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Still Lost in Space? Understanding China and India's Anti-Satellite Tests through an Eclectic Approach

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ABSTRACT

One of the most notable aspects of contemporary security policy has been the growing interest in counterspace capabilities, including the testing of destructive anti-satellite (ASAT) weapons, by major space powers at a time when space is becoming an increasingly complex strategic domain. In this reconfigured context, the rise of China and India as space powers has a significant impact on overall space security activities and policies. As a result, China and India have assumed crucial importance in debates about space security and military uses of space. This article examines the ASAT tests of China and India that were carried out in 2007 and 2019, respectively, by offering a synthetic analysis that combines structural imperatives, domestic influences, and national identity. It argues that such an eclectic approach provides a more comprehensive understanding of the drivers behind the development and testing of their ASATs.

One of the most important challenges to contemporary security policy in recent years has been the development and testing of kinetic anti-satellite (ASAT) weapons by major space powers, the most recent of which was conducted by Russia in November 2021 that created more than 1,500 pieces of space debris threatening space satellites and operations.[1] With this test, Russia became the fourth state since 2007 to destroy an orbiting satellite, after China in 2007, the United States in 2008,[2] and India in 2019.[3] In this context, the rise of China and India as space powers has a significant impact on overall space security activities and policies at a time when space is becoming increasingly securitized.[4] Indeed, China and India's growing interest in the development of counterspace capabilities has further consolidated the deterministic notion that conflict in space is inevitable.[5] Underpinning this is the emergence of a prevailing space discourse that sees the domain of space as a new battlefield resting on the narrative of a new space race.[6] Such perspectives are enmeshed in views that treat ASATs as "battlefield space weapons" sought

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for their role in protecting space assets and their deterrent effect or their asymmetric advantage that can confer to states less dependent on space vis-à-vis the United States, despite their limited strategic value in relation to alternative terrestrial and non-destructive space-based means.[7]

In this regard, while most analyses tend to focus on national security considerations and structural forces that shape the militarization and even the weaponization of space, this article suggests that this does not adequately capture the complex array of factors that have informed China and India's ASAT tests.[8] Rather than viewing ASAT systems merely as space weapons, it is argued that they are also social objects imbued with multiple values by the possessor states, which requires us to take into consideration the significance of the specific sociohistorical context within which ASATs are assigned meaning. This assumes a wider importance when we consider the recent attempt to delegitimize the conduct of debris-producing direct-ascent ASAT tests due to their harmful impact on the sustainability of the space environment and the space economy, and their possible destabilizing effects on global security.[9] This process of delegitimation has been gaining momentum after the United States pledged not to conduct such a test in April 2022 and invited other states to follow suit and help establish this as an international norm of responsible behavior.[10] Further reflecting this, in December 2022, the United Nations General Assembly (UNGA) adopted a resolution entitled, "Destructive direct-ascent anti-satellite missile testing" that was initially introduced by the United States.[11] Even though 155 countries voted in favor of the resolution, China voted against the adoption and India abstained.[12] Considering these developments, this article argues that if we want to understand why key space powers, such as China and India, acquire and conduct destructive ASAT weapons and assess whether a process of delegitimizing ASATs can produce tangible results, we first need to recognize the multiple ways in which ASATs are valued.

To develop this argument, this article offers a synthetic framework for explaining China and India's ASAT tests that were carried out in 2007 and 2019 respectively. Although the following discussion is empirically orientated, the framework employed here is in line with the research agenda of analytical eclecticism, which suggests that, in order to understand complex real-world phenomena, it is necessary to combine ideas and insights from different perspectives and theories within the field of International Relations.[13] Within this scope, rather than confining the study of China and India's ASAT tests within the boundaries of competing explanations that draw from single analytical paradigms or perspectives normally used in isolation from one another, the key issue here is complementarity premised on a combinational logic that helps us to capture the connections between a wider range of causal factors and processes, and the interplay of different logics shaping specific space policy outcomes. Progressing from this basis, such a

multidimensional framework requires foregoing parsimony and simplicity. Instead, the emphasis is on embracing the complexity and messiness of the social milieu within which space policy actors make decisions by cutting across and integrating competing explanations.[14] Such a multifaceted analysis is all the more imperative because of the usual dearth of information that accompany military space projects, such as ASATs. It is this limited comprehension of the particular dynamics and processes and the need to fill the gaps in our understanding that compels us to resort to a multidimensional framework, which allows for a more rich, rigorous, balanced, and nuanced analysis of complex phenomena in the domain of astropolitics.

It is within this framework that this analysis combines insights from different approaches, illustrating the influence of structural imperatives, domestic politics, and national identity.[15] More concretely, a focus on structural imperatives is in line with the neorealist or structural realist school of thought.[16] According to this view, states are primarily concerned with their own survival and security in a competitive international environment defined by the structural imperatives of international anarchy. Thus, states are compelled to enhance their space power and deter potential threats in space as a result of structural pressures. In this context, structural realists generally understand power, and space power, in terms of material capabilities, especially military sources than other sources of power. As we shall see, although realist insights are useful, we must go beyond the confines of these predominantly state-centric analyses to capture the complex factors that have informed the ASAT tests of China and India. One response is to focus on the domestic level of space policy decision-making that can encompass domestic influences, including the role of individual leaders, the impact of bureaucratic politics and scientific communities, and parochial domestic political considerations. Such a perspective falls within the purview of what has recently been coined Space Policy Analysis, in accordance with an established body of literature on Foreign Policy Analysis that calls for taking into account different levels of analysis, including how domestic factors shape space policy.[17] A focus on national identity draws on the constructivist literature on the study of international relations. As such, it helps to illustrate the role of ideas, norms, history, and how national identity shapes state preferences, perceptions, and actions.

On this basis, this article suggests that when applied to space capabilities, an eclectic approach helps to offer a more comprehensive approach to the drivers behind the development of ASAT technologies by taking into account structural imperatives, domestic influences, and national identity. While some cases can be better explained by one of these driving forces, for the purposes of this discussion, this article points to the importance of multicausality, arguing that it is a combination of structural pressures, domestic political considerations, and ideational influences mediated by identity that help capture the simultaneous existence of a complex array of factors that informed the ASAT tests of China and India.

This article begins with an overview of China and India's civilian and military space activities in order to inform on the broader context in which their military space programs operate. Next comes the application of the eclectic framework to China and India's ASATs, underscoring the insights that such an approach can bring to the study of the military uses of space and space security. Finally, the theoretical and policy implications are discussed, as well as findings and venues for further research.

China's space program

The rise of China as a major space power, largely as a consequence of its meteoric economic power, has been one of the most widely noted features of the current international space order.[18] The idea of China as a major space power began to gain global traction in October 2003 with the successful launch of Shenzhou 5 that carried on board Yang Liwei, China's first astronaut. The successful mission made China the third country in the world, after the Soviet Union and the United States, to send a human into space. However, it is important to remember that the origins of the Chinese space program trace back to the mid-1950s, with the formation of the Fifth Academy of the Department of Defense, a missile research and development organization aimed at building long-range missiles, under the leadership of the famous Chinese scientist Qian Xuesen.[19]

In many ways, China's early interest in the use of space was informed by the same military, political, and prestige considerations that characterized the U.S. and Soviet space programs. In particular, China's nascent space program displayed an appreciation for acquiring space capabilities as a way to strengthen military effectiveness and augment international political prestige during the Cold War. Reflecting the trajectory of the U.S. and Soviet space programs, China's space effort also benefited from its links to ballistic missile projects.[20] Tellingly enough, this period also witnessed a continued interest in human spaceflight, which culminated in the selection of a group of astronauts for training in the early 1970s. However, limited funding as well as domestic political considerations in relation to factional strife led Mao Zedong to eventually cancel China's human spaceflight ambitions by famously saying "We should take care of affairs here on Earth first, and deal with extraterrestrial matters a little later".[21]

Yet, despite the rather limited available resources and the political turmoil associated with the Great Leap Forward and the Cultural Revolution that hindered the progress of China's space program during the Cold War, it is striking that dramatic feats were achieved in space, including the successful launch of its first satellite in 1970, which was later followed by the attainment of other capabilities, such as communications and meteorological satellites. This was made possible thanks to the political and institutional support

provided by Zhou Enlai and others, who protected key scientists and engineers involved in the missile and space programs from the severe setbacks of this politically charged period.[22] In this context, China's space program was closely tied to its military efforts and benefited from its links to the strategic weapons program in the 1960s and 1970s as part of what is known in China as the "Two Bombs, One Satellite" or *Liangdan Yixing* (两弹一星) project. This describes the priority that the Chinese leadership gave to the indigenous development of atomic and hydrogen bombs and the first satellite in the pursuit of technological self-reliance, keeping in line with a top-down, techno-nationalist approach to research and development associated with advanced technology.[23] With the advent to power of Deng Xiaoping, China's space program moved towards prioritizing economic development through the practical uses of satellite technology. In 1986, however, space was identified as a key dual-use technological field that should be nurtured in order to yield breakthroughs in the future as part of the "863 High Technology Plan".[24] This served as a catalyst for the further development of the space program, including human spaceflight.[25]

Since then, it has become apparent that China has pursued its space program with consistency and in an incremental manner. Indeed, China's effort now encompasses the ability to build across-the-board space technologies and their use for a variety of purposes. In this respect, it is not surprising that China's human spaceflight program, known as the *Shenzhou* project, has attracted a lot of global attention, typified by the launch of Shenzhou 5. This was followed by several other human spaceflight missions. Another milestone was achieved in September 2011, when China launched its first space laboratory module, *Tiangong 1* (Heavenly Palace), serving as a test bed for the construction of a larger orbital space station, the basic construction of which was completed in October 2022.[26]

Likewise, China has stepped up its space exploration effort, manifested in a series of lunar missions, known as the *Chang'e* program. Emblematic of this vigorous program was the landing of the Chang'e-4 spacecraft on the far side of the Moon in January 2019, the first ever such mission in the history of lunar exploration.[27] More recently, in December 2020, China successfully completed the Chang'e-5 mission, the first lunar venture since 1976 to collect samples from the lunar surface and bring them back to Earth for scientific study. The complexity of these missions is expected to facilitate the next steps of China's burgeoning lunar exploration program in the coming years, which will involve the establishment of an 'international lunar research station' in the near future. The expertise accumulated from these lunar missions is also seen as a harbinger of future crewed landings on the Moon.[28] Furthermore, in 2021, China launched *Tianwen-1*, its first robotic spacecraft to Mars.

Apart from activities related to human spaceflight and space exploration, satellite and rocket development has also progressed steadily. For example, an

important milestone was the completion of the *Beidou* navigation satellite system in the summer of 2020, China's version of the Global Positioning System (GPS), which now provides full-scale services.[29] At the same time, China continues to deploy and operate several communication satellites, as well as different types of remote sensing satellites with various applications. Progress has also been made towards the construction and operation of new powerful launch vehicles, part of the Long March rocket family, to support China's ambitions in space, while steps have been taken towards the commercialization of its space activities.[30] China has also ramped up the use of space for military purposes.

The military dimension

Assessing the military space capabilities of any state based on open sources is a very difficult task, but this is especially the case about China as a result of the opaque nature of its space activities. That said, there is no doubt that China attaches strategic importance to the use of space for military purposes in the context of its overall military modernization and expansion. To begin with, Chinese strategists became aware of the profound impact of the use of space on modern warfare as a result of the 1991 Gulf War, also known as the "first space war", which illustrated the importance of space assets for the conduct of war at both the operational and tactical levels. Not only did this generate an increasing interest in military space capabilities, but it also led to a re-evaluation of military concepts of operations and doctrines.[31] This shift was reflected in the introduction of the new doctrine of "limited wars under high-tech conditions", with a focus on research and development (R&D) of an array of more sophisticated weapons and technologies in areas, such as electronic warfare, ballistic missiles, satellites, precision guided munitions, early warning and command, communications, artificial intelligence, and others.[32]

A number of factors accelerated this modernization effort in weapons and technology, including the so-called "Revolution in Military Affairs" (RMA), the 1995–1996 Taiwan Strait crisis, the 1999 NATO military operation against Serbia, and the U.S. led operations in Afghanistan and Iraq more recently.[33] Nonetheless, the interest in the utilization of space for military purposes has been accelerated under Xi Jinping. In 2014, during a visit to the air force headquarters in Beijing, Xi stressed the need for the air force leaders "to speed up air and space integration and sharpen their offensive and defensive capabilities".[34] Within the scope of its overall national strategy of military-civilian integration, China under Xi has also prioritized since 2016 the policy of military-civil fusion (MCF) aimed at eliminating barriers, as well as promoting synergies between the civilian and commercial sectors and the military industrial base, with implications for the Chinese space sector.[35]

The growing significance of space was also reflected in China's 2015 defense white paper that identified outer space as a "commanding height in international strategic competition".[36] In December of the same year, as part of reforms of the People's Liberation Army's (PLA) organizational structure under Xi, China announced the establishment of the PLA's Strategic Support Force (PLASSF), with the aim to combine the operation of the space, cyber, and the electromagnetic domains in a more centralized and effective way at the strategic level.[37] This serves to further illustrate the increasing importance of space as well as the need to improve its usage for military operations. The most recent defense white paper recognizes the safeguard of "China's security interests in outer space" as one of its "national defense aims" and that "outer space is a critical domain in international strategic competition".[38]

Plainly, China's global reach requires a national military force with the capacity to operate beyond its immediate periphery, marking a significant shift from the PLA's traditional orientation towards maintaining internal security and protecting continental China to supporting missions at long distances.[39] To this end, over the last years, China has placed emphasis on the deployment of dual-use satellites with a wide range of military functions capable of acting as a force multiplier. As a result, China has made strides in developing a range of space-based command, control, communications, computers, intelligence, surveillance, and reconnaissance (C4ISR) capabilities. In addition to the use of communications satellites, such as the *Fenghuo/Shentong* series, a key aspect of this effort has been the launch of a variety of high-resolution remote sensing satellites, including the *Yaogan, Haiyang, Huanjing*, and *Gaofen* series. As mentioned earlier, China has also completed the *Beidou* satellite network, which will further boost China's military space power.[40]

At the same time, it has been suggested that China has been developing a range of technologies that can be used or have the potential to provide destructive and non-destructive counterspace capabilities, such as direct-ascent, co-orbital, electronic warfare, and directed energy weapons capabilities.[41] Considering the inherent dual-use nature of space capabilities and the opacity surrounding China's military space usage, it is hard to substantiate such claims. Though, it seems that China has not yet moved towards the active use of counterspace weapons in current military operations.[42]

Be that as it may, it is apparent that China has been developing a direct-ascent ASAT program, as its 2007 test demonstrated, which is discussed in detail below. Suffice it to say that since 2007, China has carried out a number of other known or suspected non-destructive direct-ascent ASAT tests.[43] The most noteworthy of these was the launch of a rocket in May 2013, which is believed to have reached an apogee of around 30,000 kilometers (km) using a new ASAT weapons system, capable of attacking targets in medium or high earth orbits.[44] Recently, it was also reported that China has operationally deployed at least one of its direct-ascent ASAT systems and that some training

with anti-satellite capabilities has started. But although this is plausible, it is again difficult to confirm this based on information available from open sources.[45] Of significant note is that China has been testing an experimental uncrewed spaceplane that bears resemblance to the U.S. Air Force's X-37B, but little information is available.[46] Furthermore, in 2021, it was reported that China tested a new capability that is thought to be akin to an orbital bombardment system, but as yet little is publicly known about it.[47] Nevertheless, one state that has been paying close attention to China's military space capabilities in particular and its space program more generally is India, to which I now turn.

India's space program

The comparative historical experiences of China and India concerning space technology could have hardly been more different. Like China, India has one of the oldest space programs that was formally established in 1962 with the formation of the Indian National Committee for Space Research (INCOSPAR) and the subsequent launching of the first Nike-Apache sounding rocket from the Thumba Equatorial Rocket Launching Station (TERLS) in 1963. However, the origins of India's space program can be found earlier in India's participation in the International Geophysical Year of 1957–1958 (IGY).[48] Briefly stated, the IGY was a major international scientific endeavor covering geophysical activities, which was largely an embodiment of scientific internationalism and cooperation, and it contributed to the advent of the Space Age, exemplified by the launch of Sputnik in October 1957.[49] Prominent Indian scientists, such as Vikram Sarabhai, played an important part in planning and implementing key IGY activities, and it can be argued that this engagement acted as a catalyst for what would eventually become India's space program under the leadership of Sarabhai. In many ways, therefore, India's nascent space program owned much to the efforts of the Indian scientific community and its involvement with the IGY.[50]

Another equally important aspect of India's space program has been an emphasis on the civilian uses of space for development. In contrast to the experience of other space powers, such as China, from the outset, India's space program was largely driven by developmental and socioeconomic priorities, epitomized by practical applications, such as communications, meteorology, and remote sensing.[51] In this regard, despite limited resources, Sarabhai was influential in articulating a vision of India's space program that highlighted the social and economic benefits that could derive from space technology and its applications tailored to the needs of a developing state.[52] Couched in a language that associated technological advancement with progress and modernization, Sarabhai's vision was shared by many of his colleagues and contemporaries, and it was in line with Nehru's own enthusiasm for science and technology, which

meant that the much-needed political support was offered.[53] In this way, space utilization was also seen as a national scientific venture that could enable India to join the club of technologically advanced countries on its own terms and as a marker of nation-building and prestige.[54]

It was against this backdrop that India began to develop a series of space applications in the field of telecommunications and remote sensing, supported by the simultaneous acquisition of indigenous launch capabilities. This was evident in the Indian National Satellite (INSAT) system, which was established in 1983, and the Indian Remote Sensing (IRS) satellite program, which became operational in 1988. Oriented towards human security and development, these systems have been crucial in key applications, including tele-education and telemedicine, disaster monitoring, meteorological observation and forecasting, and management of natural and earth resources, including water, fishery, agriculture, and forestry.[55]

Even though India continues to stress the value of space assets for developmental and socioeconomic purposes, one of the most noteworthy changes in recent years has been its shifting focus on space exploration, which seems to mark a departure from its past activities. In this context, India has achieved a series of remarkable feats, including the launch of its first lunar probe called *Chandrayaan-1* in 2008. The success of the mission prompted the Indian Space Research Organization (ISRO) to move forward with other space exploration missions, with Mars seen as the next logical step, taking cues from what other space powers have done before.[56] Interestingly, there is evidence to suggest that India's Mars plans were speeded up in part because of the unsuccessful Russian-Chinese Phobos-Grunt Mars mission in November 2011.[57] Eventually, on 5 November 2013, India launched the Mars Orbiter Mission (MOM), also called *Mangalyaan*, making India the first Asian country to reach Mars. Indicative of India's ambitions in space, on the occasion of his Independence Day speech in August 2018, Indian Prime Minister Narendra Modi announced plans for the country's first human spaceflight mission. More recently, in August 2023, India achieved a soft landing on the lunar surface with its third lunar exploration mission, *Chandrayaan-3*,[58] and a week after it launched *Aditya-L1*, its first space-based observatory to study the Sun.[59] Meanwhile, India has also stepped up the commercialization of its space activities.[60]

The military dimension

Although India's growing focus on space exploration and human spaceflight missions has added a new component to its space program, it is also apparent that this has been accompanied by a greater interest in enhancing its military space power. Despite the fact that India has not issued a national defense strategy or something equivalent to date, in the last few decades, each of

India's military services have published single service doctrines with mentions of the role of space-based assets. However, illustrative of this increasing focus on military space, the 2017 Joint Doctrine of the Indian Armed Forces devotes exclusively one paragraph on space power, anticipating that space will become another medium for military activities in the future and stressing the growing significance of space as a force multiplier for the Indian military. It also notes that 'leveraging space power' would involve safeguarding India's space assets and utilizing space 'to enable defense capabilities across the conflict spectrum'.[61] Elsewhere, the document recognizes operations in the domain of space as part of an emerging triad, together with cyber and special operations, that need to be integrated at the strategic, operational, and tactical levels through the creation of integrated strategic structures. Likewise, it highlights the critical role of space for intelligence, surveillance, reconnaissance, navigation, and communication, as well as network centric operations using satellites.[62]

Undoubtedly, the most visible display of India's shift towards the military uses of space took place in March 2019 when India carried out its first ASAT test considered in detail herein below. Beyond the 2019 ASAT test, India has also taken other steps that serve to illustrate the growing importance of the military uses of space. For instance, ISRO has launched a series of Earth observation satellites with dual-use applications on which the India's military depends as a force multiplier, such as the IRS and CARTOSAT series of satellites. This is explained, in part, by the fact that the 1999 Kargil war exposed to the Indian forces the inadequacy of the existing constellation of remote-sensing satellites to provide effective surveillance and early detection of hostile incursions.[63] The completion of the Indian Regional Navigation Satellite System (IRNSS) is also important as a force multiplier.[64] Further, in 2013, ISRO launched Geosynchronous Satellite (GSAT)-7, the first dedicated military communications satellite, increasing India's navy surveillance capabilities, followed in 2018 by the launch of GSAT-7A to be used mainly by the Indian Air Force. ISRO also launched the country's first Electro-Magnetic Intelligence Satellite (EMISAT) in 2019 aimed at enhancing the Indian Armed Forces ability to detect and intercept signals transmitted by enemy radars.[65]

Another indication of the greater military role of India's space program has been the effort to integrate space into military operations in line with the Joint Doctrine discussed earlier. For example, in 2010 the Integrated Space Cell was created under the command of the Integrated Defense Services (IDS) Headquarters of the Ministry of Defense as an organization to integrate the three services of the Indian Armed Forces (army, navy, and air force), the Department of Space, and ISRO.[66] More recently, India established the tri-service Defense Space Agency (DSA), dedicated to dealing with space-based threats and enhancing military space power through counterspace capabilities. The agency will receive technical and research support from the newly created

Defense Space Research Organization (DSRO).[67] It is possible to argue that these organizational changes indicate an interest in the use of offensive counterspace capabilities, but it is too early to say how this will evolve.[68]

Moreover, India has signed an agreement with the United States that will allow for access to U.S. satellite data, which will help India to augment the accuracy of its weapons, such as missiles and drones.[69] ISRO has also initiated 'Project NETRA (Network for Space Objects, Tracking, and Analysis), an early warning system that is expected to contribute to the protection of India's space assets by improving its space situational awareness capabilities.[70]

Eclectic approach: The case of China's 2007 ASAT test

On 11 January 2007, the PLA successfully tested a direct-ascent kinetic kill vehicle launched from the Xichang Satellite Launch Center that destroyed a defunct *FengYun-1C* (FY-1C) Chinese weather satellite, making China the third state to carry out such a test. Remarkably, not only was the test at odds with China's traditional international stance against the weaponization of space, but it also generated a large cloud of space debris that could pose a threat to the space assets of other states. As such, it drew much international condemnation. The test engendered a debate about the possible motivations behind it, providing a useful case study for an eclectic approach applied in this analysis. Unsurprisingly, many analysts have provided explanations for the 2007 ASAT test that are in accordance with the importance attached to structural imperatives. For instance, building on offensive realism, Tellis argues that the Chinese decision to carry out the test was driven by strategic necessity as part of China's broader strategy to counterbalance U.S. military space superiority through asymmetric means, such as counterspace capabilities. According to Tellis, therefore, it makes strategic sense for China to exploit the growing dependence of the United States on space-based military assets as a potential "Achilles Heel" through ASAT capabilities, especially in the context of a future Sino-U.S. conflict over Taiwan.[71]

Likewise, for Lieggi and Quam, China's ASAT program reflects an effort "to avoid a space arms race by having an effective deterrence to potential offensive actions by the United States".[72] As such, China's interest in building counterspace capabilities can be seen as a response to perceived Chinese threats to national security deriving from U.S. plans to move on with the weaponization of space.[73] At that time, there was an emerging discourse suggesting that the George W. Bush Administration intended to develop ASAT weapons and deploy space-based missile defense systems, accompanied by U.S. doctrines and documents that stressed the importance of "space superiority" and "space control".[74] This led Chinese strategists to assume the inevitability of the weaponization of space, with particular concern that U.S. missile defense plans could negate the effectiveness of its nuclear deterrent.[75] Considered in

this way, U.S.-China military space relations have been impelled by a typical security dilemma.[76] A recent study also shows how Chinese perceptions reflect assumptions of U.S. hostile intent in space, which has been a recurring theme since the Strategic Defense Initiative (SDI).[77] Therefore, the point to make for the purposes of this discussion is that many analyses of China's ASAT test conform to the impact of structural imperatives associated with a realist perspective.

However, it should be noted that some analysts have also pointed to the limited benefits for China from the use of ASAT weapons to attack U.S. satellites.[78] This points to the need for incorporating insights and interpretations from other theories and approaches, which pay attention to other levels of analysis, such as domestic politics. In this respect, it is worth noting that it was twelve days after the test that China's Ministry of Foreign Affairs released a statement recognizing its conduct. This delayed response puzzled analysts about whether the Ministry was aware of the test, raising concerns that the PLA proceeded with the test without approval from the Chinese security and foreign policy bureaucracy, indicating an instance of factionalism between the Ministry of Foreign Affairs and the PLA.[79] It is also worth noting that the white paper "China's Space Activities in 2006" issued by the State Council stressed China's commitment to "protect the space environment", which was in contrast to the large amount of space debris produced as a result of the 2007 test, indicating a lack of consistency and coordination between those who actually make decisions regarding space operations and China's State Council.[80]

Such concerns furthermore relate to the issue of civil-military relations in China when Hu Jintao was Chairman of the Central Military Commission (CMC) from 2002 to 2012. During his tenure, there were a series of incidents, including the 2007 ASAT test, which seemed to suggest that the PLA had acted without fully disclosing information or consulting with Hu and the civilian leadership. This is not to say that the ASAT test was a rogue military operation by the PLA, as it is reasonable to assume that the highest echelons of the Chinese government knew about the test.[81] Rather, as Scobell observes, it is more accurate to describe the PLA under Hu as "roguish" characterized by "loose" and "hands-off" civilian control. In this respect, even though the Chinese military was not completely out of civilian oversight, it was also not fully subject to civilian control in all aspects of its operations.[82]

Related to domestic influences is also the analysis by Kulacki and Lewis.[83] Instead of trying to explain the Chinese ASAT test as a response to U.S. plans under the Bush Administration or other external events, the authors argue that the decision was driven by "the maturity of technology" based on interviews with Chinese individuals familiar with the ASAT program. More concretely, the authors suggest that the test was the product of a long-term R&D program, which had started in the mid-1980s in order to keep pace with the

development and testing of similar technological capabilities by the United States and the Soviet Union at that time.[84] Eventually, it is likely that the project managers who were under pressure to show the Chinese leadership that the technology had matured and was available to be used after years of research successfully lobbied for its test. It is also plausible that targeting a satellite rather than intercepting a missile was decided on the basis that the former was an easier task.[85] As Moltz points out with reference to the analysis by Kulacki and Lewis, alternative interpretations to the unitary-actor model deserve closer examination, at the very least, compared to the attention they have received so far from mainstream studies.[86]

Pertaining to domestic influences, the Chinese leadership's support for the space program has been crucial to its success from the beginning serving as a useful tool to strengthen national unity and the legitimacy of the Chinese Communist Party (CCP). The emphasis on domestic political considerations is highlighted by Sheehan, who claims that "the ultimate target audience" of Chinese space achievements as a source of prestige and propaganda is "the Chinese people themselves, rather than China's great power peers".[87] While the author puts forward this argument in the context of discussing mainly China's space feats in human spaceflight and space exploration, "high-visible" military space capabilities, such as ASATs, can also be seen in this light. In this way, enhancing China's military space power is a source of legitimacy for Chinese leaders and the Party. Doing so helps to buy the PLA's loyalty. As we have seen, this was an important consideration, especially under Hu's tenure, when military loyalty appeared rather weak and needed to be nurtured.

Interlinked and highlighting the influence of parochial organizational interests, high-ranking PLA officers may be keen to push for certain "high-visible" military space projects in order to bolster the prestige of their organization, such as the Rocket Force, and even advance their careers. Notably, in recent years, a new term has been introduced, "the cosmos club" (宇宙帮, yuzhoubang), which refers to the emergence of a group of Chinese political elites with a background in the space industry who have climbed the ladder of the CCP political hierarchy.[88] A case in point is General Li Shangfu (李尚福), China's new defense minister and a new CMC member, who held key positions in the aerospace sector, including serving as director of the Xichang Satellite Launch Center when China's ASAT was conducted. He later served as chief-of staff and deputy director of the General Equipment Development Department (formerly called the General Armaments Department) and deputy commander of the PLASSF.[89]

Apart from national security and domestic influences, ASATs are also symbols of modernity and identity. As Lauer notes, in addition to serving "national security needs", ASATs "also serve as emblems of national prestige".[90] More specifically, as far as identity is concerned, according to Cunningham, China's great power identity is central to explaining the development of its

human spaceflight program as a marker of great power status.[91] It is also worth noting that scientific and technological advancement emerged as a "standard of civilization" in the nineteenth century by demarcating the "society of civilized states" from non-European societies through a "techno-scientific orientalist" discourse. Therefore, highly visible technoscientific feats, such as space and nuclear projects, continue to serve as markers of power, status, and modernity in China, exemplified by techno-nationalist conceptions of science and technology.[92]

The space race during the Cold War consolidated this logic in the sense that space technology was "constructed" as a chief indicator of scientific and technological leadership and great power status in international society that weds China's quest for great power status to the possession of advanced space capabilities and the achievement of remarkable accomplishments in space.[93] Thus, acquiring ASAT capabilities can be understood as part of China's effort to gain recognition as a great power, something that elucidates the importance of the relationship between national identity and space weapon capabilities.[94] Equally, the fact that China continued to carry out ASAT tests after 2007 without generating space debris while framing them as "missile defense tests" is indicative of the impact of a sort of a nascent norm of testing ground-based kinetic ASAT capabilities "more responsibly" in ways that limit the generation of widespread space debris. This can be seen as an example of China attempting to act as a "responsible great power" in space.[95] In line with the role of national identity, this shift in Chinese space behavior can also be understood as the result of a process of social learning.[96] Therefore, although China has yet to formally endorse recent U.S. led efforts to delegitimize debris-generating ASATs, in reality, since 2007 Chinese actions have conformed to such an emerging norm against destructive ASATs. Beyond China, an eclectic approach can generate important insights when applied to India's ASAT test, to which the analysis now turns.

Eclectic approach: The case of India's 2019 ASAT test

On 27 March 2019, India launched a ballistic missile defense interceptor, the Prithvi Delivery Vehicle Mark-II (PDV MK-II) from the Kalam Island missile complex, which successfully intercepted an Indian satellite in low Earth orbit at an altitude of 283 km. The target was Microsat-R, an Indian military satellite that was manufactured by the Defense Research and Development Organization (DRDO) and launched by ISRO in January 2019.[97] The successful ASAT test, dubbed Mission Shakti, made India the fourth country to carry out such a test, after the United States, Russia, and China. Like China's 2007 ASAT test, India's ASAT test also marked a departure from its traditional international stance against the weaponization of space. The test was announced by Prime Minister Modi himself in

an unprecedented television broadcast. Hailing the test as a big "moment of pride for every Indian" that registered India as "a global space power" "using an indigenously developed" technology, Modi stressed that the main objective of the mission was "ensuring the country's security, its economic development and India's technological progress" and that it was not directed against any other country.[98] From the outset, Indian officials were keen to alleviate the implications of the test by underscoring that it was carried out at a sufficiently low attitude that would allow the generated space debris to re-enter the Earth's atmosphere soon after, without posing a threat to the space assets of other states.[99] Regardless of such claims, it generally elicited a mixed, but less negative global response compared to China's 2007 ASAT test.[100]

As a consequence, there is already a growing debate about the motivations behind Mission Shakti. As far as structural pressures are concerned, despite Indian assurances that the test was not directed against any other country, some observers argue that China has been the main driver behind the Indian decision.[101] For example, Kanwal Sibal, former foreign secretary of India, has pointed out that the development of ASAT capabilities acts as a deterrent that "redresses the India-China strategic balance".[102] There is also evidence to suggest that China's 2007 ASAT test had the effect of spurring India's interest in the military uses of space, including ASAT technology, signifying a reorientation of India's position toward space militarization.[103] After the Chinese ASAT test, there were a series of statements from senior military and DRDO officials, such as Vijay Kumar Saraswat, which evinced the intent to develop ASAT capabilities based on India's missile defense system.[104] Such an action-reaction dynamic points to the existence of a security dilemma in space, even if not definitive, between China and India.[105] Within South Asia, such dynamics are also susceptible to the security trilemma between India and China, India and Pakistan, and China and Pakistan.[106]

Nevertheless, although national security considerations were an important factor, especially with regard to China, structural imperatives are less adequate than domestic influences to explain the timing of Mission Shakti, considering that this was done more than a decade after the China test. Tellingly enough, there was a prevailing view that domestic political concerns were important in Modi's decision to move on with Mission Shakti and announce it in a dramatic televised address amid the general election campaign of 2019. As a result, the test was met with fierce criticism from the opposition on the grounds that Modi tried to use the mission to elicit electoral benefits. At the same time, the test coincided with increased India-Pakistan tensions, presenting an opportunity for the Indian prime minister to demonstrate his strong leadership credentials in matters of national security.[107] After all, Modi has been a supporter of India's space program, not shying away from capitalizing on the country's space feats whenever an opportunity arises.[108]

Within the scope of domestic influences, bureaucratic politics and organizational interests are also central. As we saw earlier, military and DRDO officials had been vocal about the need for ASAT capabilities for some time, suggesting that India had all the technological "building blocks" for such a program, ready to be used when the political leadership would deem that suitable. It is not unusual for powerful technocratic bureaucracies in India, such as ISRO and DRDO, to initially pursue projects without political approval aimed at putting pressure on the political leadership to eventually authorize them, and the ASAT case seems to confirm that.[109] In fact, since the 2019 test, it has transpired that the DRDO had developed the capability by 2012, but the previous government did not approve its testing. This changed with the arrival of Modi in power, who gave the go-ahead for the test.[110] It has also been suggested that the DRDO had good reasons to push for building an ASAT capability in order to improve its reputation after suffering setbacks concerning projects for the Indian armed forces.[111]

A focus on national identity is also relevant to Mission Shakti for a number of reasons. First, Kinsella and Chima show how symbolic motivations, such as seeking status, prestige, and international recognition, help to explain military industrialization and the acquisition of indigenous weapons production capacity in India, including nuclear and space technology.[112] Like China, India has also placed great emphasis on the pursuit of high-visible technoscientific projects as markers of the state's power, status, and modernity in international society, reflecting India's post-colonial identity and its sense of civilizational exceptionalism.[113] As such, India's decision to acquire ASAT capabilities is partly, at least, a manifestation of its quest for great power status.[114] As mentioned previously, in his televised address, Modi stressed Mission Shakti as a source of national pride, as well as a symbol of India's emergence as a space power. As Biswas points out, "Modi's address captures prestige as the primary rationale for it".[115] Second, in terms of norms, it is noteworthy that the test was conducted in a way to minimize the risk of creating space debris, which can be seen as an attempt to highlight India as a responsible space player, albeit with mixed results.

What is more, even before Mission Shakti, some observers had suggested that India's interest in ASAT capabilities was driven by an effort to avoid repeating the experience with the non-proliferation regime. It is worth recalling that the 1968 Nuclear Non-proliferation Treaty (NPT) did not recognize India as a nuclear state, which India has referred to as discriminatory ever since. In this context, the lesson to be drawn from its experience with the non-proliferation regime is that India should develop an ASAT capability before a future international agreement banning ASATs is achieved. From this perspective, such an agreement would create this time a discriminatory space order between those states that possess ASATs and those that have not acquired such a capability. On this basis, India should speed up the

development of its ASAT program in order to join the club of states possessing ASATs. Thus, another germane driver behind Mission Shakti is the prestige rationale deriving from being a member of the club of a handful of states with ASATs.[116]

Findings and conclusions

This survey of China and India's ASAT tests has set out to show the merits of an eclectic approach that helps to highlight the complex amalgam of factors that have informed the decision of China and India to develop and test ASAT systems. Rather than focusing merely on national security calculations stemming from structural pressures, this article has proposed an eclectic approach to the study of China and India's ASAT tests that takes into consideration structural imperatives, domestic influences, and the role of state identity.

Consequently, this approach employed in this article provides a more comprehensive framework for understanding why states decide to acquire ASATs and why others refrain from doing so by highlighting the significance of placing military space programs in their specific sociohistorical and institutional contexts. This is important, at a time when there is evidence to suggest that all the major space powers are interested in investing in military space assets, including counterspace capabilities. Hence, the cases of China and India are by no means exhaustive, and other cases can be considered through the lens of an eclectic approach.

The findings of this article also have normative and policy implications for the course of contemporary space security. More specifically, it is clear that the severity of the challenges posed by the militarization and weaponization of space has intensified as a result of the return of great power competition and early signs of an arms race in space with detrimental effects on arms control.[117] This has been accompanied by a prevailing space discourse that sees space as a new battlefield revolving on the assumption that conflict in space is inevitable, especially in the context of U.S.-China space relations that are increasingly characterized by competition and confrontation.

Alongside this, there has been an inflated threat discourse on China's rise as a space power that attributes ulterior grand strategic motivations behind everything China does in space. To be sure, the opaqueness of the Chinese space program coupled with the nature of the Chinese regime and a more assertive international behavior over the last years have raised legitimate concerns about the direction and drivers of China's space policy and strategy. However, as we have seen, while a focus on structural imperatives is helpful, it does not go a long way to encompass the role of domestic political explanations and the symbolic value of ASATs as indicators of the state's modernity and great power status, which can hold equal or even greater analytical purchase than could be found simply by solely acknowledging the impact of

structural imperatives. As a result, an eclectic approach offers a necessary corrective to accounts of Chinese intentions in space by illustrating how Chinese space policy and strategies can be messier than state-centric and rational approaches associated with structural constraints recognize. The same applies also to the case of India. At the same time, however, and reflecting the combinational logic of analytical eclecticism, the goal here is not to dismiss approaches that deal with the impact of structural imperatives, but rather how these can be complemented with a consideration of domestic politics and national identity as a way of capturing a broader array of causal factors that shape space policy outcomes.

This analysis of China and India's ASATs also raises questions for further study that have policy relevance in the context of current attempts at delegitimizing debris-producing ASATs. It is clear that this U.S. led diplomatic effort signifies not only the commitment of the most dominant space power to the long-term sustainability of the space environment, but also the return of the United States in a leadership role in space governance. At the same time, the so-called ASAT test moratorium has the potential to act as a confidence-building measure. It is likely that as the moratorium gains momentum, this will generate social pressure on China and India to make a similar pledge. Still, it is important to note that such a process of delegitimization can also be of limited scope as it does not account for the multiple values attached to ASATs by China and India, given that developing ASAT capabilities is also mediated by domestic political considerations and state identity. For example, given how the possession of ASATs has been valued by China as a marker of modernity and great power status, it is less likely for China to offer its formal support to the U.S. led initiative against destructive ASATs, even if its practices conform to such a norm. This is not only because the initiative repositions the United States as a space leader, but also because such a moratorium was not formulated by giving China a 'seat at the table' and, thus, resting on recognizing China as a great space power by the United States. Moreover, China has invested social capital in a draft text concerning a legally binding *'Treaty on the Prevention of the Placement of Weapons in Outer Space and of the Threat or Use of Force Against Outer Space Objects'* (PPWT), which has been jointly submitted with Russia to the Conference on Disarmament (CD), and rejected by the United States given geopolitics and different understandings of ASAT threats.[118] Similarly, as far as India is concerned, it is worth remembering that India opposed the European Union Code of Conduct for outer space activities mainly on the grounds that it was not asked to participate in its drafting, and as a consequence, the process did not bestow India with ownership, even if the code served its interests.[119]

Therefore, more research is required to better understand the role of 'recognition games' in the space domain, but it suffices here to say that the dynamics pertaining to different values assigned to ASATs as social objects

help explain the reluctance of China and India to support the moratorium, at least for now. The argument put forward in this article also helps to open new avenues for exploring what delegitimizing ASATs entails and the challenges involved and how such a process can also be linked with the concept of "devaluing" that can build on debates about valuing and devaluing nuclear weapons.[120]

In light of the above, although it is tempting to see space security developments only from the prism of geopolitical rivalry and competition, it is also important to acknowledge the diffusion of power in global space governance and the interdependent nature of space security by focusing on fostering cooperation on issue areas of common interests related to global space security challenges in a manner that recognizes a larger role for China and India as great space powers. Such a process can be seen as more acceptable and legitimate, and it is more likely to produce results. Consequently, as others have noted, a more holistic approach is needed to strengthen space security and stability, as well as to manage challenges and threats.[121] Such an approach can go beyond unilateral declarations against destructive ASAT tests to encompass bilateral efforts in conjunction with employing a multilateral space policy in the context of working within the existing global space governance regime, as well as outside formal institutional settings in concert with other major space powers. However, much will also depend on China and India and their willingness to assume a more proactive role in shaping the regime for governing space activities in constructive ways, which is commensurate with their status as great space powers. While tensions are likely to remain, it is more imperative than ever before that all major space powers should play their part in facilitating rule-governed interaction and stability in the domain of space on the basis of restraint and prudency.

Disclosure statement

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Notes

1. For a good recent overview of Russia's ASAT weapons, see Jaganath Sankaran, "Russia's Anti-satellite Weapons: A Hedging and Offsetting Strategy to Deter Western Aerospace Forces", *Contemporary Security Policy* 43: 3 (2022): 436–463.
2. Following China's 2007 ASAT test, in February 2008 the United States carried out Operation Burnt Frost to destroy an errant US satellite (USA-193) on the grounds of the danger that the target satellite could pose to humans due to its toxic hydrazine fuel. However, the successful operation precipitated a debate about the true motivations of the decision to shoot down a satellite, as it demonstrated an ASAT capability that for some analysts was driven by strategic calculations as a response to China's ASAT. In a recent piece in the journal Space Policy, Nicholas L. Johnson, the then chief NASA

scientist for space debris, provides a first-hand account of the Operation Burnt Frost. According to Johnson, the decision to intercept and destroy the defunct USA-193 satellite had nothing to do with China. Rather it was based on several risk assessments that indicated the potential serious harm the satellite would pose to humans upon re-entry due to its toxic hydrazine fuel. See Nicholas L. Johnson, "Operation Burnt Frost: A View from Inside", *Space Policy* 56 (2021): 101411.

3. The literature on space security and war is now vast. For different perspectives, inter alia, see Bleddyn E. Bowen, *War in Space: Strategy, Spacepower, Geopolitics* (Edinburgh: Edinburgh University Press, 2020); Daniel Deudney, *Dark Skies: Space Expansionism, Planetary Geopolitics, and the Ends of Humanity* (New York: Oxford University Press, 2020); Joan Johnson-Freese, *Space Warfare in the 21st Century: Arming the Heavens* (New York: Routledge, 2017); Cassandra Steer and Matthew Hersch (eds.) *War and Peace in Outer Space: Law, Policy, and Ethics* (New York: Oxford University Press, 2021).
4. Columba Peoples, "The Securitization of Outer Space: Challenges for Arms Control", *Contemporary Security Policy* 32: 1 (2011): 76–98.
5. Columba Peoples, "Assuming the Inevitable? Overcoming the Inevitability of Outer Space Weaponization and Conflict" *Contemporary Security Policy* 29: 3 (2008): 502–520.
6. Mai'a K. Davis Cross, "The Social Construction of the Space Race: Then & Now", *International Affairs* 95: 6 (2019): 1403–1421.
7. M. DeBlois et al., "Space Weapons: Crossing the U.S. Rubicon", *International Security* 29: 2 (2004): 50–84.
8. One exception is a recent study by Lauer, which in addition to a predominant focus on national security needs, it also recognizes the importance of status aspirations. However, there is a curious neglect of domestic influences. See Ritu S. Lauer, "When States Test Their Anti-Satellite Weapons", *Astropolitics* 20: 1 (2022): 1–26.
9. Brian Weeden and Victoria Samson, "It's Time for a Global Ban on Destructive Antisatellite Testing", *Scientific American*, January 14, 2022, https://www.scientificamerican.com/article/its-time-for-a-global-ban-on-destructive-antisatellite-testing/ (accessed June 21, 2023).
10. The White House, "Remarks by Vice President Harris on the Ongoing Work to Establish Norms in Space", April 18, 2022, https://www.whitehouse.gov/briefing-room/speeches-remarks/2022/04/18/remarks-by-vice-president-harris-on-the-ongoing-work-to-establish-norms-in-space/ (accessed June 21, 2023).
11. United Nations General Assembly, "Destructive Direct-ascent Anti-satellite Missile Testing", A/RES/77/41, December 12, 2022, https://digitallibrary.un.org/record/3997622?ln=en (accessed June 21, 2023). It is worth noting that the US pledge and the resolution focus on halting a specific type of ASAT testing, that is, destructive direct-ascent ASAT tests, which generate space debris. Therefore, the goal is not to ban ASAT testing or ASATs that do not create space debris.
12. United Nations, "General Assembly Adopts over 100 Texts of First, Sixth Committees Tackling Threats from Nuclear Weapons, International Security, Global Law, Transitional Justice" United Nations Press Release GA/12478, December 7, 2022, https://press.un.org/en/2022/ga12478.doc.htm (accessed June 21, 2023).
13. Rudra Sil and Peter J. Katzenstein, *Beyond Paradigms: Analytic Eclecticism in the Study of World Politics* (New York: Palgrave Macmillan, 2010). For two recent works that explicitly use an eclectic approach to space, see Michael Byers, "Cold, Dark, and Dangerous: International Cooperation in the Arctic and Space." *Polar Record* 55: 1 (2019): 32–47; and Scott Pace, "U.S. Space Policy and Theories of International Relations: The Case for Analytical Eclecticism", *Space Policy* 65 (2023): 101538.
14. Sil and Katzenstein, *Beyond paradigms.*

15. Such a framework is also inspired by Sagan's seminal work on nuclear proliferation which posits three models of why states build nuclear weapons: the 'security model', 'the domestic politics model', and the 'norms model'. See Scott D. Sagan, "Why Do States Build Nuclear Weapons?: Three Models in Search of a Bomb." *International Security* 21: 3 (1996): 54–86.
16. For a recent neorealist analysis, see Nils Holger Schreiber, "Man, State, and War in Space: Neorealism and Russia's Counterbalancing Strategy Against the United States in Outer Space Security Politics", *Astropolitics* 20: 2–3 (2022):151–174. For a detailed analysis of International Relations theory and outer space, including realism and constructivism, see Dimitrios Stroikos, "International Relations and Outer Space", *Oxford Research Encyclopedia of International Studies*, https://oxfordre.com/internationalstudies/view/10.1093/acrefore/9780190846626.001.0001/acrefore-9780190846626-e-699 (accessed June 21, 2023).
17. Stroikos, Ibid. On Foreign Policy Analysis, for example, see Chris Alden and Ammon Aran, *Foreign Policy Analysis: New Approaches* (London: Routledge, 2012).
18. For recent detailed accounts of China's space program on which this section draws, see Marco Aliberti, *When China Goes to the Moon* (Cham: Springer, 2015); S. Chandrashekar, *China's Space Programme: From the Era of Mao Zedong to Xi Jinping* (Singapore: National Institute of Advanced Studies (NIAS) and Springer, 2022); Brian Harvey, *China in Space: The Great Leap Forward*. Second Edition (Chichester: Springer-Praxis, 2019); Kevin Pollpeter, Timothy Ditter, Anthony Miller, and Brian Waidelich, *China's Space Narrative* (China Aerospace Studies Institute, Air University, 2020), https://www.airuniversity.af.edu/CASI/Display/Article/2369900/chinas-space-narrative/ (accessed June 21, 2023); and Xiaodan Wu, China's Ambition in Space: Programs, Policy and Law (The Hague: Eleven, 2022). For an overview also see the latest white paper on China's space program "China's Space Program: A 2021 Perspective" (State Council Information Office of the People's Republic of China, 2022), https://www.cnsa.gov.cn/english/n6465645/n6465648/c6813088/content.html (accessed June 21, 2023).
19. Yanping Chen, "China's Space Policy: A Historical Review" *Space Policy* 7: 2 (1991): 117.
20. Roger Handberg and Zhen Li, *Chinese Space Policy: A Study in Domestic and International Politics* (New York: Routledge, 2007).
21. Gregory Kulacki and Jeffrey G. Lewis, *A Place for One's Mat: China's Space Program, 1956–2003* (Cambridge, MA: American Academy of Arts and Sciences, 2009), 20–21.
22. Chen, China's Space policy.
23. Tai Ming Cheung, *Innovate to Dominate: The Rise of the Chinese Techno-Security State* (Ithaca, NY: Cornell University Press, 2022); Evan A. Feigenbaum, *China's Techno-Warriors: National Security and Strategic Competition from the Nuclear to the Information Age* (Stanford: Stanford University Press, 2003).
24. On the importance of the "863 High Technology Plan", see Feigenbaum, Ibid.
25. Kulacki and Lewis, *A Place For One's Mat*, 21–24.
26. Ling Xin, "China Astronauts Say Hello from Completed Tiangong Space Station", *South China Morning Post*, November 3, 2022, https://www.scmp.com/news/china/science/article/3198266/china-astronauts-say-hello-completed-tiangong-space-station (accessed June 21, 2023).
27. Steven Lee Myers and Zoe Mou "'New Chapter' in Space Exploration as China Reaches Far Side of the Moon", *New York Times*, January 2, 2019, https://www.nytimes.com/2019/01/02/world/asia/china-change-4-moon.html (accessed June 21, 2023).
28. Andrew Jones, "China Recovers Chang'e-5 Moon Samples After Complex 23-day Mission" *Space News*, December 16, 2020, https://spacenews.com/china-recovers-change-5-moon-samples-after-complex-23-day-mission/ (accessed June 21, 2023).

29. Lei Zhao, "Xi Declares Start of Beidou's Full-Scale Global Service", *China Daily*, L. July 31, 2020, https://www.chinadaily.com.cn/a/202007/31/WS5f2386c4a31083481725d61c.html (accessed June 21, 2023).
30. For a useful account of these developments, see Pollpeter et. al., *China's Space Narrative.*
31. Dean Cheng, "China's Military Role in Space", *Strategic Studies Quarterly* 6: 1 (2012): 57–58; Shu-Hsien Liao, "Will China Become a Military Space Superpower?", *Space Policy* 21: 3 (2005): 206, 208.
32. David Shambaugh, *Modernizing China's Military: Progress, Problems, and Prospects* (Berkeley: University of California Press, 2004), 70.
33. For a detailed discussion of the role of these external influences on the modernization of the Chinese military, see Shambaugh, Ibid, 74–89.
34. Ben Blanchard, "China's President Xi Urges Greater Military Use of Space", Reuters, April 15, 2014, https://www.reuters.com/article/us-china-defence-idUSBREA3E03H20140415 (accessed June 21, 2023).
35. While it is too early to assess how the MCF policy will affect the Chinese space ecosystem and defense innovation, it is clear that it has already some impact on facilitating the participation of private companies in the Chinese space sector. For useful perspectives, see Mingyan Nie, "Space Privatization in China's National Strategy of Military-Civilian Integration: An Appraisal of Critical Legal Challenges", *Space Policy* 52 (2020): 101372; Fabio Tronchetti and Hao Liu, "The 2019 Notice on Promoting the Systematic and Orderly Development of Commercial Carrier Rockets: the First Step Towards Regulating Private Space Activities in China" *Space Policy* 57 (2021): 101432; and Xiaodan Wu and Jie Long, "Assessing the Particularity and Potentiality of Civil–Military Integration Strategy for Space Activities in China" *Space Policy* 62 (2022): 101514. For a recent detailed assessment of China's MCF policy and its limitations, see Elsa B. Kania and Lorand Laskai, "Myths and Realities of China's Military-Civil Fusion Strategy" (Center for a New American Security, 2021), https://www.cnas.org/publications/reports/myths-and-realities-of-chinas-military-civil-fusion-strategy (accessed June 21, 2023).
36. "China's Military Strategy" (State Council Information Office of the People's Republic of China, 2015), http://english.www.gov.cn/archive/white_paper/2015/05/27/content_281475115610833.htm (accessed June 21, 2023).
37. Due to lack of information provided by the Chinese government, some aspects of the role of the PLASSF remain rather speculative. For useful discussions, see, for example, John Costello and Joe McReynolds, "China's Strategic Support Force: A Force for a New Era" (National Defense University, 2018), https://ndupress.ndu.edu/Portals/68/Documents/stratperspective/china/china-perspectives_13.pdf (accessed June 21, 2023); Kevin L. Pollpeter, Michael S. Chase, Eric Heginbotham, "*The Creation of the PLA Strategic Support Force and Its Implications for Chinese Military Space Operations*"(RAND Corporation, 2017), https://www.rand.org/pubs/research_reports/RR2058.html (accessed June 21, 2023); Mark A. Stokes, "Prepared Statement Before the U.S.-China Economic and Security Review Commission Hearing on "China in Space: A Strategic Competition?", April 25, 2019, https://www.uscc.gov/sites/default/files/Mark%20Stokes%20USCC%2025%20April.pdf (accessed June 21, 2023).
38. "China's National Defense in the New Era" (State Council Information Office of the People's Republic of China, 2019) https://english.www.gov.cn/archive/whitepaper/201907/24/content_WS5d3941ddc6d08408f502283d.html (accessed June 21, 2023).
39. Larry M. Wortzel, *the Dragon Extends Its Reach: Chinese Military Power Goes Global* (Washington, DC: Potomac Books, 2013).
40. For a good overview of these developments, inter alia, see Kevin Pollpeter, "Space, The New Domain: Space Operations and Chinese Military Reforms" in *Reshaping the*

Chinese Military: The PLA's Roles and Missions in the Xi Jinping Era, ed. Richard A. Bitzinger and James Char (New York, Routledge, 2018), 143–160; Zulfqar Khan & Ahmad Khan, "Chinese Capabilities as a Global Space Power", *Astropolitics* 13: 2–3 (2015): 185–204. For a more detailed account, see Chandrashekar, *China's Space Programme*; and Harvey, *China in Space*.

41. For an assessment of China's counterspace capabilities see Brian Weeden and Victoria Samson, "Global Counterspace Capabilities: An Open Source Assessment" (Secure World Foundation, 2022), https://swfound.org/media/207350/swf_global_counterspace_capabilities_2022_rev2.pdf (accessed June 21, 2023) and Todd Harrison, Kaitlyn Johnson, Makena Young, Nicholas Wood, and Alyssa Goessler, "Space Threat Assessment 2022" (Center for Strategic and International Studies, 2022), https://www.csis.org/analysis/space-threat-assessment-2022 (accessed June 21, 2023).
42. Weeden and Sampson, Ibid, 03–01.
43. Ibid, 03-10 – 03-16.
44. Brian Weeden, "Through a glass, darkly: Chinese, American, and Russian Antisatellite testing in Space" (Secure World Foundation, 2014), https://swfound.org/media/167224/through_a_glass_darkly_march2014.pdf (accessed June 21, 2023).
45. Weeden and Sampson, Global Counterspace Capabilities, 03–14.
46. For a detailed analysis of China's spaceplane projects, see Daniel Shats with Peter Wood, "Chinese Spaceplane Programs" (China Aerospace Studies Institute, 2021), https://www.airuniversity.af.edu/Portals/10/CASI/documents/Research/Space/2021-12-06%20Spaceplanes.pdf (accessed June 21, 2023).
47. On China's orbital bombardment system, see International Institute for Strategic Studies, "China's 2021 Orbital-Weapon Tests", *Strategic Comments* 28: 1 (2021): vii–ix.
48. S. Vijayasekhara Reddy, "India's Forays into Space: Evolution of its Space Programme", *International Studies* 45: 3 (2008): 215–45.
49. Dimitrios Stroikos, "Engineering World Society? Scientists, Internationalism, and the Advent of the Space Age", *International Politics* 55: 1 (2018): 73–90.
50. Rajesh Kochhar, "Science as a Symbol of New Nationhood: India and the International Geophysical Year 1957–58", *Current Science* 94: 6 (2008): 813–816.
51. Marco Aliberti, *India in Space: Between Utility and Geopolitics* (Cham, Springer, 2018); U. Sankar, *The Economics of India's Space Programme: An Explanatory Analysis* (New Delhi: Oxford University Press, 2007); Elizabeth Clegg & Michael Sheehan, "Space as an Engine of Development: India's Space Programme", *Contemporary South Asia* 3: 1 (1994): 25–35.
52. Vikram Sarabhai, *Science Policy and National Development*. Ed. Kamla Chowdhry (New Delhi: Macmillan, 1974).
53. Asif Siddiqi, "Making Space for the Nation: Satellite Television, Indian Scientific Elites, and the Cold War", *Comparative Studies of South Asia, Africa and the Middle East* 35: 1 (2015): 35–49.
54. Kochhar, Science as a Symbol of New Nationhood; Clegg and Sheehan, Space as an Engine of Development, 26
55. Reddy, India's Forays Into Space, 238; Sankar, *The Economics of India's Space Programme*.
56. Srinivas Laxman, *Indian Martian Odyssey: A Journey to the Red Planet* (New Delhi: Partridge India, 2014), 70–72.
57. Pallava Bagla and Subhadra Menon, *Reaching for the Stars: India's Journey to Mars and Beyond* (New Delhi: Bloomsbury India, 2014), 47–49.
58. For an analysis of the drivers behind *Chandrayaan-3*, see Dimitrios Stroikos, "Why Does India Want to Be a Space Power? Chandrayaan-3 and the Politics of India's Space

Programme", LSE Research for the World, September 26, 2023, https://www.lse.ac.uk/research/research-for-the-world/politics/india-space-programme (accessed October 20, 2023).

59. Nivedita Bhattacharjee, "After the Moon, India Launches Rocket to Study the Sun", *Reuters*, September 2, 2023, https://www.reuters.com/technology/space/after-moon-india-sets-sights-studying-sun-with-rocket-mission-2023-09-02/ (accessed October 20, 2023).
60. Aliberti, *India in Space*; Ajey Lele, *ISRO: Institutions that Shaped Modern India* (New Delhi: Rupa Publications India Pvt. Ltd, 2021), 102–108.
61. Ministry of Defense, Government of India, "Joint Doctrine Indian Armed Forces", (New Delhi: Headquarters Integrated Defense Staff, 2017), 26.
62. Ibid, 48–49. Similarly, the 2018 Land Warfare Doctrine makes references to the importance of space for military operations and calls for integrating space-based assets with the requirements of the Indian Army. See "Indian Army, Land Warfare Doctrine", (New Delhi: Indian Army, 2018), 6, 11.
63. Bharath Gopalaswamy, *Final Frontier: India and Space Security* (Chennai: Westland Publications, 2019), 80–81.
64. Ajey Lele, "Indian Armed Forces and Space Technology", *India Review* 10: 4 (2011): 383–385; Sobia Paracha, "Military Dimensions of the Indian Space Program", *Astropolitics* 11: 3 (2014): 163–166.
65. Rajeswari Pillai Rajagopalan, "India's Space Strategy: Geopolitics is the Driver", ISPI Online, December 11, 2020, https://www.ispionline.it/en/pubblicazione/indias-space-strategy-geopolitics-driver-28607 (accessed June 21, 2023).
66. Weeden and Sampson, Global Counterspace Capabilities, 04–05.
67. Vivek Raghuvanshi, "India to Launch a Defense-based Space Research Agency", *DefenseNews*, June 12, 2019, https://www.defensenews.com/space/2019/06/12/india-to-launch-a-defense-based-space-research-agency/
68. Weeden and Sampson, Global Counterspace Capabilities, 04–05.
69. Amy Kazmin, "US and India Sign Defence Agreement to Counter China", *Financial Times*, October 27, 2020, https://www.ft.com/content/a86682a4-da70-48cf-bf66-b5afee180f4b (accessed June 21, 2023).
70. D.S. Madhumathi, "ISRO Initiates 'Project NETRA' to Safeguard Indian Space Assets from Debris and Other Harm" *The Hindu*, September 24, 2019, https://www.thehindu.com/sci-tech/science/isro-initiates-project-netra-to-safeguard-indian-space-assets-from-debris-and-other-harm/article29497795.ece (accessed June 21, 2023).
71. Ashley J. Tellis, "China's Military Space Strategy", *Survival* 49: 3 (2007): 41–72.
72. Stephanie Lieggi and Erik Quam, "China's ASAT Test and the Strategic Implications of Beijing's Military Space Policy", *Korean Journal of Defense Analysis* 19: 1 (2007), 27.
73. Hui Zhang, "Action/Reaction: U.S. Space Weaponization and China" *Arms Control Today* 35: 10 (2005) 6–11.
74. For a useful overview of the US space policy under the George W. Bush administration, inter alia, see James Clay Moltz, *The Politics of Space Security: Strategic Restraint and the Pursuit of National Interests* (Stanford: Stanford University Press, 2008), 259–301; and Joan Johnson-Freese, *Heavenly Ambitions: America's Quest to Dominate Space* (Philadelphia, PA: Pennsylvania University Press, 2009), 56–94.
75. Zhang, Action/Reaction. For a detailed account of Chinese views regarding US space policy and space weapons before China's 2007 ASAT see Hui Zhang, "Chinese Perspectives on Space Weapons" in Pavel Podvig and Hui Zhang, *Russian and Chinese*

Responses to U.S. Military Plans in Space (Cambridge, MA: American Academy of Arts and Sciences, 2008), 31–77.

76. Baohui Zhang, "The Security Dilemma in the U.S.-China Military Space Relationship: The Prospects for Arms Control", *Asian Survey* 51: 2(2011): 311–332. According to some observers, the competitive nature of US-China space relations has resulted in the emergence of a security trilemma in South Asia between India–China, India–Pakistan, and China–Pakistan. See Zulfqar Khan and Ahmad Khan, "Space Security Trilemma in South Asia", *Astropolitics* 17: 1 (2019): 4–22.
77. Alexis A. Blanc, Nathan Beauchamp-Mustafaga, Khrystyna Holynska, M. Scott Bond, Stephen J. Flanagan, *Chinese and Russian Perceptions of and Responses to U.S. Military Activities in the Space Domain* (RAND Corporation, 2022).
78. Jaganath Sankaran, "Limits of the Chinese Antisatellite Threat to the United States", *Strategic Studies Quarterly* 8: 4 (2014): 19–46.
79. Bates Gill and Martin Kleiber, "China's Space Odyssey: What the Antisatellite Test Reveals about Decision-Making in Beijing." *Foreign Affairs* 86: 3 (2007): 2–6; James Mulvenon, "Rogue Warriors? A Puzzled Look at the Chinese ASAT Test", *China Leadership Monitor* 20 (2007), https://www.hoover.org/sites/default/files/research/docs/clm20jm.pdf (accessed June 21, 2023).
80. James Clay Moltz, *Asia's Space Race: National Motivations, Regional Rivalries, and International Risks* (New York: Columbia University Press 2012), 97.
81. Gill and Kleiber, China's Space Odyssey; Mulvenon, Rogue Warriors.
82. Andrew Scobell, "Is There a Civil-Military Gap in China's Peaceful Rise?", *Parameters* 39: 2 (2009): 4–22.
83. Gregory Kulacki and Jeffrey G. Lewis, "Understanding China's Antisatellite Test" *Nonproliferation Review* 15: 2 (2008): 335–347.
84. Ibid, 336.
85. Ibid, 337.
86. Moltz, *Asia's Space Race*, 21.
87. Michael Sheehan, "'Did You See That, Grandpa Mao?' The Prestige and Propaganda Rationales of the Chinese Space Program", *Space Policy* 29: 2 (2013): 111.
88. Cheng Li, "The Rapid Rise of the "Cosmos Club" in the Xi Jinping Era", *China US Focus*, July 15, 2022, https://www.chinausfocus.com/2022-CPC-congress/the-rapid-rise-of-the-cosmos-club-in-the-xi-jinping-era (accessed June 21, 2023).
89. Cheng Li, "Prominent PLA Elites in the "Cosmos Club"", *China US Focus*, September 2, 2022, https://www.chinausfocus.com/2022-CPC-congress/prominent-pla-elites-in-the-cosmos-club (accessed June 21, 2023).
90. Lauer, When States Test Their Anti-Satellite Weapons, 15. On the links between ASAT capabilities and great power status, also see Deganit Paikowsky, *The Power of the Space Club* (New York: Cambridge University Press, 2017), 228–229.
91. Fiona Cunningham, "The Stellar Status Symbol: True Motives for China's Manned Space Program", *China Security* 5: 3 (2009): 73–88.
92. Dimitrios Stroikos, "China, India, and the Social Construction of Technology in International Society: The English School Meets Science and Technology Studies" *Review of International Studies* 46: 5 (2020): 713–731. On the continuing influence of techno-nationalism as a composite ideology, see Christopher R. Hughes, *Chinese Nationalism in the Global Era* (London: Routledge, 2006).
93. Dimitrios Stroikos, "Power Transition, Rising China, and the Regime for Outer Space in a US-Hegemonic Space Order" in *Power Transition in the Anarchical Society: Rising Powers, Institutional Change and the New World Order* ed. Tonny Brems Knudsen and Cornelia Navari (Cham: Palgrave Macmillan, 2022), 329–352.

94. Lauer, When States Test Their Anti-Satellite Weapons. On China's quest for great power status, inter alia, see Yong Deng, *China's Struggle for Status: The Realignment of International Relations* (New York: Cambridge University Press, 2008); Deborah Welch Larson, and Alexei Shevchenko, "Status Seekers: Chinese and Russian Responses to U.S. Primacy," *International Security* 34: 4 (2010): 63–95; Robert S. Ross, "China's Naval Nationalism: Sources, Prospects, and the U. S. Response." *International Security* 34: 2 (2009): 46–81; Shogo Suzuki, "Seeking 'Legitimate' Great Power Status in Post-Cold War International Society: China's and Japan's Participation in UNPKO", *International Relations* 22: 1 (2008): 45–63. On the role of status and prestige in international society, inter alia, see Lilach Gilady, *The Price of Prestige: Conspicuous Consumption in International Relations* (Chicago: University of Chicago Press, 2018); Michelle Murray, *The Struggle for Recognition in International Relations: Status, Revisionism, and Rising Powers* (New York: Oxford University Press, 2019); T. V. Paul, Deborah Welch Larson, and William C. Wohlforth, eds. *Status in World Politics*. (Cambridge: Cambridge University Press, 2014).
95. Stroikos, Power Transition.
96. Joan Johnson-Freese, "China's Anti-satellite Program: They're Learning", *China US Focus*, July 12, 2013, https://www.chinausfocus.com/peace-security/chinas-anti-satellite-program-theyre-learning (accessed June 21, 2023); James Mulvenon, "Evidence of Learning? Chinese Strategic Messaging Following the Missile Defense Intercept Test", *China Leadership Monitor* 31 (2010), http://www.hoover.org/sites/default/files/uploads/documents/CLM31JCM.pdf (accessed June 21, 2023).
97. For more information about the test, see Defense Research and Development Organisation, "Anti-satellite Missile" (New Delhi: Ministry of Defense, Government of India, 2020), https://www.drdo.gov.in/sites/default/files/inline-files/ASAT_book_English.pdf (accessed June 21, 2023); Ministry of External Affairs, Government of India, "Frequently Asked Questions on Mission Shakti, India's Anti-Satellite Missile test conducted on 27 March, 2019", https://www.mea.gov.in/press-releases.htm?dtl/31179/Frequently+Asked+Questions+on+Mission+Shakti+Indias+AntiSatellite+Missile+test+conducted+on+27+March+2019 (accessed June 21, 2023); and Weeden and Sampson, Global counterspace capabilities, 04–03.
98. Narendra Modi, "Speech by Prime Minister on "Mission Shakti", India's Anti-satellite Missile Test Conducted on 27 March 2019", Ministry of External Affairs, Government of India, https://www.mea.gov.in/Speeches-Statements.htm?dtl/31180 (accessed June 21, 2023)
99. Ministry of External Affairs, Frequently Asked Questions on Mission Shakti.
100. European Space Policy Institute, "India's ASAT Test Amidst Global Ambiguity", (ESPI Brief No 31, 2019), 2, https://espi.or.at/downloads/send/5-espi-executive-briefs/419-india-s-asat-test-amidst-global-ambiguity (accessed June 21, 2023).
101. Shounak Set, India's Space Power: Revisiting the Anti-Satellite Test (Carnegie India, 2019), 2, https://carnegieindia.org/2019/09/06/india-s-space-power-revisiting-anti-satellite-test-pub-79797 (accessed June 21, 2023).
102. Kanwal Sibal, "The A-SAT Test Restores the India-China Strategic Balance", *Hindustan Times*, April 4, 2019, https://www.hindustantimes.com/analysis/the-a-sat-test-restores-the-india-china-strategic-balance/story-jkn9FsMQE3OqNdD7edCIAO.html (accessed June 21, 2023).
103. On the evolution of India's stance towards the militarization and weaponization of space, see Rajeswari Pillai Rajagopalan, "India's Changing Policy on Space Militarization: The Impact of China's ASAT test", *India Review* 10: 4 (2011): 354–378.

104. Ibid; Victoria Samson, "India's Missile Defense/Anti-Satellite Nexus", *The Space Review*, May 10, 2010, http://www.thespacereview.com/article/1621/1 (accessed June 21, 2023).
105. Ajey Lele, "Space Security Dilemma: India and China", *Astropolitics* 17: 1 (2019): 23–37.
106. Khan and Khan, Space Security Trilemma.
107. European Space Policy Institute, 2.
108. A case in point was Modi's announcement that India will launch its first human spaceflight mission mentioned earlier and his proposal for the so-called 'South Asia' satellite as part of his 'neighborhood first' policy that was launched in May 2017.
109. Bharath Gopalaswamy and Gaurav Kampani, "India and Space Weaponization: Why space Debris Trumps Kinetic Energy Antisatellite Weapons as the Principal Threat to Satellites", *India Review* 13: 1 (2014), 55.
110. Rahul Tripathi, "DRDO Ex-chief Saraswat Rules Out Political Motive", *The Indian Express*, March 28, 2019, https://indianexpress.com/article/india/drdo-ex-chief-saraswat-rules-out-political-motive-5646284/ (accessed June 21, 2023).
111. Bharath Gopalaswamy and Ting Wang, "The Science and Politics of an Indian ASAT Capability", *Space Policy*, 26: 4 (2010): 232.
112. David Kinsella and Jugdep S. Chima, "Symbols of Statehood: Military Industrialization and Public Discourse in India." *Review of International Studies* 27: 3 (2001): 353–373.
113. Stroikos, China, India.
114. There is a burgeoning literature on India's great power aspirations and its pursuit of status. See, for example, Alyssa Ayres, *Our Time Has Come: How India is Making Its Place in the World* (New York: Oxford University Press, 2018); Rajesh Basrur and Kate Sullivan de Estrada, *Rising India: Status and Power* (London: Routledge, 2017); Baldev Raj Nayar and T. V. Paul, *India in the World Order: Searching for Major-Power Status* (Cambridge: Cambridge University Press, 2003); Chris Ogden, *Indian Foreign Policy* (Cambridge: Polity Press, 2014); and Teresita C. Schaffer and Howard B. Schaffer, *India at the Global High Table: The Quest for Regional Primacy and Strategic Autonomy* (Washington, DC: Brookings Institution Press, 2016).
115. Arka Biswas, "India's ASAT Test: The Space vs Nuclear Dichotomy", *South Asian Voices*, April 1, 2019, https://southasianvoices.org/what-to-make-of-indias-asat-test/ (accessed June 21, 2023). On this point, also see Sufian Ullah and Irteza Imam, "India's ASAT Test: A Shot in the Dark", *South Asian Voices*, April 1, 2019, https://southasianvoices.org/what-to-make-of-indias-asat-test/ (accessed June 21, 2023).
116. Gopalaswamy and Wang, The Science and Politics, 232; Samson, India's Missile Defense.
117. Paul Meyer, "Restraining an Arms Race in Outer Space", *Survival* 64: 2 (2022): 81–94.
118. On the PPWT and the responses it elicited, for example, see Fabio Tronchetti and Liu Hao, "The 2014 Updated Draft PPWT: Hitting the Spot or Missing the Mark?" *Space Policy* 33: 1(2015): 38–49.
119. Aliberti, *India in space*, 177.
120. Nick Ritchie, "Valuing and Devaluing Nuclear Weapons", *Contemporary Security Policy* 34: 1 (2013): 146–173.
121. Weeden and Samson, It's Time for a Global Ban.