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US-China Space Warfare: Implications for Pakistan

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Abstract

In the contemporary world, there are no areas left where competition among states is not underway especially in international politics where global powers have always been involved in pursuing national interests. Same is the case with the area of Space where states are trying to dominate each other by increasing space capabilities and technological advancements. It has resulted in the mounting rivalry between United States and China in space which has grave implications for many countries especially Pakistan. The study will shed light on US-China space strategies and tactics against each other to dominate space. The study further aims at exploring the consequences of the increasing pace of space militarization including anti-satellite systems and space-based intelligence systems for Pakistan's national security/defense, defense policy, and regional stability. As a country that develop space ambitions and is close friends with both superpowers especially China and having a tense relation with the US, Pakistan is now in very difficult space to maneuver in this new game. In this respect the study insists on the search for vision conceived as more realistic but capable of providing the basis for the definition of a strategy that can be instrumental for the national interest, the development of technology and stability in the region. By doing so, some of the risks inherent with entering this new environment will be mitigated, and other possible opportunities in the environment will be taken.

Introduction

New military tools and weapon systems were recklessly invented during the twenty first century to maintain and even gain the competitors as global powers relaxed measures regarding the exploration of extra orbital space. At the forefront of such a state of affairs is the United States from the Western perspective and China on the other end of the eastern side and as is evident the two countries are in a close space race. It is manifested by new creations of Anti-satellite (ASAT) weaponry, communication satellites and space observation systems. However, this competition is not only a high-tech power confrontation—it is the militarization of space, the possible Keynesian shift in the balance of the system of international relations and international security (Johnson-Freese, J. 2016). However, for states that constituted just a middle weight in the international system especially south Asian states such as Pakistan, space race had the possibilities of giving a most profound waves of change. Therefore, the US China space competition can be viewed as positive and negative factors for Pakistan that seeks to develop its own space capacity in the specified region – one of the important epicenters of the international space expansion. On the one side the militarization of space is a large threat for Pak as the area and country is under pressure, and as more corporations leverage satellites for dependent protective measures. As regards, its Cooperative relationship with China brings different outlook to its role in this emerging

environment while the vague strategic partnership has provided a certain complexity to Pakistan's role with United States in this regard. At the same time, Pakistan might find cooperation with China very advantageous for the latter provides technologies and strategies but this may always pull Pakistan into the America, China kind of relationship (*Ahmed, R. 2023)*. But these two worlds are not separate and as a result for Pakistan to operate in this challenging context it will have to guarantee a progressive, watchful, and coordinated approach to space policy and security. While comprehending the big picture of the American-Chinese space competition; Pakistan has the further option that can form its national interests, elevate its technological determinacy, and may reasonably contribute to the formation of the order within its region and the world (*Khan, S. 2022)*. This research work intends to discuss these matters with a view of estimating how the state of Pakistan can position to expand its influence in the international space regime as competition between the two super power intensifies.

Theoretical prospective

As it is observed more frequent and intense combat operations in space and the growing rivalry between the US and China on space issues constitute threats to the international security. Realist theory says that this competition is unavoidable because world structure is anarchy so states have to look for their own self-interested returns, power and existence. The dispute between US and China is also signifies the power relationship of the world associated with supremacy of space is thought of as the key to supremacy of a technologically superior power. This competition is a monumental problem for such nations as Pakistan which can be located in the middle between world's giants. As such, in realist theory, the space is viewed or analyzed as an operational theatre that is analogous to the land, sea or airspace with a continually shifting balance. As the global powers like the United States and China compete for dominance in space to aid their military force development and overall economic advantage, the smaller countries and especially those of the South Asian nation have boon and bane as they experience the militarization of outer space. Realism says that security becomes the core drivers of decisions that are why it aligns risks and opportunities related to the development of space systems with military applications. These realist dynamics about space power are thus important to understand for Pakistan, a country wishing to be considered a space faring state to protect its national security, develop its space technology and adapt to shifts within the new space order in the making at the international level. Thus, realist intent to militarized space then can be viewed as an attempt to strengthen the state power acquisition and to gain advantage. Therefore, for the United States of America as a super world power and a militarily powerful nation, control of space is inevitable. As through ASAT weapons and space-based missile defence systems and as through resilient satellite networks the US seeks to solidify its role in space. This showed that there is an understanding that the space is a significant operating environment and that dominance gives one of the greatest assets in negotiating power relations in the world. However, the Chinese progressive extension of space technology as a threat to the US supremacy in space puts the US under pressure, to make strategic move; for the new environment threats. In this context, space becomes industry of innovation as well as a strategic and defended environment for the security and position of the country in the world scale (Waltz, K. N. 1979). The modern China as the potential space power realizes space in the context of ascent to the leadership of the post-American world. Its space strategy as an independent industry is to challenge the US dominance through encouraging actions that would disable or neutralize American space assets. China aims to make the U.S. go back to Elementry & Secondary Education level concerning ASAT systems, Space based missile defence and Intelligence, Surveillance, Reconnaissance (ISR). From the realism point of view, China aims at developing the technology in space as that of USA, and establish a new stratagem where china enjoys the similar or dominant power. Therefore, China seeks to raise its influence and leverage in the international sphere while

also making sure it would have a stock of elites to to counter any military operations by the United States in the areas relevant to China (Waltz, K. N. 1979). Pakistan's role in these new dimensions of space competition between US and China is quite unclear. In fact, like any other country, Pakistan should act according to its national interests and the only thing that Pakistan can do is to do things that safeguard state when the international system is gradually turning into being more unsure and cut throat. Pakistan has long depended on China as its most formidable strategic partner; no matter the situation Pakistan has experienced with its eastern neighbor India, or the more severe Cold War like rivalry between the US and China. But after the competition of space between two super power, the question being arise before Pakistan how to balance this relation. Again, the interests put forward by realists are that the major interest for any state is security and in this light the carving a new strategic angle in the emerging relations between Pakistan and China can be seen (Cheng, D. 2021). On the positive side due to relations with China Pakistan Got the facilities of advance space technologies Satellite Communication Navigation and Surveillance which are basic requirements of Most of modern age Defense Systems. This paper looks at how through the CPEC and Many other factors Pakistan has improved its Space infrastructure and also has successfully launched the Pakistan Remote Sensing Satellite (PRSS-1). Besides this it also provides an excellent opportunity to not only spare Pakistan and Pakistanis from subservience to the western countries for the state-of-art technologies but also creates the ground for strengthening of the Pakistan space program. In this respect, realist theory of course, teaches that such formations are of immense utility of otherwise the other side benefits from resources, technologies, arms, and other aid which improves Pakistan's security against threats in the region (Sagan, S. D. 2017). Realpolitik also strongly discourages dependency upon a particular partner — a colossal power as demanding as China. Pakistan is now more striving to advance its space programs commensurate with its strategic goals; these endeavours suggest substantial Chinese engagement Prime facie the enhancement of Pakistan's space ambitions might pose a threat of confrontation with Washington because of China's backing for Pakistan's space endeavors that the U.S deemed as inimical to its strategic interests in South Asia and the Indo-Pacific. It might consequently put further pressure on Pakistan—diplomatic and economically—to restrict its space cooperation with China; a move that slows down its other foreign agenda. From a realist point of view, Pakistan should use considerable diplomacy while dealing with this ally so as not to get dragged into this superpower's confrontation (Sagan, S. D. 2017). To these challenges come four characteristics of the space militarization specifics in the area that add pressure to Pakistan's strategic angle. In addition, India, the second largest regional power, has been making great efforts on investment in space tech in addition to military purposes. The recent occurrence in the South Asian space arms race was registered in 2019 when India practiced newly developed possibilities testing ASAT weapon. Regarding Pakistan this development constitute a direct security concern as India's space capabilities in the field of communication, reconnaissance, and navigation augment military capacity and geo-power (Cheng, D. 2021). Therefore, there are pressures on Pakistan to improve their own space systems to prevent India setting its technological goals. Consequently, since the world is a system of states anvil, Pakistan in the context of South Asia can not rely on the space power of other states.as has been putting substantial effort in the space technologies for military uses. India demonstrated its ability to increase the pace of the race at the regional level in 2019 when it tested an anti-satellite (ASAT) weapon (Sagan, S. D. 2017). For Pakistan, this development poses direct security threat since India's capability in space communication, surveillance and navigation makes its armed forces and overall muscle power enormously stronger. In turn, Pakistan is being forced to try to develop a native space program to counter India's technological progress. In this case, from a realist point of view, in a continent such as South Asia, which seeks constantly to gain power, the Pak must increasingly develop its own space technologies gest regional powers, has been undertaking considerable efforts on investment in

space tech with besides its military uses (Khan, S. M. 2020). The most significant event in the South Asian space arms race happened in 2019 when India demonstrated new abilities testing an ASAT weapon. For Pakistan this development poses a direct security problem as Indian space capabilities in communication, reconnaissance and navigation expand military capability and regional strength. As a result, there are demands on Pakistan to enhance its own space systems to counter India developing its technological agenda. From a realist viewpoint since the world is a power play, Pakistan in the context of South Asia cannot rely on the space power of other states.as been making significant investments in space technologies with military applications (Khan, S. M. 2020). India's successful test of an anti-satellite (ASAT) weapon in 2019 was a key moment in the South Asian space arms race, signaling its growing capabilities. For Pakistan, this development poses a direct security challenge, as India's advancements in space-based communication, reconnaissance, and navigation significantly enhance its military effectiveness and regional power projection. In response, Pakistan is under pressure to advance its own space program to maintain a competitive edge against India's technological growth. From a realist perspective, in a region like South Asia, where the balance of power is constantly shifting, Pakistan must focus on strengthening its own space technologies. This is how, in today's steadily increasing competition one has to protect its security and to remain independent on the military level (Khan, S. M. 2020). At the regional level in Pakistan, the contestation of the United States and China defines the contribution of the country to space law. USA and China on the other hand still contest for superiority in the international space organizations and treaties that will in most instances put Pakistan in a rather compromising post. The United States has long aimed at retaining American control over space by both constructing the international legal architecture, while China has pursued parity among the international system in relation to American efforts to manage space. According to realist perspective once again Pakistan will be involved in these talks in accordance with Pakistan's security interest and to further the cause that space should remain free and open for cooperation and not turned into a war fighting front. As sorted in the UN mechanism especially within the framework of the COPUOS, Pakistan itself can indicate to the international society on proper and improper use of space resources. It is in consonance with Pakistan's general strategies on the international straight for a safer and less unstable world (Waltz, K. 2019). Realist perspective also pays so much emphasis on the grounds that the portfolio of strategic partners should not be limited to a certain partner. While the relations with China are strategic as Pakistan supplies technology as well as security the readers are encouraged to diversify Pakistan partners in the region and the rest of the world. It may include entering into personal relationships with other countries of the South Asian region as well as other parts of the world in space cooperation projects, and engaging in space related projects in an effort to build up its own space program. The issue is that the diversification of partnership would make Pakistan free from overstressing of its position between US and China and give independence at the same. Thus, it is more necessary for Pakistan to be defensive of its interest but more opening regarding the world relations and future and more opening regarding operational space (Waltz, K. 2019). The final and last from the realist perspective is the fact that Pakistan's emergent space ambitions must be put to productive political and civil use. Space technologies for economic growth: The agricultural, environmental, and disaster management sectors are arguably the most likely to gain greater value from space expertise in the regions. In conclusion, technology investment for development and defense front can help Pakistan to solve several problems at one go, provided they are investment with dual use. Space militarization has to be plausible, balanced and must address both its protection and requirements for development necessary for the consolidation of the strength and security of the country which is Pakistan (Waltz, K. 2019). Hence, the intensification of rivalry in space between the United States and China challenges and provides potential for Pakistan. In a more subtle manner, but in tune with change in the global environment particularly in relation with the emergence of new

powers a realistic approach towards the management of its foreign policy, Pakistan has to guard its national security and the country should not allow itself to be dominated by any power through maintaining capability of its space program. Some of these steps are strengthening technological potentials, searching for more diverse cooperation, actively participating in making norms of space usage among the world countries – these are the ways Pakistan can contribute to the construction of the new spatial order. Given that the above trends grow military and contestation of the space, the role of Pakistan in responding to these changes will be crucial for protecting its interests, enhancing and developing technologies, and taking up a more comprehensive global role.

U.S. Strategies in Space Warfare against China

Recently the United States and China are fighting each other to over power in space war and its domain is now one of the chief features of world politics. Technological superiority is the primary method of risk reduction for USA in these areas which are critical to the mission capability of future combat forces including satellite communication, surveillance, targeting, and position fixing. Since the Start treaty China has progressed in space technology, related options in USA have grown like ASAT weapons, satellite protection and so also, missile defense. An important development of the current US operating concept is the use of ASAT weapons to deny proactively adversary access to space. Kinetic or missile-based ASAT systems and non-kinetic or cyber ASAT systems are all of them which USA has unveiled with the aim of targeting China's satellites. Indeed, new technologies in space had made new missile defense systems including interceptors and lasers essential against the Chinese missile threats including hypersonic glide vehicles and other missiles that decouple conventional systems (Johnson-Freese, J. 2016). Besides, the protection of space assets, the United States has goals in the context of satellite protection as well. This include capability that relate to the ability to send satellites into space that can hardly be threatened. But can be in the low earth orbit, there are lesser and in larger numbers thus would be difficult for china's asat weapons to target. Which would provide U.S a safer and more flexible space architecture. AI and Machine learning are also used as part of these measures too. AI integrated satellites also contain modem opportunities of threat systhesis and/or decision making possibilities on the ground which also increase operational flexibilities and decreases operational manpower requirements (Johnson-Freese, J. 2016). Further, the United States have had formal plan which is referred to as space domain awareness or SDA under which the artifacts in space are closely watched. This becoming more saturated but more so potentially hostile, means that the protection afforded by SDA cannot be overemphasized when it comes to American space property. In other words, if the Americans keep vigilance to China's hostile acts in the Space domain, the momentous response will be produced for those acts (Moltz, J. C. 2019). Furthermore, until recently, the U.S has not formally restricted space as a warfighting domain as it officially did in the creation of the United States Space Force in 2019. This new branch of the military is to regulate, organize, equip and prepare citizens in order to defend space assets in the United States and its allies where threats such as China and other miscreants come into the picture. As the U.S partner of the USSPACECOM, U.S. Space Force is responsible for planning and executing space protective actions to ensure the nation is prepared for an actual space protective situation. By adopting space warfare as a countering form of strategy alongside focusing on space situational awareness America is ready to mitigate Chinese space threats while at the same time helping to make space better. It also means that space-based missile defense systems, and the stress laid on Space Environment Surveillance, afford opportunities for a swift reaction to any Chinese attempt at interfering with American operations in space (Moltz, J. C. 2019). The third important factor in the U.S. policy is collaborating with the other countries which are to have the similar concerns about the space security. Understanding that space security is more and more global problem the USA has engaged in efforts of improving relations with countries that might be useful with regard

to counterbalancing China more effectively. The NATO has also been a major participant in this process, while the United States was the first to integrate the space into NATO's analysis of an attack threat. During the combined maneuvers and technologies share NATO members work together to enhance space anti-missile systems, to monitor possible space threats and to prepare coordinated reaction to any Chinese space provocation. The U.S has also stepped up interaction with members of the Quadrilateral comprising of chemical analysis of the U.S, Japan, India and Australia for enhancing space security in the Asia-Pacific region. On space, as on other fronts, Quad members concur on an open, rule-governed Indo-Pacific; they cooperate on space tracking, intelligence, and countering China's uses of space (Moltz, J. C. 2019). In addition, there are the relations with NATO and among Quad countries: USA, India, Japan and Australia and newly AUKUS which unites Australia, the United Kingdom, and the United States. Despite starting with the nuclear submarines, the cooperation is gradually expanding into a more general space domain. This trilateral relationship brings a better space surveillance system, fosters more development of technologies and better coordination on the emerging challenges presented by china in space. The U.S. also spearheaded the Artemis Accords that is a structure of how the countries should behave when exploring space. With the Accords, the U.S aims at preserving cooperation in areas such as lunar exploration, space infrastructural development and other peaceful space operation, denying China which has refused to ink the agreements. Artemis Accords are central to the formation of the governing structure for space, codes of conduct for responsible behaviour in space and liabilities, and have the benefit of containing China's belligerent space ambitions and promoting utilization of space for peaceful purposes, while Americans are being led to believe that the US is leading the charge for peaceful space development (Weeden, B., & Samson, V. 2020). Apart from these partnerships, the U.S. has tried to lesser long-term effects of decision-making in global legal and regulatory systems of space with its own interests in mind. The U.S has been clear in supporting the successive of the Outer Space Treaty (OST) which forms the base of space law proscribing the launch of nuclear weapons into space and working to limit space militarization. But the U.S. is also striving to make an enhancement of the provisions that all states, including China, act responsibly in space. In this respect, the US has stepped up efforts to encourage the formation of new treaties and agreements that will regulate the possible military utilization of space in order to avoid an arms race in this environment and possible conflict. Through enforcing of these norms, the U.S. aims at making space a free, open environment of cooperation and challenge, not war (Weeden, B., & Samson, V. 2020). Therefore, based on sexay analysis, the United States space warfare strategy against China is comprehensive and four-pronged approach, technological, military, political and legal. The U.S. has spent a lot on advanced space assets and technologies like ASAT weapons, missile defense architectures, advanced constellation and AI enabled operations to continue to dominate space. Moreover, space warfare has become rather officialized, due to the formation of the United States Space Force and Space Command. The U.S., therefore, is partnering with NATO and other Quad, AUKUS and other global partners to confront China's Space aims. On that account, by setting standards and controlling and shaping different norms to tackle and prevent the escalation of conflicts in outer space, the United States strives to maintain the peace, and stability of the space to encourage exploration, as well as to confront and limit China's military domination in space. In that vein, the need to keep on adjusting more strategies as the race to space intensifies will be a pivotal factor in the US retaining its superior position in space warfare (Weeden, B., & Samson, V. 2020).

China's Strategies in Space Warfare against the United States

In the last twenty years, the Chinese have especially ramped up the Space power, meaning that china poses as a great threat as the US in a Space war. As space is getting more important to military, economic and strategic force, the Chinese military representatives view space not only as

a part of the conventional war, but as the specific sphere, in which China can trophy to the U.S. Chinese strategy to wage the space warfare against U.S is multifaceted plan which incorporates both technological and strategic operations which are mainly targeted at dismantling the US space systems as well as reducing the US weakness. These efforts focus on three main areas: counter-space capabilities, space infrastructure development and apart from these militant strategies to counter space powers (Li, X. 2022). The counter-space, or anti-satellite (ASAT), capabilities constitute an essential part of the Chinese strategy of warfare in space. Knowing how much and how the current U.S. military depends on space support for communication, navigation, surveillance and missile shield, China has progressed well in technologies to neutralize or utterly eliminate American satellites. This is not just a technological aim, but a strategic one, the purpose of which is to make it impossible for the USA to carry out its activity in outer space without considerably threatening its own existence. Another important aspect of Chinese approach in this area is related to creation of anti-satellite (ASAT) weapons that are aimed to derogate essential American satellites. China has tested various types of ASAT technologies- active and passive both, kinetic and non kinetic. The kinetic ASAT weapons like; grounds based missiles and direct-ascent space systems are capable of attacking and effectively eliminating satellites in LEO. In 2007, China created a stir by shooting down one of its dead satellites with a ground-based missile and warning the United States and the world about its capacities for such an action. Since then, China has further advanced its missile systems and has made modifications aiming at enhancing the destructiveness to satellites in LEO that the enemy possesses (Li, X. 2022). China has been building up kinetic weapons, but China has also focused on developing other potential non-kinetic systems, which include using cyber-attacks, electronic warfare and directed-energy weapons in the context of their Anti-Satellite (ASAT) system. Space capabilities, as part of cyberspace capabilities, may enable China to spoof or immobilize U S satellite systems by attacking the software and communication links. Despite their nonlethal targets, directed energy weapons such as high powered lasers can blind, or harm satellites and effectively put them out of order. These are useful as non-kinetic approaches because China does not need to destroy US space-system since they can cripple them without attacking for direct confrontation. By growing ASAT systems, China wants to show that American space assets can be threatened hence preventing its armed forces operation. This means neutering of the use of satellites important to the US military since they have a key role in providing both orientation, reconnaissance as well as communication (Li, X. 2022). However, besides countering-space China is also developing space-based missile systems for defense that can intercept and provide destruction to missiles even those targeting it space vehicles are being developed. Despite being nascent, these systems are part and parcel of the Chinese broader concept of anti-satellite defense against kinetic and non-kinetic threats. China has been working on the missile threat from space defense through use of different satellites that include sensor as laser carrying satellites to detect and intercept ballistic missile or other dangers to China's space programs. Thus, by placing such systems in space, China bolsters its defense, it is no more an open invitation to the American missile defense systems or space-based attack on its satellites (Hitchens, T. 2021). On the parallel columns, China has been steadily developing its space environment boosting the powerful satellite systems used for communication, reconnaissance, meteorological and navigation purposes. Their main objectives are mainly to decrease the reliance of China on overseas space resources especially those held by the United States and further advance China's space ability to carry out its self-organized operations without constraint by US technological control. Among all the space-based facilities, BeiDou Navigation Satellite System (BDS), which could be referred to as Chinese GPS, is one of the largest and most important. BeiDou was accomplished in 2020, and China obtained independency in general navigation services, which can help cut reliance on the American satellite system. This is especially valuable for military, as maximal accuracy of positioning is critically important for

contemporary armed conflicts (Hitchens, T. 2021). China has also developed a large number of communication satellites to achieve military management, monitoring and timely transfer of information and intelligence. That way, China acquires reliable protection for its satellite networks controlled internally, thereby avoiding the influence by the U.S. in its communication and military capacity. Besides, China has also launched high throughputs satellites that ensure high transmission rates required in today's warfare information sharing. The PLA is especially interested in the improvement of its orbital systems and electronic reconnaissance system, which are important in acquiring information on enemy projects, selecting targets and command of warfare operations. These satellites are capable of tracking activities of the American military, this comprehensives troops mobilization, naval movement and missile launches among others. Some of china's higher resolution earth observation satellites can even compete or even outcompete the us reconnaissance satellites with technologies they have like SAR and Optical imaging for large areas of the world and sometimes even in real time (Hitchens, T. 2021). China is also undertaking space-based surveillance in the developments of space-based missile warning that can track missile launches. These systems afford essential information for China to provide timely threats from counts or countermeasures to a possible U.S. missile attack. China through increasing it prowess in surveillance not only improves its defense posture but also erodes the unique assets which the U.S. has had for decades in space. However, China is also using the latter [space program] to create soft power and improve its standing within the international community. China's Chang'e lunar exploration program has been another major development in this preparation with a recent addition to it the Tianwen Mars mission that put China out there both technologically and internationally in the space exploration field. The accomplishment of these missions serves as an indication that China is an emerging space power thus enabling it form space cooperation with other countries. Although such space exploration endeavors can be best explained as part and parcel of China's military and technological strategies, they also place China at the forefront of the agenda-setting regarding the future of space regulation (Pollpeter, K., Anderson, E., & Klein, J. 2020). In the context of its larger attempt to rival the United States in space, China is now adopting guerrilla war strategies, using its comparative advantage to compensate for its comparative disadvantage. As such, asymmetric warfare means that China will employ strategies basing on ways of defeating the U.S. without necessarily having to challenge the U.S. space power with an equal technological investment or by openly challenging the U.S. The seven elements of China's asymmetric strategy include: the inner space, outer space, EW attack on satellites and ground stations, sabotage of space facilities or space debris, cyber warfare on space assets, and hacking of space networks. China has created tremendous cyber-power; thus, they may install malware to destroy the satellites, disrupt satellite signal, and alter the software of the space facilities belonging to the United States. In this way, China loses the capability neither to wage an intense space war by physically damaging or destroying satellites belonging to the United States of America but is capable of rendering the overall space capability of America rather ineffective by conducting cyber warfare on the satellites of USA. These attack can be direct against satellite communication networks, against the ground control systems and other components to make the U.S satellites useless or even dead (Pollpeter, K., Anderson, E., & Klein, J. 2020). China has similarly advanced EW applicable to interrupting the electromagnetic domain employed by the US satellites. With these capabilities, China can intercept, deceive, degrade and attack USA satellite communications, positioning and surveillance information making the USA military operation blind. Specific emphasis has been placed at jamming the GPS satellites of the US military which play vital roles in navigation, aim and synchronization of military instruments. China, for instance, though it lacks the raw space war fighting capability to match the U.S., has made a conscious effort to cultivate a means by which it can selectively and surgically strike space assets. One of such truths is the concept of space-based kinetic strikes that establish attacks from space crafts such as satellites, space launch vehicles and

even space stations on the adversaries' space resources including satellites, launch vehicles or even space stations. Despite such capability may sound futuristic, China has been developing technologies which could allow it to target American space assets with missiles fired from space, as a measure of countering American space supremacy (Pollpeter, K., Anderson, E., & Klein, J. 2020). Getting back to the China's asymmetric approach another significant element is its endeavor for the domination over partners, especially with the help of BRI. Via the BRI China has been funding space infrastructure development across many countries including construction of ground stations, satellite launching, and access to space technologies. These alliances enable China to establish more provinces in the international community, building a system of satellite service providers and communication pathways that, to some degree, can serve the PLA's military needs while bypassing US space systems. In such a way, China not only improves its multiple space devices but also forms a powerful group of space partners who can necessarily support the Chinese side in case of space war. This network could work as an opposite to such American led space unions as NATO or Quad and provide China with significant diplomatic bargaining chip in case of any future space conflicts. China's tactics employed in the war situations to the United States are comprehensive and coordinated to offset a superior American's space power. Through creating new counter-space assets, increasing its space assets, and using irregular warfare techniques, China wants to contain America's space superiority while increasing its own military/sustaining its strategic independence. Challenging rivalry over space capabilities is anticipated for the two powers with enormous ramifications for international security and the character of future warfare. The emerging competition between the United States and China in space will reshape the space governance, security, and technological advancement not only for both countries but for emerging space faring nation of Pakistan and other nations of the world as well.

Implications for Pakistan

Hence, the emerging rivalry between USA and China in the space has become a concern for Pakistan because of the strategic location in South Asia and gradual dependency on utilization of space science. Another important sphere that is being weaponized at the same rate by the two countries is space, inclusive of anti-satellite (ASAT) weapons and space-based signals intelligence creates new threats for the space-reliant states such as Pakistan. Given that space has become a critical component of global security and defense, Pakistan immediately experiences security threats since space capability may be targeted or annihilated (*Gupta, R. 2021)*. Weakness of Pakistan satellites shows how space defense system is important to protect from enemies. Hence, such acquisition can help safeguard basic space capabilities and structures still existing in Pakistan and require investment in protective technologies, multiple backup systems, space vehicle, and ground communication safety. It becomes even more urgent in this connection for Pakistan that both the USA & China tested ASAT weapons recently, which put extra pressure on Pakistan to build strong space technologies (Qureshi, A. 2024). On the other hand, this moderation of space competition provides a Pakistan with the potential for improving its technological sophistication and gaining more pronounced strategic independence. It is fanatically advancing in the space sector especially with the launch of Pakistan Remote Sensing Satellite (PRSS-1). These have been accomplished by developing a more extensive cooperation with China that provides access to innovative space products and knowledge that enhances not only military strengths but the satellite system as well. This collaboration also means that Pakistan cuts on its dependence on its traditional allies, the Western powers, for vital technologies that can bolster its defense and does help in establishing a new space power (Qureshi, A. 2024). But Brent must recognize that it is in close partnership with China, where geopolitical risks are also found. While the US and its allies abhor China, Pakistan's growing space power with Chinese help may find increased diplomatic pressure from the US and its allies. The pro-Saudi bias in the country might also alter its bilateral relations

with the U.S., in terms of military relations, trade and political alliance. To this end, Pakistan will have to balance its strategic cooperation with China, try to avoid over-reliance on a single country and seek for the new partners in foreign policy. This will also help in maintaining independency of Pakistan and protecting its interest in the dynamic world (Qureshi, A. 2024). This paper focuses on the regional implication of the US-China space competition for Pakistan especially concerning with India. Besides, a neighbouring emerging South Asian power and an aspirational space faring nation in its own right, India only amplifies the challenges for Pakistan in a fast growing militarized space domain. The ASAT missile test in 2019 by India has shown the country's advances in space importance and therefore making South Asia a theatre within the space arms race. Such development adds a new dimension to the security dynamics of Pakistan because space technologies are increasingly becoming part of military planning (*Khan, S. 2022)*. Pakistan now exist in a situation where it needs to defend its own space assets as well as to assessment the burgeoning space power of its neighbors. Projected threats of space aggression which consists of aiming satellites in communication, spying, and showing means could further complicate hostility within the conflicting area. Thus, Pakistan has to integrate space into the rest of its national defense framework, with both offense and defense counter space. This is the goal of preserving national space assets while keeping abreast with the rapidly rising importance of space in the military applications of a given region (*Khan, S. 2022)*. However, Pakistan also faces increasing risks at the same time it has a chance to become a responsible player in the international space community. Through the peaceful multilateral forums such as being a member of UN Committee on Peaceful Uses of Outer Space (COPUOS) and supporting instruments aiming at preventing space warfare, Pakistan can keep the trend towards the peaceful use of outer space. Proposing the space diplomacy and supporting the tendencies of transparency and CBM in space may decrease the probability of a conflict (*Gupta, R. 2021)*. No doubt, Pakistan's active participation in the deliberation of regulating space environment and utilizing it for the mutual benefits would not only increase the countries' profile on standard international forums but also would go a long way in maintaining the peace in space and stability in two very sensitive regions of the globe. Thus, it is possible for Pakistan to use its strategic position to contribute to the resolution of the tendency toward militarization of space stem from the confrontation between the US and China simultaneously avoiding space conflicts that destabilize South Asia (*Khan, S. 2022)*. It has also been found that the collaboration of Pakistan with space-based applied sciences provides numeric strategic warfare benefits, however it also has wide economical and development prospects. In addition to the military application the space technologies are used in areas like agriculture, environment and disaster management. The expansion of its space program is beneficial for Pakistan as it will not only help Islamabad to monitor crops, regulate water supply, predict disasters and/no respond to disasters quickly. The satellite technologies are used both for the civil and military purpose and thus let Pakistan overcome a great number of problems in the sphere of development and contribute to its security (*Ahmed, R. 2023)*. Specifically, enhancing specifics of space-based intelligence, surveillance, and reconnaissance (ISR) will enable Pakistan to get a better sight of the regional occurrences by developing its security threat counteraction. The strengthening of these capabilities will also assist the country in building its coping mechanisms against such shocks as climate change and natural disasters as well as enhance the governance of internal and external security threats (*Gupta, R. 2021)*. In conclusion, the paper has showed that the space rivalry between the USA and China affects Pakistan greatly the technological, as well as security frontier, which offered and/or posed to the country at large. As China and the USA are developing their space potentials, Pakistan needs a powerful and quite hiccup-free space program to become immune to threats and act independently. That will occur as satellite defense is intensified, counter space operations are developed and space-based ISR systems are bolstered. At the same time, Pakistan will need to regulate relations with China, as well as in the context of sparing itself criticism, trying

to diversify friendships with other countries while not entirely relying on one or another state (*Ahmed, R. 2023)*. Competing within the frame work of the space race in the South Asian region has own strategic considerations and Pakistan has a particular chance to become a crucial player in the international space community. In this capacity, Pakistan can participate in global initiatives in space, and uphold the principles of the peaceful use of outer space and help lessen the threats of space security threats and foster the security of the region. The concept of space as a domain for military operations becomes more essential with time, the capacity that Pakistan has in this domain will determine the safety of its state, technology, and position on the international arena (*Ahmed, R. 2023)*.

Conclusion

Thus, this space competition between the US and China is one of the subs sets of the emerging rivalry between two super world super powers. The US and Russia have strategic, economical interests on space where they both wish to demonstrate their military might; this has made both countries dedicate substantial resources in endeavoring to attain space supremacy. The United States is focusing more on maintaining a technological edge for its space assets, more so their military space policies and stances, political and military relationships, and leadership in the post-Cold War era space law (U.S. Space Force. 2019). On the other hand, China is still steadily enhancing its technological functions and recently showed ASAT capacities, expanded the space support system, and is using some rather creative strategies to threaten US domination. China concentrating on space based Missile Defense, Cyber Space, Space Weaponization and its dominance of the International Space Law has all positioned the country for Space Environment Modification to deliver the best results. In Pakistan, this emerging more focused US-China space competition is both, the threat and opportunity. Pakistani policymakers and space enthusiasts are trying to determine how the country — a developing nation with its own space agency and friendly relations with China and the US — can find its place in this rapidly evolving and potentially unfriendly space domain. space equipment's laying out pose direct menace to the Pakistani satellites which are so vital for communication, navigation and over powering (U.S. Space Force. 2019). On the same note, relations with China provide geographic proximity based on relatively well developed technologies and space solutions but diplomacy and security comprehensiveness are relatively challenging. Pakistan also has to rethink the strategies for creating its own independent space capabilities, designing how to be engaged in cooperation with other countries and states, how to protect its crucial space facilities against new forms of space warfare. Last, the race to the militarization of space by both the US and China will define the future of space governance as well as stability with massive effects on the rest of the world. The not too distant space race needs development of rules as well as cooperation and precaution against conflicts in the new arena that both countries want to drive. For Pakistan and other nations the challenge of these changing realities and dynamics of power equation was more profound for it required developing sustaining and expanding capabilities for security, statecraft, for translating technological capacities into usable products and for protecting strategic autonomy freedom of action and the sovereign will of the state in the space age.

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