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No deal in space: A bargaining model analysis of U.S. resistance to space arms control

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ABSTRACT

Space systems are essential to the global economy and security. The possibility of disruptions arising from competition between the United States and China through the testing and deployment of weapons in space has led to concerns over an incipient space arms race that would threaten satellites, leading to international calls for a space arms control treaty. The paper presents a rationalist theory analysis on the lack of progress in establishing such a treaty, identifying the United States' position of primacy in the global order and its preeminence in space as a primary cause.

Space is essential to the global economy and international security. The United States currently holds an advantageous position in space exploration and use, granting it great economic and security benefits. Yet space is increasingly becoming more "congested, contested and competitive" as more states and non-state actors become capable space players each pursuing their own interests. In the coming years the United States will have the opportunity to define how space is used for military purposes beyond surveillance, communications, targeting and navigation as it seeks to guarantee its security interests and to gain an undisputed position of space superiority, possibly deploying weapons in space (thus "weaponizing" space) to defend its satellites and project power through and from space, to preserve its primacy [1]. This position of space superiority can be understood as the use by the United States of the "commons" of space unrestricted, including being able to deny and defeat any challenges to its use by any other state and non-state actor [2].

Potential U.S. adversaries have noted America's dependence on space and the vulnerability of these systems, calling it America's "Achilles' heel." [3]. In January 2007 China shot down one of its own satellites with a modified ballistic missile. This anti-satellite (ASAT) test was interpreted by many analysts as a signal to the United States not to pursue any plans in dominating space [4]. While actions from other notable space players, such as Russia, the European Union, and India, as well as Iran and North Korea, impact space security, the possibility of disruptions arising from competition between the United States and China through the testing and deployment of space weapons has been considered the most concerning and at risk of triggering a space arms race, leading to international calls for a space arms control treaty.

Since the United States' space power [5] is essential to economic prosperity and security, and considerably dependent on satellites, and that these satellites are highly vulnerable to any disruption, why isn't the United States attempting to secure its position with a space arms control agreement that would eliminate such a threat? The objective of this article is to present an analysis based on James D. Fearon's "rationalist explanations for war" theory on the lack of progress in negotiating and establishing a space arms control treaty [6].

The first part of the article presents the United States' interests in space and how it relates to its primacy noting the challenge of a rising China. The second part presents the U.S.–China rivalry as the basis of the article's analysis on space weapons. The third part presents various models outlining the U.S. and Chinese negotiating positions to demonstrate how American primacy hinders the establishment of a space arms control agreement. The fourth and

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final part summarizes the article's findings and presents concluding remarks.

1. The United States at a crossroads

The United States remains unrivaled in overall power. Its military, political, economic and cultural power makes it the preeminent state. With the use of satellites the United States has been able to not only enhance its economic dynamism, but also project military power across the globe. Of the 1046 operational satellites currently in orbit the United States owns and operates 455 [7]. The United States is the preeminent space power. But as it is highly dependent on space, it is also vulnerable to any disruptions to these systems [3].

As a 2001 Congressional report on U.S. space security interests affirmed, a surprise attack on U.S. satellites, a "Space Pearl Harbor", could have disastrous consequences not only on economic activities, but especially on the U.S. military's ability to act quickly and efficiently throughout the world [8]. Although critics of the report considered the threats overblown, the report did raise awareness on U.S. dependence on space and pushed policymakers into considering the defense of these systems a priority, with any threats to it requiring U.S. responses, most notably during the George W. Bush administration [9]. Depending on how the United States perceives emerging threats, formulates objectives and means, U.S. actions, as the preeminent power, will strongly influence the dynamics of international and space security. It faces a crossroads and dilemma in "how to establish a secure international environment in outer space that will protect U.S. interests, as well as those of its allies and future generations." [10].

As the world transitions from the immediate post-Cold War unipolar world to one more "multipolar" in which the United States remains "first among equals" because of the disparity in overall power capabilities, but increasingly encounters limits to its influence and due to more capable states defending their own interests and pursuing different agendas. Many states have been "catching up" with the United States on many measures of power, with one in particular standing out: China.

The United States' current GDP is $14.5 trillion, about 23% of world GDP, while China, with the second highest GDP of $6 trillion accounts for 9.5% [11]. China has presented astonishing growth rates but it will still be years before it is able to catch up with the United States. Various studies have been presented forecasting when the Chinese economy would surpass the United States' economy, many reducing forecasts to as early as 2019 [12]. As Joseph S. Nye, Jr. noted, China may one day match the United States' gross domestic product, becoming "equivalent in size, but not equal in composition." [13]. The United States still fares better in terms of national competitiveness, ranking 7th in the World Economic Forum's *Global Competitiveness Report 2012–2013*, while China ranked 29th [14]. As Fareed Zakaria noted, the United States presents other advantages China lacks, such as a highly developed higher education system (that translates into technological and economic innovations) and demographic trends in its favor brought about by immigration that further enhances its economic development [15].

Much has been debated on China's rise and its interests and views on the continued primacy of the United States, the preservation of the current international order, and the role China sees for itself in the world [16]. In the short term, China is concerned over any U.S. interference in a conflict over Taiwan. In the long term, geopolitical rivalry with the United States impels China to invest in greater military capabilities.

Challenging the United States through conventional means is difficult and economically daunting [17]. Current U.S. defense spending is about $711 billion, about 41% of total world spending. China accounts for 8.2%. If any state wishes to challenge the United States alone, it would find the effort to be quite daunting. U.S. conventional power is so overwhelming that adversaries must seek alternatives to confront the United States, either through "asymmetric warfare" or the pursuit of weapons of mass destruction [18]. Since China cannot match U.S. conventional power, it has an incentive in developing asymmetrical alternatives to deny U.S. advantages, including in space, such as with the development of space weapons. Space is not yet "weaponized," meaning no nation can launch direct attacks from space against other space based platforms (other satellites), or even to the surface of the Earth [19].

As technological advances make space activities more accessible and cheaper, space increasingly becomes an area of dispute among nations. Any state determined to challenge the United States will have to counter the advantages granted to it by its space assets, including possibly the resort to military means [20]. These states may seek asymmetrical tactics to limit U.S. space advantages, instead of trying to match U.S. space power satellite by satellite, with the use of space weapons [21]. Therefore the United States' current position of space superiority, like its earthly global primacy, may not be the same in the coming decades.

In January 2007 China shot down one of its aging weather satellites using a missile, clearly demonstrating an ASAT capability. Analysts interpreted the Chinese test as a signal to the United States, a demonstration that China would be able to affect U.S. military effectiveness by destroying its space based advantage, and an incentive to reconsider any intentions in weaponizing space and triggering a space arms race in its pursuit of preserving U.S. space superiority [22]. There are indications that China has also been seeking other means of limiting or even denying U.S. space advantages, researching ground based lasers and other energy weapons, and electronic jammers capable of affecting American satellites [23].

Many analysts debate if China's testing of space weapons capabilities is an inevitable response to the United States and an inherent dynamic of great power competition. China's counterspace programs are linked to its objective in limiting the United States' superiority in conventional forces, especially air force and naval forces which operate in China's vicinity [24].

The United States' concern over its primacy extends to its favorable position in space, and of possible challenges to it, reflecting the concern of a return to great power politics in the near future. The choices the United States make now in space may help it to secure a long term favorable position or risk an acceleration of competition with potential rivals. American initiatives in space would seek to establish firmly U.S. space advantages and contain an adversary's emerging space capabilities that would allow it to challenge U.S. primacy more easily [19]. Some notable developments indicate the United States' interest in preserving its space superiority, such as the United States' own ASAT test in 2008, with the launch and testing by the U.S. Air Force of the X-37 unmanned space plane in 2010, 2011 and 2012, whose mission is classified, raising suspicions and concerns over its military applications [25].

The use of missiles to destroy satellites, the only currently proven ASAT capability, if ever employed widely, would create a large quantity of space debris [22]. As space debris orbits the Earth at extreme velocity, it endangers other satellites and manned space missions. Even the smallest piece of debris can cause great damage. A hit by a small fragment, even centimeters long, has the potential of seriously damaging satellites and other manned spacecraft [26]. Space debris itself is already a threat and can become a greater threat with the unrestricted use of certain space weapons.

Since space debris threatens and can harm all space-faring nations' satellites, including the nation that decides to test or launch