genuine problems with technology transfers are worsened by overly dramatic reports.

Conclusion

The instances of cooperation described above scratch only the surface of space cooperation. The multilateral space agency ESA, the American-Soviet symbolical Apollo-Soyuz mission, and the many international scientific cooperative missions are all examples of cooperation that have not been mentioned in this thesis. But the examples that were mentioned are some of the most important cases of (non-)cooperation in space politics. The US and Soviet Union stood at the cradle of international space law with the COPUOS and Outer Space Treaty, only for this cooperative relation to end due to bickering regarding a single article in the Moon Treaty. The ISS is an example of successful collaboration between former rivals who are still unsure about their relation. The US was willing to compromise greatly on its expectations and guidelines to get Russia into the project, to ensure better bilateral relations and to improve global stability after the end of the Cold War. The end of the Cold War also saw the end of a somewhat cooperative space relation between the US and China, and the beginning of a climate of non-cooperation. So why do states sometimes cooperate with their rivals, and why do they sometimes not?

One of the most important reasons why the US is unwilling to cooperate with China is the fear of technology transfer. While the US also wanted to reduce the risk of transfer when working together with Russia on the ISS, the issue was not as important. It was not an issue that was brought up in negotiations, even though building a space station together would be one of the most risky missions with regards to transferring technology. On the other hand, when American companies gave advice on launching satellites to China, it prompted an in-depth report on technology transfer to China. The differences are striking. It is clear that the Soviet Union had a much more advanced space program than China, which leads us to the first conclusion: space cooperation is more likely if the rivals are equally advanced in space technology as this minimizes technology transfer.

A major reason for non-cooperation can be gleaned from the Moon Treaty and America's relation with China. Internal political resistance can end space collaboration, even when the government has already agreed with cooperation. The American democratic system ensures space policy is less important than ideological or economic politics. Space

policy by experts can generally succeed if there is no internal resistance due to a lack of interest. But if some resistance is organized it can lead to major policy decisions regardless of expert opinion, such as with both the Moon Treaty and the 2011 ban on cooperation with China. The US government agreed on the Moon Treaty, and its refusal to sign it harmed its interests in both space law and in other international negotiations. International Relations Theory often focuses on the interests of states, but it is clear that in regards to space the interests of the government can become secondary to the sometimes unrelated interests of the democratic system.

Further reasons for cooperation are a wish to maintain the stability of the global order, such as with the ISS and the space laws, and if cooperating with one rival can weaken a stronger rival, such as with US cooperation with China to weaken the Soviet Union. Rivals may not cooperate if strategic military interests collide and a climate of non-cooperation may make cooperation difficult despite good reasons. But these reasons are already well-known among academics and are far from exclusive to space cooperation.

The main conclusions of this thesis can be used for International Relations Theory to theorize about the role of technology and military capabilities in cooperation, and about the role of internal politics in international affairs, especially in geopolitical theatres such as space relations. The real difficulty for mankind to work together in outer space may not be in our cultural differences, our conflicts or rivalries, but in our national politics.

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