

AIR POWER

Journal of Air Power and Space Studies

Vol. 15 No. 3 • Monsoon 2020
(July-September)



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CENTRE FOR AIR POWER STUDIES, NEW DELHI



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CENTRE FOR AIR POWER STUDIES

VISION

To be an independent **centre of excellence on national security** contributing informed and considered research and analyses on relevant issues.

MISSION

To encourage independent and informed research and analyses on issues of relevance to national security and to create a pool of domain experts to provide considered inputs to decision-makers. Also, to foster informed public debate and opinion on relevant issues and to engage with other think-tanks and stakeholders within India and abroad to provide an Indian perspective.

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➤ EDITOR'S NOTE

The quarter just gone by was dominated by the events in Ladakh amidst the continuing stand-off since early May. Ever since June 15, when the clash at the Galwan Valley took place, in a roller-coaster change of stance at the diplomatic level, the Chinese were at their best by not showing their true hand while waxing eloquent about the need to calm tempers at the tactical level and maintain peace and tranquillity along the LAC.

A memorial has since been built on the Darbuk-Shyok-DBO (DSDBO) Road (at Km 120 stone) to commemorate the supreme sacrifice of the twenty bravehearts—the Gallants of Galwan—who evicted the PLA soldiers and destroyed the observation post that the PLA had built on Indian soil near the Y-junction of the Galwan river.

On September 29, in a sudden, unilateral move, China declared the 1959 claim line as its perception of the Line of Actual Control. Rejecting the abrupt declaration, India responded that the cartographic claim that was made by then Chinese Premier Chou En-lai to then Prime Minister Jawaharlal Nehru through a letter on November 7, 1959, had been rejected even then by the Indian prime minister as soon as the absurd claim was made. On September 30, 2020, they were also reminded that China was already in illegal possession of 33,000 sq km of territory in Aksai Chin, besides the 5,180 sq km of territory in the Shaksgam Valley that was illegally ceded to it by Pakistan in 1963. The Chinese side was further asked to refrain from advancing an “untenable” interpretation of the de facto border. On September 30, 2020, during the diplomatic level talks at the 19th round of the Working Mechanism for Consultation and Coordination (WMCC) on India-China border affairs, both sides agreed to continue early actions to ensure peace and tranquillity along the border, with the Chinese side also stating that both sides should “take practical measures

to promote further de-escalation and cooling of the border situation and *avoid any action that could complicate the situation (emphasis added)*".

It appears that the Chinese have been particularly peeved at the preemptive action taken by the Indian Army in occupying key positions—while being on the Indian side of the LAC on the south bank of the Pangong Tso—that overlook Chinese positions. Hence, the above inclusion in the Chinese statement. Calling it another 'stunt' by the Indian Army, the Chinese media is awash with rhetoric that this action by India would see a befitting reply by the Chinese who would inflict another 'new defeat' on the Indian Army in the Pangong lake region.

The two sides remain locked in eyeball-to-eyeball confrontation while the diplomatic parleys continue.

Pakistan, not the one to sit idly by while India and China face-off at the LAC, has been stoking the POK/GB fire and following its favourite pastime: that of finding new ways of needling India. This time it was through a declaration of intent to elevate the status of Gilgit-Baltistan to a 'full-fledged Province'. It appears that Pakistan has got so carried away on the need to show solidarity to 'Big Brother China' that it is willing to risk international opprobrium if it goes ahead and declares the region—which is still a disputed region between India and Pakistan—as its Fifth Province. The biggest advantage would accrue to China by such a declaration as it would, de facto, 'clear the decks' for the CPEC project to roll on 'officially', besides permitting Chinese businessmen to buy land in GB. But are the Chinese really that naïve not to see the dangers that lie in store for them before investing large sums of money in areas that are not the sovereign territory of Pakistan—not even contained in Article 1 of the Pakistani Constitution? Also, the final status of the erstwhile State of J&K is not yet decided. Of course, the shrewd Chinese mind has already found that there is more than one way to skin a cat. In this case, while proposing the Flagship project of its BRI, the Chinese were aware that the CPEC would pass through GB—a disputed territory. It will be recalled that once India showed its unwillingness to be a part of China's One Belt One Road initiative—on the grounds that the CPEC violated India's sovereignty—China was looking for a way to placate India. Accordingly, it conveyed to

India the terms contained in Article 6 of the Agreement it had signed with Pakistan in 1963 (after Pakistan had illegally ceded the Shaksgam Valley to China—a total of 5,180 sq km) that clearly mentions that when India and Pakistan settle the Kashmir dispute, *the sovereign authority concerned would reopen negotiations with the government of the People's Republic of China, on the boundary as described in Article 2 of the present agreement, so as to sign a formal Boundary Treaty to replace the present agreement.* The Chinese proclivity of taking a 'long-term view' of matters that could jeopardise its national interests in future, appears to be vindicated when one sees the ongoing developments post the abrogation of Article 370.

There is absolutely no harm in taking a long-term view of things and being pragmatic, especially when you are about to sink a sizeable amount of your national wealth into a project that could go horribly wrong. If China is going ahead with the CPEC for meeting its 'Connectivity requirements'—an alternate supply route that could resolve its Malacca Dilemma—is India not entitled to resolve *its* connectivity problems by reaching out to the Central Asian Republics via the Wakhan Corridor? Should India, then, not look at *its* strategic interests that are inextricably linked to the very same region? That the access to CAR lies in an area under Pakistan's wrongful occupation is an internal matter of India; how that can be resolved should be a bilateral issue between the countries involved. A third nation—that is best seen as an 'opportunist' and one that has literally 'arm-twisted' Pakistan into ceding to it a critical portion of the Shaksgam Valley, and now plans to construct a road through this territory, and onwards through GB, to further its national interests—has absolutely no *locus standi* in this issue.

The geostrategic position that GB enjoys—at the gateway that opens to West Asia—is an advantage that China would never want to squander away. Putting pressure on Pakistan to legitimise its construction of the CPEC is high on the agenda of Xi Jinping. China also feels threatened by the fact that the strategic Karakoram Pass is barely 15 km from the Indian post at DBO, and which has since been connected by the DSDBO road built by India's Border Roads Organisation. Hence, the continued stand-off with India at the LAC since April—in a staring contest to see who blinks first.

The action taken by the Indian military to forestall any action by the Chinese in the Ladakh and Arunachal sectors includes positioning of Akash SAMs, Brahmos surface-to-surface cruise missiles (not to forget that these can also be launched from the Su-30 MKI), the T-72/T-90 Main Battle Tanks, BMP-2 Infantry Combat Vehicles, and a host of other subsonic cruise missiles, shoulder fired SAMs, radars, and other elements of the army and the air force crucial to war-fighting. While this build-up has taken place to send a strong message to the other side, one must not forget the Chinese proclivity to 'go around obstacles', much like water does while flowing downstream and encounters a boulder in its path. This Sun Tzu dictum has been followed by the Chinese in more battles than one. Providing adequate defence-in-depth with a tiered/layered defence to challenge the adversary, should he attempt to outflank areas where defences appear to be strong, would be the most appropriate method to counter such designs of the enemy.

Another disturbing fact that has emerged of late is the mining activity that is being carried out in the border town of Lhunzhe opposite the Arunachal sector. The town has been in the throes of a 'gold rush' due to rich finds of the yellow metal, silver and other minerals—estimated to be worth more than US\$ 60 billion. The mining activity in the region—which is extremely close to the border—has the potential to become a military flashpoint in the future. With Xi Jinping personally imploring Han Chinese to settle in the area 'and grow roots', the intentions of the Chinese in that region do not inspire confidence. It will be recalled that one of the reasons for the withdrawal of the PLA from the areas close to Missamari (near the foothills close to Tezpur) in Assam—to which they had advanced during the 1962 conflict—was the lack of local support to withstand the long winter period that lay ahead that would have cut off their supply routes. With more Han Chinese settling in the border areas—like the border town of Lhunzhe—Xi hopes to overcome this shortcoming in the future.

And finally, another typical Chinese trait that has surfaced post the creation of the PRC is the harking back to the 'Century of Humiliation' by its leadership to evoke nationalism in times of crisis, or to further a geopolitical/geostrategic agenda. It has been seen in the actions by the Chinese in the SCS where they have given the rules-based world order (UNCLOS-82) a go-by

and implanted domestic laws of China to justify their actions at building military infrastructure on reefs after dredging and 'reclaiming' the area from the sea. A weak reference to the Century of Humiliation 'in modern times' was attempted by them after the Chinese Embassy was bombed in Belgrade—by mistake—by US aircraft during the Kosovo conflict. Given the Chinese propensity to recall such incidents to raise national sentiment—and justify any action thereof—it would be advisable to keep in mind the humiliation suffered by the PLA at Walong during the 1962 conflict. This was the only sector in which the Indian Army counterattacked the PLA, and where the PLA suffered huge casualties. Could the PLA, then, be thinking of some action to 'avenge' the bloody nose they got at the hands of the valiant Indian Army at the Battle of Walong?

In this issue, we also pay homage to our founder Director, late Air Cmde Jasjit Singh. Usually, CAPS conducts the annual Jasjit Singh Memorial Lecture at India Habitat Centre in July; the same had to be cancelled this year due to the Covid-19 situation.

Born on July 8, 1934, he joined the IAF in 1956 and was commissioned into the Fighter stream. During his extremely eventful and successful career in the IAF—that also saw him participating in the 1971 Indo-Pak conflict where he earned a Vir Chakra—he was appointed Deputy Director, IDSA in 1985. This was a first for a serving military officer, and the beginning of an even more rewarding second career for Jasjit Sir, as he went on to become one of the foremost strategic thinkers and military strategists that the nation has ever produced. After taking over the reins of IDSA from Shri K. Subrahmanyam in 1987, he served as its longest serving Director—for 14 years!

Thereafter, he set up CAPS under a private, non-profit trust registered in New Delhi called the Forum for National Security Studies. From its humble beginnings in a DDA flat to its present location in Subroto Park, was a journey that was full of hard work and the unflinching commitment to see how best CAPS could be an instrument to provide professional military education to the IAF and to help it understand the global trends in air power transformation. National security remained the underlying *mantra* behind all his endeavours at CAPS that soon began to grow in stature under his dynamic and visionary leadership. In a cruel twist

of fate, he succumbed to a bronchial infection and breathed his last on August 4, 2013.

Dr. Manpreet Sethi, Distinguished Fellow at CAPS, and one of the many scholars groomed by Jasjit Sir, pays a special tribute to him in an article that appears in this issue. It is titled "Jasjit Singh: The Nuclear Strategist with the Red Turban". I would not like to steal her thunder any further, knowing how emotionally attached she—and the other scholars at CAPS—were to Jasjit Sir, not the least for his professional acumen, but also for his humaneness.

Finally, a word of caution.

China has been over-hyped in recent times. There have been so many Webinars—forced by the outbreak of the Wuhan virus—that have dealt with 'China's (not-so) peaceful rise', that it has become a self-defeating exercise, to say the least. A common thread in most such webinars that deal with the security threat posed by China is that most of the new technologies that China boasts about—Quantum communications, AI, Hypersonic Glide Vehicle (DF-17), and others—have never been tested in an operational environment. Their interplay and integration with other systems to produce the desired effects is at best a work in progress as many strategic experts around the world suggest. To make the enemy ten feet tall would, therefore, be an exercise in self-deterrence, and needs to be studiously avoided. At the same time, making good one's critical voids in military equipment, gearing up for a long haul, and staying prepared for a worst-case scenario, and most importantly, having faith in your capabilities and your level of training, would be the most pragmatic exercise for the Indian military establishment in the current situation.

Happy reading!

STAY SAFE STAY HEALTHY STAY CHEERFUL



JASJIT SINGH: THE NUCLEAR STRATEGIST WITH THE RED TURBAN

MANPREET SETHI

INTRODUCTION

Air Cmde Jasjit Singh AVSM VrC VM (retd) was amongst India's most versatile strategic thinkers whose understanding and writings traverse a wide expanse of subjects like aerospace and air power, challenges posed by Pakistan and China, higher defence organisation, India's foreign policy, defence economics and modern forms of warfare, as well as social issues impacting national security, counter-insurgency and many more. However, particularly close to his heart was the subject of India's nuclear future—from the perspective of utilising the technology for peaceful applications as well as optimally putting its military dimension in the service of national security.

The role that nuclear energy could play in India's energy mix and the role that nuclear weapons should play in national security strategy were both issues on which Jasjit Singh spent a lot of his thought and writing. On the former issue, he framed the need for nuclear energy in the context of India's energy security and argued in favour of the country's accommodation into the international nuclear regime so that outside help could be available to

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This paper has been written for the forthcoming book by Shrabana Barua and Soumya Awasthi, eds., *Tribute to Makers of India as a Nuclear Power: A Biographical Tale*. The paper is published here with the permission of the editors.

Jasjit Singh framed the need for nuclear energy in the context of India's energy security and argued in favour of the country's accommodation into the international nuclear regime so that outside help could be available to the indigenous nuclear power programme for its rapid expansion.

the indigenous nuclear power programme for its rapid expansion. On the latter issue of nuclear weapons, he was clear that it was a necessary evil given the security compulsions of the neighbourhood. But he never gave up the idea that India must continue to press for universal elimination of nuclear weapons. In fact, he had plans to write his next book called *Counterstrike*, to further the understanding of no first use (NFU), a much misunderstood concept, in India's nuclear strategy. Global acceptance of NFU, he firmly believed, could also serve as a stepping stone towards universal

nuclear disarmament. Unfortunately, his book was not to see the light of day. He passed away on August 4, 2013 after having lived and breathed national security for over six decades of his active service—almost half of which was spent in think tanks.

EARLY YEARS

Born on July 8, 1934, in his ancestral home in Chandpur Rurki, a small village close to Nawanshahr in Shaheed Bhagat Singh Nagar district of Punjab, Jasjit Singh was one of eight siblings. Born into a landed family, his father felt that Jasjit's first responsibility lay in helping run the farm, even though he got his graduation in English (Hons) from a college in Shimla. Jasjit Singh was always very proud of his proficiency in English language which he learnt first at a missionary school that he attended in Lahore, and then honed during graduation. One is often reminded of his insistence on the distinction between certain words such as *will* and *shall*—vocabulary that is pretty much used interchangeably today. But he would always remember his school grammar that had ingrained in him the difference in usage of the terms. He brought this to bear in the drafting of the nuclear

doctrine where he was sure of why he was writing “India shall pursue a doctrine of credible minimum nuclear deterrence” or that “any nuclear attack on India and its forces shall result in punitive retaliation with nuclear weapons to inflict damage unacceptable to the aggressor.” For him, *shall* spelt a definitiveness that brooked no hesitation, whereas *will* could indicate the exercise of an option.¹

After finishing his graduation, Jasjit wanted to join the Indian Air Force (IAF), but surprisingly enough, his father, who had himself retired as

Chief Minister of Nabha State and returned to farming, disapproved of the decision. As stated earlier, he wanted Jasjit to join him in farming, and the son complied. But a period of drought during 1951-53 convinced him that he could not make a career out of farming. Finally, his father agreed to let him join the IAF and Jasjit joined the service in 1954, earning his commission in 1956.

Soon after, Jasjit Singh graduated with top honours and was awarded the much coveted Jodhpur Sword of Honour. He served the institution of IAF for thirty-one years with great distinction. As an ace fighter pilot, not only was he a flying instructor but he also tenanted several operational, command and instructional appointments. His participation in the Indo-Pak war of 1971, where he carried out air attacks that destroyed Pakistani tanks, won him a Vir Chakra for his gallantry in the face of enemy action. Subsequently, in 1974 he was awarded the Vayu Sena Medal by the IAF for his significant

Jasjit Singh’s participation in the Indo-Pak war of 1971, where he carried out air attacks that destroyed Pakistani tanks, won him a Vir Chakra for his gallantry in the face of enemy action. Subsequently, in 1974 he was awarded the Vayu Sena Medal by the IAF for his significant work in the personnel branch on manpower and career planning. The Ati Vishisht Seva Medal came his way in 1984 for his distinguished service.

1. Modern English usage of the two terms can be found in the sentence, “*will* can imply volition or intention, while *shall* can imply necessity”, as cited in Maeve Maddox, “the difference between ‘will’ and ‘shall’”, <https://www.dailywritingtips.com/the-difference-between-will-and-shall/>

work in the personnel branch on manpower and career planning. The Ati Vishisht Seva Medal came his way in 1984 for his distinguished service.

During his time as a fighter pilot, Jasjit underwent two ejections from aircraft that he was flying. The first such incident took place on October 18, 1973 (which was also his wedding anniversary) when a bird hit caused engine failure and led to loss of control over the aircraft. The mishap happened while he was posted at Hindon. The second incident took place in 1977 when he was commanding 17 Squadron at Halwara. This time the aircraft had an engine malfunction and he was compelled to eject. Both times, during the ejections, he suffered multiple spinal injuries, but his destiny brought him back for bigger things in life. Many a time, and especially when he held on to contrarian positions, he would joke that since he had broken his spine twice, it went to show that he had a spine!

By the early 1980s, once it was clear that the injuries would not let him be fit enough to fly fighter jets again, his academic interests came to the fore. He completed his Masters in history from the University of Mysore during this time. He also started writing a series of articles on air power for *Strategic Analysis*, the flagship journal of the then only national security think-tank in India, the Institute for Defence Studies and Analyses (IDSA) at New Delhi. This is how he and IDSA got introduced to each other and their destinies were to remain intimately intertwined for sixteen years thereafter.

THE JOURNEY AS A STRATEGIC THINKER

In 1985, Jasjit Singh became the first serving military officer to be appointed Deputy Director at IDSA. This was an unprecedented move both for the IDSA and for the military. He himself used to say that few in the IAF understood his decision at the time. They considered it crazy for him to give up a promising service career to 'move to the sidelines' to do research on air power and national security. At IDSA, the Director then was Mr. K. Subrahmanyam, the individual who India remembers as the doyen of national strategic thinking, particularly on nuclear strategy. The two came to form a formidable team as they wrote and spoke on matters of national security.

Two years later, in 1987, K. Subrahmanyam or K Sub, as he was called by all, decided to retire from his active position as Director. He reposed his faith in Air Cmde Jasjit Singh to step into his shoes. Many years later Jasjit described this moment as having arrived too quickly for him. He found the shoes of Mr. Subrahmanyam too large for him and he felt that he had only been shuffling along in them! However, for fourteen years after the change of guard at IDSA, Jasjit remained in the position of Director until 2001. He made a huge contribution in earning a stature for the organisation that made it count across the world as one of the leading policy think tanks. The crop of scholars that he groomed and mentored by showing direction as Director, today constitute the vibrant strategic community that populates nearly every think tank in India.

The dawn of the decade of the 1990s came with the end of the Cold War. As the US-USSR/Russia relations transformed, it spelt a tectonic shift not just for the world in general but also for India. The collapse of the USSR, with whom India had forged a deep strategic relationship, and the brief unipolar moment with the US as the sole superpower, with whom India had not enjoyed great relations during the Cold War, put New Delhi in a difficult diplomatic situation. At this juncture, Jasjit Singh stepped up his efforts to secure the country's interests in a changing geopolitical landscape. While he engaged with his counterparts across the world, of particular relevance were his interactions with the USA, Russia and China. In fact, during the decade of the 1990s, he led eight rounds of Track II Indo-US strategic dialogues. He also annually addressed military academies in Moscow and Beijing. These engagements had a major impact on shaping perceptions about India and in imparting an understanding of India's security challenges. Further, this served as a period of laying down the groundwork that had a huge role to play in the quick turnaround in American perceptions and position on India after the conduct of nuclear tests in 1998. He and Mr. Subrahmanyam (who remained a frequent participant at IDSA events) made a significant contribution to shaping the country's nuclear discourse at a time when it was ostracised and under severe international sanctions.

An anecdote comes to mind about the man who inspired many scholars and was instrumental in harnessing the young minds. In 1997, I had already submitted my doctoral thesis at the Jawaharlal Nehru University, New Delhi, and was eager to start a career as an international affairs research analyst. Air Cmde Jasjit Singh, then Director of IDSA interviewed me. He did not check my academic credentials and declined to see my certificates. Rather, I remember being asked by him to spell out my dreams for myself and my country. After a few minutes of conversation on the state of nuclear non-proliferation, he asked me, "So when do you want to join? Tomorrow?" This was typical of the man—ever welcoming of young scholars and always willing to give them a chance. He never dithered in appointing new scholars. He used to joke that people called him a 'tin pot dictator' for making these decisions without calling for an appointment committee and following elaborate procedures. But, he took these decisions based on his gut instincts and it is clear that they worked well, since there are many in the strategic community today who can attribute their careers to the platform he gave them. I was lucky to be one of them.

It was also my good fortune to join the IDSA in 1997, one year before India tested its nuclear weapons. The momentousness of the event and its implications revealed themselves to me through my observations of Jasjit Singh's myriad interlocutions with others of the Indian and international strategic community on the subject, as well as through my many interactions with him over the years. As it may be recalled, when India conducted its nuclear tests on May 11 and 13, 1998, the international community led by the USA and its allies erupted in anger and strongly criticised the action. Sanctions and technology denials followed as the then American President Bill Clinton led the demand that India 'cap, roll back and eliminate' its nuclear weapons programme.

At a delicate time like this, India's diplomatic cadres went into overdrive across all major capitals of the world to explain the nation's nuclear compulsions. As the Director of IDSA, India's premier national security think tank that was beginning to be recognised and respected around the world, it

also fell upon Jasjit Singh to put his weight behind this effort. He contributed wholesomely to the making of informed opinion on India's nuclear policy. He travelled across the length and breadth of the world to explain Indian threat perceptions to policymakers and opinion shapers and thus subtly influenced their view of India. It is hardly surprising that so many in the strategic world remember him as the man with the red turban who passionately, but politely, argued the case for India's nuclear status.

The period 1998-2001, the four years before he retired from IDSA, could perhaps be counted amongst the busiest ones of his career as a strategic analyst. He spent nearly all his time addressing conferences across the world, participating in TV discussions, writing short and long articles, hosting delegations from many countries, organising conferences. Every action was a brick in the making of the understanding of what a nuclear India meant.

Meanwhile, just before the nuclear tests in 1998, the National Democratic Alliance (NDA) Government, in fulfilment of one of the agenda points from its election manifesto, had set up a three-member Task Force under Shri K. C. Pant to review policy challenges and recommend structural reforms to India's higher defence organisation. Mr. Jaswant Singh was a member of the Task Force, while Jasjit Singh was made its Convener. In this capacity, he laboured for months and temporarily also relocated himself to an office on Parliament Street as he immersed himself in the exercise. The group managed to produce a comprehensive document that recommended measures that could be taken to remedy the situation. These steps eventually led to the creation of the National Security Council (NSC), Strategic Policy Group (SPG) and the National Security Advisory Board (NSAB), even though the NSC model that was adopted was not truly in concurrence with the one recommended by the KC Pant Committee.

Even as Jasjit Singh was busy with the task mandated to the Committee, he was conscious that the conduct of nuclear tests by India necessitated a publication that explained the country's position on the subject. One afternoon, soon after the nuclear tests, he summoned some of us, the IDSA researchers, to his new den to share his idea of bringing out a book, the

Jasjit Singh wrote, rather presciently in 1998: China is, and is likely to remain, the primary competitor and challenge to India in strategic terms, ranging from competition for investments, markets, political influence, especially in the developing world and possible military terms.

name of which he had already thought of—*Nuclear India*. He wanted to document the new and significant development in India's nuclear journey. Each one of us was tasked to write a chapter for the book and we were given a stiff deadline. Consequently, in only two months of India going nuclear, the book was published to explain this new reality to the world and to the people at home. The volume explained the need for India to conduct the nuclear tests at that juncture, the complexities that the new status would bring for the country and the doctrine and strategy

it must follow as a path towards an affordable credible deterrence. To this day, the book remains essential reading for anyone wanting to understand nuclear India.

A PEEP INTO JASJIT SINGH'S NUCLEAR THINKING

Jasjit Singh was clear that the reason for India's acquisition of nuclear weapons was not prestige or status, but security. The former, he firmly believed would only come from "how we solve our problems and how we conduct ourselves in the face of evolving geo-strategic and geo-economic realities." Nuclear weapons, on the other hand, were meant to provide an "assured environment of peace and stability in which our primary goal of human development can be pursued unhindered." Therefore, in his reckoning, the weapons were an "insurance against challenges to peace, stability and our independence of decision making."² And, the environment so created was to be exploited by the country to grow and develop. Prestige, he believed, would naturally follow.

In his assessment, the biggest threat to India's rise was the uncertainty posed by China's ascendance to economic and military power and the future direction of its policies. The India-China bilateral agreement of 1993 (on

2. Jasjit Singh, ed., *Nuclear India* (New Delhi: Knowledge World, July 1998), p. 10.

Maintenance of Peace and Tranquillity along the Line of Actual Control) was based on the principle of 'mutual and equal security', and in Jasjit's reckoning, the acquisition of nuclear weapons strengthened India's 'equal security', which in a case of nuclear asymmetry would have been a mirage. He wrote, rather presciently in 1998:

China is, and is likely to remain, the primary competitor and challenge to India in strategic terms, ranging from competition for investments, markets, political influence, especially in the developing world and possible military terms.³

This sentence written two decades ago is today a reality as China flexes its military muscles in South China Sea and reaches out to developing nations across the world with its Belt and Road Initiative (BRI).

While explaining the centrality of China as a security threat as the reason for India to acquire nuclear weapons, Jasjit Singh, nevertheless, also took pains to explain that before taking the difficult decision of conducting nuclear tests, India had long pursued a policy of keeping its nuclear options open. "This was an approach in keeping with Indian civilisational value of taking the veritable middle path," said Jasjit Singh. India kept to this path in the hope that the world would move towards disarmament at some stage and that would address India's security concerns from China. But the move of the world at the end of the Cold War from disarmament towards a renewed focus on discriminatory non-proliferation (with the indefinite and unconditional extension of the Non-Proliferation Treaty in 1995 and the conclusion of the Comprehensive Test Ban Treaty in 1996 as well as strengthening of ad hoc

3. Ibid., p. 19.

export control instruments) put pressure on India's ability to stay on the middle path. As he pithily put it: "The situation that India faced by early 1998 was that if the stranglehold of the non-proliferation order continued to tighten around the open option, and India did not take steps to break out of it, very soon it would be no option left." So, it was hardly surprising that India decided in favour of testing, willing to bear the costs the decision might entail, over living in a state of permanent nuclear adverse asymmetry.

Despite having taken the step of possessing nuclear weapons, Jasjit Singh was clear about India's ethical stand. He wrote:

India's strategic and security interests are served better if there are no nuclear weapons that can impinge on India's security calculus. Nuclear disarmament, therefore, is not only a moral/ethical principle for us, and a necessity for international peace and security, but also an imperative for national security.⁴

According to him, this factor had not altered even after India went nuclear and in fact, could even be leveraged to "strengthen our negotiating position to seek disarmament".

As a vocal member of the international Pugwash movement that brings together scholars and public figures to work towards peace and security, Jasjit argued passionately in favour of universal, multilaterally negotiated, verifiable disarmament. In 1988, he was pivotal in the drafting of the Action Plan that was presented by then Prime Minister Rajiv Gandhi at the Third Special Session on Disarmament. Twenty years later in June 2008, he planned and executed (despite having fallen seriously unwell in February that year) an international conference—"Towards a Nuclear Weapons Free World"—which was addressed by the Prime Minister and the Vice President of India and was attended by as many as two hundred members of India's strategic community, including fifteen international experts. He had conceived the idea of the conference towards the end of 2007 and had it vetted by then

4. Jasjit Singh, "Nuclear Diplomacy", in Jasjit Singh, *Nuclear India*, pp. 289-90. Italics in original.

National Security Advisor (NSA) who agreed readily, including providing funding from the Ministry of External Affairs for the event. The Indian Council of World Affairs (ICWA) also agreed to co-sponsor the conference and share the myriad tasks.

Jasjit Singh wanted it to be an international conference and he quickly set in motion the process of contacting his vast network of strategic friends spread across the world. However, before the implementation of his ambitious plans could commence, he suffered a severe brain haemorrhage in February 2008 and remained in hospital for several weeks. Through March and April, the state of his health caused much concern, even as the Additional Director, AVM Kapil Kak valiantly held fort. Soon after his discharge though, while not allowed to come to office, he made sure that the office came to him! So, from his study he directed the execution of the humongous task of crafting the programme, sending out invitations, overseeing flight and hotel arrangements and ensuring the smooth conduct of the conference. The prospects and challenges of universal nuclear disarmament were well examined in the two-day deliberations that were inaugurated by the then Prime Minister. As explained by Jasjit himself in his introductory remarks:

We plan to explore the nuclear environment of the future in its diverse dimensions and discuss the ways and means of dealing with them ... As we know consciousness of the danger is a prerequisite to our ability to deal with it successfully. It is the consciousness slipping back in our minds that led to lowered attention to abolition of nuclear weapons after the end of the Cold War.⁵

He also made a persuasive case for “a paradigm shift from competitive security to cooperative security” as a way of managing future challenges especially to manage international peace and security in a non-nuclear world. The papers presented by scholars of high stature made for a worthy volume

5. Jasjit Singh, “The Third Nuclear Wave: Introductory Remarks to the New Delhi Conference”, in Manpreet Sethi, ed., *Towards a Nuclear Weapon Free World*, (New Delhi: KW Publishers, 2009), p. xii.

and it was the big-heartedness of the man that he asked me to be the editor of the book that was published in 2009.⁶

Despite being a supporter of universal nuclear disarmament, Jasjit had no illusions that such a world was going to come about either quickly or easily. So, while he exhorted India and other countries to make efforts to achieve this goal some day, for the present, he was realist enough to understand that India would need to possess nuclear weapons to protect its national interests. He recognised that this also meant drafting a clear and unambiguous doctrine having an appropriate role for nuclear weapons. This task too was ably performed by the Air Cmde in his capacity as a member of the first National Security Advisory Board constituted by the Government of India under the chairmanship of Mr. K. Subrahmanyam. Along with other astute minds well versed in understanding of nuclear deterrence as part of the group, the duo worked hard to put together a draft doctrine. This was produced in record time and presented to the government around the middle of 1999. The draft, in a rather uncharacteristic move for India, was made public by then National Security Advisor, Mr. Brajesh Mishra, in August 1999.

Contours of what came to constitute India's nuclear doctrine can be discerned from Jasjit's chapter on "A Nuclear Strategy for India", in *Nuclear India* that was published almost a year before the doctrine was drafted. He opined in the chapter that India's nuclear doctrine must take its direction from the logic of the role that India wants to bestow upon its nuclear weapons. In his view, the role of India's nuclear weapons was to dissuade and deter nuclear blackmail and coercion and to prevent the threat of use or use of nuclear weapons against Indian territory or people. With this in view, he found no role for nuclear weapons for war-fighting. Accordingly, he firmly ruled out the need for any pre-emptive use of the weapons. With NFU as the driving strategy, he rightly put emphasis on survivability of the nuclear arsenal as a crucial necessity. As he pointed out, "various ways will have to be found so that an adversary is not

6. Manpreet Sethi, ed., *Towards a Nuclear Weapon Free World* (New Delhi: KW Publishers, 2009).

tempted to believe that a first strike against us will seriously degrade our ability to retaliate.”⁷

Writing on the issue of tactical nuclear weapons, a capability that Pakistan introduced into its nuclear deterrence posture with its first test of the very short-range ballistic missile, Nasr, in April 2011, Jasjit had already dismissed the concept of tactical nature of nuclear weapons in 1998, especially between physically contiguous neighbours. He wrote:

Any nuclear weapon of any quality, mode of delivery or yield, used against any type of target, will result in a strategic impact to which the logical response would be the use of nuclear weapons, more often than not, on an overwhelming scale ... Regardless of the yield or type of delivery system, we must ensure that we do not become the victim of believing in the fallacy of any nuclear weapon being tactical. The artificial division of nuclear weapons into tactical and strategic is not only irrelevant for us, but carries with it the danger that a belief system could grow in a way that might justify the use and utility of such weapons for actual war-fighting.⁸

As is evident, the book *Nuclear India* sought to make public the altered context and content of India’s nuclear debate. His attempt was to highlight the issues that would need serious and detailed consideration and evaluation in the public domain so that a national perspective could emerge. He himself acknowledged that the book:

[S]et forth some ideas, not with the belief that they represent a finality of logic and necessity, or even to perceive them as some sort of prescription, but with the hope that they will trigger further discussion and debate to evolve our nuclear doctrine and strategy.⁹

7. Jasjit Singh, “A Nuclear Strategy for India”, in Manpreet Sethi, ed., *Towards a Nuclear Weapon Free World*, p. 314.

8. *Ibid.*, p. 317.

9. *Ibid.*, p. 323.

Signs of definite restraint by India to neither expand the scope of conflict by opening another front, nor allowing its aircraft engaged in the operation of dislodging the Pakistani soldiers from crossing the Line of Control (LoC), led the international community to tilt its opinion in favour of India. The ability to execute a limited conventional response when both sides had demonstrated nuclear capability was seen as responsible behaviour, and it stood out in stark contrast to the irresponsible and provocative actions taken by Pakistan.

Indeed, some of the principles and beliefs that he then articulated have stood India in good stead as its capabilities have improved in keeping with the guidelines provided by the doctrine.

In the closing pages of the book, Jasjit Singh made an assertion. He wrote:

War in the sub-continent, if it takes place will remain a “border war” limited in time, space and aims. The “N”-factor will continue to weigh heavily on the prospect, scope, and nature of a conventional war involving India ... in the past, the wars of the subcontinent were limited (in time, scope, goals, etc.) by choice. But nuclearisation has made wars limited as an imperative.¹⁰

This proved to be so uncannily correct when in less than one year of the publication of this book, Pakistani regular soldiers had infiltrated into Kargil dressed as *mujahedeen*. This was a bold step taken by Pakistan under the assumption that its nuclear weapons gave it the freedom to undertake offensive actions with no risks since the international community was expected to step in quickly to disentangle the situation. As Jasjit often explained, the central logic of Pakistan’s acquisition of nuclear weapons was to “neutralise Indian conventional superiority to the degree that any punishing military operation by India in retaliation to its actions is forestalled by the risk of escalation

10. Ibid., p. 311.

to a nuclear weapon exchange.”¹¹ However, while conceding that the presence of nuclear weapons may have made full-scale wars difficult, Singh was a votary of the concept of limited war. In fact, he believed that the country that could manage the dynamics of limited war would be able to run a successful national strategy.

In Kargil, as India fought back to regain its territory it was able to “demonstrate the politico-military acumen to conduct a limited war”.¹² This negated the Pakistani assumption of an early involvement of the international community that would insist on a ceasefire, thus enabling salami slicing of territory. But, signs of definite restraint by India to neither expand the scope of conflict by opening another front, nor allowing its aircraft engaged in the operation of dislodging the Pakistani soldiers from crossing the Line of Control (LoC), led the international community to tilt its opinion in favour of India. The ability to execute a limited conventional response when both sides had demonstrated nuclear capability was seen as responsible behaviour, and it stood out in stark contrast to the irresponsible and provocative actions taken by Pakistan.

Pakistan’s defeat at Kargil created considerable misgivings between the civilian administration and the military institutions. After a number of developments that heightened the tensions, Prime Minister Nawaz Sharif decided to remove then Chief of Army Staff (COAS), General Musharraf, from the position. This act was done when the COAS was not even in the country and he is reported to have received the news as he was playing golf in Sri Lanka on the 50th anniversary of the Sri Lankan Army. The Army, however, could not have been expected to take this move lightly. In fact, it was a matter of little surprise that on October 12, 1999, with the support

On October 12, 1999, with the support of the Chief of General Staff, Gen Musharraf managed to stage a coup and ousted the Prime Minister. He even elevated himself to the position of Chief Executive of Pakistan.

11. Jasjit Singh, “The Fourth War”, in Jasjit Singh, ed., *Kargil 1999: Pakistan’s Fourth War for Kashmir* (New Delhi: Knowledge World, October 1999), p. 125.

12. *Ibid.*, p. 126.

of the Chief of General Staff, Gen Musharraf managed to stage a coup and ousted the Prime Minister. He even elevated himself to the position of Chief Executive of Pakistan.

The day this event took place happened to be one on which IDSA was hosting a delegation from abroad. At the evening dinner organised for them on the India International Centre (IIC) rooftop, the talk was all about the latest development in Pakistan and its future as a nuclear state with the army in the saddle. Little did I, then a fledgling in these circles, realise the importance of what was being discussed by the stalwarts at the gathering. But, this was a unique way of mentoring by the Air Cmde. He gave ample opportunity to young scholars to rub shoulders with seniors and encouraged them to ask questions, sit at the main table and engage in conversation. It was a sheer delight to see him in action at such events—a gracious host and a firm speaker upholding India's national security interests.

AN INSTITUTION BUILDER—FROM IDSA TO CAPS

After retiring from IDSA at the age of 67, Jasjit Singh briefly took on the role of editorial advisor for defence and strategic affairs at *The Indian Express*. Enjoying a great rapport with the young workforce at the newspaper office, he was equally at ease in the small cubicle. He had a kettle and a couple of cups tucked away in a corner and had no qualms about making the coffee himself and offering it to every visitor with lots of food for thought on the evolving global security scenario. His columns reflected on these matters and he was also happy to answer questions from laymen on issues related to national security.

However, his stint at the newspaper did not last very long as he soon immersed himself in the task of setting up the Centre for Air Power Studies (CAPS) under a private, non-profit trust registered in New Delhi called the Forum for National Security Studies. This was mandated to undertake studies in national defence and security, military affairs and strategy in general and on air power dimensions in particular. It was meant to provide professional military education to the IAF and to help it understand the global trends in

air power transformation. The first office of CAPS was a room and a half in a DDA flat, the other half being occupied by the Indian Pugwash Society. The drawing room of the flat had been converted into a small conference hall with a large round table in the centre. This also doubled as office space once a couple of air force officers were deputed by the IAF to the Centre to initiate studies on air power and space. Most of the money for furnishing the office and hosting the few early seminars followed by lunch came out of the Air Cmde's own pocket. But, such was his passion and drive that he kept the endeavour going till more funds were provided by the Ministry of Defence to set up a corpus to sustain the Centre.

The other initial source of income for the Centre was a project that Jasjit obtained from the Department of Atomic Energy (DAE) to study the case of nuclear energy for India. Back in 2003, one day Air Cmde called me in Jamnagar to say that CAPS had obtained the project and that it was time for some hard work. His objective was to come up with a study that would suggest solutions on how to get India out of the stranglehold of the non-proliferation regime. The task was to produce a series of papers on the Nuclear Suppliers Group—its functioning, limitations and possibilities of engagement with India. As part of this effort, a national seminar was organised in the first half of 2004 in which presentations with the idea of seeking India's exceptionalisation from the NSG were made.

As one of the deliverables of the DAE project, a newsletter called *Nuclear Power* was started. It began as a short 8-page, fortnightly compilation of news and views. Despite all constraints of resources and manpower, Jasjit Singh was committed to bringing out the newsletter without interruption and to sending it *gratis* to policymakers and members of the strategic community. Sitting in Jamnagar, with often unreliable access to the internet that is typical of a cantonment, I would compile nuclear news and views of every fortnight and send it to Air Cmde Singh at Delhi, where he had someone format it into the newsletter, make photocopies and have them dispatched. Further, during the time when the Indo-US nuclear deal was being negotiated, special issues of the newsletter were also sent to Indian missions abroad and to many

members of Parliament. These endeavours would have made a difference, however small, in shaping opinions on the matter at a time when India faced a fractious debate on the subject. There were several Indian voices that objected to India accepting any safeguards on its nuclear programme as a condition of engagement into international nuclear commerce. There were also many who questioned the very need for arriving at an agreement with the USA! Amid these extreme positions, Jasjit Singh endeavoured to inject the voice of reason based on research and analyses of India's situation and global developments. He surely played a role in shaping India's nuclear narrative, but to him personally it mattered little whether his actions were having an impact or not. He just believed in doing his *karma*—actions that arose from a strong power of conviction that he derived from a compass that always pointed to national security. Unconcerned about whether his writings were being read or not, his motto was "*lagey raho Munnabhai!*"

In 2007, the scope of the DAE project granted to CAPS was expanded. In keeping with this, the newsletter *Nuclear Power* grew into *Nuclear Security*. It now covered the entire range of nuclear issues from nuclear power to nuclear strategy, non-proliferation and arms control and even missile defence. The newsletter has since been printed without missing a single issue. Jasjit Singh used to call the process of compilation of the newsletter as *akhand paath*—a continuous, unending task. It is distributed to over four hundred people today.

Over the next five years CAPS grew in strength and stature. Several air force officers joined the Centre, undertook many projects and several books were published. Another of Jasjit's forward-looking initiatives for disseminating education on nuclear issues was the idea of running week-long capsules where the officers were exposed to the best speakers on the subject. A nuclear strategy capsule was started for the senior echelons of the three services, including officers posted at the Strategic Forces Command (SFC) to explain the nuances of nuclear doctrine and strategy of India and others. From the time of the first capsule in 2007 to the twenty-seventh capsule held

in July 2019, more than fifteen hundred officers have been exposed to nuclear thinking.

Having the foresight to envision the role of India in reshaping the global security order of the future, Jasjit Singh exhorted the young and not so young officers at every forum where he interacted with them to read and write more and broaden their horizons beyond their immediate professional requirements. He strongly believed that only scholar warriors could be trusted with the future of the country, especially in times of strategic uncertainty. He was concerned about defence planning for India in conditions of rapid technological change, and placed emphasis on self-reliance, creation of operational capabilities and use of military power for political purposes without leading to war. His dedication, commitment and boundless energy are as well remembered as his professional experience, depth of knowledge, vision and sincerity of effort. CAPS, meanwhile, has grown into a well-respected national security think tank. Over eighteen years of its existence today, it has published ninety-two books, most of which have emerged from the research projects undertaken by the research faculty at the Centre. CAPS continues down the path that he set for the organisation, with the same sincerity of purpose.

RECOGNITION OF NATIONAL SECURITY AS A DISCIPLINE OF STUDY

Jasjit Singh was ever ready to engage with the uniformed or the non-uniformed, the informed and the uninformed, the intelligentsia, the bureaucracy, the academia, and most of all with young students on all issues of national security. He found this imperative. In fact, his constant worry was that India was not investing enough in building 'intellectual capacity' to sustain its rise to power. Ever an optimist, he believed that India would inevitably rise to power by the sheer size of its economy and human resource potential. A greater concern for him was the need to sensitise his compatriots to the concepts and challenges of national security that would confront the country as it grew in capability and stature. Therefore, he

After spending 31 years in active service in the IAF, Jasjit Singh served the nation for another about 30 years through the study of national security and defence. Whether from the cockpit of a fighter jet or as a strategic thinker, he was consistent in his endeavour to defend, propagate and promote India's national interests in national and international military and civil circles.

encouraged new ideas from fresh, young minds and his room was open to all. He would often say that a think-tank must remain ahead of the security challenges in its thinking if it is not to become a 'thought tank'.

He was quite unhappy about the fact that the subject of national security was not taught as a separate discipline in our education system—neither in the civilian universities, military training institutions or in mass communication institutes. He considered this a major handicap in making India a knowledge society that could transcend the parochial regional affinities. He rightly believed that a

country with the kind of diversity that India enjoyed must make a conscious effort to instill a 'national security consciousness' among all sections of society.

Convinced by his arguments in this matter, Mr. Kapil Sibal, Minister of Human Resources Development in the late 2000s, appointed an Expert Committee to examine the issues. Jasjit Singh was chosen as the head of the Committee, with Chairman of University Grants Commission (UGC) and other senior professors as its members. The report of the Committee was produced in record time and its recommendations were accepted by the Government for phased implementation. Universities were mandated to open departments of National Security Studies and the Central University, Jammu took the lead by becoming the first university to do so.

Subsequently, as member of the Indian Council of Social Science Research (ICSSR), Jasjit Singh was also instrumental in the inclusion of the subject of National Security in the list of topics on which the institution was granting research fellowships and projects to scholars. I became the first recipient of this fellowship when my proposal on space security was accepted by the

ICSSR for a research grant. Needless to say, it was Jasjit Singh's idea that I make this proposal in order to get the ICSSR endeavour started off. As is evident, he was making things happen at all ends to ensure the success of his multifarious efforts at suffusing a larger understanding of the many complex dimensions of national security.

Meanwhile, as his own contribution to this process, he wrote a book titled, *India's Security in a Turbulent World*, which was published by National Book Trust of India in 2013. Written in an easy style for all to understand, the book was particularly meant for the younger generation to make sense of the developments occurring around the world that were likely to impact India's security. In the last chapter of the book he outlined a security strategy for the twenty-first century. He foresaw the rivalry between the US and China and recommended that India "maintain friendly cooperative relations with both the current superpower and the aspiring superpower, the People's Republic of China."¹³ This had to be complemented with the build-up of military capability premised on self-reliance and with instruments to carry out effects based outcomes. The relevance of this advice in today's times is immense.

CONCLUSION

After spending 31 years in active service in the IAF, Jasjit Singh served the nation for another about 30 years through the study of national security and defence. Whether from the cockpit of a fighter jet or as a strategic thinker, he was consistent in his endeavour to defend, propagate and promote India's national interests in national and international military and civil circles. Indeed, he maintained national interest as the only prism through which to analyse every development in the region and beyond. And his rare ability to connect the dots to get the larger picture from tell-tale tactical details and facts helped him peer ahead to notice what was coming. The man never let the nation down, whether as an air warrior or a strategist. In fact, he was ever ready to voice his views irrespective of how the wind was blowing and always remained practical in his approach.

13. Jasjit Singh, *India's Security in a Turbulent World* (New Delhi: National Book Trust, 2013), p. 164.

Jasjit Singh had kept an eagle eye on the security of the nation. His deep insights borne out of his rich reading of history and sharp analytical acumen stood the country in good stead in several moments of crisis. There is little doubt that he stands out amongst many in the Indian strategic community as much for his balanced analysis, as for his ethics and integrity to the profession.

member of the National Security Advisory Board in 1990-91 and in 1999-2001 during which he was responsible for the preparation of India's Draft Nuclear Doctrine. Further, he served many additional roles—Member of the International Commission for a New Asia, Member of the International Commission for Peace and Food, Consultant to the Standing Committee on Defence of the Indian Parliament, Advisor as well as Member of Advisory Committee (on Defence Matters) to the 11th Finance Commission of India, Chairman of Committee of Experts to review the functioning of Defence and Strategic Studies and related university system of Ministry of HRD (2011), Member of Governing Council ICWA as well as of ICSSR, Member of Planning Commission Advisory Committee on Vision 2020, Member of Advisory Committee on Civil Aviation of Punjab Government, Member of Executive Council of Central Jammu University.

On Jasjit Singh's 75th birthday, K. Subrahmanyam, his mentor and friend, gifted him a watch. He explained the reason for this by saying since Jasjit Singh had kept a "constant watch over India's security for the last many

Jasjit Singh was quite prolific as a writer. He has been author and contributing editor of nearly three dozen books, including such pioneer works as, *Air Power in Modern Warfare* (1985), *Non-provocative Defence* (1989), *Nuclear India* (1998), *India's Defence Spending* (2000), *Air Power and Joint Operations* (2003), *Iraq War* (2004), *Defence from the Skies: Indian Air Force through 75 Years* (2007) and *The Icon* (2009). Amongst his many affiliations, he has had some major roles in which he rendered great service to the nation. He was convener of the Task Force to set up the National Security Council (1998). He was a

decades”, he deserved just such a gift. And indeed, Jasjit Singh had kept an eagle eye on the security of the nation. His deep insights borne out of his rich reading of history and sharp analytical acumen stood the country in good stead in several moments of crisis. There is little doubt that he stands out amongst many in the Indian strategic community as much for his balanced analysis, as for his ethics and integrity to the profession.

Singh received the Padma Bhushan in 2006 for his outstanding service to the nation in the field of defence and strategic affairs. The Padma Bhushan citation recognised him as the country’s ‘leading thinker, defence expert and institution builder’. His experience, sense of responsibility, immense knowledge and ability to work hard, ignoring all personal ailments, was awe-inspiring and worthy of emulation. For the generations of India that follow, here is a man who breathed his country’s interests to the last breath and passed away with a number of ideas still bubbling inside him. On his 79th birthday on July 8, 2013, he had delivered an inspiring address at CAPS on the issue of national security—that was, of course, the only way he knew to celebrate any day! In fact, all days were equally special, or inconsequential to him. All that he looked forward to every single day was a good discussion on national security. Anyway, on his birthday in 2013, he laid down a ten-year plan for all that he wanted to achieve over the next decade. Willing to work himself to a punishing schedule, he travelled to Mhow for a seminar in the last week of July 2013 and despite taking an early morning return flight and suffering from a bad throat, he stayed on in office till late into the evening for some meetings. The bronchial infection only worsened over the weekend and he was admitted to the hospital for treatment. A week down the line, on August 4, 2013, he breathed his last. Then PM Manmohan Singh, in his condolence message, described him as a ‘brave soldier’, an ‘inspirational military leader’ who provided ‘intellectual vision for India’s defence and strategic planning’. Indeed, every word of that is true.

Air Cmde Jasjit Singh was a drummer who played to his own beat and marched as he thought fit. Obviously, not all appreciated this. But even his

worst critics have never grudged him his integrity, forthrightness and clarity of views. Let me conclude with a short verse that I wrote for him some years ago, capturing the many aspects that I, and many other scholars, have learnt from him.

Clarity of thought and
precision with word
depth of a worm and
breadth of a bird

Common sense and logic
over verbiage and pretence
are what you need the most
to wade from 'fog' into sense

Being open to all
the young and the old
encouraging all to think
beyond what was told

These are only a few of the things,
that the Thinker taught all
keeping India ahead of the curve
an eye on every ball.

AIR POWER AND EFFECTS-BASED OPERATIONS: LESSONS FROM THE PAST FOR FUTURE APPLICATION

R VERMA

INTRODUCTION

The concept of Effects-Based Operations (EBO), though not articulated in such precise terminology, has existed ever since mankind was involved in warfare. History is replete with examples wherein military actions were prosecuted towards producing the desired effects rather than concentrating on destruction of the enemy, especially at the expense of high casualties.¹ In modern times, the term EBO was first used during Operation Desert Storm by the USAF Centre for Campaign Planning.² The staff employed a mathematical and empirical construct which, coupled with other planning tools like the Centre of Gravity (COG) analysis and Operational Net Assessment (ONA), allowed the commanders to analyse the 'effects' produced from military and non-military actions. The role played by air power, in the resounding success of the campaign, propelled EBO and

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1. John T. Correll, "The Assault on EBO", *Air Force Magazine*, January 2013, [https:// www.airforcemag.com /PDF/Magazine Archive/Docu/0113EBO.pdf](https://www.airforcemag.com/PDF/Magazine%20Archive/Docu/0113EBO.pdf)
2. Williamson Murray, "Transformation: Volume II", in Williamson Murray, ed., *Transformation Concepts for National Security in the 21st Century*, Strategic Studies Institute, September 2002, p. 3, <https://www.publications.armywarcollege.edu/pubs/1557.pdf>

The role played by air power, in the resounding success of the campaign, propelled EBO and aerial targeting into prominence and awarded the combination the recognition that was being sought by proponents of air power.

aerial targeting into prominence and awarded the combination the recognition that was being sought by proponents of air power.

Detractors of this theory launched a scathing attack on the effectiveness of EBO after the failure of Israeli Defence Forces (IDF)—especially the Israeli Air Force (ISAF)—during the Second Lebanon War in 2006.³ Led by General James Mattis, then commander of United States Joint Forces Command (USJFCOM), questions were raised regarding the linkages that were perceived to exist between effects produced and attainment of the objectives. Mattis vociferously stated that “USJFCOM would no longer use, sponsor or export the concepts related to EBO”.⁴ His arguments were contested, especially by the Air Force community, who reiterated that discarding EBO would be foolhardy and could lead to disastrous consequences in future conflicts. The tireless efforts by experts supporting and challenging EBO led to a multitude of discourses in military academic circles. The USAF subsequently reworded their doctrine and introduced the phrase ‘Effects-Based Approach to Operations’ (EBAO) to gain more acceptability amongst the critics. The doctrine clarified that EBAO was a way of thinking that provided guidance for designing, planning, execution and assessment of the campaign as an integral whole.⁵

The success of EBO and air power—which received unprecedented accolades after the Gulf Wars—were outcomes of campaigns where advanced and superior Air Forces were pitted against weak opponents.

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3. Avi Kober, “The Israeli Defence Forces in the Second Lebanon War: Why the Poor Performance?”, *The Journal of Strategic Studies*, vol. 31, no. 1 (February 2008) p. 8, <https://doi.org/10.1080/01402390701785211>
 4. Gen James N. Mattis, “USJFCOM Commander’s Guidance for Effects-Based Operations”, *Joint Force Quarterly*, issue 51 (Fourth Quarter, 2008), p. 106, <https://www.hsdl.org/?view&did=792444>
 5. US Air Force Operational Level Doctrine, Annex 3-0, updated on November 4, 2016, <https://www.dctrine.af.mil>

Hence, the efficacy of this perception needs to be examined and emulated with caution, lest wrong lessons are inferred. This paper, segregated into three parts, intends to rekindle the debate on the effectiveness of EBO in general and its intrinsic relationship with air power in particular. A theoretical explanation is followed by examining four air campaigns to establish the causal link between objectives, effects and aerial targeting. The last segment examines the credibility of EBO in future wars and the capacity of air power to translate aerial actions into producing the requisite effects.

The success of EBO and air power—which received unprecedented accolades after the Gulf Wars—were outcomes of campaigns where advanced and superior Air Forces were pitted against weak opponents. Hence, the efficacy of this perception needs to be examined and emulated with caution.

UNDERSTANDING EFFECTS-BASED OPERATIONS

Warfare, traditionally, has always concentrated on target-based operations, where military power is employed for creating physical destruction of the target. Subsequently, strategists evolved the 'objective' based philosophy which introduced linkages between strategy, objectives and action.⁶ The approach relied on the assumption that a linear relationship existed between the 'action' and 'objective' and the corresponding belief that the correct action would lead to the achievement of the selected objective.⁷ This was a major shortcoming of objective-based method since war is not a linear activity and military actions would definitely produce multiple reactions that are difficult to predict.⁸ EBO evolved as a solution to circumvent this perceived limitation, where a Course of Action (COA) was selected after having evaluated all possible effects that could emerge from an act.

6. Lt Col Brett T. Williams, "Effects-Based Operations: Theory, Application and Role of Airpower", in *Transformation Concepts for National Security in the 21st Century*, n. 2, p. 136.

7. Ibid.

8. Ibid., p. 137.

In the early 1990s, Colonel John Warden of USAF introduced the modern conception of effects-based operations by depicting the enemy as a system comprising a network of nodes and links.⁹ This network was termed as the System of Systems Analysis (SoSA) which identified and evaluated various political, social, military, economic, infrastructure and informational (PSEMII) tentacles of the adversary.¹⁰ These systems were further dissected to identify the significant entities or nodes that were tangible elements and could be delegated as targets. According to the EBO lexicon, an action against such a node could result in four different types of effects; the predicted desired effects, predicted undesired effects, unpredicted desired effects and unpredicted undesired effects.¹¹

The effects produced from an action can be direct or indirect. Direct effects, also known as 'first-order effects', are physical results of an action that are immediately recognised and can often be meaningfully quantified.¹² 'Second' or 'third' order effects, referred to as indirect effects, are offshoots of direct effects that trigger additional outcomes and generally affect the psychological and behavioural pattern of the enemy. They may be intended or unintended, are displaced in time and space and often hard to quantify or measure empirically.¹³ Indirect effects that result from the aggregation of many effects are termed as cumulative effects and those effects which ripple through a system, affecting other systems, are cascading effects.¹⁴ Evaluation of these effects enables decision-makers to identify prospective targets, consider available Courses of Action (CsOA) and formulate the targeting plan.

The theory explained is recounted with an example. Insurgency in Kashmir was gaining momentum in 2015 and one of the primary reasons

9. Gary H. Cheek, "Effects-Based Operations: The End of Dominant Manoeuvre?", in *Transformation Concepts for National Security in the 21st Century*, n. 2, p. 74.

10. "Commander's Handbook for an Effects-Based Approach to Joint Operations", US Joint Warfighting Centre (Suffolk, February 2006), Chapter 2, p. 2.

11. Williams, n. 6, p. 140.

12. US Air Force Doctrine, vol. 3, chapter 2, Annex 3-0, n. 5.

13. Ibid.

14. Ibid.

was the widespread support it received from the local population. The objective was to abate militancy and the task identified was to degrade the prevalent support to the belligerents. An objective-based assessment led to identification of Burhan Wani, commander of the Hizbul Mujahideen, as a significant entity in the environment. Armed with a charismatic personality and technological knowledge he was exploiting his charm and the social media to garner support. It was perceived, through the strategy-objective-task triangle of objective-based targeting, that elimination of this young and flamboyant leader would diminish the local support for militancy. Interestingly, following his killing in July 2016, Burhan Wani became a cult hero and more renowned than when he was alive. The valley witnessed unprecedented reactions and thousands thronged to have a last glimpse of the militant at his funeral. In the ensuing clashes with security forces, 16 civilians were killed and the entire development attracted unwanted international attention.¹⁵ The most significant and concerning effect of this action was the spike in the number of youth joining militancy in Kashmir, a figure which rose from 66 in 2015 to 191 in 2018.¹⁶ The presence of educated youth in this spike exponentially increased the severity of the indirect effects. The objective-based action could not achieve the end state because of undesired effects, both cascading as well as cumulative.

In an effects-based planning, analysis would have identified leadership, romanticising militancy, radicalisation of educated youth and exploitation of social media as some of the key contributory factors influencing the local populace. During the evaluation, Burhan Wani would have emerged as a key node with strong linkages to other nodes in the operating environment. Security forces would have determined the effects required to achieve the specified objective of abating militancy, and having done so, the benefits accruing from various desired effects would have been compared with the

15. Qadri Inzamam and Haziq Qadri, "The Funeral of Burhan Wani and the Unrest that Followed", *The Caravan*, July 10, 2016, [https:// www.caravanmagazine.in](https://www.caravanmagazine.in)

16. Tahir-ul Gani Mir, "From Scholars to Teenagers—What makes Kashmiri Youth to Join Militancy?", *Social and Criminology—Open Access*, vol. 7, issue 2, October 2019, [https:// www.longdom.org/sociology-and-criminology.html](https://www.longdom.org/sociology-and-criminology.html)

drawbacks emanating from the undesirable effects. In the final evaluation for determining the best COA, the dominance of undesirable effects and high probability of unpredictable effects would have forced the planners against conducting a direct action against Burhan Wani. They would have been coerced to search for other options, including non-kinetic operations, against other nodes and linkages in the environment. The intent of subsequent actions would have been directed towards creating effects to diminish the popularity and dilute the significance of Wani. A direct action, when his popularity was low, would have provided reasonable assurance on lesser prospects of unpredictable and undesirable effects. To summarise, 'effects' in campaign planning may be described as the conditions that need to be established, or avoided, within the operating environment to achieve the end state.¹⁷

CRITIQUE OF EBO

The criticism against EBO gained momentum after the debacle of IDF during the Second Lebanon War. Post conflict assessment concluded that over-reliance on EBO was one of the primary contributory factors for the perceived defeat.¹⁸ In his highly controversial memorandum, General Mattis claimed that EBO assumes a high level of unachievable predictability, necessitates unattainable knowledge of the enemy, discounts human dimensions of war and promotes micromanagement.¹⁹ He argued that EBO and aerial targeting are effective against closed systems like road networks, power grids and railway infrastructure that permit a thorough examination of likely outcomes and possible consequences can be conceived. Mattis contested that war is a complex adaptive system laced with variables and any planning construct attempting to provide certainty and predictability in such an uncertain environment

17. "Commander's Handbook for an Effects-Based Approach to Joint Operations", n. 10, chapter 3, p. 5.

18. Kober, "The Israeli Defence Forces in the Second Lebanon War", n. 3, pp. 32-33.

19. Mattis n. 4, p. 106.

is fundamentally at odds with the nature of war.²⁰ He concluded by stating that use of 'effects' in campaign planning has confused what was previously a well derived process to determine 'ends'.²¹ An article, featuring in the *Australian Army Journal*, backed this thought process with the authors emphasising that "a chaotic and complex activity like war is not amenable to reductive scientific deductions".²²

Milan Vego, the veteran professor at the US Naval War College, has argued that using mathematical models to assess unquantifiable aspects of warfare portrays it more as a science rather than an art, which is against the ethos of operational art.²³ He contested that tasks are assigned to achieve objectives and inserting effects between objectives and tasks complicates the mechanics of campaign planning.²⁴ Vego echoed the statement made by Mattis regarding the difficulty to predict the effects of own actions on the enemy's political or military leadership.

The primary reason for the criticism against EBO originates from the fact that air power, often, has been visualised as the focal and most potent means of producing the envisaged effects. It has been emphasised by senior USAF officers that "precision air attack is the best way to exploit effects-based operations and Air Force should be the decisive element of American military power".²⁵ Over the years, nations have felt the need to graduate from attrition and annihilation forms of warfare to efficient and economical methods of conducting wars. The emergence of precision guided munitions (PGMs), coupled with real-time intelligence, allowed nations to exert their will on another by employing air power and, importantly, without the need to commit their ground forces into action. This paved the way for negotiated settlement of conflicts without

20. Ibid., p. 107.

21. Ibid.

22. Justin Kelly and David Kilcullen, "Chaos Versus Predictability: A Critique of Effects-Based Operations", *Australian Army Journal*, vol. ii, no. 1, Winter 2004, p. 90, [https:// www.search.informit.com.au](https://www.search.informit.com.au)

23. Milan N. Vego, "Effects-Based Operations: A Critique", *Joint Force Quarterly*, Issue 41 (Second Quarter, 2006), p. 51, <https://ndupress.ndu.edu/portals/68/Documents/jfq/jfq-41.pdf>

24. Ibid., pp. 52-53.

25. Williams, n. 6, p. 134.

unnecessary collateral damage and loss of life.²⁶ In such a situation, EBO and air power emerged as the ideal arrangement as a counter to attrition and annihilation types of warfare.

EBO AND AIR POWER

Lt Col Edgar S. Gorrell, of the US Army Air Service, wrote the first paper regarding strategic bombing by air power during World War I.²⁷ The paper highlighted the fact that there were indispensable economic targets without which Germany could not fight the war and this assessment laid the foundation for the intrinsic, complicated and debatable relationship between objectives, effects and targeting by air power. During the inter-war period, air power theorists Giulio Douhet and Billy Mitchell projected their views on aerial bombardment as an instrument to paralyse the economy and break the resolve of the enemy. The Royal Air Force (RAF), led by Air Marshal Hugh Trenchard, argued that the psychological effects of bombing outweighed the physical effects. However, unlike Douhet, Trenchard believed that directly attacking local population was morally and militarily questionable and reasoned that disruption of normal life, as a result of rising unemployment and disruption of essential services, would force the population to demand peace. During the war, while the US Army Air Force wanted to bomb factories to destroy the nation's capability to wage a conflict, the RAF sought to bomb infrastructure to destroy the national will.²⁸

STRATEGIC BOMBING OF GERMANY BY BRITAIN

Clausewitz had written that the COG is always found 'where the mass is concentrated most densely' and identified the adversary's army as the COG.²⁹ Few theorists have contradicted this definition of COG and advocated

26. Arjun Subramaniam, "Strategic Role of Air Power: How We Need to Think, Train and Fight in the Coming Years", *Air Power Journal*, vol. 1, no. 2, Winter 2006 (October-December), p. 15.

27. Philip S. Meilinger, "The Origins of Effects-Based Operations", *Joint Force Quarterly*, issue 35 (Third Quarter, 2004), p. 117, <https://ndupress.ndu.edu/portals/68/Documents/jfq/jfq-35.pdf>

28. Ibid.

29. Carl von Clausewitz, "On War", ed. and transl. by Michael Howard and Peter Paret (Princeton,

that military objectives cannot be achieved if the population continues to display resilience and it is the will of the people that is more important than the army.³⁰ In all probability, it is this belief that convinced the British Bomber Command to conduct area bombing of Germany during World War II. Air Marshall Arthur Harris, the brain behind the campaign, reasoned that bombing cities would lead to high civilian casualties and destruction of infrastructure.³¹ The ensuing indirect effect, according to him, would be disruption of urban life which would have a devastating and decisive effect on the German morale, and would play a crucial role in ending the war. However, contrary to this belief, the persistent bombing by the RAF ignited the patriotic sentiments of the German population rather than dampen their morale. Despite the physical damage to industrial plants, loss of working hours due to continuous air raid alarms and migration of more than two million people, German industrial production rose by three times between 1941 and 1944.³²

At the operational level, the unpredicted behavioural pattern displayed by the German military leadership led to significant desirable effects for the Allied forces. The persistent bombing produced a notable change in the outlook of the German leaders, forcing them to shift from an offensive mindset to a defensive one. The need to keep a large number of aircraft within Germany weakened

During the war, while the US Army Air Force wanted to bomb factories to destroy the nation's capability to wage a conflict, the RAF sought to bomb infrastructure to destroy the national will.

NJ: Princeton University Press, 1984), p. 485, [https:// www.antilogicalism.com/wp-content/uploads/2019/04/on-war.pdf](https://www.antilogicalism.com/wp-content/uploads/2019/04/on-war.pdf)

30. Joseph Strange and Richard Iron, "Centre of Gravity: What Clausewitz Really Meant", *Joint Force Quarterly*, issue 35, 2005, pp. 25-26, [https:// www.theforge.defence.gov.au/sites/default/files/adfwtc06_strange_and_iron.pdf](https://www.theforge.defence.gov.au/sites/default/files/adfwtc06_strange_and_iron.pdf)
31. Philip S. Meilinger, "Air Strategy: Targeting for Effects", *Aerospace Power Journal*, Winter 1999, p. 52, [https:// www.apps.dtic.mil/tr/fulltext/u2/a515118.pdf](https://www.apps.dtic.mil/tr/fulltext/u2/a515118.pdf)
32. Richard Overy, "The Air War in Europe, 1939-1945", in *A History of Air Warfare*, ed. John Andreas Olsen (New Delhi: Vij Books, 2010), p. 49.

During World War II, military experts did not have the wherewithal to predict the likely effects during the planning stage and, most importantly, the means to measure the effectiveness of their actions during the execution phase. Therefore, based on the effects produced, modifications in strategies could not be injected as remedial measures during the progress of the campaign.

the capacity of the army to fight effectively at most of the major European fronts.³³ By January 1944, 68 percent of German fighters were defending the homeland and only 17 percent were available to escort the bombers supporting the ground offensive in the eastern front.³⁴ Additionally, the need for more fighters had an impact on the production of bomber aircraft. In 1942, over 50 percent of combat aircraft produced were bombers which reduced to 18 percent over the next two years and had adverse ramifications on the conduct of air-land operations in support of the ground campaign.³⁵ To enhance the air defence capabilities to counter the bombardment, the Germans diverted their technological research programme towards the infamous terror weapons—the V-1 unmanned flying bomb and the V-2 rocket bomb. Analysts have concluded that the revenue siphoned off for this expensive project could have been utilised to produce 24,000 aircraft.³⁶ The bombing produced effects which were undesirable for the British at the strategic level but the unpredicted desirable second-order effects at the operational level had strategic implications.

The USAF doctrine states that in the struggle between being efficient or effective for successful implementation of effects-based operations, the latter takes precedence.³⁷ The British selected an efficient option of employing air power which proved ineffective because the campaign managed only partial

33. Robert Pois and Philip Langer, *Winston Churchill, Arthur Harris and British Strategic Bombing*, in *Command Failure in War: Psychology and Leadership* (New Delhi: KW Publishers Pvt. Ltd., 2011), p. 156.

34. Overy, n. 32, p. 49.

35. *Ibid.*, p. 50.

36. Williams, n. 6, p. 156.

37. US Air Force Doctrine, vol. 3, ch. 2.

achievement of the objectives at the cost of 300,000 German civilian lives and 70,000 aircrew of the RAF.³⁸ During World War II, military experts did not have the wherewithal to predict the likely effects during the planning stage and, most importantly, the means to measure the effectiveness of their actions during the execution phase. Therefore, based on the effects produced, modifications in strategies could not be injected as remedial measures during the progress of the campaign, a capability which is comparatively more accessible in the present scenario.

JAPAN'S ATTACK ON PEARL HARBOUR

The Pearl Harbour attack is an appropriate example to illustrate the difference between effects-based and target-based air operations. The Japanese objective at the strategic level was to “cripple the American fleet with a single blow as a prelude to operations designed to capture the oil areas of Southeast Asia”.³⁹ At the operational level, their objective was to destroy the US Pacific Fleet to impede US naval dominance in the Pacific theatre. Admiral Isoroku Yamamoto, the chief architect of the plan, had spent much of his military career developing air tactics for aircraft carriers and wrote, “it is necessary to have a powerful Air Force to strike deeply at the enemy’s heart at the very beginning of the war and thus deal a blow from which enemy will not be able to recover for some time.”⁴⁰

Yamamoto believed that the COG for the US Navy in the Pacific region was the fleet of destroyers and carriers. This thought, apparently, was a fallout of the fascination Japanese naval officers had for the views propounded by sea power theorist Mahan, who emphasised on “the need to target enemy fleets by amassing overbearing power that swept opposing navies from important

38. Pois and Langer, n. 33, p. 172.

39. James E. Hazuka, “An Operational Analysis of the Pearl Harbour Attack”, Thesis submitted at US Naval War College, Newport on June 17, 1993, p. 3, <https://www.apps.dtic.mil/tr/fulltext/u2/a263962.pdf>

40. David C. Gompert, Hans Binnendijk and Bonny Lin, “Japan’s Attack on Pearl Harbour, 1941”, in *Blinders, Blunders, and Wars: What America and China Can Learn* (Santa Monica: Rand Corporation, 2014), p. 101, https://www.rand.org/pubs/research_reports

At the operational level, the Japanese failed to identify the effects that had to be produced at the tactical level to attain operational and strategic objectives. They concentrated their efforts on destroying capital ships and omitted the shore-based support facilities.

expanses".⁴¹ Consequently, on December 7, 1941, two waves of 353 Japanese aircraft, attacked and damaged all eight battleships docked at Pearl Harbour.⁴²

At the strategic level, the effects produced were undesirable and unpredicted. The perceived treacherous nature of the attack, loss of American battleships and the high death toll united the public opinion in USA against Japan. As a result, President Roosevelt was able to mobilise the economic and industrial might of the USA to defeat Japan and Germany.⁴³

This validates the arguments by Mattis and Vego that enemy reactions cannot be predicted and anticipating the same entails unattainable knowledge of the enemy.

At the operational level, the Japanese failed to identify the effects that had to be produced at the tactical level to attain operational and strategic objectives. They concentrated their efforts on destroying capital ships and omitted the shore-based support facilities, which were later utilised to reconstitute the US Pacific Fleet.⁴⁴ Pearl Harbour had no source of supply for oil and the same was transported from the mainland, approximately 2,000 miles away. The oil was stored in tanks which did not have bomb proof covers, were susceptible to small calibre bullets and were clearly visible to the naked eye from the air.⁴⁵ At the time of attack, these tanks stored 4.5 million barrels of oil and destruction of this critical fuel reserve would have

41. James R. Holmes, "Why Didn't Japan Finish Job?", *The Diplomat*, October 23, 2011, <https://www.the-diplomat.com/2011/10>

42. Ibid.

43. James Bowen, "The Pacific War from Pearl Harbor to Guadalcanal", Pacific War Historical Society, <https://www.Pacificwar.Org.Au>

44. Hazuka, n. 39, p. 17.

45. Patric H. Donovan, "Oil Logistics in the Pacific war: In and after Pearl Harbour", Thesis submitted at Air Command and Staff College, Alabama on April 1, 2001, p. 21, <https://www.pdf.semanticscolor.org/c9fb/e645b6cb575f282cef905cb6944.pdf>

immobilised every ship based at Pearl Harbour and would have driven the US Pacific Fleet back to the west coast.⁴⁶ The ensuing fire in the island, as a result of the inferno, would have produced additional indirect effects.

The ship repair and servicing installations at the harbour were overlooked as potential targets. Out of the eight ships damaged, six were repaired at this dockyard and returned to service later during the war.⁴⁷ In May 1942, the aircraft carrier USS *Yorktown* received serious damage during the Battle of Coral Sea but the carrier was expeditiously repaired at Pearl Harbour. Interestingly, had the repair facilities been destroyed by Japan in the aerial attack six months earlier, there was a possibility that USS *Yorktown* would not have been repaired in such a short time frame and may have been out of action during the Battle of Midway in June 1942. Analysts believe that the absence of USS *Yorktown* from Midway would likely have altered the course of the Pacific War in Japan's favour.⁴⁸

The effects that were required to be produced were ignored by the flawed Japanese doctrinal precepts which had an overwhelming bearing over their strategies. The US Naval ships would have been identified as the COG since they provided the 'critical capability' to project US presence in the Pacific Ocean. Examination of the capabilities would have revealed the need for continuous replenishment of oil and infrastructural facilities for repairing the ships as 'critical requirements' for the US Navy to sustain prolonged operations. Further evaluation of the critical requirements would have led to identification of the fuel storage dump and repair dockyard as the 'critical vulnerabilities'. This ability of air power, to circumvent the strengths of the

This ability of air power, to circumvent the strengths of the enemy and attack his vulnerabilities, enables aerial action to produce the effects that can undermine the critical capabilities of the adversary's COG.

46. Ibid.

47. Hazuka, n. 39, p. 20.

48. Bowen, n. 43, p. 3.

enemy and attack his vulnerabilities, enables aerial action to produce the effects that can undermine the critical capabilities of the adversary's COG.

Another probable reason for the Japanese action flows from the notion that offensive action by air power often provides instant perceptible first-order effects, which receives prompt recognition and attracts widespread reverence for the act. The LGB attack on Tiger Hill during the Kargil conflict, the Israeli air attack on the nuclear plant at Osirak in 1981 and the recent Balakot strike substantiate this viewpoint. The Japanese action was influenced by the need for immediate glory and they failed to visualise that destruction caused by air power is not an 'end' by itself but 'means' to produce desirable effects at the operational and strategic levels of war. To be fair to the Japanese, unavailability of methods to forecast 'effects' and dominance of their myopic fixation towards physical destruction of ships might have compelled them to select this COA. These two issues were addressed during Operation Desert Storm by exploiting the capabilities of air power to conduct effects-based operations.

OPERATION DESERT STORM

Operation Desert Storm highlighted the views of John Warden that technology, coupled with an effects-based approach, would allow USAF to discard the erstwhile sequential nature of bombardment to impress effective control over the enemy.⁴⁹ The postulation was formally institutionalised in the campaign planning process by retired Lt Gen David Deptula of USAF who, as a Colonel, was a member of the joint planning team during the operation. He convinced his superiors to change the targeting paradigm and concentrate on the 'effects' instead of target destruction. Deptula firmly believed that technological developments in the field of aviation, stealth aircraft and PGMs could be exploited to produce the obligatory effects during the campaign. In the opening hours of Desert Storm, more than 50 separate targets were attacked

49. John Warden III, "The Enemy as a System", *Airpower Journal*, vol. ix, no. 1, Spring 1995, p. 54, <https://www.airuniversity.af.edu/portals/10/ASPJ/volumes-09>

which enabled reasonable control over the enemy forces without the requirement for massing surface forces.⁵⁰

An interesting example, narrated by Deptula, is presented to elaborate this thought process. Towards achieving air superiority, there was a requirement to incapacitate the Iraqi Integrated Air Defence System (IADS). Traditional operations would have focused on physical attacks aimed at destroying missile launchers, radars and the control centres. During the planning process, four major Sector Operations Centres (SOCs) were identified, all fortified with underground command and control bunkers. Experts concluded that adequate force level was not available to attain the operational objective through destruction-based targeting. The consequent plan that evolved did not focus on physical damage, but was designed towards producing ‘effects’ to render the air defence system ineffective. Employing half the number of aircraft, persistent bombing from stand-off distances produced psychological effects on the personnel operating the systems, which translated into functional paralysis of the entire operating network. The objectives were achieved by creating the desired effects while employing fewer aircraft and less ammunition.⁵¹

The success of EBO and air power during Op Desert Storm should be viewed critically from an unbiased perspective. At the strategic level, the operation witnessed massive disparity between the military and the technological capabilities of the opposing forces, and victory for the coalition forces was a known reality. Iraq was aware of this fact and planned to conduct a warfare of attrition, in an attempt to bend and break the will of the mighty enemy.⁵² Gen Norman Schwarzkopf, commander of the coalition forces, adopted a strategy which adhered to Sun Tzu’s philosophy of “attacking the enemy’s plan to save lives and money”. Though the factor of time was not a constraint for initiating the campaign, it assumed great significance

50. Brig Gen Deptula, “Effects-Based Operations: Change in the Nature of Warfare”, *Defense and Airpower Series* (Arlington: Aerospace Education Foundation, 2001), pp. 5-17.

51. Ibid.

52. Colin S. Gray, *Airpower for Strategic Effect* (Maxwell, Alabama: Air University Press, 2012), p. 212, <http://aupress.au.af.mil>

once operations commenced to counter the Iraqi design. Therefore, the preparatory time was utilised by the trained staff, equipped with newly developed computer-based programs, to analyse the effects that needed to be produced to achieve the objectives. To ensure that these objectives were achieved quickly and with minimal casualties after operations commenced, EBO and air power emerged as the appropriate, visionary and out-of-the-box solution.

At the operational level, the campaign fuelled the dichotomy with regard to the contentious relationship between COG analysis, application of EBO and aerial targeting. Unlike the theory expounded by Clausewitz and Mahan—which is widely accepted by surface and marine military commanders—air power theorists proved that attacking critical vulnerabilities reaped greater benefits than targeting the source of strength.

However, most notably, the campaign proved that EBO provided maximum dividends when the risk factor was least. In effects-based operations, risk is measured by the potential for an action to produce unpredicted outcomes. If the probability of unpredicted effects is low, risk is low.⁵³ During the planning phase of Operation Desert Storm, the preponderance of technological and information superiority enjoyed by the coalition forces enabled the staff to paint a comprehensive canvas comprising all possible effects that were likely to emerge from various military actions. In doing so, they reduced the emergence of unpredictable effects which empowered the commanders to identify the likely effects that aerial action needed to generate to modulate the enemy's behavioural pattern. A significant corollary of this analysis is that parity between contesting forces would increase the risk factor because the operational outcome is less certain. Additionally, the campaign highlighted that prediction of effects is easier when the opponent is weak and unmotivated in comparison to an adversary who is competent, innovative and adaptive. The US-led coalition forces realised this during Operation Allied Force in Kosovo and the Israeli Air Force during the Second Lebanon War.

53. Williams, n. 6, pp. 141-42.

SECOND LEBANON WAR

On July 12, 2006, a raid by the Hezbollah along the border between Lebanon and Israel resulted in the capture of two Israeli Defence Forces (IDF) soldiers and killing three others. The 34-day military campaign was one of the most intriguing air offensives undertaken by the Israeli Air Force (ISAF) in their accomplished history wherein the ISAF flew a total of 18,900 combat sorties and struck some 7,000 targets, at an average rate of 340 sorties a day. The operations witnessed the release of 24,000 air-delivered munitions, a figure comparable to the 29,500 weapons released by the coalition forces during Operation Iraqi Freedom in 2003.⁵⁴ But surprisingly, for the first time in its many trials by fire since 1948, the operation ended up being one of the most inconclusive performances by the IDF and a major confrontation ended without a clear military victory on Israel's part.⁵⁵ Though military experts have identified numerous reasons for the questionable performance, this paper will deliberate on issues pertaining to EBO and air power.

The war showcased the nebulous nature of future wars where boundaries between political and military objectives are likely to be obliterated. The IDF's new operational doctrine, issued three months before the outbreak of the war, relied heavily on technology and stressed the ascendancy of firepower over manoeuvre. It also highlighted the acceptance of the 'post-heroic' style of warfare, which strongly advocated avoidance of own fatalities and prevention of civilian casualties.⁵⁶ ISAF opined that aerial targeting would minimise own casualties by creating battlefield conditions to ensure that land forces would not be exposed to any resistance.⁵⁷ Milan Vego, in an article, has opined that air power on its own cannot win campaigns and the reason for the failure of IDF was their inability to synchronise the use of massive air attacks with operations on ground.⁵⁸ The emerging lesson is that, unlike

54. Benjamin S. Lambeth, *Air Operations in Israel's War Against Hezbollah: Learning from Lebanon and Getting It Right in Gaza* (Santa Monica: Rand Corporation, 2011), p. xviii, <http://www.rand.org>

55. Ibid.

56. Kober, n. 3, p. 7.

57. Ibid., p. 17.

58. Milan N. Vego, "Major Joint/Combined Operations", *Joint Force Quarterly*, issue 48 (First Quarter, 2008), p. 116, <https://www.hsdl.org/?view&did=792434>

Success of EBO hinges on the ability to evaluate the progress of actions towards achieving the effects, which entails constant adaptation to balance ‘ends’ with ‘means’ and likely costs with potential benefits.

Operation Desert Storm, air power and technology may not always be able to create the desired effects when employed in isolation, especially during unconventional and asymmetric warfare against a highly ideological, motivated and determined enemy.

Second, the operation highlighted that effects-based operations do not follow the principle of replicability where the same inputs always yield the same outputs. The IDF has long been known for its willingness to adapt foreign conceptions to meet their specific requirements.⁵⁹ The IDF

and the ISAF were enamoured by the role played by air power in the success of Operation Desert Storm and the doctrinal changes were a result of the strong conviction that EBO and air power could always recreate the same success story, irrespective of the governing factors and operating conditions. The present USAF doctrine stipulates that unknown and uncontrolled variables make replication of results impossible. Hence, EBO necessitates thorough examination of the operating environment, relating the effects to the objectives and thereafter identifying the role for air power.

Lastly, effects-based operations came under attack as having failed to meet the test of combat conditions. After the success of Operation Desert Storm, the IDF Institute for Campaign Doctrine Studies developed an alternative doctrine for military thinking, replacing traditional military terminologies like ‘objective’ and ‘subjugation’ with new phrases like ‘campaign rationale’ and ‘conscious-burning of the enemy’. The doctrine was designed to influence the perception of the enemy, rather than destroying it physically.⁶⁰ Subsequent to the war, a senior army officer of IDF commented that apart from the confusion created by the literature, EBO failed in translating the ‘effects’ enunciated by the higher echelons to the mandatory actions at the

59. Russell W. Glenn, *All Glory Is Fleeting: Insights from the Second Lebanon War* (Santa Monica: Rand Corporation, 2012), p. 19, <http://www.rand.org>

60. *Ibid.*, p. 21.

operational level. He added that precious time was wasted by the staff to evaluate the effects and the means to achieve them.⁶¹

The campaign proved that correct and continuous measure of effectiveness determines modification and alterations in plans at the tactical and operational levels to generate the desired effects.⁶² On realising that the effects were not being attained and the difficulty encountered in measuring the effectiveness of their actions, IDF made the cardinal mistake of reviewing the 'effects', rather than modifying their strategies.⁶³ The military leaders failed to understand the fact that success of EBO hinges on the ability to evaluate the progress of actions towards achieving the effects, which entails constant adaptation to balance 'ends' with 'means' and likely costs with potential benefits.

EBO, AIR POWER AND FUTURE WARS

The Gerasimov Doctrine—enunciated by Russia in 2013—scripted the background for Grey Zone warfare and exemplifies the ambiguous and complex nature of future conflicts where disinformation, political influence and economic coercion would be the primary non-military means to achieve security goals.⁶⁴ According to historian Hal Brands, this type of warfare is designed at achieving objectives and end states without escalating to overt warfare and crossing the stated red lines.⁶⁵ In future, strategies would be adopted that would seek to prevent full-fledged wars and the threat of employment of force—especially air power—would be overtly demonstrated for projecting coercion or deterrence strategies. Coercion is *"persuading an adversary to change his behaviour through the use of force"* while

61. Ibid.

62. Williams, n. 6, pp. 144-45.

63. Kober, n. 3, p. 33.

64. Kathleen H. Hicks, "Russia in the Gray Zone", Centre for Strategic and International Studies, July 25, 2019, <https://www.csis.org/analysis/russia-gray-zone>

65. Hal Brands, "Paradoxes of the Gray Zone", Foreign Policy Research Institute, February 5, 2016, <http://www.fpri.org/article/2016/02/paradoxes-gray-zone>

Deterrence by denial, which is defensive in character, advocates denying the adversary the ability to achieve his military and political objectives. On the other hand, deterrence by punishment threatens imposition of severe penalties or wider punishment, like all-out war or even nuclear escalation through aggression.

deterrence is “*preventing a specific behaviour by the adversary*”.⁶⁶ Both the strategies aim at producing effects to regulate the behaviour of the adversary, with deterrence aimed towards prevention and coercion towards enforcing a change.⁶⁷ Deterrence can be imposed through either denial or punishment. Deterrence by denial, which is defensive in character, advocates denying the adversary the ability to achieve his military and political objectives. On the other hand, deterrence by punishment threatens imposition of severe penalties or wider punishment, like all-out war or even nuclear escalation through aggression.⁶⁸

The drone attack by the US at Baghdad, in January 2020, that eliminated General Qassem Soleimani and the Balakot strike

by IAF demonstrated the capability of air power to inflict deterrence by punishment. The effects produced, both desired and undesired, would have been assessed and the desired outcomes would have outweighed the undesired effects in the cost-benefit analysis. Unlike the killing of Soleimani, the Balakot strike was symbolic in nature and the primary intent was not blowing up a building or killing some terrorists, but to demonstrate that India had the political gumption to attack targets inside Pakistan.⁶⁹ In both cases, the weaker states were forced to exhibit a rather conservative and inhibited response which, ostensibly, was to satisfy their respective domestic

66. Robert A. Pape, “*Bombing to Win: Air Power and Coercion in War*” (New York: Cornell University Press, 1996), p. 12.

67. Ibid.

68. Michael J. Mazarr, “Understanding Deterrence, Perspectives”, Rand Corporation, 2018, https://www.rand.org/content/dam/rand/pubs/perspectives/PE200/PE295/RAND_PE295.pdf

69. Rajesh Rajagopalan “The Deterrence Implications of Killing Soleimani”, Raisina Debates, January 29, 2020, ORF, <http://www.orfonline.org.expert-speak/the-deterrence-implications-of-killing-soleimani-60483/>

audience. In the Indian context, a significant effect of the strike was that IAF shattered the long held conservative perception that employment of air power is escalatory in nature. Over the years, this impression had evolved based on the presumption that air power expands the stature of destruction and held a high risk of escalating the conflict.⁷⁰ Additionally, the strike also busted the myth portrayed by Pakistan of a direct connection between any Indian military action and their retaliation with tactical nuclear weapons.⁷¹ These indirect effects, which were unpredictable yet desirable, will have a significant influence on the employment philosophy of air power in the Indian subcontinent in future.

Another recent operation, in the realms of asymmetric warfare, highlights the innate relation that air power shares with EBO. The Saudi Aramco oil facilities were attacked by eighteen drones and seven cruise missiles on September 14, 2019.⁷² At the tactical level, the impact points were the separation towers in the extraction facility, where oil and gas are segregated for stabilising the crude oil.⁷³ The damage created the anticipated effects with almost 50 percent of the Saudi oil production destroyed, which accounted for nearly 5 percent of global oil production. The cumulative effects, over the next few days, led to a hike in the crude oil prices by nearly 15 percent. This further led to destabilisation of the world energy market and adversely affected the financial business all over the globe, including a drop in Sensex and Nifty in India.⁷⁴ The abovementioned examples reveal that, in future, political resolve, advancements in battlefield transparency, proliferation of unmanned platforms and accuracy of stand-off weapons would provide air power the required tenacity and assertiveness to produce the preferred consequences.

70. Manpreet Sethi, "Air Power at Balakot: Exploiting Flexibility for Strategic Effect", *Air Power Journal*, vol. 14, no. 3, Monsoon 2019 (July-September), p. 10.

71. Ibid.

72. Editor's Note, *Air Power Journal*, vol. 14, no. 3, Monsoon 2019 (July-September).

73. Ibid.

74. Maj Gen Ajay Kumar Chaturvedi (Retd), "Impact of Attack on Saudi Aramco Facilities on India", Vivekananda International Foundation, September 25, 2019, <http://www.vfindia.org/article/2019/september/25/impact-of-attack-on-saud-aramcottaack-on-sud-aramaco-facilities-on-india>

Needless to say, every action will produce an effect, especially if the action is produced by air power. The exploitation of these effects, towards achieving the objective, should be the premise of EBO when fighting in a joint environment.

In the Indian context, the stated political end states and military objectives that need to be achieved would determine how campaigns would be planned and battles fought. However, in future, synchronisation of EBO and air power would be surrounded by discrete caveats which would entail serious understanding of the concept to ensure its successful implementation. At the politico-strategic level, it should be understood that despite the changing nature of warfare, fundamentals of war will remain all-pervasive. Effects-based operations would ensure that the basic principles of war like maintenance of aim,

concentration of force, economy of effort, surprise and flexibility are neither overlooked nor compromised. The amorphous nature of future wars means that this approach would not hinge on application of military power alone and will have to be seamlessly orchestrated in concert with other elements of national power. Therefore, emphasis should be towards a holistic assessment to interpret the 'effects', and not the means, that need to be produced at the tactical and operational level so as to force the adversary to behave differently. While doing so, if air power emerges as an effective and potent instrument, the same needs to be employed.

Second, critiques of EBO claim that the myriad variables omnipresent in war, coupled with the uncertainty of human behaviour, makes evaluation of effects a cumbersome, complicated and equivocal task. This thought process is an outcome of the predicament encountered in identifying the 'effects' against an unknown adversary with an alien political structure, economic set-up, cultural background and religious mindset. However, against adversaries with whom India has fought wars in the past, the political, military, economic and social environment would be subjected to continuous evaluation of 'effects' and examination of available options at the strategic, operational and tactical levels to achieve these effects. Harmonising the

existing capabilities of air power towards achieving the wanted effects, while avoiding the undesired effects, would enable military planners to identify targets for aerial engagement during peacetime. For example, globalisation and the growing mercantile reliance between nations has intertwined the world economy. This implies that infrastructural establishments in enemy territory can no longer be presumed as the sole property of the adversary, and, targeting them, especially by overt aerial action, could evoke international repercussions and may provoke neutrals. EBO would ensure that such restrictions, emerging from extraneous political compulsions, are identified in the planning process and incorporated in the target plan.

Thirdly, effects-based operations, as a doctrinal precept, should not be shrouded in vocabulary wherein semantics overshadow its tangible application. Needless to say, every action will produce an effect, especially if the action is produced by air power. The exploitation of these effects, towards achieving the objective, should be the premise of EBO when fighting in a joint environment. One of the facets of effects-based operations is that it allows far-reaching evaluation of a range of effects, both, the effects required to achieve the objectives and the effects that are likely to emerge from an action. Comprehensive analysis of these effects and linking them with objectives would assist campaign planners in identifying targets, resource allocation and, importantly, prioritising the sequence of targeting. For example, if the effects are to cut off the supply chain to the enemy ground forces fighting at the front, then destroying a critical bridge, through aerial action, might produce the necessary results. However, destroying an inconsequential bridge in enemy territory, because the capability exists, would mean that critical resources are frittered away in attacking targets that do not lead toward attainment of the end state. Similarly, if a logistics node is to be destroyed to choke the enemy, the attack should be timed in a manner to ensure that the sudden absence of resupply creates the effects and impacts the combat potential of the adversary, both physically and mentally. A premature attack on the logistics node might produce the same damage but would enable the enemy to find mitigating solutions to make certain that the effects do

In future, prior to employment of air power, political and military leaders would need to examine the predictability of effects, both direct as well as indirect, link these effects to the desired objectives, deduce the time required for these effects to fructify, extrapolate the risk factor and compare it with the desirability quotient.

not permeate towards the frontline. Joint planning and effects-based operations will ensure that air assets are exploited optimally and employed judiciously towards achieving the objectives.

Lastly, if the factors of space and time dictate restrictions at the political and military echelons, then employing air power towards producing second and third-order effects would find reduced acceptability in the planning stage. This thought process needs to be contested because second-order effects, when produced through aerial action, have the propensity to generate unproportionable outcomes. The 16 aircraft raid on Japan in 1942, led by Lt Col Jimmy

Doolittle, achieved minor effects at the tactical level but produced second and third-order effects which had ramifications at the grand-strategic level. The fear created amongst the populace changed the thinking of the Japanese and transformed their war-fighting philosophy. Their offensive in China was halted and the national military effort was altered and shifted towards the Pacific region, a decision which proved decisive in their overall defeat.⁷⁵ Employment of air power, in a calculated and calibrated manner, has the capacity and audacity to rapidly change the perceptions of the adversary, as was witnessed after the attack on the Governor's House in Dhaka during the 1971 war. In future, prior to employment of air power, political and military leaders would need to examine the predictability of effects, both direct as well as indirect, link these effects to the desired objectives, deduce the time required for these effects to fructify, extrapolate the risk factor and compare

75. The Doolittle raid has been discussed in the USAF Doctrine, twice, to elucidate the efficacy of air power towards producing effects. The aerial action has been used to explain the input versus output proportionality factor and subsequently to highlight the implications of unpredictable effects.

it with the desirability quotient. An analysis of such order would enable the architects of a campaign to formulate cogent CsOA that would facilitate effective and optimum employment of air power.

CONCLUSION

EBO is a theory that emerged because of the changing character of war. For centuries one has traditionally measured victory or defeat in terms of armies destroyed, soldiers slain and territory captured because these standards are quantifiable and widely recognised.⁷⁶ EBO contests this thought process by arguing that military action need not always be in the realms of physical destruction and could be intended towards creating psychological effects that would serve the overall military aim. The manifestation of these 'effects', in terms of credibility and effectiveness, has often been linked to the ability of air power to transcend boundaries and produce immediate results, while promising minimal losses. EBO and air power, therefore, will continue to be viewed as the potent combination which conjoins political objectives with military options. However, EBO is not a silver bullet and would necessitate military strategists to undertake an extensive and impartial appreciation of this concept and its symbiotic relation with air power. Understanding the essence of effects-based operations, articulating the doctrines accordingly and leveraging the capabilities of air power towards producing the desired effects would decide whether this combination sinks or swims on its own merit.

76. Meilinger, n. 31, p. 60.

THE SPACE RACE AND PRE-SPUTNIK ERA

MARTAND JHA

INTRODUCTION

The human race since time immemorial has always been fascinated by the night sky and space in general. The desire to venture into space and reach out to stars and planets has been there in all civilisations. That's why it is said 'Sky is the limit'. People in general have admired birds because they could fly in the skies and defy gravity to an extent; mankind has always wanted to take a similar giant leap. With the launch of Sputnik 1¹ on October 4, 1957, humanity did take a giant leap as for the first time a man-made object was placed into the earth's orbit. This event made news headlines across the globe and as a result it was hailed as the 'dawn of the space age'.

The Soviet Union which launched this satellite (Sputnik 1) showed its potential and capability as one of the two superpowers present in the international system then. The other superpower, USA, was meanwhile trying hard to build its space capabilities and outdo its rival, the Soviet Union, in the domination of Outer Space. This attitude of outdoing each other turned first into a 'race' and subsequently transformed into a 'rivalry'. To understand the difference between the two, a race can be understood as a process in which two or more than two competitors try to reach a goal

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1. Sputnik 1 was the first ever artificial satellite ever to be launched. The launch of Sputnik 1 was a landmark moment in history that marked the start of space age.

The space rivalry started to become political when leaders of these states got personally interested in the matter. More than that, both the Superpowers were trying to 'woo' the newly independent states to join their bloc as 'ally' and those nations who were already 'allies' felt a sense of security.

by focusing on their own abilities. On the other hand a rivalry starts within a race when a competitor is setting his strategies in opposition to a specific opponent. In this case, these opponents were the USA and USSR.

The space rivalry was not just seen as a feat in the field of science, technology and engineering but it was seen more as an issue of *prestige* and *national* honour by both the superpowers. Other countries who were not participants in the Space Race watched the rapid unfolding of events in the field of outer space activities with awe and a sense of

admiration towards the Superpowers. Both the American and Soviet systems were being judged on the basis of their technological prowess especially in areas like outer space. Socialism² inside the Soviet Union was pitted against Capitalism³ in the United States. The space rivalry started to become political when leaders of these states got personally interested in the matter. More than that, both the Superpowers were trying to 'woo' the newly independent states to join their bloc as 'ally' and those nations who were already 'allies' felt a sense of security. Countries like India, which were part of neither of the two blocs, i.e., NATO⁴ or Warsaw Pact,⁵ were also looking at the activities in outer

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2. Socialism is an economic and political system based on public or collective ownership of the means of production, which emphasises equality. The Soviet Union throughout its existence was a socialist state till its dissolution in 1991.
 3. Capitalism is an economic and political system in which a country's trade and industry are controlled by private owners for profit, rather than by the state.
 4. North Atlantic Treaty Organization (NATO), military alliance established by the North Atlantic Treaty (also called the Washington Treaty) of April 4, 1949, which sought to create a counterweight to Soviet armies stationed in central and eastern Europe after World War II.
 5. The Warsaw Treaty Organization (also known as the Warsaw Pact) was a political and military alliance established on May 14, 1955 between the Soviet Union and several Eastern European countries. The Soviet Union formed this alliance as a counterbalance to the North Atlantic Treaty Organization (NATO).

space by these Superpowers with much interest. India began contemplating whether it could develop its own space programme sometime in the future. This was the situation prevalent globally in the second half of the decade of the 1950s.

This article looks primarily into the genesis of the Cold War space rivalry and how outer space became a strategic domain by the end of the 1950s. The focus of the article is to analyse the history before the Sputnik 1 was launched by the erstwhile USSR on October 4, 1957 which gave birth to a Space Race between the then two superpowers, i.e., the United States and USSR. The decade of the 1940s and 1950s therefore becomes crucial to understand how the early space programmes in both US and USSR came into being.

BEFORE 1950s

The dawn of Space Age with the launch of Sputnik 1 was not an event which happened out of the blue. It took place within a context. The context was the Cold War rivalry between the US and USSR and if one goes further beyond, one could find the traces of technological innovations in the field of space related technology even before the Second World War. Space came to be seen as a strategic arena with the advent of V-2 rockets in Nazi Germany, when Adolf Hitler used these rockets to attack London during the Second World War for the first time on September 8, 1944 killing and injuring civilians. Each of these V-2 rockets were 14 metres in height and carried a ton (900 kg) of explosives.

The letter 'V' in V-2 stood for 'vergeltungswaffen', or 'retaliatory weapon.' They were called retaliatory weapons because it was the last hope for Hitler to somehow try and reverse the outcome of the war which the Germans were losing. V-2 rockets⁶ were a giant leap in terms of technological advancement in the field of rocketry. These rockets had an approximate range of 200 miles. The man who designed the V-2 rocket was Wemher von Braun who later became one of the pioneers of the Cold War Space rivalry. V-2 rockets were

6. Richard Hollingham, "V2: The Nazi rocket that launched the space age". BBC News, <https://www.bbc.com/future/article/20140905-the-nazis-space-age-rocket>. Accessed on March 10, 2020.

built on automatic guidance systems which meant that they could operate independently of controllers on the ground. The target destination was programmed into the analogue computers on board which helped the rocket to adjust and keep itself in the trajectory for hitting the target.

The 'potency' and 'capability' of these V-2 rockets made them a strategic asset to the Nazis. Major powers like the USA and USSR were eyeing the V-2 rockets to develop a similar technology in their own countries. This is because they realised that having a weapon like the V-2 in the arsenal could give them both 'absolute' as well as 'relative' advantage over their adversaries. This became more evident after the end of the Second World War when Americans and Soviets tried their best to get hold of V-2 rockets from Nazi Germany who had lost the war. In fact, Wernher von Braun, the man behind the V-2, surrendered himself to the allied forces of USA in order to escape being captured by the Soviet forces which were also looking for him.

Not only von Braun but all his associates in Nazi Germany were of great "strategic value" to both the Soviets and Americans as these trained and experienced team of engineers and scientists possessed the potential to take forward the space programmes of the country they surrendered to or were captured by. Though the Soviets and Americans were allies during the Second World War and fought the war together, both were also in competition with one another to become the biggest power of the planet at the end of the war. To ensure its supremacy in general—and over the USSR in particular—an operation was launched by the USA to capture the scientists involved in the V-2 programme.

OPERATION PAPERCLIP

'Operation Paperclip' was the code name of the US intelligence and military services that extricated scientists from Germany, during the final stages of and after World War II. The project was initially called *Operation Overcast* but later came to be known as *Operation Paperclip*. Many of these scientists were Nazi 'War Criminals' who had done horrendous things like carrying out scientific experiments on humans under the

Hitler regime. Most of them were in high positions in their respective fields and supported the Nazi ideology. Once the Second World War was over, both Americans and Soviets wanted to get hold of the technological prowess of the Nazi regime, including the sophisticated technological equipment built in Germany.

Once they got hold of the instruments, equipment, weapons and machines, the question was what to do with the highly skilled and trained people who designed all these things? The question was of morality because on the one hand, the world knew about their Nazi past, while on the other hand, these scientists were too skilled to be just left behind and punished for the war crimes they had committed.

Writing on the issue, journalist Annie Jacobson in her book *Operation Paperclip: The Secret Intelligence program that brought Nazi Scientists to America* wrote, "The U.S. government secretly decided that the value of these former Nazis' knowledge outweighed their crimes and began a covert operation code-named Paperclip to allow them to work in the U.S. without the public's full knowledge."⁷

The NASA history series under the *Selected Documents in the History of US Civil Space Program* revealed how the rocket scientists from Nazi Germany were transferred to the USA. In the book *Exploring the Unknown*, it is clearly stated that, "On May 2, 1945, Wemher von Braun, Dornberger and 116 other rocket specialists surrendered to American officials in the Austrian Tyrol town of Reutte, just south of Bavaria. A few months later, they were taken to the United States, along with about 100 V-2 rockets, many rocket components, and truckloads of scientific documents. This "rocket team" formed the foundation of the US progress in the missile and rocket development for several decades to come."⁸

7. Annie Jacobsen, *Operation Paperclip: The Secret Intelligence Program that Brought Nazi Scientists to America*, <http://93.174.95.29/main/A4477CD74C76858B73683D3FB19A5BFA>. Accessed on March 11, 2020.

8. John M. Longsdon, "Exploring the Unknown: Accessing space", <https://history.nasa.gov/SP-4407/ETUv1.pdf>. Accessed on March 9, 2020.

The United States not only took these scientists but used their potential by giving them a platform to build the US capabilities as a superpower in the arena of outer space along with other areas in science. Dr. Kurt H. Debus, who was a German V-2 Rocket Scientist under Nazi rule, was made the first director of NASA's John F. Kennedy Space Center. He remained there from 1962 till 1974. Similar was the case with many other Nazi scientists who later gained prominent positions in highly reputable institutions in the United States. While this was the case with the US, the Soviets did not allow captured Nazi Scientists to take part in their space programme or any other institution. All the information that these captured scientists possessed about rocketry and missile technology was elicited from them. Once this was achieved, these scientists were deported back to West Germany.

THE SOVIET RESPONSE: 'SOVIET ALSOS'

The Soviet version of Operation Paperclip was 'Soviet Alsos'. Under this, the Soviets tried to take control of the German technological and scientific materials, equipment, instruments as well as scientists and engineers who were the brain behind it. The Soviets were particularly interested in getting hold of atomic technology of the defeated Germans. The idea was to ensure that firstly, they secure these technologies with them and second, to prevent these from falling into the hands of the Americans, who also had a similar objective. Under the Soviet Alsos, the German scientists were captured to work on defence and space related programmes that the Soviets were focusing on during the days of Second World War. The atomic and the space programmes were actually going in tandem with one another in the USA and USSR. The dawn of the Space Age, which was still a distant reality owed its development to programmes like Operation Paperclip and Soviet Alsos.

Thus, both the USA and USSR, in a way, used the Nazi space technology in order to advance their own space programmes. Germany was clearly one of the pioneers in space technology; its defeat in the Second World War halted its forward momentum towards becoming one of the major space powers in the world. One thing which is noteworthy is that, during this time, the real

potential of the space sector had not even been envisaged. The technology related to rocketry was primarily for military purposes. Historical events like Operation Paperclip and Soviet Alsos give us a fair idea of the interest shown by Superpowers in strategic weapons.

THE POST-SECOND WORLD WAR SCENARIO

The end of Second World War led to the rise of two Superpowers, i.e., the USA and USSR. Despite being allies in WWII, both turned antagonistic towards each other in order to establish their individual supremacy over the world. The fight was mostly ideological as both tried to portray to the world that their ideas, their political system, their morality, their culture was better than that of the other. It was in this backdrop that both the US and the Soviet Union started working seriously towards advancing their endeavours in the arena of outer space. It was at this time that 'Space Militarisation' started and gained greater and greater currency.

The term militarisation of space could signify the usage of space assets in order to increase military effectiveness of ground-based forces. Various developments in the field of information and communication satellites have made the global positioning system (GPS) an undeniable part of militaries across the world.⁹ Space militarisation could also be understood as the use of assets based in space to enhance the military effectiveness of conventional forces or the use of space assets for military purposes.¹⁰ Militarisation of space enables a greater 'strategic advantage' over the opponent. Before the launch of Sputnik 1, outer space was unexplored but the 'near space' was very much a 'strategic arena' as the world got to know its potential when nuclear bombs were dropped on Hiroshima and Nagasaki in the Second World War by the US, effectively ending the war decisively.

9. Richard L. Garwin, "Proceedings of the American Philosophical Society", vol. 145, no. 3 (September 2001), pp. 243-59, https://www-jstororg.ezproxy.jnu.ac.in/stable/pdf/1558107.pdf?ab_segments=0%252Fbasic_search%252Fcontrol&refreqid=excelsior%3A02b48b00df173927c9b35231035a63b2. Accessed on March 12, 2020.

10. Mathew Mowthorpe, "The Militarization and Weaponization of Space" (Lexington Books, 1st edition, December 17, 2003), <https://www.goodreads.com/book/show/9924084-militarization-and-weaponization-of-space>. Accessed on March 14, 2020.

In the year 1957, the first successful test of an Intercontinental Ballistic Missile (ICBM) was conducted by the Soviet Union. Although the United States had tried to conduct the first launch of an ICBM before the Soviets, but the test launch had failed.

Scientists in both the US and USSR were working in tandem on both nuclear and space programmes. The combination of these two capabilities coming together had the most 'destructive potential'; Intercontinental Ballistic Missiles (ICBMs) emerged as a result of this thinking. ICBMs were designed to carry nuclear warheads over large distances, across continents. These ICBMs started coming up during the 1950s. These were much more powerful than the previous long-range guided ballistic missiles like Nazi V-2 rockets. For years after the Second World

War, both the United States and the Soviet Union had been trying to perfect a long-range missile capable of carrying nuclear warheads. Building on the success of Nazi Germany in developing the V-1 and V-2 rockets that caused great damage to Great Britain during the last months of World War II, both American and Russian scientists raced to improve the range and accuracy of such missiles.

In the year 1957, the first successful test of an Intercontinental Ballistic Missile (ICBM) was conducted by the Soviet Union. Although the United States had tried to conduct the first launch of an ICBM before the Soviets, but the test launch had failed. To fully understand the competition between the US and Soviet Union in the arena of outer space—which ultimately led to a space race and further to a space rivalry between them—one has to understand the context of the global order in which these events were unfolding.

The context was the 'birth' of Cold War itself. The end of World War II actually left three Superpowers in the offing, i.e., the USA, UK and USSR. The United Kingdom could not continue to maintain its status of a Superpower because of the huge damages it incurred during the war. Second, the large decolonisation of the British empire, including independence of huge colonies

like India, which had served the British Empire's development, contributed to its downfall. With the empire gone, the United Kingdom remained a shadow of its glorious past, leaving only two Superpowers ultimately, i.e., the US and USSR.

THE ADVENT OF THE COLD WAR

The term 'Cold War' was coined on April 16, 1947 by Bernard Baruch, the multimillionaire financier and adviser to presidents from Woodrow Wilson to Harry S. Truman, in order to explain the increasingly adverse relations between the two World War II Allies: the United States and the Soviet Union. The Cold War was a period of 'competition' and 'tension' between the two Superpowers through the second half of the twentieth century until the break up of the Soviet Union in 1991. The period 1945-1991 is generally seen as the period of Cold War. Though the US and USSR never fought a direct war in this period, there were many stand-offs between them which brought them dangerously close to a nuclear war.

The Cold War as a period in the history of international relations is understood as a period of 'bipolarity'. The world was divided into two poles, each with its own ideology, claiming supremacy over the other. The Cold War became a rallying point for countries with similar systems of governance and ideologies to come together as a group, as an alliance, and as security partners. NATO and Warsaw Pact are examples of such groupings, where NATO represented the Western Bloc, while Warsaw Pact represented the Eastern Bloc. The Western Bloc was led by the United States while the Soviet Union led the Eastern Bloc. Though the US and USSR had fought together as allies against the Axis powers—which included Nazi Germany—tensions started

The Cold War as a period in the history of international relations is understood as a period of 'bipolarity'. The world was divided into two poles, each with its own ideology, claiming supremacy over the other. The Cold War became a rallying point for countries with similar systems of governance and ideologies to come together as a group, as an alliance, and as security partners.

coming to light between the two from the time of the Potsdam Conference itself where the allies negotiated the joint occupation of Germany.

As per information provided by the JFK presidential library and museum on the Cold War, “During the 1940s, the United States reversed its traditional reluctance to become involved in European affairs. The Truman Doctrine (1947) pledged aid to governments threatened by communist subversion. The Marshall Plan (1947) provided billions of dollars in economic assistance to eliminate the political instability that could open the way for communist takeovers of democratically elected governments.” The Cold War gave birth to realist issues like balance of power, deterrence, territorial integrity and sovereignty. Realism, an approach to the study and practice of international politics, emphasised the role of the nation-states, motivated by their national interests, which could sometimes be disguised as moral concerns.

The Cold War became a battleground of ideas clashing with each other constantly. The world was moving in the direction of binaries. Things like ‘us’ versus ‘them’, ‘capitalism’ versus ‘communism’, ‘America’ versus ‘Soviet’, ‘East’ versus ‘West’, ‘First World’ versus ‘Second World’ started to define the nature of the Cold War. It was within this context that both the US as well as USSR tried to assert their dominance over the other. The idea was that once a Superpower manages to defeat the other in an ideological battle of supremacy aided by physical military strength as well, one of the two would become a ‘hegemon’ in the system. The term ‘hegemony’ was brought into International Relations literature by Robert Keohane—derived from the Greek word *hegemonia*, which translates as dominance or leadership.

The hegemonic ambitions of both Superpowers demanded an absolute edge with respect to military capabilities over the other. To achieve that, both the USA and USSR started building their military capability aided by nuclear, missile and space technologies. If the 17th, 18th and 19th centuries were about the mastery of seas to become great powers, the twentieth century was about getting mastery over air and space. The combination of air and nuclear power together provided quite a ‘lethal combination’, as was seen during the dropping of a nuclear bomb in World War II as well as in the use of V-2 rockets by Nazi

Germany (though nuclear weapons were not used at that time). Pioneers of space engineering—which included people like Wemher von Braun and Sergei Korolev—were therefore focusing on building and enhancing such capabilities which in their minds would become the future of warfare.

With the US already in the lead, having declared itself a nuclear power—in fact, the first nuclear power on the planet—the USSR followed soon thereafter and declared itself a nuclear power in 1949. One thing that needs to be kept in mind is that the nuclear arms race between the two superpowers was a precursor to the upcoming space race between them. Therefore, one cannot fully understand the nuances of ‘Space Race’ which intensified the Cold War in the 1960s. The space programmes in both the US and USSR were not conceived for ‘civilian purposes’ at the outset. Militarisation of outer space was at the heart of both these programmes. There was a great ‘mutual suspicion’ between Americans and Soviets and therefore a lot of spying and counter-spying was involved. In order to ‘outdo’ each other across all fields—especially trying to have a relative superiority in the military arena—both the countries started to invest heavily in their defence sector. Let’s have a brief look into both the US and Soviet involvement in the arena of Outer Space before the dawn of the Space Age.

AMERICAN EFFORTS IN OUTER SPACE AFTER WW II

The end of the Second World War was decisive in many ways. On the one hand, it ended the tyrannical Nazi regime in Germany which was the perpetrator of crimes against humanity at large, while on the other it threw up a new international order with two Superpowers. Also, the war ended with the ‘dawn of nuclear age’ with the US dropping the atomic bomb named ‘Little Boy’ over Hiroshima and another bomb named ‘Fat Man’ over Nagasaki. The Americans started working on their ballistic missile programme with the help of the German scientists who had been taken out of Germany by the US under Operation Paperclip. Wemher von Braun began working for the Americans along with hundreds of German—and US—scientists and engineers reporting to him.

Till then, the air power capabilities of the US or any other country in the world were limited to the earth's atmosphere. Reaching outer space was still a distant dream, although the advancement in rocketry and missile technology provided a real possibility of making manned forays into outer space soon. The only big question was when? The US administration at the very top level, including its President, was involved in the decision-making process regarding the kind of space policy that was to be made with respect to the usage of outer space. One thing which is noteworthy is that each of the US Presidents had a different approach with respect to the militarisation of space.

In the book, *US Presidents and the Militarization of Space: 1946-1967*, the author, Sean N. Kalic describes the stand taken by various US Presidents during the early Cold War. The book looks into the role played by three successive presidents of the USA after Second World War, i.e., Presidents Truman (1945-53), Eisenhower (1953-61) and Kennedy (1961-1963). Kalic states, "President Truman remained personally detached from the work on the early ideas about the use of satellites and space systems." The Truman era also saw the birth of the idea that eventually led his successors to push for an international ban on the stationing of weapons in space. Eisenhower recognised the significant national security contributions that non-aggressive military satellites could provide the United States. He also saw the importance of advancing the US civilian space programme as a demonstration of US commitment to the peaceful use of space.

These ideas were carried over to the administrations of Presidents Kennedy and Johnson. President Kennedy emphasised the role of NASA by embracing the capabilities of the civilian space programme to further the US agenda of the peaceful use of space. Despite strong criticism for his decision to emphasise NASA's programmes over those of the military, Kennedy advanced the use of non-aggressive military satellites as developed and authorised under Eisenhower. The decisions by these three presidents to use space for military as well as civilian purposes were not made in a vacuum. Rather all the three presidents embraced the use of

space for reasons of national security, international prestige, and scientific and technological research, all areas of heightened concerns during the Cold War.¹¹

The years 1945-1952 are not considered as a part of the Space Age and yet these very years provided the intellectual beginnings of the American space programme. The Americans were wary of Soviet progress in the arena of military technology. By the start of the 1950s, the US did not remain the only nuclear power. The USSR was the new entrant to the nuclear club. From 1945 to 1949, it seems that the US remained a bit relaxed vis-à-vis its progress in the arena of strategic military assets. The reason seems to be that firstly, the Second World War had just finished and most of the countries needed a breathing time after a long war to bring back things to normalcy. Secondly, during this period, the US had proved itself as the most powerful and the only force in the world possessing nuclear weapons and therefore had a big 'strategic advantage' over the USSR. With the Soviets bridging the nuclear gap between itself and the US, the Americans started to embrace the militarisation of Space. It was under the Eisenhower administration that the military space activities by the US increased dramatically. Eisenhower took a deep interest in space related issues; he was especially in favour of using satellites for military purposes.

President Dwight Eisenhower authorised preliminary research on Anti-satellite systems (ASAT) and Ballistic Missile Defences (BMDs). Eisenhower supported these programmes because he believed that they could be used to stop a Soviet attempt to control space. Though he was against the use of weapons in space, Eisenhower defended US interest in ASAT and BMD research as necessary to preserve global peace and stability. Eisenhower did not usher America into the space age. It was already there, and he expanded on principles set out in the Truman years. What was new in the Eisenhower presidency was the President's recognition of the need for a national space policy based upon the militarisation of space.

11. Sean Kalic, *US Presidents and the Militarization of Space: 1946-1967* (Texas A&M University Press, 2012), <http://93.174.95.29/main/378373758BA9D7F3743BDFB0B91C77B3>. Accessed on February 27, 2020.

Though he was against the use of weapons in space, Eisenhower defended US interest in ASAT and BMD research as necessary to preserve global peace and stability. What was new in the Eisenhower presidency was the President's recognition of the need for a national space policy based upon the militarisation of space.

The concept of 'space superiority' is believed to have first been elaborated in the early 1950s by Wernher von Braun. In 1951 von Braun envisioned a space station that would give the United States 'military omnipresence'. He stated,

It appears to me that in the atomic age the nation which owns such a bomb-dropping space station might be in position virtually to control the earth. The political situation being what it is, with the earth divided into a western and an eastern camp, I am convinced that such a

station will be the inevitable result of the present race of armaments.

In the 1950s, Outer Space began to be seen as an arena of 'strategic stability' by the Americans. There is no particular or one definition of strategic stability as the word is used in many contexts and therefore one definition cannot do justice to all those contexts. But one definition which stands out among many is the one given by International Relations scholar Thomas Schelling. He defined 'strategic stability' as, "a particular balance between nuclear armed rivals that have credible retaliatory nuclear strike capabilities." He further added,

a situation is stable when either side can destroy the other when it strikes first or second—that is, when neither in striking first can destroy the other's ability to strike back. To maintain this equilibrium, it is not sufficient for all sides to simply have nuclear weapons. Strategic stability demands 'the maintenance of an effective second-strike capability'. (UNIDIR Report, "Space Security and Strategic Stability".)

Though this definition was written in 1958 but the debates on this issue had

started much before in the early 1950s which ultimately led to the formation of national space policy in the US post the launch of Sputnik 1.

SOVIET EFFORTS IN OUTER SPACE AFTER WORLD WAR II

Soviet efforts were no less than the US in the arena of outer space, although, unlike the US, the Soviets had a highly secretive and centralised set-up. The space programme, like other programmes in the USSR, was attached to its five-year plans which were very successful in taking Soviet Russia to a dominant position on the global stage. After the Second World War, the Soviets realised that though they were one of the two Superpowers, they were lagging behind the US as it was the sole nuclear power by then. Despite being an ally of the US in WWII, the Soviets were never kept in the loop about the Manhattan Project by the US (at least not officially) nor were they informed by the US about its decision to drop the atom bomb on Hiroshima and Nagasaki.

The mutual suspicion between the two superpowers was running very high and it was in this context that the Soviets geared up to build their strategic and military arsenals, especially in the areas of ballistic missile technology and space technology. Sergei Korolev, a rocket engineer by profession, was put in charge of the Soviet Space programme. Considered as the Father of the Soviet Space programme, Sergei Korolev took the Soviet Space programme to great heights in his lifetime.

Though the rocketry and space programmes of the Soviet Union had their origins in the late 1800s with the farsighted and at times farfetched writings of a deaf, self-taught schoolteacher named Konstantin Eduardovich Tsiolkovskiy, it was Sergei Korolev who took the Soviet Space programme

After the Second World War, the Soviets realised that though they were one of the two Superpowers, they were lagging behind the US as it was the sole nuclear power by then. Despite being an ally of the US in WWII, the Soviets were never kept in the loop about the Manhattan Project by the US.

to the next level. Soviet efforts in outer space after the Second World War were formidable, given that the country had incurred tremendous loss of life and property. At that time, it was difficult for nations to think of spending large sums of money on outer space technology. But the young engineers of Soviet Russia—which included Korolev as the head of the operations—were in a ‘mission mode’. It was the combined fear of the country’s leaders and love for the country itself that provided the context within which the young aeronautical engineers of the Soviet Union started working towards their space programme. Their love for pursuing science and engineering was also one of the big motivating factors for the Soviet engineers to work under adverse conditions.

Stalin, who was then president of the Soviet Union, directed his forces to take control of the Nazi military technology which was quite advanced, but the Soviet forces did not have much success in getting the desired assets, i.e., German technology, or its scientists. US forces had already captured most of the Nazi military assets by the time Soviet forces reached those military facilities in Germany. Even Wemher von Braun, along with hundreds of engineers and scientists, had surrendered to US forces. Soviet leaders who had expectantly awaited capture of this most precious war booty were in some cases stunned by the efficiency and swiftness with which these ‘weapons’ were taken from under their noses. Stalin was reportedly quoted as saying: “This is absolutely intolerable. We defeated the Nazi armies: we occupied Berlin and Peenemunde but the Americans got the rocket engineers. What could be more revolting and more inexcusable? How and why was this allowed to happen?”¹²

Soviet efforts to take control of whatever was left were also disorganised. Among the Soviet team members for capturing the Nazi missile technology was a person named Boris Chertok, a guidance systems engineer who became one of the pioneers of the Soviet Space programme.

12. Asif Siddiqui, “Challenge to Apollo: The Soviet Union and the Space Race, 1945-1975”, <http://93.174.95.29/main/7C0CF0B1521459E67F7A52527EC10B26>. Accessed on February 24, 2020.

Chertok took a leading role in making impartial assessments of leftover German remains. The preliminary impressions resulting from the combined inspection of the artillery and Air Force groups at Peenemunde in May and June had repercussions not only on the perceived level of German missile technology, but they also reflected poorly on the accomplishments of the Soviets themselves.¹³

Soviet rocket scientists and engineers were as advanced, as inventive and as clever as their German counterparts but in putting these theories into practical technology they turned out to be behind the Germans. But soon that was about to change. The Soviets took back around 152 scientists to Moscow, all of whom were experts of rocketry. While the Soviet Alsos was going on, back at home the Soviet government was focusing to build up institutions. By the time the Germans arrived in Moscow, a vast network of institutions had been formed around the nerve centre of NII-88 at Kaliningrad, about 16 km north of Moscow.

The institute itself, headed by Maj General Gonor, was divided into three formal structural units:

- A specialised design bureau to design long-range ballistic missiles.
- A scientific branch with sub-departments for materials science, stress, aerodynamics, engines, fuels, control, testing and telemetry.
- An experimental plant to manufacture the missiles.

After getting their hands on whatever was necessary for the Soviets to exploit, the Nazi military assets (the scientists and engineers) were sent back to Germany.

CONCLUSION

The dawn of the space age is identified by the launch of Sputnik 1, but as is said 'Rome wasn't built in a day', similar was the case with the progress in the space arena. It took a lot of historical twists and turns, along with

13. Ibid.

the fast-changing global order, that eventually led to the era which is known as the space age. If one has to understand the nuances of the origins of the Cold War space race and then the space rivalry between the two superpowers, one needs to understand the context in which it happened and more importantly the historical background to this important landmark in international relations history. The pre-Sputnik era essentially built the ground for the 'space race'; it equipped the Superpowers to become much more powerful states in the decade that followed the end of the Second World War.

It was in this pre-Sputnik era that the international order and the system changed. The world was saved from the Nazi regime headed by Adolf Hitler who could have created much more havoc and could have threatened global security in a much more despotic manner had his regime been in possession of highly potent and destructive weapons like the atom bomb or ICBMs. The desire and zeal of the Superpowers to reach out to outer space gained currency in this period. The period of pre-Sputnik launch was a period of dreamers, achievers and pioneers who wanted to venture into a 'new world', a more 'scientific world'. To have supremacy over the planet was no longer the biggest dream; now mankind wanted to conquer Space. This need for gaining supremacy over the rest of world led to the intensification of the Cold War.

SOUTH ASIA UNDER CHINA'S NUCLEAR SHADOW

SANJANA GOGNA

INTRODUCTION

While India and Pakistan are often regarded as the protagonists in nuclear South Asia, the role of China in the regional dynamics remains no less critical. Beijing's nuclear relations with both the actors are of different nature and purpose: with New Delhi, it appears to share a stable nuclear dyad owing to their symmetrical nuclear postures, even as both the sides face varying degrees of threats from one another; whereas, with Islamabad, it shares deep strategic relations, whereunder it has armed Pakistan with both nuclear weapons and conventional capabilities to counter India.

This article has two purposes: first, it attempts to analyse the consequences of China's nuclear capabilities and posture on South Asian nuclear dynamics; second, it delineates China's nuclear strategy towards India and Pakistan, and analyses its implications on regional stability. The article begins by laying out the analytical framework of nuclear South Asia based on concepts such as security trilemma and strategic nuclear chain. In this section, the article explains how China's nuclear equations with the US impinge on its strategic relations with India and Pakistan. It further describes how China's nuclear dyads with each of

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To understand the nuclear dynamics in South Asia, it is important to take into consideration the nuclear dynamics between the China and the US.

these states get forged into a chain that result in a complex interrelated security dynamic. Next, the article analyses China's nuclear relations with India and Pakistan, and highlights Beijing's role in causing nuclear instability in the region. Finally, the paper extrapolates the dynamics of the strategic nuclear chain to analyse the future of nuclear deterrence in the region vis-à-vis China and assess the prospects of arms control between Beijing and New Delhi.

THEORETICAL AND CONTEXTUAL BACKGROUND

Susan Turner Haynes notes, "China's nuclear threat perception, and thus its nuclear modernisation, stems from its bilateral relationships, where the US is rightfully characterised as the 'heavyweight' in its security calculations, and India is the peripheral aggravator."¹ To understand the nuclear dynamics in South Asia, it is important to take into consideration the nuclear dynamics between the China and the US. Haynes notes that even though the US does not share a border with China, it features prominently in the latter's nuclear strategic calculations. To wit, Beijing's decision to acquire nuclear weapons was driven by the issuance of nuclear threats by Washington in the early 1950s. These threats had aimed to coerce the Chinese leadership to end the Korean War, and to prevent its conquest of Taiwan.² In the present context, the nuclear dynamics between the two are driven by the development and deployment of Ballistic Missile Defence (BMD) systems and long and medium-range missiles by the US, along with its strategic partnership with other nuclear and near-nuclear states³ in China's neighbourhood.

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1. Susan Turner Haynes, "China's Nuclear Threat Perceptions". *Strategic Studies Quarterly*, 10, no. 2 (2016): 25-62, www.jstor.org/stable/26271504. Accessed on July 14, 2020.
 2. John W. Lewis and Litai Xu, *China Builds the Bomb* (Stanford University Press, 1991), pp. 25-32.
 3. Near nuclear States refer to the countries that have the scientific workforce and infrastructure for building nuclear bombs. In the above context, these include Japan and North Korea.

With regard to South Asia, China shares tense relations with India which mainly stem from long-standing unresolved border demarcations. Both the countries have differing perceptions over 3,488 km of the Line of Actual Control (LAC). Further, China lays claim to over 80,000 sq km of the Indian state of Arunachal Pradesh. As a result, the two countries went to war in 1962, and continue to engage in low-level border confrontations. Despite many rounds of negotiations between special representatives of both sides, the territorial issues remain unresolved.

In terms of nuclear capabilities, China does not publicly identify India as a threat to its national security; although it covertly feels challenged by India's nuclear weapons, particularly its indigenously developed nuclear enabled long-range Agni-series missiles that have a range of over 5,000 km and are capable of reaching any part of China.⁴ India's nuclear weapons offer New Delhi a strategic parity vis-à-vis China, which allows the former to deter large-scale confrontations. It has been evident in the timely de-escalation of the border confrontations as well as in the absence of the nuclear rhetoric in their relations which, incidentally, remains common in other nuclear dyads such as the China-US and India-Pakistan as well.

John W. Lewis and Xu Litai in *China Builds the Bomb* posit that the Chinese leadership's perception of challenges is not necessarily based on situations that pose a direct threat to its security; it could often be situations that can be potentially detrimental to its security interest. In the case of South Asia, China began to reckon India as a security challenge when the latter

In the case of South Asia, China began to reckon India as a security challenge when the latter achieved a decisive victory against Pakistan in the 1971 war, which resulted in the liberation of East Pakistan, now known as Bangladesh. The war had demonstrated tremendous improvements in India's conventional capabilities, as compared to its performance in the 1962 China-India war.

4. "Why the World Should Fear India's New ICBM's". *The National Interest*. Last modified January 25, 2018. <https://nationalinterest.org/blog/the-buzz/why-the-world-should-fear-indias-new-icbms-24211>

achieved a decisive victory against Pakistan in the 1971 war, which resulted in the liberation of East Pakistan, now known as Bangladesh. The war had demonstrated tremendous improvements in India's conventional capabilities, as compared to its performance in the 1962 China-India war. In the immediate aftermath of the India-Pakistan war of 1971, China began to aid Pakistan in developing its nuclear capabilities, whereby it sought to complicate India's security environment. Siddharth Ramana suggests that by proliferating to Pakistan "China can make use of its proxy in instigating a nuclear conflict in South Asia, wherein the affected parties would be Pakistan and India, with China attempting to emerge unscathed".⁵ He refers to the Chinese aversion to Pakistani Foreign Minister's requests to guarantee nuclear protection in 1998 to suggest that China finds Pakistan as an extended deterrence proxy more practical than a recipient of its nuclear umbrella.

In the last decade and a half, China's threat perceptions have been elevated due to India's strengthened strategic relations with the US, which gained momentum with the signing of Indo-US nuclear deal in 2008. It has further been reinforced with the formation of the informal Quadrilateral Security Dialogue, known as the Quad, consisting of China's adversarial states, namely, Australia, Japan, India, and the US. China has sought to respond to these developments by fortifying its relations with Islamabad by launching several infrastructural projects throughout Pakistan that have military implications for India.

The paper seeks to suggest that dynamics of South Asia, which traditionally involves hostile relations between India and Pakistan, gets impinged upon by the nuclear relations between the US and China. Linton Brooks and Mira Rapp-Hooper have termed this overlapping of deterrence relationships as 'security trilemma', wherein actions taken by one state to defend against another state have the effect of making a third state feel insecure.⁶ In South

5. Siddharth Ramana, "China-Pakistan Nuclear Alliance: An Analysis." IPCS | Institute of Peace and Conflict Studies, https://www.ipcs.org/issue_briefs/issue_brief_pdf/SR109.pdf. Accessed on May 10, 2020.

6. Linton Brooks and Mira Rapp-Hooper, "Extended Deterrence, Assurance, and Reassurance in the Pacific during the Second Nuclear Age," in *Strategic Asia 2013-14: Asia in the Second Nuclear Age* (National Bureau of Asian Research, n.d.), PDF e-book, p. 267.

Asia, due to the modernisation of the US and China's nuclear capabilities, as mentioned above, India gets pulled into an offence-defence spiral. Further, as India is involved in a separate nuclear dyad with Pakistan, Islamabad faces an extended security dilemma. Manpreet Sethi defines this complex interrelation of multiple dyads as a strategic nuclear chain,⁷ wherein she suggests that any changes that occur in the nuclear capabilities, doctrines or postures of the US and China inevitably disturb the strategic nuclear balance between India, China, and Pakistan.

ANALYSING THE INDIVIDUAL DYADS

To set the context of the nuclear dynamics in South Asia, this section would briefly discuss the nuclear relations between India and Pakistan, before delving into the discussion of China's relations with the two.

India and Pakistan's hostilities are rooted in the partition of British India and have a basis in historical religious conflict. It gets manifested in contestation over the state of Kashmir. India and Pakistan fought wars on four occasions, namely in 1949, 1965, 1971 and 1999, whereby New Delhi repeatedly proved its conventional military superiority. India's strategy, thus, has been to maintain the regional status quo, whereby it seeks to maintain its military, economic as well as normative superiority; whereas, Pakistan seeks to draw the regional power balance in its favour and, therefore, follows a revisionist strategy.

Islamabad views India's nuclear weapons as an existential threat, especially as the 1971 war had resulted in the liberation of Bangladesh. For Pakistan, its nuclear weapons promise to offer strategic parity vis-à-vis India. In order to deter a conventional war with India, Pakistan has kept its nuclear threshold low with its doctrine of First Use and has frequently engaged in the tactic of nuclear brinkmanship. The aim of such tactics is to wage covert war in Kashmir,⁸ and continue its terror activities over the Indian territories

7. Manpreet Sethi, "Nuclear Risks in Southern Asia: The Chain Conundrum", in Wilfred Wan, ed., *Nuclear Risk Reduction: Closing Pathways to Use*, UNIDIR, 2020, pp. 138-53.

8. Shalini Chawla, "Decoding Pakistan's Nuclear Brinkmanship", TribuneIndia News Service (blog), September 18, 2019, <https://www.tribuneindia.com/news/archive/comment/decoding-pakistan-s-nuclear-brinkmanship-834037>

under the broader threat of using nuclear weapons.⁹ Further, China has exploited Pakistan's insecurity by providing it with material and technical assistance to establish a nuclear deterrence vis-à-vis India.

China and India

As discussed earlier, China-India rivalry largely stems from long-standing disputes over the Indo-China border that led the two countries to go to war in 1962. The period following the war was marked by a break, but the relations began to improve mid-1980s onwards. Several border management agreements crafted during this period, such as the 1993 agreement on 'Maintenance of Peace and Tranquillity along the LAC in the India-China Border Areas' enabled a relative calm in the relations; nevertheless, the border peace was occasionally interrupted by minor border skirmishes.

In recent times, the tensions between India and China tend to routinely get intensified as they get involved in frequent high-level border confrontations. Two of such confrontations took place in Chumar and the Doklam in 2014 and 2017 respectively and involved a military stand-off that lasted several weeks. The Galwan Valley military clashes in 2020 resulted in heavy mobilisation and unprecedented killing of several soldiers on both sides. These clashes have caused the breakdown of the various border management mechanisms that held peace at the LAC for several decades.

Monika Chansoria notes, "Beijing appears intent at keeping the border dispute alive as a tactical pressure point against India. China seems to be awaiting an opportune moment in which the existing military asymmetry with India will widen and Beijing will be positioned to bring the dispute to a close on its own terms."¹⁰

China's first nuclear tests in Lop Nur in 1964 which came close on the heels of the China-India War of 1962 elevated India's threat perceptions.

9. Shyam Saran, "Dealing with Pakistan's Brinkmanship". *The Hindu* (blog). December 7, 2012, <https://www.thehindu.com/opinion/lead/Dealing-with-Pakistan%E2%80%99s-brinkmanship/article14641185.ece>

10. Monika Chansoria, "India-China Border Agreement: Much Ado About Nothing," *Foreign Policy*, <https://foreignpolicy.com/2014/01/13/india-china-border-agreement-much-ado-about-nothing/>. Accessed on January 13, 2014.

New Delhi initially took to a diplomatic recourse to achieve universal nuclear disarmament to stabilise its security environment. In 1965 India, along with other states, moved resolution 2028 in the UN General Assembly that sought to halt the spread of nuclear weapons. Through the negotiations, New Delhi was expecting reciprocity obligations whereby the states who possessed nuclear weapons would halt further proliferation in return for the non-nuclear weapons states stopping acquiring them.¹¹ In the past, India was actively involved in the draft negotiations of the Nuclear Non-Proliferation Treaty (NPT) and had also voted in favour of the Irish Resolution introduced at the United Nations General Assembly in 1960 to prevent nuclear proliferation.¹² However, Russia, the US and the UK converted the NPT to allow unlimited nuclear proliferation to the nuclear weapons states and impose a total ban on the acquisition of nuclear weapons by all other nations. This had led India to back out of the negotiations. Incidentally, China had not acceded to the NPT at this time.¹³

India's threat perceptions were once again raised when it suffered nuclear blackmail by the US during the India-Pakistan war of 1971. The US at that time was backing Pakistan, and had moved the nuclear enabled USS *Enterprise* into the Bay of Bengal to threaten India with a nuclear attack. China was also siding with Pakistan and the US during this time.¹⁴ Following the end of the war, reports of Pakistan's efforts to acquire nuclear weapons started to emerge, and soon thereafter, evidence of China's collaboration in Pakistan's nuclear weapons also surfaced.¹⁵ At this stage, pressure began to be built on the Indian leadership to develop its nuclear deterrence.

Notably, as mentioned earlier, despite deep-seated hostilities the nuclear component does not seep into their security relations. Several analysts

11. K. Subrahmanyam, "Indian Nuclear Policy—1964–98 (A Personal Recollection)", *Strategic Analysis* 42, no. 3 (2018): 294, DOI: 10.1080/09700161.2018.1463956

12. Evgeny M. Chossudovsky, "The Origins of the Treaty on the Non-Proliferation of Nuclear Weapons: Ireland's Initiative in the United Nations (1958-61)", *Irish Studies in International Affairs* 3, no. 2 (1990): 111-35, www.jstor.org/stable/30001773. Accessed on July 18, 2020.

13. Subrahmanyam, "Indian Nuclear Policy", n. 11, p. 295.

14. *Ibid.*, p. 296.

15. *Ibid.*

China, till date, dismisses both India and Pakistan as legitimate nuclear weapons states as neither has signed the NPT. China also rebuts India's rationale for developing nuclear weapons—which is to deter a nuclear war with China. Instead, Chinese strategic scholars argue that India developed nuclear weapons to achieve prestige and status.

suggest that the appearance of stability within the China-India nuclear dyad comes from similarities in their nuclear postures. Vipin Narang notes,

China and India have both adopted assured retaliation postures. Each relies on a small but secure and survivable nuclear force, arrayed for an assured retaliatory strike against their primary opponents' strategic targets. Both have paired a declaratory no-first-use policy with operational procedures that make the first use of nuclear weapons unlikely. Nevertheless, both assure nuclear retaliation should they sustain a nuclear hit or, adversaries must assume if a level of unacceptable conventional damage were sustained.¹⁶

Similarly, Rajesh Basrur and Kartik Bommakanti have listed several similarities in the nuclear postures of China and India.¹⁷ These include, first, the adoption of the policy of minimum deterrence whereby both the countries prefer a relatively small number of warheads and delivery platforms; second, the fact that neither side is interested in nuclear warfighting, and hence have no proclivity for keeping nuclear weapons ready for combat; third, both the countries have a non-offensive posture of non-deployed weapons for reducing the potential for rapid spiralling of risk during tense times; fourth, they have their doctrines and force postures crafted around the concept

16. Vipin Narang, "What Does It Take to Deter? Regional Power Nuclear Postures and International Conflict." *The Journal of Conflict Resolution* 57, no. 3 (2013): 478-508, www.jstor.org/stable/23414723. Accessed on May 5, 2020.

17. Rajesh Basrur and Kartik Bommakanti, "The India-China Nuclear Relationship". *Strategic Analysis* 35, no. 2 (2011), 186-93. DOI: 10.1080/09700161.2011.542914.

of No First Use (NFU); fifth, both have used nuclear weapons as instruments for coercion; and, finally, both the sides have chosen to conduct a small number of nuclear tests, which remain far less than other major nuclear powers.

In a differing perspective, Chinese scholars often argue that India's limited nuclear capability along with its defensive posture, and the lack of intention to go to war, negates any possibility to consider India as a threat. China, till date, dismisses both India and Pakistan as legitimate nuclear weapons states as neither has signed the NPT. China also rebuts India's rationale for developing nuclear weapons—which is to deter a nuclear war with China. Instead, Chinese strategic scholars argue that India developed nuclear weapons to achieve prestige and status.¹⁸

In contrast, the rest of the section would argue that it is neither the similarities in the nuclear posture nor the policies that provide stability in the relations. Nor is it India's limited nuclear capabilities that have led China to underrate India's nuclear deterrence. As argued earlier, China faces security challenges from India that stem from India's conventional and nuclear capabilities, as well as from New Delhi's strengthened relations with Beijing's adversaries. As a result, China has crafted its nuclear strategies to counter India's challenge. Several of such strategies have a destabilising effect on regional security.

First, China does not identify India as a legitimate nuclear weapons state as it is not a signatory to the NPT. Such a stance by China prevents any prospects of nuclear dialogues between the two states. Adversarial nuclear

Adversarial nuclear weapons states, including the US and Russia, have been part of several bilateral and multilateral agreements which are designed to prevent or reduce the occurrence of ambiguities, doubts and suspicions. A lack of such dialogues/agreements between China and India fuels mistrust that often creates instability within the dyad.

18. Xiaoping Yang, "China's Perceptions of India as a Nuclear Weapons Power", Carnegie Endowment for International Peace. Last modified June 30, 2016, <https://carnegieendowment.org/2016/06/30/china-s-perceptions-of-india-as-nuclear-weapons-power-pub-63970>

weapons states, including the US and Russia, have been part of several bilateral and multilateral agreements which are designed to prevent or reduce the occurrence of ambiguities, doubts and suspicions. A lack of such dialogues/agreements between China and India fuels mistrust that often creates instability within the dyad.

Second, stemming from China's non-acceptance of India and Pakistan as nuclear weapons states is its ambiguity related to its policy of NFU. China dropped the word 'unconditional' from its nuclear posture in 1995 and added conditionality to its NFU policy, thereby making it applicable only to the NPT member states or a nuclear-weapons free zone. In 2010, China reiterated that it continues to be "adhered to the policy of no-first-use of nuclear weapons at any time and in any circumstances", and made the unequivocal commitment that under no circumstances will it "use or threaten to use nuclear weapons against non-nuclear weapon states or nuclear-weapon-free zones." This was a sharp reversal from the position it had stated in a letter delivered to the UN Secretary General in 1982, that said that "at no time and under no circumstances will China be the first to use nuclear weapons, and that it undertakes unconditionally not to use or threaten to use nuclear weapons against non-nuclear countries and nuclear-free zones". Brahma Chellaney notes that

the shift from an unconditional to a conditional NFU posture effectively left out only India, Israel and Pakistan. The policy change, however, could not be directed at close ally, Pakistan, or even Israel, with whom Beijing has collaborated in military-technology projects. The shift appeared aimed at sending a message to New Delhi. The reversal from China's earlier policy effectively excludes India, and therefore raises security concerns for New Delhi.¹⁹

China's non-acceptance of India as a legitimate nuclear weapons state as well as its subsequent exclusion from Beijing's NFU policy, generates a threat of a first strike by China. It can potentially trigger countermeasures by New

19. Brahma Chellaney, *Securing India's Future in the New Millennium* (Hyderabad: Orient Blackswan, 1999), p. 195.

Delhi, such as the development of BMDs to safeguard its cities, industrial towns, as well as nuclear assets, and thus create an offence-defence spiral.

Third, even while China and India are not engaged in any arms race, the rapid modernisation in China's nuclear force, albeit vectored against the US, puts pressure on their nuclear dyad. China has responded to the US ballistic missile defence systems, constituted by its National Missile Defense (NMD) and advanced Theatre Missile Defense (TMD) in East Asia, by modernising its nuclear arsenals to allow them to penetrate the US defence shields. China's modernisation of nuclear weapons includes the Hypersonic Glide Vehicles (HGVs), multi-warhead missiles, as well as multiple independently-targetable re-entry vehicle (MIRV) ballistic nuclear missiles. Among these, the MIRV capability is particularly destabilising for India as it allows a ballistic missile to send several separately targeted nuclear warheads on their separate ways. It is a preferred choice of weapon for not only escaping a BMD shield, but also destroying an adversary's nuclear assets, especially as it can take several warheads to destroy one silo-based missile. China showcased its MIRV capable ICBM Dong Feng 41 in October 2019. M. Taylor Fravel and Evan S. Medeiros suggest that deploying the MIRV warheads increases the options available to China for using its nuclear weapons against its adversaries, including India.²⁰ One of the possible options with China is the pre-emptive use of MIRV missiles to destroy India's nuclear assets. China's exclusion of India from its NFU further lends credibility to this possibility. China's nuclear modernisation heightens the vulnerability of India's nuclear assets, and therefore can potentially trigger an offence-defence spiral within the dyad.

Lastly, China does not see advancements in India's strategic capabilities with complacency. In response to the burgeoning military as well as strategic strength of India post its defeat to China in 1962, China has been seeking to strike a balance of power vis-à-vis India through establishing strategic relations with Pakistan. To this end, China contributed

20. M. T. Fravel and Evan S. Medeiros, "China's Search for Assured Retaliation: The Evolution of Chinese Nuclear Strategy and Force Structure", *International Security*, 35, no. 2 (2010), pp. 48-87. DOI: 10.1162/isec_a_00016

significantly towards Pakistan's nuclear weapons programme and ballistic missile programme, which will be discussed in detail in the following section. China's proliferation to Pakistan is destabilising for South Asian security as Islamabad maintains its nuclear weapons in an offensive posture against India and seeks to build first-strike capabilities for that purpose. Further, China has been suspicious of New Delhi's intentions since it signed the Indo-US nuclear deal in 2008 and thus strengthened its strategic relations with Washington. China has responded by investing heavily in infrastructure projects in Pakistan that come under its Belt and Road Initiative (BRI), thus strengthening its relations with Islamabad.²¹ As a part of the project, China has invested in the China-Pakistan Economic Corridor (CPEC) to strengthen its relations with Islamabad. The CPEC has become another irritant in the India-Pakistan relations as it passes through Pakistan-occupied Indian territory of Kashmir. The BRI project in Pakistan also involves a deep-water naval port at Gwadar. China has already deployed submarines to the Gwadar port, therefore, it is expected that China would use the port for military purposes.²²

China and Pakistan

Pakistan had leaned towards the US in the initial years of the Cold War and served as its strategic ally by forming a part of its South-East Asia Treaty Organisation (SEATO), as well as the Central Treaty Organisation (CENTO); however, it was only in the aftermath of the India-China war of 1962 that Beijing and Islamabad came forward to forge strategic relations. The primary objective of the alliance was to deter India's attempts to go into a war with either of the countries by creating the fear of a two-front theatre. In China's thinking, the India-Pakistan tensions serve Beijing's strategic

21. Gurmeet Kanwal, "Pakistan's Gwadar Port: A New Naval Base in China's String of Pearls in the Indo-Pacific". CSIS, 2018, <https://www.csis.org/analysis/pakistans-gwadar-port-new-naval-base-chinas-string-pearls-indo-pacific>

22. "In a First, China, Pak Navies Deploy Submarines in Strategic Arabian Sea Drills". *Hindustan Times*. Last modified January 8, 2020, <https://www.hindustantimes.com/world-news/in-a-first-china-pakistan-navies-deploy-submarines-in-strategic-arabian-sea-drills/story-yjiQMFnTPDV1ZZLICZkEhM.html>

interest as it keeps India bogged down, and thus hinders New Delhi from competing with Beijing or achieving its global ambitions.²³

Jonah Blank notes, “the most important service Pakistan provides is its mere existence”.²⁴ He suggests that “having a strong adversary on India’s western flank helps prevent a challenge from Asia’s other rising nuclear-armed power with a billion-plus population.” Thus, China’s nuclear strategy towards Pakistan has been to assist Pakistan to develop nuclear deterrence against India. Additionally, by such a strategy, China sought to contain the US expansion in South Asia, and strengthen its relations with the Islamic world, and thereby secure its energy interest in that region.

China’s assistance to Pakistan goes to the extent that it passed the entire design of the nuclear weapons test of 1966 to A. Q. Khan, the key scientist in the latter’s nuclear weapons programme, in 1982.²⁵ Gordon Corera has remarked that such a transfer was unprecedented as although countries have helped their allies with the design of weapons, there has been no history of a country handing over the full design of nuclear weapons to an ally. He posits that the full design spared Pakistan the difficult work in developing and miniaturising a weapon as well as the diplomatically risky task of carrying out the nuclear test. In the early 1980s, China also provided Pakistan with weapons-grade uranium that could power two nuclear devices. Further, in 1988 China sold components of its M-11 short-range ballistic missiles to Pakistan, which the latter has used to develop nuclear-capable missiles. In 1995, China sold 5,000 ring magnets to Pakistan for its high-speed gas centrifuges.²⁶ The export of ring magnets was strictly controlled under the terms of an international agreement with the International Atomic Energy Agency (IAEA) as they

23. Iskander Rehman, “Keeping the Dragon at Bay: India’s Counter-Containment of China in Asia”, *Asian Security* 5, no. 2 (2009), 114-43. DOI: 10.1080/14799850902885114

24. “Pakistan and China’s Almost Alliance.” RAND Corporation Provides Objective Research Services and Public Policy Analysis | RAND, <https://www.rand.org/blog/2015/10/pakistan-and-chinas-almost-alliance.html>. Accessed on May 10, 2020.

25. Gordon Corera, *Shopping for Bombs: Nuclear Proliferation, Global Insecurity, and the Rise and Fall of the A. Q. Khan Network* (New York: Oxford University Press, 2009).

26. Ibid.

are used in gas centrifuges to extract weapons-grade enriched uranium from uranium gas.²⁷

The military-technological transfers between China and Pakistan have not been one way. During the initial years of the Cold War, Pakistan gave China access to several US and Western military technology that Beijing's scientists reverse-engineered. A US Department of State report, titled "Pakistan and Communist China Strengthen Cooperation", released on December 4, 1968 alleged that the Pakistani Army had provided the Chinese access to US F-104 supersonic fighter aircraft in violation of the acceptance agreement with the Pentagon. Further, Khan had also provided China with ultracentrifuge technology, which he had acquired through his experience of working as a scientist at the European Uranium Enrichment Centrifuge Corporation (URENCO).

The US changed its position against such transfers in the 1970s, when China's relations with the Soviet Union began to sour. During this period, Pakistan's President Yahya Khan had played the role of a broker in the forging of these relations by arranging for a meeting between the then US Foreign Secretary Henry Kissinger and Zhou Enlai during the peak of tensions of the India-Pakistan war of 1971.²⁸ Following the meeting, the US offered tacit approval of the transfer of its military technologies to China through Pakistan. In 1982 Central Intelligence Agency had made the sales of AN/ALR-69 radar warning system to Pakistan contingent on Islamabad transferring those sensitive technologies to Beijing.²⁹ Towards the end of the 1980s, China, Pakistan, and the US worked together to support the anti-Soviet terrorist group—Mujahideen—to fight in Afghanistan. These terrorist groups later became a potential threat to South Asian nuclear security due to the concerns that they might gain access to nuclear weapons due

27. "Chinese Nuclear Exports to Pakistan", Federation of American Scientists—Science for a Safer, More Informed World, https://fas.org/irp/congress/1996_cr/s960207b.htm. Accessed on May 3, 2020.

28. "A Leaf from History: Ping-pong Diplomacy." Dawn.com. March 11, 2012, <https://www.dawn.com/news/701831>

29. "USA Reprimands Pakistan for Misusing F-16 Fighter Aircraft", Centre for Land Warfare Studies (CLAWS), New Delhi, India. December 30, 2019, <https://www.claws.in/usa-reprimands-pakistan-for-misusing-f-16-fighter-aircraft/>

to their close ties with Pakistan's armed forces. There have also been concerns that the Pakistani Army might facilitate acts of nuclear terrorism through their links with the al-Qaeda network.

Nevertheless the US' tacit approval of the indirect transfer of its technologies to China via Pakistan ended with the end of the Cold War. In a reversal of policies, the US levied several sanctions on both China and Pakistan through the 1990s to curb their nuclear transfers. The sanctions on China were rolled back when Beijing, albeit a non-member, assured Washington that it would follow the Missile Technology Control Regime (MTCR) guidelines that seek to limit the proliferation of missiles and missile technology. However, China continues to transfer nuclear weapons technology to Pakistan through narrow interpretations of the guidelines.³⁰ It is believed that Pakistan has reverse engineered China's DF-11 to produce several new nuclear-capable missile systems including Shaheen-I, II and Ababeel missiles.³¹

Additionally, China has been involved in Pakistan's civil nuclear programme. Based on a 1991 bilateral nuclear cooperation agreement, China built the first reactor, namely a 325 MW plant called Chashma-I at the Chashma complex in Punjab in 2000, and the Chashma-II plant in

US levied several sanctions on both China and Pakistan through the 1990s to curb their nuclear transfers. The sanctions on China were rolled back when Beijing, albeit a non-member, assured Washington that it would follow the Missile Technology Control Regime (MTCR) guidelines that seek to limit the proliferation of missiles and missile technology. However, China continues to transfer nuclear weapons technology to Pakistan through narrow interpretations of the guidelines.

30. "China Violating Missile Proliferation Controls, Cables State." Nuclear Threat Initiative (NTI). July 14, 2011, <https://www.nti.org/gsn/article/china-violating-missile-proliferation-controls-cables-state/>

31. "DF-11 (Dong Feng-11/M-11/CSS-7)." *Missile Threat*. January 29, 2018, <https://missilethreat.csis.org/missile/dong-feng-11/>

In contemporary times, the relevance of the strategic partnership between China and Pakistan has been reinforced due to the recent developments in India's security posture and foreign relations, particularly in the context of growing US-India relations and the crystallisation of the naval Quad to counter China in the Indo-Pacific.

2011. Further, in 2009, after becoming a member of the Nuclear Suppliers Group (NSG), China finalised the sale of two more reactors, namely Chashma-III and Chashma-IV. However, the sales came under the scrutiny as the NSG guidelines do not allow members to supply nuclear technology to countries that have not signed the NPT. In spite of this, China constructed the units even as the matter remains unresolved with the NSG.³²

In contemporary times, the relevance of the strategic partnership between China and Pakistan has been reinforced due to the recent developments in India's security posture and foreign relations, particularly in the context of growing US-India relations and the crystallisation of the naval Quad to counter China in the Indo-Pacific.³³ On the other hand, India is also perceived to have adopted a bolder posture in its pursuit of national security. This was evident when the Indian Air Force crossed the Line of Control, the de facto border in the disputed region of Kashmir, and dropped bombs on a terrorist training facility close to the town of Balakot in Pakistan in 2019.³⁴

The direct consequence of China's nuclear transfers to Pakistan on regional nuclear stability has been twofold:

First, as discussed earlier, China has carried out its nuclear transfers in contravention of export control agreements, namely, the MTCR and the NSG.

32. "China's Reactor Sale to Pakistan: The Known Unknowns", Manohar Parrikar Institute for Defence Studies and Analyses. October 14, 2016, https://idsa.in/issuebrief/ChinasReactorSaletoPakistan_gbala

33. "A Rising India in the Indian Ocean Needs a Strong Navy." Centre for Strategic and International Studies, <https://www.csis.org/npfp/rising-india-indian-ocean-needs-strong-navy>. Accessed on May 10, 2020.

34. "Balakot Airstrike Ensured No Pakistan-sponsored Attack in India a Year Since", *The Print*. February 26, 2020, <https://theprint.in/opinion/balakot-airstrike-ensured-no-pakistan-sponsored-attack-in-india-a-year-since/371288/>

These were evident in, for instance, China's export of ring magnets for use in gas centrifuges, sale of specialised steel by a Chinese firm to a Pakistani company involved in its missile and nuclear operations, and its building of Chashma-III and Chashma-IV power reactors respectively. The multilateral arms control institutions are vital in ensuring nuclear stability, as they seek to encourage countries to manage their weapons in limited cooperation with each other. Through the subversion of such agreements, China's proliferation to Pakistan has created an environment of mistrust in the region.

Second, while it has been China's nuclear policy to arm Pakistan with nuclear weapons in order to complicate India's security, China's assistance to Pakistan has often gone beyond providing it with means to develop nuclear deterrence against India; it has, in effect, supported Pakistan in engaging in an arms race against India. Of late, China has been providing Islamabad with technologies for its full spectrum deterrence strategy, whereby Islamabad seeks to develop offensive weapons ranging from tactical nuclear weapons to second-strike capability. One of the latest transfers by China includes sale of a highly sophisticated, large-scale optical tracking and measurement system to aid Pakistan in developing MIRV capabilities.³⁵ An indirect consequence of China's proliferation to Pakistan on the region's security has been, as mentioned earlier, the latter's use of tactic of nuclear brinkmanship, whereby it keeps its nuclear threshold low and frequently issues nuclear threats to New Delhi to deter a conventional attack. Such a tactic is potentially destabilising, if not met with restraint from India.

FROM DYADS TO STRATEGIC NUCLEAR CHAIN

Nuclear weapons are the cornerstone of the security calculus of China, Pakistan and India. For China, nuclear weapons allow Beijing to counter the threat from the US and to a lesser degree India and Russia, and at the same time, contain Washington's influence in Asia. For India, they are necessary to negate any possibility of nuclear blackmail or coercion to ensure its

35. "Pakistan and China's Almost Alliance." RAND Corporation Provides Objective Research Services and Public Policy Analysis | RAND, <https://www.rand.org/blog/2015/10/pakistan-and-chinas-almost-alliance.html>. Accessed on May 10, 2020.

nuclear security within a nuclearised and conflict-prone neighbourhood. For Pakistan, they are considered necessary to gain strategic parity with India, and to deter the possibility of a conventional conflict.

Further, China's nuclear deterrence is to a greater degree hinged upon US nuclear capabilities and posture. The US, by extension, interacts with the nuclear posture of Russia in addition to that of China to maintain its strategic equilibrium. With China being a critical player for South Asian nuclear security—as the previous section has extrapolated—any advancements or changes in the nuclear posture within any of the dyads concerning the US, China and Russia inevitably disturbs the strategic balance in South Asia.

In current times, the strategic nuclear chain has to factor in developments such as those of US ballistic missile defence systems. China, in turn, is responding by developing HGVs and MIRV missiles to penetrate the US defence shield. This triggers a security dilemma in New Delhi as it renders Indian nuclear assets vulnerable to pre-emptive strikes by China, especially since Beijing does not include New Delhi in its NFU pledge. As India explores prospects of countermeasures to Beijing's nuclear modernisation, Pakistan would inevitably face a security dilemma and seek to match up with own modernisation efforts such as the development of its MIRV enabled missiles. China has played a proactive role in aiding Pakistan to develop and modernise nuclear capabilities; China does so to challenge India's dominance in the region and to pose a two-front strategic challenge. In this way, the individual dyads forge into an interrelated strategic nuclear chain. The security of each nation is precariously placed on the nuclear deterrence sought within each dyad.

The strategic nuclear chain is likely to play out in the maritime domain as well. In 2015, China tested its intercontinental-range submarine-launched ballistic missile JL-2—which has an estimated range of up to 7,200 km—which enables it to target across the whole of the Indian territory. China has been advancing in its sea-based deterrence to make up for the vulnerabilities posed by the land-based missile systems of its strategic rivals. India has been progressing with the development of its sea-based deterrence, which until now consists of INS *Arihant* nuclear-powered ballistic missile submarine that

started its patrol in 2018. Both China and India had envisaged sea-based nuclear weapons as a cornerstone of their nuclear deterrence; they are the most survivable as they are virtually undetectable under the sea. China's construction of the Gwadar port in Pakistan raises concerns about the possible use of Pakistani territory to dock Chinese nuclear submarines. As a result of the progress of China and India's nuclear submarines, Pakistan has been exploring its sea-based nuclear deterrence options. Pakistan currently lacks the technical capabilities such as nuclear power submarines to operationalise its sea-based nuclear deterrence. Notwithstanding, it conducted two successful flight tests of its Babur-3 nuclear-capable submarine-launched cruise missile (SLCM) between 2017 and 2018, which are expected to be carried on Pakistan's diesel-powered Agosta 90B conventional submarine. **As a result of the progress of China and India's nuclear submarines, Pakistan has been exploring its sea-based nuclear deterrence options. Pakistan currently lacks the technical capabilities such as nuclear power submarines to operationalise its sea-based nuclear deterrence. Notwithstanding, it conducted two successful flight tests of its Babur-3 nuclear-capable submarine-launched cruise missile (SLCM) between 2017 and 2018, which are expected to be carried on Pakistan's diesel-powered Agosta 90B conventional submarine.** The head of Pakistan's Inter-Services Public Relations (ISPR) remarked that the missile tests were a response to India's nuclear capabilities and posture.³⁶ It must be noted, however, that the intertwining of nuclear weapons with conventional delivery systems, known as 'nuclear entanglement', can be destabilising for the regional security. It may render the adversary unable to distinguish between the conventional and strategic weapons, which can thereby raise the risks of miscalculation and misperception.

36. "Pakistan Advances Sea Leg of Triad", Arms Control Association | The Authoritative Source on Arms Control Since 1971, <https://www.armscontrol.org/act/2018-06/news-briefs/pakistan-advances-sea-leg-triad>. Accessed on July 15, 2020.

Much like the dynamics of deterrence, the prospects of arms control measures are interrelated; the arms control measures need to be initiated amongst China, Russia and the US, to be able to trickle down to the China-India dyad.

The phenomenon of the strategic nuclear chain is also seen in the domain of nuclear arms control agreements between China, India and Pakistan. Beijing has asymmetric dyads with Washington and New Delhi: China's primary nuclear competition is with the US, which remains far ahead in its nuclear capabilities vis-à-vis India. Further, China's nuclear force remains much smaller than that of the US and Russia, and therefore it has been reluctant to engage with the latter two in the New START Treaty. It

is also unlikely that China would engage in any Confidence Building Mechanisms (CBMs) with India until it recognises India as a Nuclear Weapons State.

There is a possibility of resistance from India as well; New Delhi has remained out of several arms control treaties such as NPT and the Comprehensive Nuclear Test Ban Treaty (CTBT) for their discriminatory nature. New Delhi in the past has complained about being unfairly targeted by the non-proliferation treaties and export control and technology denial regimes and, therefore, perceives them as ineffective at best and discriminatory at worst, based on their formulation and enforcement.³⁷ Nevertheless, there is a possibility that India's enhanced nuclear capabilities and their credible deployment against China might force Beijing to engage in risk reduction measures.³⁸

Much like the dynamics of deterrence, the prospects of arms control measures are interrelated; the arms control measures need to be initiated amongst China, Russia and the US, to be able to trickle down to the China-India dyad. The prospects of arms control and disarmament remain unlikely

37. Manpreet Sethi, "Nuclear Arms Control and India: A Relationship Explored", Arms Control Association | The Authoritative Source on Arms Control Since 1971, <https://www.armscontrol.org/act/2010-09/nuclear-arms-control-india-relationship-explored>. Accessed on May 10, 2020.

38. Manpreet Sethi, "Nuclear Arms Control and the Global Order: A View from New Delhi", Toda Peace Institute, 2019, https://toda.org/assets/files/resources/policy-briefs/t-pb-53_manpreet-sethi_nuclear-arms-control-view-from-new-delhi.pdf

until the US and Russia make concessions to pull China into an agreement, and similarly thereafter have India and Pakistan follow suit.

CONCLUSION

The article has sought to analyse the consequences of China's nuclear capabilities and posture on South Asia as well as delineate its nuclear strategy towards India and Pakistan. The article argues that while China-India dyad appears stable owing to their postural similarities, it faces pressure from China's nuclear dynamics with the US, as well as Beijing's security concerns emanating from New Delhi. It also sought to explain how China seeks to arm Pakistan with nuclear weapons to complicate India's security, and thus create a balance of power in South Asia. The article has done so by tracing the dynamics within interrelated nuclear dyads, which has been referred to as a strategic nuclear chain. The article contextualised the nuclear chain in the light of the nuclear modernisation by the US and China wherein the deployment of the BMD shields by the former has prompted the latter to develop countermeasures such as HGVs and MIRVs. The competition between the US and China is destabilising for South Asia as India, by virtue of sharing the dyad with China, is pulled into the offence-defence spiral vis-à-vis the latter. China, at the same time, has been providing Pakistan with MIRV technologies to complicate India's security.

The article uses the dynamics of the strategic nuclear chain to analyse the role of China in the future of deterrence in South Asia and assesses the prospects of nuclear arms control in the region. It suggests that the theatre of nuclear deterrence may spread to the Indian Ocean Region, especially as China has made rapid advancements in its nuclear submarine, and with India expected to enhance its sea-based leg capabilities to draw the strategic equilibrium in the region. With regard to the prospects of nuclear arms control, the article suggests that given the complex interrelation of the deterrence dynamics, the arms control measures need to be initiated between China, Russia and the US, to be able to trickle down to the China-India Dyad.

CHINA'S NAVAL MODERNISATION: THEORY AND PRACTICE

JOSHY M. PAUL

Every country focuses on military modernisation too when it is growing economically. However, for some, this process is faster and more aggressive when they face an immediate threat or have a global ambition. China, the new emerging great power in the 21st century, has given high priority to the modernisation of its defence forces. China's defence modernisation is part of the four modernisations drive along with agriculture, industry and science and technology that Deng Xiaoping undertook when he assumed the highest office in the late 1970s. A major objective of the modernisation drive has been to place China in the league of major powers in the international system. The defence modernisation focused initially to thwart an invasion by external powers and lately to project Chinese power in attaining great power status. Modernisation also aimed at enhancing the domestic legitimacy of the Communist Party—which has been the vanguard of the state—and welfare of the people. Protecting the sovereignty of the nation and regaining its old glory by being a military power thus became a high priority for the top leadership of the Communist Party. Throughout history, modern China faced threat from a superior enemy—especially from among the European powers—so victory over a superior power became the hallmark of Chinese strategic thinking.

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Theory of realism argues that when a country faces external security threat it focuses on internal balancing through the process of modernisation of its armed forces and equips them with sophisticated weapons to prevent the threat.

A fundamental aspect of Chinese defence modernisation is that it has been more theory-driven than situation-driven.¹ According to Chinese thinking, theory provides a sound basis for facing the challenges of situational demands. A theory-based situational challenge is a classical Marxist approach to problem solving. Since China had faced security threats from technologically superior powers, theory would help in formulating an optimal strategy to cope with such threats. This, in turn, may lead to a more efficient use of scarce resources for modernising the defence forces. Also, arming

the still technologically backward forces with advanced theory may quicken the formation of combat effectiveness once advanced arms are available. Initially, the defence planners believed that modern arms will be available once the budgetary allocation increases as the country grows economically. For China, a technologically advanced military that lags, in theory, may mean a higher cost in war, as the French and the British militaries discovered during the early phases of World War II.² Winning a war is indispensable for the People's Liberation Army and technological inferiority can be compensated by winning a war based on conceptual innovation and a sound war doctrine. So, from Mao's period, doctrinal aspects have attained the highest priority in Chinese strategic thinking and the doctrine has been modified before formulating a new strategy or a particular policy to respond to a new security situation.

Preventing a threat is the currency of the balance of power. Theory of realism argues that when a country faces external security threat it focuses on internal balancing through the process of modernisation of its armed

1. Nan Li, "The PLA's Evolving Campaign Doctrine and Strategies", in James C. Mulvenon and Richard H. Yang, *The People's Liberation Army in the Information Age* (Santa Monica, CA: RAND Corporation, 1999).

2. Ibid.

forces and equips them with sophisticated weapons to prevent the threat. Balance of power theory explains that to prevent the emerging threat, States balance either by building up their own military capabilities (internal balancing), by forming alliances with others (external balancing), or by combining these two forms of balancing.³ Internal balancing is the enhancement of a State's power in response to a potential threat. Through internal balancing, States could obtain countervailing capabilities and thereby attempt to balance the rising threat. Kenneth Waltz maintains that threatened States increase their power

appropriately to ensure their security, albeit not absolutely.⁴ China has faced security threats, both domestically and externally, right from its inception after the prolonged civil war. The Korean War and the subsequent presence of the American military stationed in East Asia was a major security concern during the 1950s. Then, friction in the relationship with the former Soviet Union, followed by the border stalemate in the late 1960s wherein a threat of a major Soviet invasion loomed large over China. Again, after the end of the Cold War, China alleged that the continuation of the forward deployment of US forces, a corollary of the Cold War mechanism, was targeted to prevent China's rise. China claims that it lost 3 million sq km of maritime territory during the period of the 'century of humiliation'; regaining the lost territory is, therefore, considered as being of paramount importance of every Chinese regime. However, its quantitative and qualitative military preparedness has

China claims that it lost 3 million sq km of maritime territory during the period of the 'century of humiliation'; regaining the lost territory is, therefore, considered as being of paramount importance of every Chinese regime. However, its quantitative and qualitative military preparedness has not been sufficient to achieve this objective.

3. Christopher Layne, "The War on Terrorism and the Balance of Power: The Paradoxes of American Hegemony", in T. V. Paul, James J. Wirtz and Michel Fortmann (eds.), *Balance of Power: Theory and Practice in the 21st Century* (California: Stanford University Press, 2004).

4. Kenneth N. Waltz, *Theory of international politics* (California: Addison-Wesley Publishing Company, 1979).

not been sufficient to achieve this objective. Some of the countries with whom China was involved in territorial disputes are allies of the US, therefore, preventing US intervention in a crisis over China's (supposed) legitimate claim of territory would be possible only by gaining local military superiority over the US in the theatre. Since China does not have any military ally to form a regional balancing mechanism against the US, internal balancing has been the only possible way to counter the threat.

Defence modernisation was first introduced by Premier Zhou Enlai in 1973 when China made an inquiry about the British Harrier V/STOL ground attack aircraft and resumed the halted negotiations for the transfer of the British Spey turbofan aircraft engine technology as part of the process of gradual force improvement based upon self-reliance.⁵ Subsequently, Deng Xiaoping assumed a prominent role in the military modernisation process. When Deng got complete authority over the Chinese Communist Party (CCP), he resuscitated the defence modernisation and dispatched numerous delegations to Europe and Japan to study foreign military technology.⁶ In August 1977, the People's Liberation Army (PLA) announced a new doctrine of "People's War Under Modern Conditions" replacing the old Maoist doctrine of "People's War". The new doctrine emphasised modernised defence forces by acquiring modern equipment and technology. However, in the early stages money was a major stumbling block, but the defence planners were convinced that when the economy grows money would not be a problem in future for fulfilling modernisation objectives.

The international situation has also influenced China's defence modernisation programme. The lessons from the 1973 Arab-Israeli conflict—where new technologies were used to gain air superiority or denying air superiority to the enemy—new inventions in defence technology in the United States such as the Strategic Defense Initiative (SDI) or the "Star Wars" programme, and also China's poor performance in the 1979 Vietnam fiasco,

5. Sydney H. Jammes and G. Lawrence Lamborn, "China's Military Strategic Requirements", in *China under the Four Modernizations, Part 1*, Selected Papers Submitted to the Joint Economic Committee Congress of the United States, August 1982.

6. Ibid.

led to the need for a new look in China's war preparedness.⁷ Accordingly, in July 1985, the Central Military Commission, together with the State Council and Central Committee, issued a new plan titled *Plan for Reforms, Streamlining, and Reorganisation of the Military System*. The goal of the reforms was to develop a force with streamlined administration, more flexible command, and greater combat power by reducing the number of personnel, eliminating the level of bureaucracy, downgrading units, and closing some installations.⁸ When the downsizing was completed in 1987, over a million soldiers—roughly 25 percent of the force—had been cut.⁹ Moreover, China gave significant importance to a qualitative change in its armed forces across the spectrum to meet the new and emerging challenges. By the end of the 1980s, the Soviet threat dissipated as a result of normalisation of relations between the two and a new concept of warfare emerged. With China's security environment becoming stable, it was assessed that the new conflict would occur at the local level for a limited period, especially over disputed territory in the southern border of China. Accordingly, China shifted its attention from the north to the southern border, especially the South China Sea. Similarly, the booming coastal region had now become the engine of Chinese economic growth; protecting these regions also became one of the important aspects of China's defence strategy.

Though the end of the Cold War has changed the global security perspective, it demonstrated new challenges for China's security. Most of the security mechanisms built by the US to counter the Soviet threat still remained in the Asia-Pacific region. China felt that the continuation of US deployment of forces in Asia, despite the Soviet threat having vanished, was against a resurgent China.¹⁰ For the Chinese, continued maintenance of US troops in South Korea and Japan was evidence of an emerging containment strategy against China. Similarly, Japanese assertiveness and the modernisation of

7. Taylor Fravel, *China's Military Strategy Since 1949*, p. 163.

8. *Ibid.*, p. 175.

9. *Ibid.*

10. David Shambaugh, "The Insecurity of Security: The PLA's Evolving Doctrine and Threat Perceptions towards 2000", *Journal of Northeast Asian Studies*, vol. 13, 1994, pp. 3-25.

the Japanese Self-Defence Forces (JSDF) under the US umbrella aimed to constrain the space needed for China's revival. All these necessitated an internal balancing strategy of force modernisation—especially for the PLA Navy—in the coming decades.

In its growth trajectory, China has had unfinished existential objectives such as the reunification of Taiwan with the mainland, settling territorial disputes over Senkaku/Diaoyu islands in the East China Sea, and Spratly and Paracel Islands in the South China Sea, and converting China into a maritime power by the middle of the 21st century. To achieve these objectives China wanted to get local superiority over the US naval contingent established in the Western Pacific. In this respect, China's naval modernisation has been focused on building a strong navy by getting control over China's near-seas region (particularly the South China Sea) for enforcing China's view that it has the right to regulate foreign military activities in its 200-mile maritime exclusive economic zone (EEZ); for defending China's commercial sea lines of communication (SLOCs), particularly those linking China to the Persian Gulf; for displacing US influence in the Western Pacific; resolving the Taiwan problem militarily, if need be—all this being aimed at asserting China's status as the leading regional power and a major world power.

MAJOR DRIVERS OF CHINA'S NAVAL MODERNISATION

Although Chinese naval modernisation was evidently initiated as early as 1975, when the PLA Navy's "ocean going proposals" were endorsed by Mao Zedong,¹¹ it got strategic priority only in the 1980s when China shifted its attention to the south. In the initial period of the defence modernisation, the navy was not given importance in the overall national security objectives and had to play a supporting role for the PLA Army. Its main objective was for preserving combat capability and preventing early engagement with the Soviet Pacific Fleet in decisive sea battles in order to endure a protracted

11. Alexander Chieh-cheng Huang, "The Chinese Navy's Offshore Active Defense Strategy", *Naval War College Review*, vol. 47, no. 3, 1994.

war.¹² Lately, China's attention has shifted from land to the sea and the navy has become a strategic service, with the ocean being considered as a theatre for projecting the power of modern China. Major driving forces behind the Chinese naval modernisation are doctrinal changes, changes in the technology of war, regional security environment, and ambition for maritime power projection.

DOCTRINAL CHANGES

Doctrinal reform has been one of the most important elements of the PLA modernisation drive over the last five decades. Military doctrine is a body of published principles concerning the force and the nature of war.¹³ In all militaries, doctrine consists of the basic principles that guide military commanders and their staff in planning and executing the application of military force to achieve specific military objectives. As succinctly described in the US Army's principal field training manual (FM-100-5), "Doctrine captures the lessons of past wars, reflects on the nature of war and conflict in its own time, and anticipates intellectual and technological developments in future times."¹⁴ Military doctrine must also be distinguished from military *strategy*, which in western usage is usually concerned with linking those military objectives to a set of desired political-strategic goals. In the Chinese context, military doctrine is determined at the highest level of political and military leadership, provides both the political vision of the nature of war and the military guidance for the armed forces to follow.¹⁵ Accordingly, the military doctrine has been modified to meet changes in strategic and political environments. In Maoist China, "people's war" was the doctrine of the PLA. Under Deng Xiaoping's modernisation programmes doctrine has been

12. *Ibid.*, p. 11.

13. Ching-pin Lin, *China's Nuclear Weapons Strategy: Tradition within Evolution* (Lexington, Mass.: Lexington Books, 1988), p. 3.

14. U.S. Army Field Manual (FM) 100-5, *Operations*, June 1993. Quoted from David Shambaugh, *Modernizing China's Military: Progress, Problems, and Prospects* (Berkeley: University of California Press, 2002), p. 57.

15. Paul H. B. Godwin, "Changing Concepts of Doctrine, Strategy, and Operations in the Chinese People's Liberation Army 1978-1987", in *China Quarterly*, vol. 112, December 1987, pp. 572-90.

Under Deng's initiative a new slogan of "people's war under modern conditions" was developed after Mao's death. It put old Maoist doctrine into new strategic and technological environments. It brought in the need for modernising the military doctrine.

adjusted to new conditions such as "people's war under modern conditions", "local war under historical conditions", and "local war under modern high technology conditions". Along with the doctrinal changes, the naval strategy has also been modified from "active offshore defence" of the 1980s to "open sea protections" in the 21st century.

Maoist "people's war" focused on protracted war utilising the vast landmass and masses by 'luring the enemy in deep' and striking second, adopting guerilla warfare to defeat the enemy decisively. It was believed that this was the way a victory could be achieved over a technologically superior enemy. Mao had mastered it in the long civil wars and continued it as a war strategy against the threat of Soviet invasion. It emphasised strategic defence, where the initial surprise attack by an opponent is countered by using a combination of offensive and defensive operations to blunt the force of the attack. Positional warfare was key at this stage. The second stage was strategic counterattack, where offensive operations were to be used to counterattack when the enemy's offensive had been stalled. The third and final stage was a strategic offensive once the enemy had been weakened and conditions created for a decisive battle to end the war. It included the elements of forward defence, positional warfare, and combined arms operations and the entire operational tactics were countering an invasion.

However, when the economic reform started in the late 1970s, Deng realised that early strategic retreat to the inland would severely jeopardise protection of the newly emerged economic growth centres in the coastal areas. Under Mao's "people's war", the coastal areas would be exposed to the enemy, and once they were lost it would affect China's war preparations and would lead to a defeat. Therefore, defeating the adversary close to the border before he could capture any territory became the priority in China's security calculations. In

this regard, under Deng's initiative a new slogan of "people's war under modern conditions" was developed after Mao's death. It put old Maoist doctrine into new strategic and technological environments. It brought in the need for modernising the military doctrine in order to direct its military preparedness and achieve the fighting capabilities necessary for future wars. The new doctrinal concept aimed: to upgrade the quality of PLA's personnel and equipment, increase the efficiency of organisational and command structures, and improve force projection and combat capabilities.¹⁶ To achieve all these goals, the new military doctrine focused on improvement of the PLA's command, control, communications, and intelligence (C3I) and logistic systems, combined arms training, and rapid response task force.¹⁷

By the 1980s China's doctrinal concepts and military strategy had been revamped to suit the changing security environment. China adopted new strategic guidelines based on global security perceptions, China's military capability and preparedness, and the nature of war that had taken place in different parts of the world.

Accordingly, by the 1980s China's doctrinal concepts and military strategy had been revamped to suit the changing security environment. China adopted new strategic guidelines based on global security perceptions, China's military capability and preparedness, and the nature of war that had taken place in different parts of the world. After a series of meetings and reviews at the top political leadership and China's Central Military Commission, it was concluded that a large-scale invasion of China by an external power is highly unlikely. It was observed that PLA lacked any credible means of launching offensive strikes beyond its border and also pre-empting a Soviet attack was difficult.¹⁸ At the same time, the guidelines argued that a general war was highly unlikely because of the financial cost of the war and that China's most likely threats came from

16. Huang, "The Chinese Navy's Offshore Active Defense Strategy".

17. Ibid.

18. M. Taylor Fravel, *China's Military Strategy Since 1949: Active Defense* (Princeton: Princeton University Press, 2019), p. 142.

small and medium-sized local conflicts, not general or total wars.¹⁹ Following the strategic guidelines, the military planners and strategic thinkers came up with a new “local war” concept, which, in the subsequent periods, has become the central tenet of the military doctrine of the PLA.

Since then China focused on the technological advancement of its defence forces to gain superiority in a local war theatre. Chinese analysts argued that the local war would be geographically limited and shorter in duration, although some wars like the Iran-Iraq war dragged on for several years.²⁰ During the major wars, combatants employed massive firepower—particularly airpower—and short-range missiles. While, in the local war, the role of an army could not be discarded entirely, it was no longer key to victory as it was during the world wars. All weapons in the disputants’ inventory were fair game for use, including chemical and tactical nuclear weapons, and successful armies practised combined arms and had good command, control, communications, and intelligence systems (C3I). The objective was that without attaining supremacy both in terms of capability as well as being a flexible force, China cannot defeat the enemy in a limited local war. With the changes in the nature of war and more sophisticated weaponry emerging with major powers worldwide, China modified the local war doctrine to “local war under modern high-tech conditions” in the 1990s; it later became “under conditions of informatisation”, which is now the guiding principle of Chinese military strategy. The 1991 Gulf War and the 1996 Taiwan Strait crisis apparently convinced the PLA planners that a medium-sized local war could take place involving a large-scale sea crossing and amphibious landing operations, counteroffensive operations in the border regions, repelling local foreign invasion, and above all preventing the US forces deployed in the Western Pacific from interfering in China’s efforts for unification of Taiwan.²¹

19. M. Taylor Fravel, “The evolution of China’s Military Strategy: Comparing the 1987 and 1999 Edition of Zhanluexue”, in James Mulvenon and David M. Finkelstein (eds.), *China’s Revolution in Doctrinal Affairs: Emerging Trends in the Operational Art of the Chinese People’s Liberation Army* (Beijing: Chinese People Liberation Army, 2002), pp. 79-99.

20. Ibid.

21. Toshi Yoshihara and James R. Holmes, *Red Star over the Pacific: China’s Rise and the Challenge to US Maritime Strategy* (Annapolis: Naval Institute Press, 2010).

The local war theory has brought in a new concept into the lexicon of China's military strategy which includes "active defence", "strategic frontier", "strategic deterrence", "victory through elite groups", "gaining initiative by striking first", "victory over inferiority through superiority", and "fighting a quick battle to force a quick resolution".²² The concepts are important in real-time situations with specific objectives to support particular types of systems and missions. For instance, "active defence" is a strategy of offensively defending the "core area" which includes China's shorelines and territorial waters, while "strategic frontier" is a geographical perimeter line preventing the enemy from approaching the "core area". Similarly, technological advancement is the key component in all aspects of the new strategy. According to Chinese calculations, local war will likely take place in the maritime domain, and, as a result, the navy and air force received increased attention in the modernisation drive. Indeed, concepts like "active defence" and "strategic frontiers" are exclusively connected with the maritime domain which is relevant in the 21st century security strategy of China. For instance, the 2015 defence white paper states that "active defence is the guiding principle of China's defence strategy in a new era".²³ From the 1990s onwards, China has focused on a concerted naval modernisation drive to make the "active defence" and "strategic frontiers" strategy successful, and lately with a blue-water navy ambition.

CHANGES IN TECHNOLOGY OF WAR

Technology has changed modern warfare; it has increased the lethality of war but reduced duration and casualties. Technological modernisation of defence forces is a continuing process that countries have undertaken to achieve victory in a war. Technological modernisation is also a preparation for war that generally happens during peacetime. How technology can change the theory of war can be seen in the change in China's war theory

22. Nan Li, "The PLA's Evolving Warfighting Doctrine, Strategy, and Tactics, 1985-95".

23. Ministry of National Defence, "Chapter III: Strategic Guideline of Active Defence", in *China's Military Strategy 2015* (Beijing: People's Republic of China, May 2015), http://eng.mod.gov.cn/Database/WhitePapers/2015-05/26/content_4586711.htm

from “victory through inferiority over superiority” to “victory through superiority over inferiority”. In the Maoist “luring the enemy in deep” concept China would be able to overcome the adversary’s technological superiority by utilising Chinese comparative advantages of landmass, manpower, and time. However, in the local war scenario, Chinese victory could only be guaranteed through technological superiority over the enemy. Chinese leadership realised that without technological advancement getting superiority in the local theatre was difficult to achieve. Since the local war theatre could be the shorelines of China, naval modernisation got a higher priority in China’s military modernisation drive. As a result, the subsequent decades have witnessed billions of dollars being spent for research and development in the defence sector to convert China into a modern maritime power in the 21st century.

The quest for technological modernisation of defence forces emanated from the Chinese assessment of small wars such as Israel’s invasion of Lebanon in 1982, and the Falklands war between Argentina and Britain that demonstrated the ability of the technologically superior power to finish the war quickly before international responses mounted against it. The military leadership realised that modern limited wars emphasising speed, mobility, lethality, and C3I technologies can change the course of the war in one’s favour. Given the nature of war and victory for the technologically advanced states, PLA demanded increased budgetary allocation for modernisation, especially to create “fists” and rapid response units or “special forces” in every military region, who must be well trained and equipped to fit the local situations and the capability of a potential adversary.²⁴ It was also recognised that, except the USSR, and possibly India, the most likely source of conflict around China’s periphery would not involve countries whose military forces had the capability to conduct high-technology warfare in the same capacity as the Western powers.²⁵ The 1989 Tiananmen tragedy put a

24. Godwin, “Changing Concepts of Doctrine, Strategy, and Operations”.

25. Jian Wenxian, et al., “Tentative discussion of the special principles of a future Chinese limited war,” *Guofang Keji Daxue Xuebao*, No. 11 (November 1, 1987), in *JPRS-CHI*, 12. Quoted in Godwin, *Changing Concepts of Doctrine, Strategy, and Operations*, p. 470.

roadblock to China's effort in acquiring Western equipment and technology and emphasised the need to promote indigenous research and development.

It was understood that weapons and technology are the decisive elements of modern warfare.²⁶ More precisely, the 1991 Gulf War became the reference point for the PLA's modernisation programme. The Gulf War was a high-tech war, used the latest weaponry against an inferior state by a Superpower, and which highlighted the need for a defence industrial complex in China. The Gulf War proved decisive in China's technological preparedness to ensure victory in short and limited wars. The Gulf War demonstrated the awesomeness of American military prowess that inspired the PLA to model its modernisation on that of the Pentagon.²⁷ Since then China focused its attention on Russia for technological cooperation and started giving attention to strengthening the indigenous capability to equip the Chinese defence forces as a modern and flexible force in the 21st century.

General Liu Huaqing, China's most senior officer and the military official responsible for overseeing the technological improvements of China's armed forces, highlighted the need for the technological modernisation. He stated (in 1993) that the PLA "fails to meet the needs of modern warfare and this is the principal problem with army-building."²⁸ This problem would be met, he stated, by the "vigorous" importation of foreign technology and accelerating the modernisation of weapons and equipment through improvements in China's own defence industries and R&D.²⁹ As a result, higher budgetary allocation for defence was earmarked and high priority was placed on mastering electronic warfare (particularly air and naval); improving missile and aircraft guidance systems; developing precision-guided munitions (PGMs); building satellites, early warning and command systems, and advanced communication relay stations; laser technology; artificial intelligence; mastering in-flight refuelling;

26. Shambaugh, "The Insecurity of Security", n. 10.

27. Allen S. Whiting, "The PLA and China's Threat Perceptions", *The China Quarterly*, No. 146 (Special Issue: China's Military in Transition) 1996, pp. 596-615.

28. Liu Huaqing, "Unswervingly march along the road of building a modern army with Chinese characteristics," *Jiefangjun Bao*, August 6, 1993, in FBIS-CHI, August 18. Quoted in Godwin, *Changing Concepts of Doctrine, Strategy, and Operations*, p. 472.

29. *Ibid.*

The regional security environment that emerged after the end of the Cold War was another reason for China's defence modernisation, especially naval modernisation. With rapprochement with the Soviet Union and a relatively stabilised land border in the south and west, China felt no major security threat from external sources.

and developing an anti-ballistic missile system.³⁰ Of course, China's persistent search abroad for military technology and hardware has been a bone of contention in that China was accused of stealing Western technology. Despite its opaque intellectual property rights protection system, China's vigorous efforts at force modernisation and steady higher budgetary allocations for defence were visible in every budget for the next three decades.

REGIONAL SECURITY ENVIRONMENT

The regional security environment that emerged after the end of the Cold War was another reason for China's defence modernisation, especially naval modernisation. With rapprochement with the Soviet Union and a relatively stabilised land border in the south and west, China felt no major security threat from external sources. No regional country that was capable of challenging China, whether in terms of technological capability or the sheer size of the military, emerged in the vicinity. For Chinese analysts, Russia was no longer a primary threat for China, Japan was unlikely to become a threat in the foreseeable future, while the US was continuously depicted as the number one source of threat to the People's Republic of China.³¹ This threat perception emerged due to American policies and actions toward Tibet, Taiwan, Hong Kong, and human rights which were all seen as aimed at the eventual demise of Communism in China. Besides, Chinese defence planners and security analysts questioned the rationale of the existence of the forward deployment of US forces in the region even after the demise of the Soviet Union, and they suspected that the continuation of US forces in

30. Shambaugh, "The Insecurity of Security", n. 10, p. 18.

31. Whiting, *The PLA and China's Threat Perceptions*, n. 27.

the region was against a resurgent China.³² In their view, the Pentagon was trying to manufacture China as a principal threat to replace the Soviet Union to justify continued high levels of defence expenditure. For them, the US still maintained its Cold War era military alliances in East Asia, and its defence cooperation with Taiwan had been a stumbling block in the unification dream. Since the US was superior, both in terms of technology and manpower, China was in no way able to cope with the US threat.

Since the US is a global Superpower, and while China has not harboured any ambitions to become a rival to the US at the global level, a Cold War with the US would not lead to the same fate as that of the former Soviet Union. At the same time, China had to mitigate the challenges posed by the US' increasing preponderance in Asia. In this situation, Beijing felt that the only way it could counter the threat from the US was to gain local superiority. In this regard, China's technological modernisation was targeted at achieving local superiority in the "war zone campaign",³³ a major type of local war that may enhance local and temporary PLA superiority over the powerful enemy. Incidentally, China's "active defence" strategy itself is to prevent US amphibious operations from the sea, as the theatre of future conflict would in all likelihood be the maritime domain in the east and the south of China. The PLA Navy, therefore, received high priority in China's defence modernisation.

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POWER PROJECTION AMBITION

Ever since the establishment of PRC, Communist leaders have harboured the notion that the new China should emerge as a great power one day.

32. David Shambaugh, *Modernizing China's Military: Progress, Problems, and Prospects* (Berkeley: University of California Press, 2002).

33. Nan Li, "The PLA's Evolving Campaign Doctrine and Strategies", n. 22.

However, the economic capacity and technical capability were not conducive to preparing China for such a project. When the Soviet threat dissipated and the economic reforms allowed China to earmark money for modernisation of its defence forces, China had gradually started focusing on projecting its power at least in the Asia-Pacific region. China has been surrounded by strong land powers such as India and Russia, so a continental expansion was impossible, while the ocean has been dominated by US naval power. However, the US is a distant naval power while China could emerge as a regional power by marginalising the US power at sea by means of strengthening its naval capability. This was evident when Admiral Liu Huaqing propounded his island chain strategy in the 1980s that China would be able to expand its influence gradually into “far sea” areas in three stages. In the first stage, from 2000 to 2010, China was to establish control of waters within the first island chain that links Okinawa Prefecture, Taiwan, and the Philippines. In the second stage, from 2010 to 2020, China would seek to establish control of waters within the second island chain that links the Ogasawara island chain, Guam, and Indonesia. In the final stage, from 2020 until 2050, China would have to be able to exercise its naval power in the South Pacific and Indian Oceans, using aircraft carriers as a key component of its military force.³⁴

Sea power strategy has a unique role in China's development strategy in matters of countering the pressures and challenges that China faces. A powerful navy is required for securing its maritime trade as well as protecting its extra-territorial interests. Protecting the sea lines of communication (SLOCs) has been necessary for a smooth ride of economic reforms. The booming economic belt in the south and east coastal area—which became the engine of China's economic growth—was heavily dependent on seaborne trade. The protection of trade and overseas assets is integral to projecting the maritime power of a nation. A Chinese naval officer spelled out as early as in the 1990s that “the international law of the sea today stipulates thus:

34. Hailong Ju, *China's Maritime Power and Strategy: History, National Security and Geopolitics* (Singapore: World Scientific, 2015).

the black land is yours, the blue water is everyone's, and the brown water is yours and everyone's. The enlightenment from historical experience today is: if you cannot occupy yours, it is someone else's."³⁵ In this respect, it was necessary for China to build a strong and modern navy that is commensurate with China's international status which can also safeguard its maritime sovereignty, rights, and interests. Importantly, the domestic stability and the continuity of the Communist Party's hold on power rests on whether it can protect its maritime rights and its status as a powerful and prosperous nation.

At the same time, Deng was well aware of the repercussions of China's defence modernisation programme that would have unleashed across the region an arms race in Asia. It was feared that other countries would see China as harbouring hegemonic intentions. To mitigate such suspicion and concern, Deng proclaimed his '24-character strategy' in the early 1990s that China needs to: "observe calmly; secure our position; cope with affairs calmly; hide our capacities and bide our time; be good at maintaining a low profile; and never claim leadership."³⁶ China needed a peaceful regional and global environment at least for the initial 20 years of the 21st century, conducive to China's rise to regional pre-eminence and global influence.³⁷

CHINA'S NAVAL MODERNISATION

China's naval modernisation has been targeted to achieve specific missions as part of the national grand strategy. In general, China's naval modernisation effort encompasses a wide array of platforms and weapon acquisition programmes, including anti-ship ballistic missiles (ASBMs), anti-ship cruise missiles (ASCMs), submarines, surface ships, aircraft, unmanned vehicles (UVs), and supporting C4ISR (command, control, communications, computers, intelligence, surveillance and reconnaissance) systems. The

35. Quoted from Whiting, *The PLA and China's Threat Perceptions*, n. 27, p. 600.

36. See, for example, "Deng Xiaoping's '24-Character Strategy'", <https://www.globalsecurity.org/military/world/china/24-character.htm>

37. Office of the Secretary of Defence, "Annual Report to Congress: Military Power of the People's Republic of China 2008", Washington, D.C., <https://fas.org/nuke/guide/china/dod-2008.pdf>

modernisation efforts also include improvements in maintenance and logistics, doctrine, personnel quality, education and training, and exercises.

The Chinese navy is tasked with national defence 'goals and tasks' of 'safeguarding national sovereignty', which include national economic development; defence of the homeland, to include "the security of China's lands, inland waters, territorial waters, and airspace, safeguard its maritime rights and interests; to oppose and contain the separatist forces for 'Taiwan independence', and defend national sovereignty and territorial integrity."³⁸ Besides, the mission and objectives of China's naval modernisation aimed to achieve a greater degree of control or domination over China's near-seas region, particularly the South China Sea; for enforcing China's view that it has the right to regulate foreign military activities in its 200-mile maritime exclusive economic zone (EEZ); for defending China's commercial sea lines of communication (SLOCs), particularly those linking China to the Persian Gulf; for displacing US influence in the Western Pacific; and for asserting China's status as the leading regional power and major world power.³⁹

Specific operational missions and strategies have been carved out for the PLA Navy according to the doctrinal changes. In the initial period Navy's mission was 'coastal defence', then defined as 'offshore defence', and from the second decades of the 21st century onwards it is 'open sea protection'. The need for a strong navy was outlined by Mao when he emphasised that expertise in amphibious warfare, seaborne logistics and maritime airpower were required to conquer Taiwan. However, his plan to organise a strong navy was aborted because of the Korean War and thereafter limited by domestic political events, especially the disastrous Great Leap Forward. Later, naval development was severely impacted during the 1960s by the Sino-Soviet split and the continental mindset. Only at the end of the 1970s, after the end of the

38. "China's National Defense in 2010", Information Office of the State Council of the People's Republic of China, March 31, 2011, http://www.china.org.cn/government/whitepaper/node_7114675.htm

39. "China Naval Modernization: Implications for U.S. Navy Capabilities—Background and Issues for Congress", CRS Report (Washington, D.C.: Congressional Research Service, 2019), <https://fas.org/sgp/crs/row/RL33153.pdf>

Cultural Revolution and the post-Mao power struggle, was the PLA Navy in a position to 'take off'. Up until the mid-1980s PLAN's primary strategic concept was one of 'coastal defence' or to play a supportive role to the army in China's 'luring the enemy into deep' strategy. This strategy focused the PLAN on defending China's coast from the Soviet Pacific Fleet. By the late 1980s, then PLAN Commander Admiral Liu Huaqing laid out a new strategy known as 'offshore defence' in pursuance of new missions of the Chinese Navy.⁴⁰

The main objective of the 'offshore defence' strategy was to build China a powerful regional navy. It called for naval capabilities suited to China's specific regional maritime interests. In essence, the strategy emphasised a defence perimeter for the navy to be extended from coastal waters out to between 200 and 400 nautical miles, and even further in defence of territorial claims in the South China Sea. Eventually, the mission areas of offshore defence were defined as the Yellow Sea, East China Sea, South China Sea, the areas around the Spratly Islands and Taiwan, and the areas inside and outside the Okinawa island chain as well as the northern part of the Pacific Ocean.⁴¹ This includes the areas outside the 'first island chain' as well as the more traditional coastal waters.

PRC's industrial base upon which to build a modern naval force was inadequate in the early decades. As a result, China had heavily relied on the former Soviet Union for its naval requirements. During this period, the Chinese navy focused on frigates, submarine chasers, minesweepers, guided-missile fast attack craft, torpedo boats, patrol boats, diesel-electric submarines and shore-based tactical bombers.⁴² Initially, torpedo boats were imported from the Soviet Union or constructed in Chinese shipyards with Soviet designs and parts. In the 1960s, the local industry began to deliver more types of ships, also of Soviet origin. The PLAN fielded a large number of small craft

40. Alexander Chieh-cheng Huang, "The Chinese Navy's Offshore Active Defense Strategy", *Naval War College Review*, vol. 47, no. 3, 1994.

41. Office of Naval Intelligence of the US Navy, "The People's Liberation Army Navy: A Modern Navy with Chinese Characteristics", August 2009, <https://fas.org/irp/agency/oni/pla-navy.pdf>

42. Kamlesh Agnihotri, *Strategic Direction of the Chinese Navy: Capability and Intent Assessment* (Bloomsbury: New Delhi, 2015).

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and submarines, particularly the Type 021 Huangfeng guided-missile boats and the Type 033 Romeo-class submarines. China's first generation diesel-electric submarines were Russian built Romeo-class and indigenously built Ming-class (Type 35) submarines, based on the Soviet Romeo design. The first nuclear powered Han-class (Type 091) attack submarine (SSN) was commissioned in 1974, and its first ballistic missile nuclear submarine (SSBN), Xia-class (Type 092), was commissioned in 1983 and entered into service in 1987. Subsequently, China built more advanced Jin class SSBNs which are now operationally in service.

When Chinese Premier Li Peng and Deputy Chief of Staff General Xu Xin visited Moscow in April 1990, despite the disintegration of the Soviet Union, they got assurance from the new Russian leaders about the possibility of arms sales and technology transfers.⁴³ China then purchased US\$ 5-6 billion worth of Russian weaponry in 1993, which included 26 SU-27 interceptors, 4 *Ilyushin* transport aircraft, 18 SA-300 anti-aircraft systems and 100 missiles.⁴⁴ In 1994, China bought four Russian Kilo-class diesel submarines, along with additional SU-27 fighters, T-72 battle tanks, and AWACS early warning aircraft and in-flight refuelling tankers from Russia.⁴⁵ To strengthen its naval fleet, the PLA Navy (PLAN) ordered four *Sovremenny*-class destroyers from Russia. Of particular note, these ships are outfitted with the 3M-80E Moskit (NATO designation: SS-N-22 Sunburn) ramjet-powered, supersonic ASCM, which has a range of 120 km; later-model

43. Tai Ming Cheung, "Ties of convenience: Sino-Russian military relations in the 1990s," in Richard H. Yang (ed.), *China's Military: The PLA in 1992/93* (Boulder: Westview Press, 1993), pp. 61-77.

44. Shambaugh, "The Insecurity of Security", n. 10.

45. See, "Kilo Class". <https://www.globalsecurity.org/military/world/china/kilo.htm>

Sunburns have a 200-km range. Some of the systems that China bought were to gain the technology and production capability needed to become more independent of foreign sources of supply.⁴⁶

Richard Bitzinger argues that China actually started its naval modernisation programme in the year 1997, and he gives multiple reasons for that. For him, it was the year that Chinese defence spending began its remarkable run of double-digit real annual growth.⁴⁷ Besides, the central government

forced the PLA to divest itself of the bulk of its commercial activities so as to concentrate on its primary functions—defence, compellence, and if necessary, war-fighting. It was also around the time PLA officially adopted the strategic concept of fighting “limited local wars under high-technology conditions/conditions of informatisation” or the addition of computers and information sharing networks to military platforms,⁴⁸ which still drives current operational and hardware requirements for military modernisation. From the beginning of the new century, PRC has increasingly turned to its own indigenous defence industry to provide the PLA with modern weaponry—in some cases through reverse engineering or stolen outright from foreign suppliers. China’s 2006 defence white paper outlined a three-step development strategy with a short-term and medium-to-long term plan for the modernisation of national defence and armed forces; the first step was to lay a solid foundation by 2010, the second was to make major progress around 2020, and the third is to basically reach the strategic goal of building informationised armed forces and being capable of winning informationised wars by the mid-

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46. Shambaugh, “The Insecurity of Security”, n. 10.

47. Richard Bitzinger, “Modernising China’s Military, 1997-2012”, *China Perspective*, no. 4 (88), 2011, pp. 7-15.

48. *Ibid.*

21st century.⁴⁹

Naval modernisation had given considerable attention to surface platform ships and submarines. Since the 1990s, China has commissioned 6 new classes of destroyers. The Type 052D represents the latest effort to upgrade the PLAN's destroyer programme. Type 052D entered service in 2014 outfitted with an Aegis-type air-defence radar and fire-control system and forms a critical part of the PLAN's goal of expanding operations into distant seas. As of May 2020, there were 11 Type 052D destroyers in active service, while an additional nine were undergoing sea trials or are being fitted out. China has also built another class of Type 055 (*Renhai*-class) guided missile destroyer, and the first ship was commissioned in January 2020, and five destroyers have been launched over the last 18 months.⁵⁰ These vessels are equipped with the indigenous YJ-83 or YJ-62 anti-ship cruise missile (ASCM) and the HN-2 land-attack cruise missile (a variant of the Russian Kh-55 missile). The Type-052C also carries several Chinese built HHQ-9 surface-to-air missiles (SAM), housed in vertical launch systems (VLS). A new Type 052D (*Luyang*-class) destroyer is under construction with an estimated displacement of more than 7,000 tonnes, which is expected to perform major command and control functions and will likely serve as the primary escort of China's aircraft carrier strike groups in blue-water operations.⁵¹

China's naval modernisation has also taken place in the case of submarines, and most of its submarines are now being built under Russian and Chinese designs. Qualitatively, China's newest submarines might not be as capable as Russia's newest submarines, but compared to China's earlier submarines, which were built to antiquated designs, its newer submarines are much more capable.⁵² Most of China's submarines are non-nuclear-powered

49. Information Office of the State Council, People's Republic of China, "China's National Defense in 2006", December 29, 2006, <https://fas.org/nuke/guide/china/doctrine/wp2006.html>

50. Franz-Stefan Gady, "China's Navy Commissions First-of-Class Type 055 Guided Missile Destroyer", *The Diplomat*, January 13, 2020, <https://thediplomat.com/2020/01/chinas-navy-commissions-first-of-class-type-055-guided-missile-destroyer/>

51. "How is China modernizing its navy?", *CSIS China Power*, <https://chinapower.csis.org/china-naval-modernization/>

52. "China Naval Modernization: Implications for U.S. Navy Capabilities—Background and Issues for Congress", Congressional Research Service, January 22, 2020, <https://fas.org/sgp/crs/row/RL33153.pdf>

attack submarines (SSKs). China also operates a small number of nuclear-powered attack submarines (SSNs) and a small number of nuclear-powered ballistic missile submarines (SSBNs). The number of SSNs and SSBNs may grow in the coming years, but the force will likely continue to consist mostly of SSKs. Since the late 1990s, the PLAN has acquired three types of indigenously built conventional submarines; Yuan-Class (Type 039A or Type 041), Song-Class (Type 039), and Ming-Class (Type 035), and bought 12 Kilo-class submarines from Russia. Its inventory of nuclear powered submarines are ballistic missile (SSBNs) Jin-Class (Type 094), *Han*-class (Type 091) and Shang-Class (Type 093) attack submarines (SSNs). China's submarines are armed with one or more of the following: ASCMs, wire-guided and wake-homing torpedoes, and mines. Wake-homing torpedoes can be very difficult for surface ships to elude. Each Jin-class SSBN is expected to be armed with 12 JL-2 nuclear-armed submarine-launched ballistic missiles (SLBMs). China reportedly is developing a new SLBM, called the JL-3, as a successor to the JL-2. The weapons systems of SSNs include torpedoes and cruise missiles. According to the US Naval Intelligence report, China's submarine force will grow from a total of 66 boats (4 SSBNs, 7 SSNs, and 55 SSKs) in 2020 to 76 boats (8 SSBNs, 13 SSNs, and 55 SSKs) in 2030.⁵³ Since 2006, 8 nuclear submarines have reached initial operational capability, for an average of one every 15 months. Diesel-electric submarines are produced at two shipyards and typically undergo approximately one year of outfitting and sea-trials before becoming operational.⁵⁴

China's newest series-built SSK design is the Yuan-class (Type 039A) SSK, its newest SSN class is the Shang-class (Type 093) SSN, and its newest SSBN class is the Jin (Type 094) class SSBN. In May 2020, it was reported that two additional Type 094 SSBNs had entered service, increasing the total number in service to six.⁵⁵

53. "China Naval Modernization: Implications for U.S. Navy Capabilities—Background and Issues for Congress", Congressional Research Service, May 21, 2020, <https://assets.documentcloud.org/documents/6927913/China-Naval-Modernization-Implications-for-U-S.pdf>

54. *Ibid.*

55. *Ibid.*

Table 1: Numbers of Certain Types of Ships Since 2005

Year of DOD report	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2019 change from 2005
Ballistic missile submarines	1	1	1	1	2	2	2	2	3	3	4	4	4	4	4	+3
Nuclear-powered attack submarines	6	5	5	5	6	6	5	5	5	5	5	5	5	5	6	0
Diesel attack submarines	51	50	53	54	54	54	49	48	49	51	53	57	54	47	50	-1
Aircraft carriers	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	+1
Destroyers	21	25	25	29	27	25	26	26	23	24	21	23	31	28	33	+12
Frigates	43	45	47	45	48	49	53	53	52	49	52	52	56	51	54	+11
Corvettes	0	0	0	0	0	0	0	0	0	8	15	23	23	28	42	+42
Missile-armed coastal patrol craft	51	45	41	45	70	85	86	86	85	85	86	86	88	86	86	+35
Amphibious ships: LSTs and LPDs	20	25	25	26	27	27	27	28	29	29	29	30	34	33	37	+17
Amphibious ships: LSMs	23	25	25	28	28	28	28	23	26	28	28	22	21	23	22	-1
Total of types above (does not include other types, such as auxiliary and support ships)	216	221	222	233	262	276	276	271	273	283	294	303	317	306	335	+119
China Coast Guard ships	<i>nila</i>	185	240	248	<i>nila</i>											
Total U.S. Navy battle force ships (which includes auxiliary and support ships but excludes patrol craft)	291	282	281	279	282	285	288	284	287	285	289	271	275	279	286	-5
U.S. Navy figure compared to above total for certain Chinese ship types	+75	+61	+59	+46	+20	+9	+12	+13	+14	+2	-5	-32	-42	-27	-49	-124

Source: "China Naval Modernization: Implications for U.S. Navy Capabilities—Background and Issues for Congress", CRS Report (Washington, D.C.: Congressional Research Service 2019). <https://fas.org/srgp/crs/row/RL33153.pdf>

China's first aircraft carrier, *Liaoning* (Type 001), was purchased from Ukraine in 1998 and reverse-engineered for Chinese conditions; it entered service in 2012. China's second aircraft carrier (and its first fully indigenously built carrier), *Shandong* (Type 001A), entered service on December 17, 2019. China's third carrier, the Type 002, is under construction and is expected to enter service by 2024. China's fourth carrier, reportedly also to be built to the Type 002 design, may begin construction as early as 2021.⁵⁶ The Type 002 carriers are to be conventionally powered just like the *Liaoning* and *Shandong*. In late November 2019, it was reported that the Chinese government, while deciding to proceed with the construction of the fourth carrier, had put on hold plans to build a fifth carrier, known as the Type 003, which was to be nuclear-powered, due to budgetary and technical considerations.⁵⁷ Observers expect that it will be some time before China masters carrier-based aircraft operations on a substantial scale.

China's naval modernisation effort, which forms part of a broader Chinese defence modernisation programme, has been underway for more than 25 years, which has transformed China's navy into a much more modern and capable force.

CONCLUSION

China's naval modernisation effort, which forms part of a broader Chinese defence modernisation programme, has been underway for more than 25 years, which has transformed China's navy into a much more modern and capable force. China's navy is a formidable military force within China's near-seas region, and it is conducting a growing number of operations in more-distant waters, including the broader waters of the Western Pacific,

56. "Power Projection: China's Fourth Aircraft Carrier", *Forbes*, December 3, 2019, <https://www.forbes.com/sites/hisutton/2019/12/03/super-power-projection-work-to-start-on-chinas-4th-aircraft-carrier/#4d49f75c5d38>

57. Minnie Chan, "Chinese Navy Set to Build Fourth Aircraft Carrier, but Plans for a More Advanced Ship Are Put on Hold," *South China Morning Post*, November 28, 2019, <https://www.scmp.com/news/china/military/article/3039653/chinese-navy-set-build-fourth-aircraft-carrier-plans-more>

the Indian Ocean, and waters around Europe. China's navy is, by far, the largest of any country in East Asia, and within the past few years, it has surpassed the US Navy in numbers of battle force ships, meaning the types of ships that count toward the quoted size of the US Navy. It was reported that at the end of 2020, China will have 360 battle force ships, compared with a projected total of 297 for the US Navy at the end of FY2020. US Department of Defence projects that China will have 400 battle force ships by 2025, and 425 by 2030.⁹

Until recently, China's naval modernisation effort appeared to be focused less on increasing total platform numbers (i.e., ships and aircraft) than on increasing the modernity and capability of Chinese platforms. Some categories of ships, however, are now increasing in number. The planned ultimate size and composition of China's navy is not publicly known. Compared with other countries, China does not release a navy force-level goal or detailed information about planned ship procurement rates, planned total ship procurement quantities, planned ship retirements, and resulting projected force levels. The 2006-20 Medium and Long-Term Defence and Science Technology Plan which sought to address the reform and development of defence innovation ecosystem comes to an end, and China has almost fulfilled its objectives in modernising its naval force which is now capable of establishing Chinese order at least in the near seas. Chinese military authorities have been pushing to achieve the target of defence and related programmes in every Five-Year Plan (FYP) without any delay, and the 13th Five-Year Plan (2016-2020) has provided added momentum in the modernisation programme. At the annual meeting of the Chinese National Peoples' Congress in March 2019, President Xi noted this was "a crucial year for implementing the development and construction of our military's 13th FYP to achieve the 2020 targets for national defence and army building."⁵⁸ Importantly, the year 2020 is also crucial in Chinese strategic thinking as it is the period where China was to complete sea control within the second island chain propounded by

58. *Military Balance 2020*, International Institute of Strategic Studies, London, 2020, p. 238.

Liu Huaqing in the 1980s, and as China is celebrating its 100th year of the launch of Chinese Communist Party in 2021. So Xi seeks to ensure that by the 100th anniversary of the inception of the People's Republic of China, its path towards becoming a great power by 2049 is smooth and China is headed in the right direction. China's emphasis on modernisation of its navy has contributed to make the PLA Navy a very formidable and also a challenging navy in the Indo-Pacific region in the 21st century.



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